

Placer County/Town of Truckee

Final Joint Annual Monitoring Report for:

Implementation of the Truckee River Water Quality Monitoring Plan

Water Year 2012



January 2013

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Executive Summary

This report presents the results of implementing the third year of the Truckee River Water Quality Monitoring Plan (TRWQMP) which took place during the 2012 water year (October 1, 2011 – September 30, 2012). The report is a joint effort between Placer County (County) and the Town of Truckee (Town) and presents the results of both entities' monitoring activities.

Purpose and Objectives

As a Small Municipal Separate Storm Sewer System (MS4), the County and Town must comply with the State's general National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharges. In accordance with this permit and other requirements, the County and Town collaborated to develop a comprehensive water quality monitoring plan.

The overall purpose of the TRWQMP is to assess the effectiveness of various Stormwater Management Plan (SWMP) related actions implemented by the County and Town to protect natural surface waters from the impacts of stormwater runoff. The goals of the TRWQMP are as follows:

- TRWQMP Goal 1: Ensure regulatory compliance with the NPDES permit, Lahontan Board Orders, Middle Truckee River Sediment TMDL, Squaw Creek sediment TMDL, and the Martis Valley Community Plan.
- TRWQMP Goal 2: Develop water quality monitoring datasets that will be scientifically defensible and provide accurate data to evaluate the effectiveness of Stormwater Management Programs in protecting surface water resources.
- TRWQMP Goal 3: Develop a monitoring plan that is economically feasible to implement and maintain over time.
- TRWQMP Goal 4: Ensure that the TRWQMP allows collaboration, effort-sharing and integration of multiple independent private and public monitoring efforts.

Implementation Overview

Implementation of Phase 1 of the TRWQMP began during the 2010 water year (October 1, 2009 through September 30, 2010) and has been continuous through the 2011 and 2012 water years. Information regarding the monitoring plan and protocols are found in the TRWQMP and the Sampling and Analysis Plans (SAP) that were prepared for the County and Town for the Phase 1 monitoring.

The 2012 water year (WY 2012) was well below average in terms of precipitation as compared to historical records. The discharge measured by the USGS near Truckee was below historical daily median values until January before climbing above the historical daily median values during the spring and summer. Flows peaked in April 2012 in response to the snowmelt runoff and releases from the dam in Tahoe City. There were no major fires, landslides, floods or other events during this period.

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. Each of these projects has potential to improve downstream water quality.

Data collected during WY 2012 is considered representative of current conditions and improves the baseline dataset which can be used for the evaluation of future changes in the watershed.

Year 3 TRWQMP implementation activities included a set of select monitoring activities in the Squaw Creek, Bear Creek, Martis Creek, and Truckee River (Town corridor) sub-watersheds that included:

- Rapid Assessment Methodology (RAM) to characterize the amount of fine substrate on streambeds,
- Bioassessments to evaluate the benthic macroinvertebrate community and physical habitat conditions Squaw and Martis Creeks,
- Community level water quality sampling to characterize the quality of stormwater runoff from various communities,
- Tributary level water quality sampling to characterize the water quality of the tributaries within the Martis Creek sub-watershed, and
- Stream gauge operation on Martis Creek to develop a continuous record of discharge.

Results and Discussion

Rapid Assessment Methodology

The purpose of the RAM monitoring is to characterize the accumulation and distribution patterns of fine sediment on the bottoms of surveyed channels. A long-term data set will allow tracking of the overall change in fine sediment distribution and identify specific areas of concern. RAM monitoring is conducted on a biannual basis; it was first conducted during WY 2010, and was conducted for a second time during WY 2012.

The second year of RAM monitoring included portions of Squaw, Martis, and Bear Creeks for the County, and Donner Creek, Trout Creek, and the Truckee River for the Town. The results indicate that Bear Creek has the least amount fine sediment on the channel bottom while Trout Creek in Truckee had the most. The channel substrate in the main stem of Martis Creek, the Truckee River, Donner Creek, and East Martis Creek each averaged more fine particles than Bear Creek, but less than other monitored areas. West Martis Creek and Trout Creek contained the largest percentages of particles less than 2mm.

Bioassessment

Bioassessments provide an overall indication of stream health by evaluating the benthic macroinvertebrate community and physical habitat conditions present in a given stream reach. A long-term dataset will allow tracking to determine whether these conditions are improving or

declining with time. Similar to the RAM, bioassessments are performed biannually and have occurred during the 2010 and 2012 water years.

Bioassessments were performed at Squaw Creek and Martis Creek in the summer and fall of 2012 following slightly different protocols. Squaw Creek sampling followed the specific bioassessment protocol developed in conjunction with the Squaw Creek sediment TMDL, while Martis Creek sampling followed the statewide standard bioassessment protocol.

The results of the Squaw Creek bioassessments continue to indicate the predominance of DG sand and finer sediments in benthic habitat areas; however, the biological metrics for two of the three bioassessment reaches have improved since the previously conducted surveys in 2010. It is likely that Squaw Creek may have experienced fewer disturbances associated with reduced surface flows and intermittency during the summer of 2011. Snowmelt and saturated ground conditions from the record snowpack of the 2010-2011 winter likely sustained surface flows in Squaw Creek further into the summer and fall than usual in 2011, thereby allowing a more robust benthic community to develop during this period.

The Martis Creek bioassessment results continue to show that the surveyed reaches located upstream of the developed areas ranked higher than the respective downstream reaches in terms of the biological metrics used to evaluate the streams. The scores also improved at five of the six surveyed reaches in Martis Creek and this is also likely related to the large and more continuous flows that occurred in the stream due to the large winter in 2011.

Community Level Water Quality Monitoring

Samples were collected at eleven different sites with varying drainage area characteristics. Five of these sites have been monitored previously, but six new sites were incorporated during WY 2012. Two sites were implemented by the County and the remaining nine were implemented by the Town.

Statistical analyses were performed on the original five community level sites to determine whether significant differences in water quality exist among sites and if any trends were present. The results show the Brickelltown site contained significantly higher concentrations of the four main constituents (TSS, turbidity, total phosphorus, and total nitrogen) and samples from the Lahontan site had significantly lower concentrations of these constituents.

The Brickelltown site is located within historic downtown Truckee. The land uses include primary and secondary roadways, commercial, residential, and upland forest. Little to no water quality improvements have been implemented in this drainage area.

The Lahontan Golf Club site is located within the Lahontan residential community. The land uses include secondary roadway, residential, and golf course. Some water quality improvements have been implemented in the drainage area, and no impervious areas are directly connected to the sample location. This site also receives a large amount of groundwater baseflow which likely dilutes the stormwater samples.

Statistical analyses were also conducted for the six new Town of Truckee sites; however, the data is very limited (5 data points per site) and any conclusions are considered preliminary. Based on the data collected to date, these sites discharge runoff with high concentrations of TSS although they are lower than those observed at the Brickelltown site.

The results of the trend analysis are very sensitive to the more extreme values in this limited dataset and are not clearly indicative of changes/activities in the watersheds.

Tributary Level Water Quality Monitoring

Samples were collected from six different sites that represent the major tributaries to Martis Creek. The largest differences in mean concentrations were observed between DST-MC1 and DST-MC6 for turbidity and DST-MC2 and DST-MC6 for total nitrogen. The t-test results show that these differences are significant at the 95 percent confidence level. These are the only two combinations showing statistically significant differences. Site DST-MC1 is located on the main stem of Martis Creek just upstream of Martis Creek Reservoir. This site receives the most flow of all the tributary sites, and had the highest levels of turbidity and TSS. Site DST-MC6 is located on an unnamed branch of Martis Creek near Martis Creek Lake Road, and it receives the least flow of all tributary sites. This site had the lowest levels of TSS and turbidity, but had the highest concentrations of total nitrogen. Site DST-MC2 is located on East Martis Creek, and had the lowest concentrations of total nitrogen.

For all other site and constituent combinations, the differences in mean concentrations are relatively small, and no sites had consistently higher or lower mean values. The largest variation in data occurred at the lower Martis Creek site (DST-MC1) and the smallest variation in the data occurred at the East Martis Creek site (DST-MC2).

The tributary level data indicates decreasing trends in TSS and turbidity values at the tributary sites, most likely a result of WY 2011 being an above average precipitation year, and WY 2012 being a below average precipitation year. Runoff rates and volumes during WY 2012 were much lower than the previous year and carried less sediment downstream.

Trends in nutrient concentrations are inconsistent and additional data is needed to make meaningful conclusions. Decreasing trends in total phosphorus are likely related to the decrease in sediment discussed above. The slightly increasing total nitrogen and dissolved phosphorus trends are most likely caused by a few more extreme values in the data set.

A site by site comparison of the WY 2012 total pollutant load per acre of watershed (the summation of TSS, total phosphorus, and total nitrogen) shows that the unnamed tributary site (DST-MC6) had the lowest value with approximately 9 pounds per acre. The West Martis Creek site had the highest load with a value of 21 pounds per acre. The Middle Martis Creek, East Martis Creek, and Upper Main Stem Martis Creek sites had totals of 11, 15, and 17 pounds per acre, respectively. The East Martis Creek site was not expected to have higher pollutant loading than other sites since its sub-watershed is undeveloped upland forest. The sub-watershed of the Middle Martis Creek site contains a portion of SR 267, and the West Martis Creek site contains a majority of the Northstar ski resort, residential areas, and a golf course.

Stream Flow Monitoring

The site selected for the Martis Creek gauging station is at Frank's Fish Bridge just upstream of SR 267. The gauge was installed in November of 2011 and has been operated continuously since that time. During WY 2011, velocity measurements were obtained at surveyed stream locations at varying stream stages, and a stage to discharge relationship was developed. Due to the interfering effects of a beaver dam downstream of the stream gauge, velocity measurements were again collected during WY 2012 to develop a revised rating curve for the new condition. Therefore, two rating curves have been developed to date. The two relationships allowed for the estimation of total discharge and peak discharge at the gauging station for water years 2011 and 2012.

The total discharge volume in WY 2011 was almost four times as large as in WY 2012 with values of 23,400 cfs and 6,200 cfs, respectively. The difference in discharge volume between the two years can be attributed to the large differences in precipitation between the two years. The peak discharge values during the 2011 and 2012 water years were approximately 430 cfs and 250 cfs, respectively. The 430 cfs discharge occurred on March 16, 2011 after nearly 4 inches of precipitation fell over a 72 hour period. In general, the discharge at the gauging station tends to be greatest during the spring snowmelt cycles and lowest during the late summer and fall.

Water Quality Areas of Concern

After three years of monitoring, the following areas were identified as areas of the highest concern for water quality:

- **Brickelltown:** Community level water quality sampling indicated that stormwater runoff from this portion of historic downtown Truckee often contains high concentrations of sediment and nutrients.
- **Donner Creek:** Community level water quality sampling indicated that stormwater runoff entering Donner Creek from West River Street contains high concentrations of suspended solids. Visual observations at the Donner Creek/Truckee River confluence also indicate that Donner Creek discharges large amounts of sediment into the Truckee River during large storm events.
- **West Martis Creek:** Monitoring results show that this site had the greatest pollutant loading of TSS, total phosphorus, and total nitrogen per acre of watershed. RAM monitoring also show a high percentage of fine substrate in West Martis Creek.
- **Trout Creek:** Results of the RAM indicate Trout Creek has very high percentages of fine substrate covering the streambed. The newly restored portion in the upper reaches of the RAM survey segment shows improvement over conditions during the previous survey but also indicates a large amount of sediment is being transported from upstream.
- **Squaw Creek:** RAM and bioassessment results indicate a continued impact to this stream by sediment deposition. The area of highest concern identified from 2012 bioassessment monitoring was the upper meadow site in Squaw Creek (site Bio-SC1). This site had the lowest IBI score of all sites sampled in 2012 (IBI score= 46), as well as the smallest median particle size (D50= 2 mm). The middle meadow (site Bio-SC2) and lower meadow (site Bio-SC3) sites in Squaw Creek also had very small median particle sizes (D50= 3 mm), although these sites scored well in terms of Biological Condition Scores (BCS= 25 and 27 out of a possible 35, respectively) and the Eastern Sierra IBI (93 and 89 out of a possible 100, respectively).
- **Truckee River (Town Corridor):** The results of the Truckee River RAM did not indicate high percentages of fine substrate despite a very high percentage in Trout Creek and elevated TSS concentrations at the community level monitoring sites discharging into the Truckee River throughout the downtown corridor. The integrated results indicate that most fine sediment is discharged to the Truckee River from areas of high vehicle traffic where traction sand is used and is then transported downstream where it settles in lower energy reaches downstream and along the channel fringes where flows are slow.

Evaluation of SWMP Performance

The effectiveness of the implementation of SWMP related activities can generally be evaluated through the comparisons presented above. Because this is only the third year of implementation and little improvements to the watershed have occurred, spatial comparisons are most appropriate at this time. The temporal water quality trends that were identified are likely related to differences in precipitation amounts and are not related to SWMP activities. Temporal analyses will become more valuable with the continued, long-term, implementation of this program. Also, in some cases, a specific project or action may cause an immediate improvement that is recognizable in the data from one year to the next.

For the activities implemented during WY 2012, the community level discrete sampling provides some demonstration of the effectiveness of SWMP activities. The permanent stormwater treatment BMPs present in some of the drainage systems provide clear benefits as shown in the monitoring results. When compared to other sites, the water quality at the treated sites is clearly improved with respect to all the monitored pollutants in almost every runoff event.

Prioritization of Existing TRWQMP Elements

The TRWQMP is currently being implemented as planned. Overall, monitoring activities should be continued per the guidance in the TRWQMP and the adaptive management based modifications that have been made to the program over the initial three years of implementation. There is a continued need to develop more comprehensive and robust datasets that will help to identify specific areas of concern and evaluate SWMP performance.

For the WY 2013, monitoring will take on a new focus on continuous turbidity monitoring and sediment load evaluations. Two new automated stations will be operated in the Martis Creek Watershed at the West Martis Creek (DST-MC4) and main stem Martis Creek (DST-MC5) tributary sites. These new stations will be equipped with continuous turbidity probes and pressure transducers to monitoring discharge. Two new continuous turbidity probes will also be installed and operated in the Truckee River upstream and downstream of the Town boundary. The Town's turbidity probes will be installed at existing USGS gauging stations so that stream discharge data will also be available from those locations. The implementation of continuous turbidity probes in the Truckee River and Martis Creek will provide valuable insight on the current sediment loading patterns within these watershed systems. This data, combined with data collected by other groups and through other TRWQMP elements, will be valuable in identifying watershed areas of concern and developing recommendations for water quality protection and improvement activities.

Section 1

Introduction

As Small Municipal Separate Storm Sewer Systems (MS4s), Placer County (County) and the Town of Truckee (Town) must comply with the State's general National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharges. In accordance with this permit, the County and Town have each developed Storm Water Management Programs (SWMPs) (Placer County, 2007 and Town of Truckee, 2007) which were required by the Lahontan Regional Water Quality Control Board (Lahontan) to include the development of a comprehensive water quality monitoring plan for the Middle Truckee River Watershed. Additionally, Clean Water Act 303(d) Total Maximum Daily Load (TMDL) programs are being implemented in both Squaw Creek and the Middle Truckee River. In response to these regulations, the Truckee River Water Quality Monitoring Plan (TRWQMP) (2NDNATURE, LLC, 2008) was developed collaboratively by the County and Town to cost-effectively assess the effectiveness of their ongoing SWMPs with respect to protecting downstream water resources.

The TRWQMP is a fifteen year comprehensive water quality monitoring plan that is intended to be implemented in three phases. The County and Town began implementation of Phase 1 during the 2010 water year (WY 2010) (October 1, 2009 through September 30, 2010). Phase 2 implementation is planned for Years 4 and 5 (2013-2014), and Phase 3 is planned for Years 6 through 15 (2015-2024). The level of implementation will depend on a number of factors including cooperation by other independent entities conducting water quality monitoring in the watershed and the availability of funding.

This Joint Annual Monitoring Report describes the monitoring activities performed by Placer County and the Town of Truckee during WY 2012 and presents their results. Data collection activities during this third year of the TRWQMP's Phase 1 implementation included:

- Targeted rapid assessment methodology (RAM) surveys to assess fine sediment distributions in stream channels,
- Bioassessments to gauge stream health based on its benthic macroinvertebrate community,
- Community level discrete water quality sampling within the Truckee Town Corridor and the Martis Creek sub-watersheds,
- Tributary level discrete water quality sampling within the Martis Creek watershed, and
- Continuous discharge monitoring on Martis Creek.



Figure 1-1
Martis Creek Main Stem
September 2012

Several documents have been previously produced in the course of planning and implementing the initial Phase 1 monitoring program including:

- *Evaluation of Existing Monitoring for Integration with the Truckee River Water Quality Monitoring Plan* (CDM Smith, 2010a) to review the existing monitoring programs that were identified for potential integration in the TRWQMP and then develop recommendations to begin their incorporation.
- *Truckee River Water Quality Monitoring Plan, Phase 1 Permitting and Approvals Requirements* (CDM Smith, 2010b) to identify and track the permitting and approvals required for each type of assessment, their proposed location, property ownership, contact information, approvals schedule, required fees and required submittal information.
- *Truckee River Water Quality Monitoring Plan Monitoring Site Selection Report* (CDM Smith, 2010c) to present evaluations and recommendations for monitoring site locations to be used for the Phase 1 implementation.
- *Sampling and Analysis Plan, Water Year 2011* (CDM Smith, 2011a) and (CDM Smith, 2011b) to describe the initial management strategy and the specific monitoring activities to be implemented under Phase 1. These documents are updated as appropriate to document revisions to monitoring activities.
- *Equipment Installation Report* (CDM Smith, 2011c) to document the installation of the stream gauge and the tributary and community level water quality monitoring stations in the Martis Creek watershed.
- *Truckee River Water Quality Monitoring Plan Field Equipment Operations and Maintenance Manual* (CDM Smith, 2011d) to provide an inventory of equipment as well as protocols for operating and maintaining the equipment.

The results of WY 2010 monitoring activities were presented in two reports that were produced separately by the County and Town. To better document the program as a whole, the results of WY 2011 monitoring activities were presented in a single document produced jointly by the County and Town. The names of these reports are as follows:

- *Placer County: Annual Report for Implementation of the Truckee River Water Quality Monitoring Plan, Water Year 2010* (CDM Smith, 2010d);
- *Town of Truckee: Annual Report for Implementation of the Truckee River Water Quality Monitoring Plan, Water Year 2010* (CDM Smith, 2010e); and
- *Town of Truckee/County of Placer: Joint Annual Monitoring Report for Implementation of the Truckee River Water Quality Monitoring Plan, Water Year 2011* (CDM Smith, 2011e).

Section 2

TRWQMP Summary

The purpose of the TRWQMP is to provide a strategy for assessing the effectiveness of the County and Town SWMPs in protecting downstream water resources. It provides guidelines for conducting multiple types of monitoring activities to evaluate the various SWMP actions being implemented to protect natural receiving waters from the impacts of stormwater runoff. This section provides a summary of the TRWQMP's purpose and presents the goals and objectives that were defined to help guide its implementation.

2.1 Purpose

The SWMP outlines two categories of assessment for evaluating the effectiveness of stormwater management programs. The first, compliance assessment, focuses on inspections of activities that may contribute to poor quality of stormwater runoff with the goal of enforcing compliance with the guidelines delineated in the SWMP. Compliance monitoring is conducted by the County's and Town's staff as outlined in their respective SWMPs and is not addressed by the TRWQMP. The second, performance assessment, is the focus of the TRWQMP. Performance assessment involves directly evaluating the water quality of stormwater and receiving waters in order to gauge the success of the SWMP in protecting surface water resources. Results from the TRWQMP can inform strategies for stormwater management outlined in the SWMP by identifying sub-watersheds of concern and prioritizing pollutant sources that disproportionately affect water quality.

The overall purpose of the TRWQMP is to assess the effectiveness of various SWMP related actions taken to protect natural surface waters from the impacts of stormwater runoff. The TRWQMP also aims to promote collaboration among the various independent groups performing monitoring in the Truckee River Watershed. The creation of a more unified data management and reporting structure will help to identify and track pollutant sources and evaluate long-term water quality trends.

2.2 Goals and Objectives

The following set of goals and objectives were defined during the development of the TRWQMP to help describe its purpose and the guidelines under which it was developed.

TRWQMP Goal 1: Ensure regulatory compliance for Placer County and the Town of Truckee with the NPDES permits, Lahontan Board Orders, Middle Truckee River Sediment TMDL, Squaw Creek sediment TMDL, and the Martis Valley Community Plan.

TRWQMP Goal 2: Develop water quality monitoring datasets that will be scientifically defensible and provide accurate data to evaluate the effectiveness of Stormwater Management Programs in protecting surface water resources.

TRWQMP Goal 3: Develop a monitoring plan that is economically feasible to implement and maintain over time.

TRWQMP Goal 4: Ensure that the TRWQMP allows collaboration, effort-sharing and integration of multiple independent private and public monitoring efforts.

To meet the goals of the TRWQMP, a more focused set of objectives were developed as follows:

- Provide a comprehensive and integrated data collection, data analysis and reporting framework to evaluate and track the status of surface water resources within the project area spatially and over time.
- Prioritize monitoring resources on spatial locations determined to be existing and/or future potential source areas.
- Focus monitoring resources on pollutants of concern and indicators that are clearly rationalized for each location of monitoring. Prioritize pollutants based on greatest risk to surface water resources due to specific land use activities.
- Maximize monitoring resources by including a range of monitoring types that vary in frequency of collection, relative cost to complete and statistical accuracy.
- Focus monitoring resources on times (season, storm events, etc.) when potential source area water quality is expected to deviate greatest from observations at minimally impacted locations.

The TRWQMP prescribes multiple types of monitoring activities to be implemented in a phased approach. Also, data collection and analysis activities are intended to be flexible from year to year to allow adjustments based on available funding and new information that is developed through the program's implementation. To improve the value of data collected by the various monitoring activities, more specific objectives have been developed to focus implementation on answering specific water quality related questions. The following additional objectives were developed for the current Phase 1 monitoring:

Rapid Assessments

- Describe the current distribution of fine sediment in the Truckee River, Bear Creek, Squaw Creek, Donner Creek, Trout Creek, and Martis Creek within the monitored intervals.
- Identify potential correlations between sediment impacted stream segments and potential upstream sources or other stream or geological characteristics.

Bioassessments

- Describe the current stream health of Squaw and Martis Creeks as indicated by their benthic macroinvertebrate communities.
- Identify potential correlations between stream health and watershed characteristics/land uses.

Community Discrete Samples

- Characterize the water quality of stormwater runoff from various areas within the study area.
- Conduct source area analysis based on pollutants present in the runoff.

Tributary Discrete Samples

- Characterize the water quality differences among the various Martis Creek tributaries.
- Conduct source area analysis based on pollutants present in the tributaries.

Stream Discharge Monitoring

- Characterize annual discharge patterns and volumes for Martis Creek and develop annual pollutant load estimates for each monitored branch of Martis Creek and to Martis Creek Lake.

The data from all five of these assessment types will also provide base line water quality information to be used for the comparison of future data and evaluation of water quality trends over time.

Additionally, the data from sites exhibiting good water quality can provide realistic water quality targets when planning stormwater improvements for problem areas.

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.

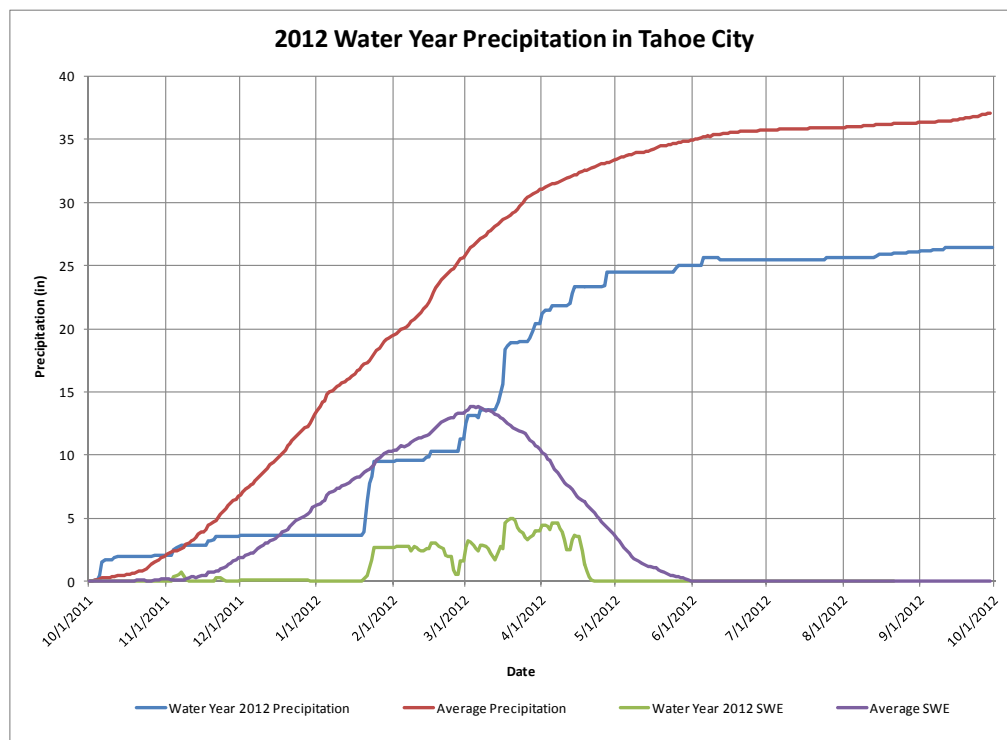


Figure 3-1
Daily Precipitation in Tahoe City, CA (USDA, 2012)

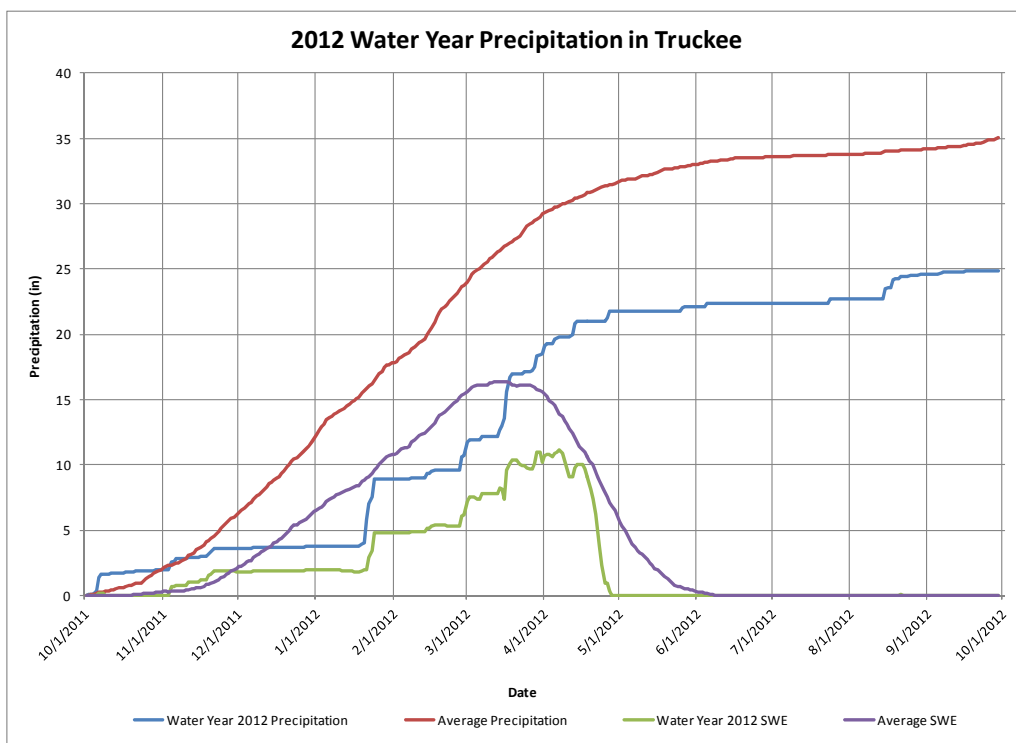


Figure 3-2
Daily Precipitation in Truckee, CA (USDA, 2012)

Table 3-1. Tahoe City Precipitation Totals for Water Years 2010-2012¹

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 2010-2012¹

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 2011-2012¹

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 2011-2012¹

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%

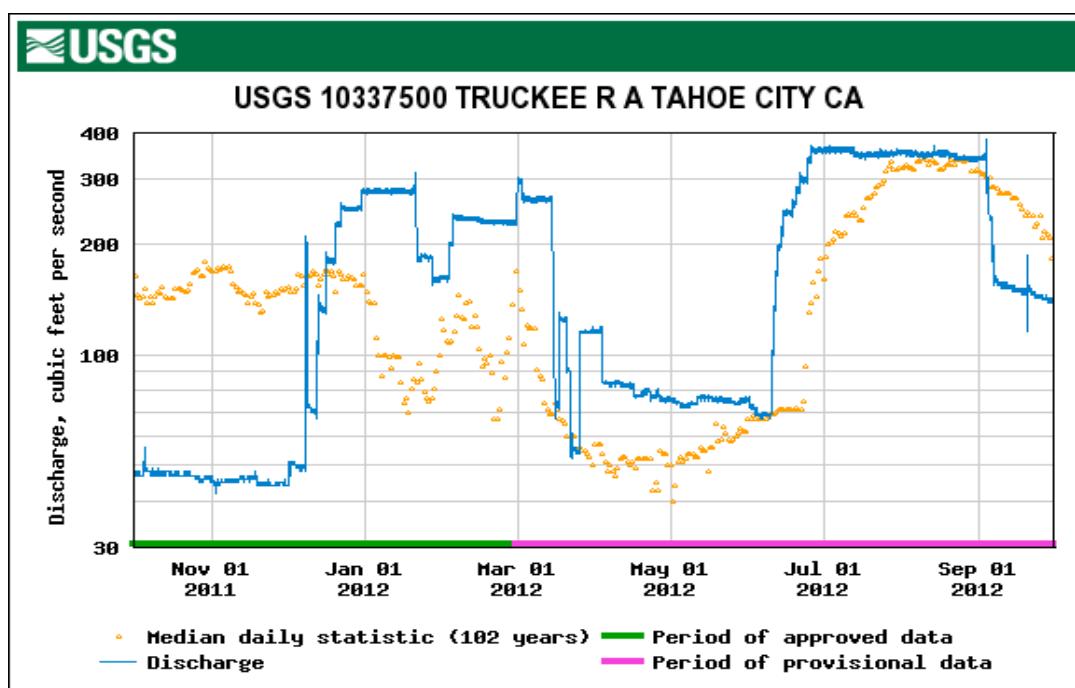
1. Data acquired from the SNOTEL Tahoe City Cross Site (USDA, 2012)

2. Based on all recorded data from water years 1982 to 2011

3.2 Stream Flow Summary

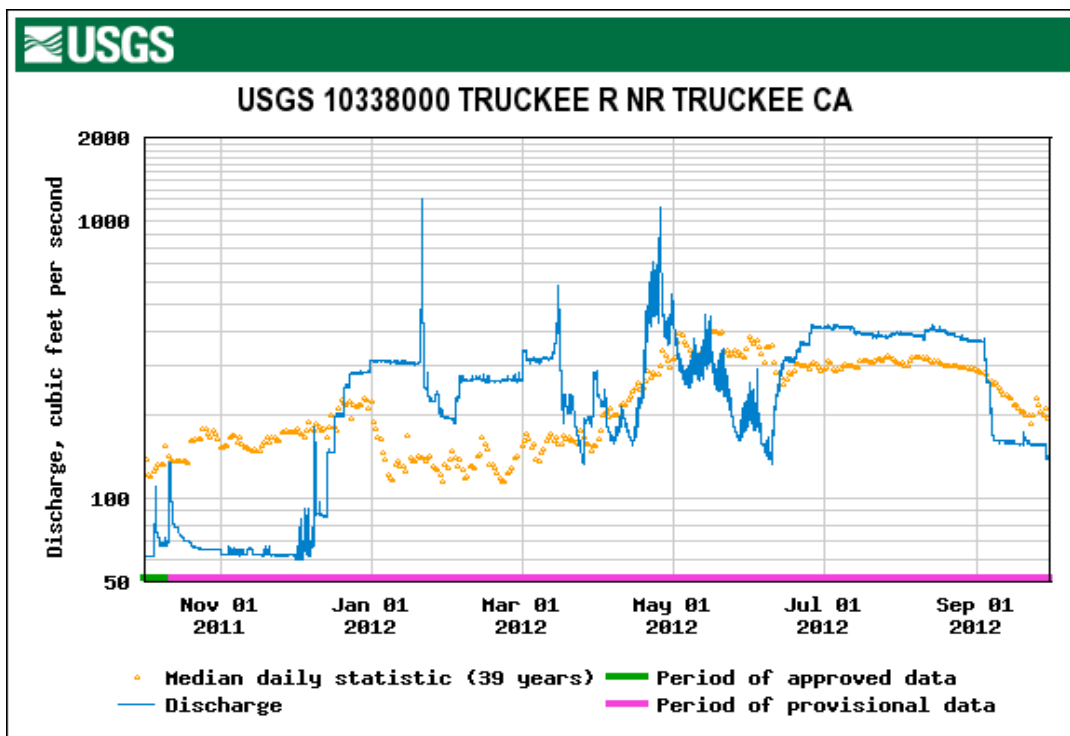
The discharge rates in the Middle Truckee River are partially regulated by dam operations on Lake Tahoe and Donner Lake. Additional flow is contributed by several unregulated tributaries including Bear, Squaw, Silver, Deer, Pole, Deep, Cabin, and Cold Creeks. Below downtown Truckee, additional flows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



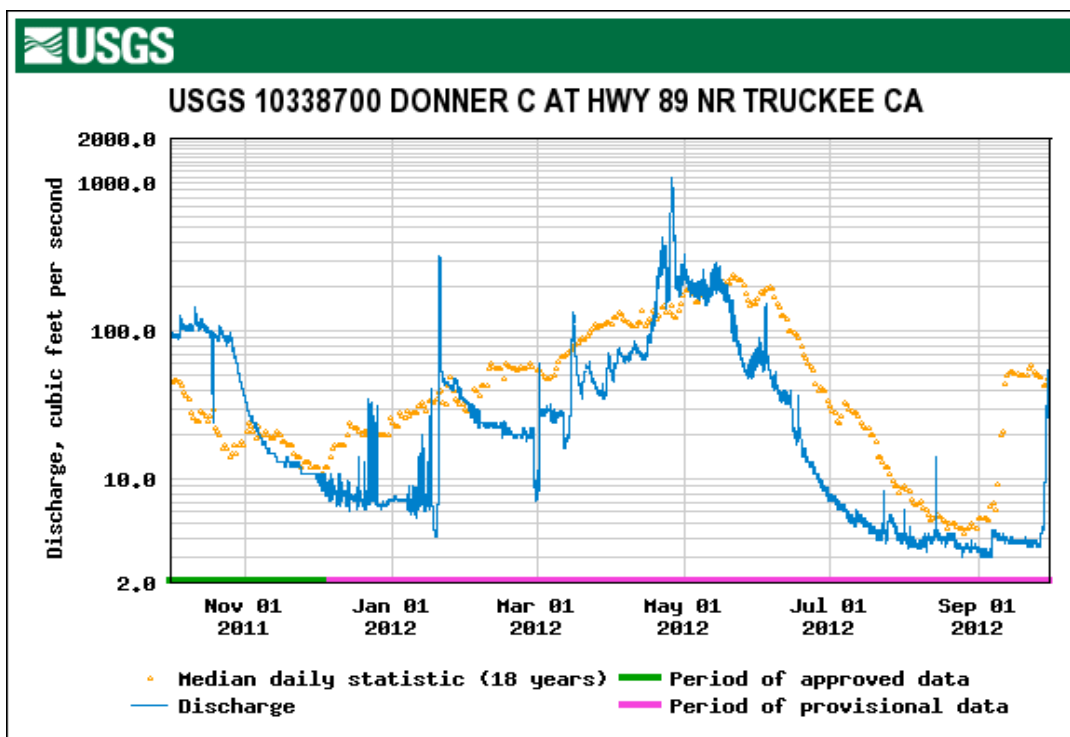
Source: http://waterdata.usgs.gov/nwis/dv?referred_module=sw&site_no=10337500

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 Ratings¹

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.

Section 4

Data Collection and Analysis Methodologies

This section presents the data collection and analysis methodologies that were implemented during the third year of monitoring under the TRWQMP (WY 2012). The monitoring activities conducted during WY 2012 included:

- Rapid Assessments,
- Bioassessments,
- Community level discrete water quality sampling,
- Tributary level discrete water quality sampling, and
- Stream flow monitoring.

The TRWQMP serves as the overarching guidance document for the implementation of this monitoring program and contains documentation of field protocols, data analysis and reporting procedures. The purpose of this section is to provide detailed descriptions of activities performed during WY 2012 and to describe any modifications that were made to the TRWQMP guidance.

Table 4-1 lists the assessment types conducted by both the County and Town, the locations where monitoring was conducted, and a short description of each. The following subsections then present more detailed descriptions of the monitoring site locations and the data collection and analysis methodologies. Additional subsections are included to present the data quality objectives that have been developed for this program, the statistical analyses conducted on the various data groups and, finally, a summary of modifications that were made to the data collection and/or analysis methodologies.

Additional information regarding specific monitoring protocols, site selection, equipment installation, and equipment operation and maintenance may be found in the Sampling and Analysis Plans (SAPs) and other supporting documents listed in Section 1 of this report.

Table 4-1. TRWQMP Monitoring Summary

	Assessment Type	Locations and Site ID	Performance Assessment Description
Placer County	Rapid Assessment		Physical measurements of channel substrate grain size and cobble embeddedness to characterize and track fine sediment distribution.
	Bioassessment		Surveys of benthic macroinvertebrates and physical habitat to provide an indication of overall stream health and the impacts of upstream pollutant sources.
	Discrete Tributary	Six sites on Martis Creek	Collection of in-stream discrete water quality samples to characterize and track water quality in the various branches of Martis Creek.
	Discrete Community	Two sites in the Martis Creek Watershed, one in the Northstar residential area and one in the Lahontan Golf Club community.	Collection of discrete samples of stormwater runoff to characterize and track the impacts of upstream landuses and water quality improvements.
	Stream Flow Gaging Station	Main stem of Martis Creek, just south of the SR 267 crossing at Frank's Fish Bridge.	A continuous record of stream discharge for Martis Creek to evaluate trends and develop annual pollutant load estimates.
Town of Truckee	Rapid Assessment		Physical measurements of channel substrate grain size and cobble embeddedness to characterize and track fine sediment distribution.
	Discrete Community	Nine sites within the Town of Truckee Boundary at stormwater outfalls to the Truckee River, Trout Creek, Donner Creek and Martis Creek.	Collection of discrete samples of stormwater runoff to characterize and track the impacts of upstream landuses and water quality improvements.

4.1 Rapid Assessment Methodology

The rapid assessment methodology (RAM) is intended to provide a method for evaluating the fine sediment distribution in the Truckee River and its tributaries. Rapid assessments provide data for spatial and temporal comparisons of evaluated reaches based on one or a few categories of concern. The rapid assessments performed for this program focus on characterizing stream conditions with respect to fine sediment (particles less than 2 mm in diameter) accumulation and distribution in the channel bottom and identifying potential sources upstream of surveyed stream segments. The rapid assessments are conducted biannually with the intent of developing a long-term data set to track changes in fine sediment distribution and identify specific areas of concern.

4.1.1 Monitoring Locations

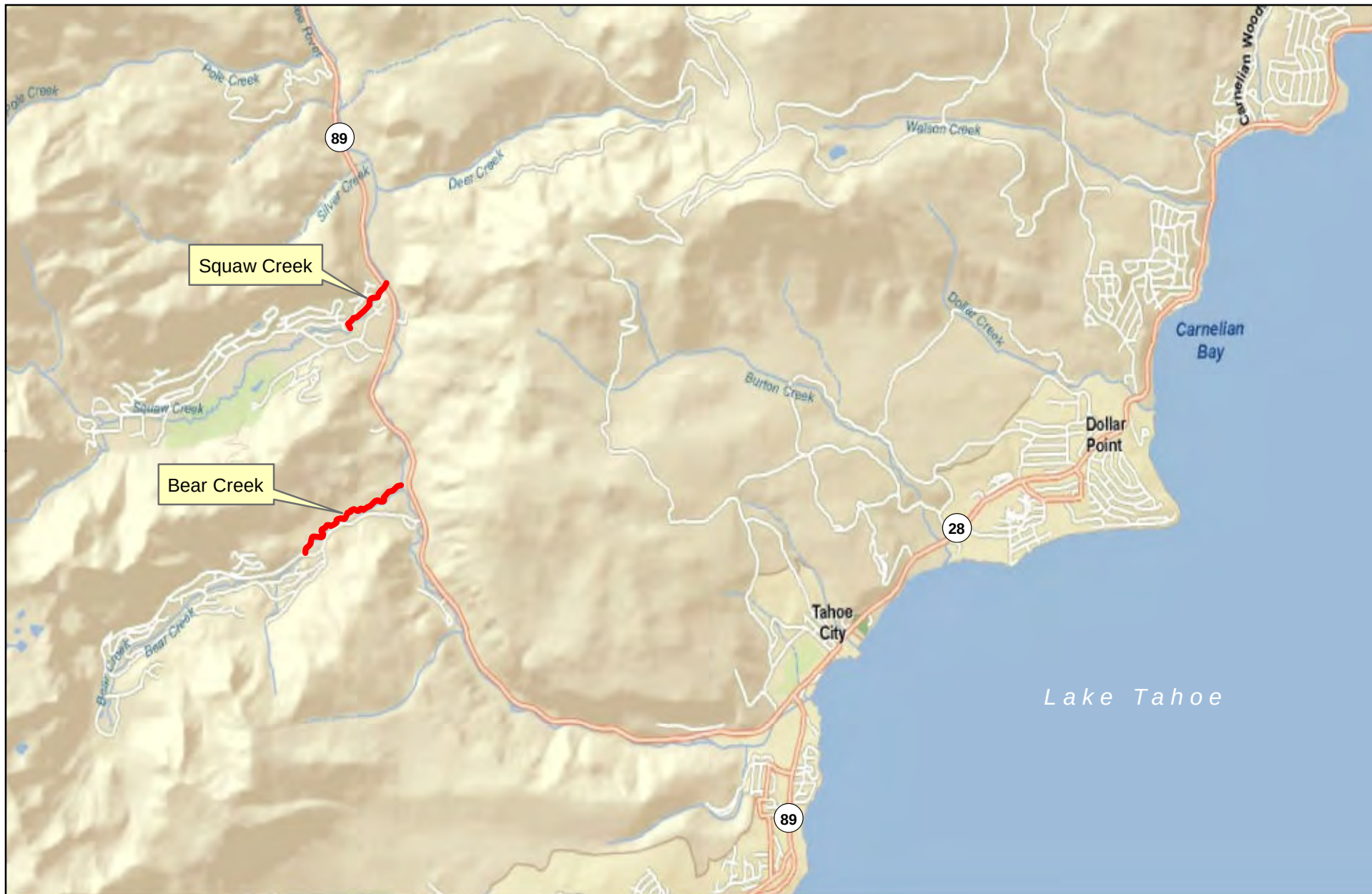
During Year 1, the RAM stream intervals were established and documented in Bear, Squaw, Martis, West Martis, East Martis, Donner, and Trout Creeks as well as the Truckee River. Stream intervals approximately 700-1500m in length were designated using specific landmarks (e.g., bridges, tributary confluences, large buildings, boulders, etc.) easily discernable from high resolution aerial maps and field photographs. Intervals were documented in the project database. Detailed mapping was also developed to ensure consistency in locating the monitoring intervals during each monitoring event.

In WY 2012, the RAM intervals on the Truckee River through the Truckee Town corridor were prioritized to focus on major stream confluences and road crossings. Rapid assessment surveys were conducted in one reach upstream and one reach downstream of Donner Creek, Bridge St, Trout Creek, State Route 267, Martis Creek, and Glenshire Drive. Interval identification information and other characteristics are presented in Table 4-2 and location maps are provided in Figures 4-1 and 4-2.

Table 4-2. Summary of RAM Intervals Surveyed in WY 2012

Jurisdiction	Interval ID (ID)	Interval Length (m)	No. of Reaches	Physical Interval Description		Interval Latitude / Longitude ¹	
				Upstream End	Downstream End	Upstream End	Downstream End
Placer County	Squaw Creek	750	5	750m upstream of Truckee River confluence	Truckee River confluence	39° 12' 25.45" N	39° 12' 42.81" N
						120° 12' 15.09" W	120° 11' 56.93" W
Placer County	Bear Creek	1650	11	1650m upstream of Truckee River confluence at Bridge	Truckee River confluence	39° 11' 0.81" N	39° 11' 25.97" N
						120° 12' 39.09" W	120° 11' 51.83" W
Placer County	Martis Creek	1650	11	1650m upstream of Middle Martis Creek confluence	Middle Martis Creek confluence	39° 17' 56.2" N	39° 18' 6.96" N
						120° 8' 5.43" W	120° 7' 17.34" W
Placer County	West Martis Creek	1650	11	1650m upstream of Middle Martis Creek confluence	Confluence with Middle Martis Creek	39° 17' 29.88" N	39° 18' 6.80" N
						120° 6' 52.62" W	120° 7' 17.09" W
Placer County	East Martis Creek	1650	11	1650m upstream of Martis Creek confluence	Martis Creek confluence	39° 18' 31.21" N	39° 18' 53.45" N
						120° 6' 26.89" W	120° 7' 1.41" W
Town of Truckee	Truckee River @ Donner Creek	300	2	150m upstream of Donner Creek	150m downstream of Donner Creek	39° 18' 55.41" N	39° 19' 1.40" N
						120° 12' 5.80" W	120° 11' 56.16" W
Town of Truckee	Truckee River @ Bridge St	300	2	150m upstream of Brockway Rd. Bridge	150m downstream of Brockway Rd. Bridge	39° 19' 33.98" N	39° 19' 37.78" N
						120° 11' 5.61" W	120° 10' 54.84" W
Town of Truckee	Truckee River @ Trout Creek	300	2	150m upstream of Trout Creek	150m downstream of Trout Creek	39° 19' 49.94" N	39° 19' 58.06" N
						120° 10' 6.23" W	120° 9' 50.14" W
Town of Truckee	Truckee River @ SR 267	300	2	150m downstream of Trout Creek	150m downstream of SR 267	39° 19' 58.06" N	39° 19' 58.83" N
						120° 9' 50.14" W	120° 9' 37.79" W
Town of Truckee	Truckee River @ Martis Creek	300	2	150m upstream of Martis Creek confluence	150m downstream of Martis Creek confluence	39° 20' 55.31" N	39° 21' 3.49" N
						120° 7' 10.78" W	120° 7' 3.60" W
Town of Truckee	Truckee River @ Glenshire Dr	300	2	150m upstream of Glenshire Bridge	150m downstream of Glenshire Bridge	39° 21' 9.67" N	39° 21' 14.09" N
						120° 7' 17.61" W	120° 7' 30.27" W
Town of Truckee	Donner Creek	1650	11	1650m upstream of Truckee River confluence	Truckee River confluence	39° 19' 21.96" N	39° 18' 58.72" N
						120° 12' 53.21" W	120° 12' 2.09" W
Town of Truckee	Trout Creek	1650	11	1650m upstream of Truckee River confluence	Truckee River confluence	39° 19' 48.84" N	39° 19' 55.97" N
						120° 10' 58.07" W	120° 9' 55.30" W

¹ Coordinate System: NAD 1983 State Plane California II FIPS 0402 Feet



Data Source: Mapping courtesy of Esri, 2009.

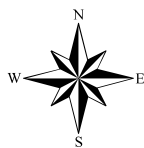
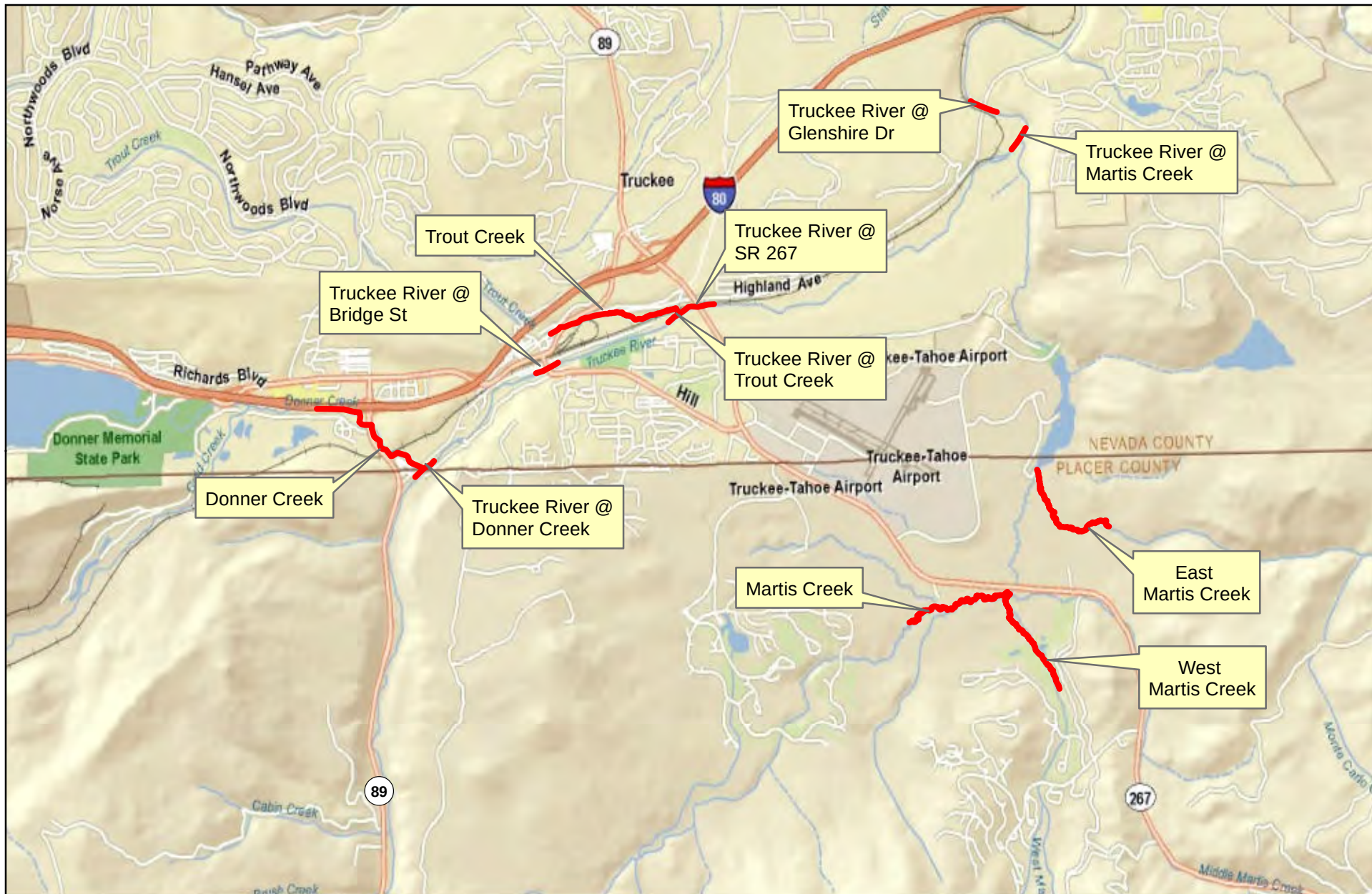


Figure 4-1

Rapid Assessment Methodology
Bear Creek and Squaw Creek
Site Vicinity Map



Data Source: Mapping courtesy of Esri, 2009.

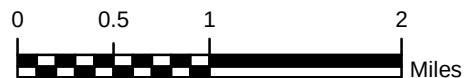
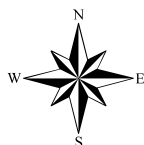


Figure 4-2

**Rapid Assessment Methodology
Truckee River Corridor and
Martis Valley Site Vicinity Map**

4.1.2 Field Evaluation Protocols

The TRWQMP suggests that rapid assessments should be conducted during low flow conditions in late summer or early fall when the Truckee River discharge is below 100 cfs at the Tahoe City dam. Since discharge rates at this dam are governed by lake levels and flow requirements in the Truckee River, this condition does not occur every year. In general, efforts are made to conduct the rapid assessments under similar flow conditions and similar times of year to improve spatial and temporal comparisons.

To conduct the rapid assessments on the Truckee River main stem, intervals were divided into 150m stream reaches, which were then surveyed at transects across the channel spaced every 30m. In WY 2012, all other stream intervals were evaluated at transects that were spaced at every 15m rather than the 30m spacing used during the previous WY 2010 surveys. Based on a better understanding of the level of effort required to conduct these surveys, the additional transects were incorporated in an effort to obtain higher resolution data. The Truckee River intervals were not decreased to 15m due to the much larger effort required to survey the larger channel.

Five sediment grain size observations were recorded along the wetted width of each transect according to protocols outlined in the TRWQMP. The first transect measurement was taken at the beginning of the upstream reach (distance = 0m). See Figure 4-3 for an example reach showing transect and measurement point locations for the furthest upstream reach of Donner Creek. Within each reach, sediment observations also included at least 12 measurements of the embeddedness of cobble-sized (64-250mm) particles. These measurements were estimates of the percent by volume of the cobble embedded in fine sediment. If the transects did not include 12 cobble-sized particles, a random walk-through of the reach was performed to find and evaluate any additional cobbles needed to collect 12 measurements.

4.1.3 Data Management and Analysis

Following the completion of the field work, the data was compiled and entered into electronic data tables then reviewed by a secondary staff member who was also responsible for back-checking any corrections that were required. Any questionable data was flagged for further review by the project manager. All field datasheets were then stored and will be kept on file for a minimum of five years following the completion of the project.

For each 150m reach, the grain size measurements were used to estimate the percentage of the channel bottom that was covered with fine sediment less than 2mm in diameter. The percentage of fine sediment measurements in each reach was then calculated and presented on color-coded GIS maps in increments of 10 percent (i.e. 0-10 percent, 10-20 percent, etc.). A was then developed for each stream interval to illustrate the distribution of fine sediment according to monitoring reach. Mean percent cobble embeddedness and median particle diameter (D50) measurements were also calculated.

Several additional analyses were conducted using the RAM data from WY 2010 and 2012. A temporal comparison of results was made to identify and evaluate changes in fine sediment distributions between the two years and a gradient based analysis evaluated possible correlations between fine sediment and channel gradient.

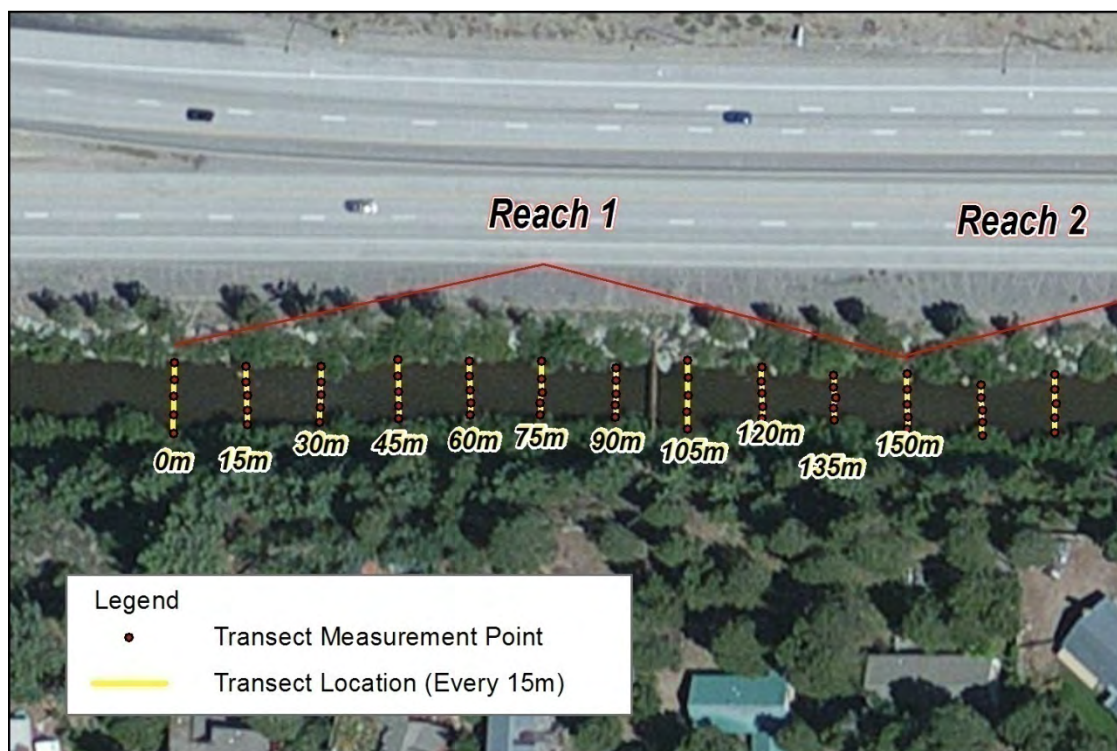


Figure 4-3
Typical RAM Reach Showing Transects and Measurement Points

4.2 Bioassessment Monitoring

Bioassessments provide an indication of stream health by evaluating the benthic macroinvertebrate community and physical habitat conditions present in a given stream reach. Under the TRWQMP schedule, data collection activities for the project are conducted biannually beginning in 2010. As with the rapid assessments, the bioassessment data collection should be conducted during the same years and at the same time of year at all sites in the project area to improve comparability of results.

Bioassessments were performed at Squaw Creek and Martis Creek in the summer and fall of 2012 following slightly different protocols. Squaw Creek sampling followed the specific bioassessment protocol developed in conjunction with the Squaw Creek sediment TMDL, while Martis Creek sampling followed the statewide standard bioassessment protocol (SWRCB, 2007).

4.2.1 Monitoring Locations

All bioassessment sites on Squaw and Martis Creeks were previously established and have been monitored by others in years past. During the first year of TRWQMP implementation, field crews confirmed each location, its access requirements and then documented them in data tables and the project database. The sites and access routes are also mapped using available GIS data and aerial photography so that they can be accurately relocated in the field for each subsequent monitoring event.

4.2.2 Field Evaluation Protocols

The TRWQMP bioassessments are conducted biannually in Squaw and Martis Creeks although the specific protocols used for each stream are somewhat different.

Squaw Creek

Surveys in Squaw Creek followed the Sampling and Analysis Requirements for Numeric Target Monitoring for the Squaw Creek Sediment TMDL (LRWQCB 2008). Upper, middle, and lower meadow sampling locations each consisted of a 150m reach of Squaw Creek. The upper and lower boundaries of each site were marked using GPS, and digital photographs were taken (looking upstream and downstream) at several points along each reach (0m, 50m, 100m, and 150m). Per the sampling protocol, benthic macroinvertebrate samples were collected as targeted riffle composites (each comprised of three 1 ft² kick samples) using a 250micron mesh D-framed net. Five replicate samples were collected from each site (one each from 5 randomly selected riffle areas within each 150m reach).

Physical habitat parameters (width, depth, substrate composition, cobble embeddedness, bank cover, bank angle, canopy cover, aquatic vegetation, algae, detritus, etc.) were measured at cross-sectional transects located every 10m along the 150m reach. Riparian vegetation, slope, sinuosity, and stream discharge were evaluated for each 150m reach as a whole. In situ water quality (temperature, pH, conductivity, and dissolved oxygen concentration and saturation) was also measured at each site using a YSI model 556 multi-meter.

Martis Creek

Surveys in the Martis Creek followed the Standard Operating Procedures for Collecting Benthic Macroinvertebrate Samples and Associated Physical and Chemical Data for Ambient Bioassessments in California (LRWQCB, 2007b). All sites consisted of a 150m reach of stream. Per the SWAMP protocol, benthic macroinvertebrate samples were collected as both targeted riffle composite (TRC) samples (comprised of eight 1 ft² kick samples) and reach-wide benthos/multi-habitat (RWB-MH) samples (comprised of eleven 1 ft² kick samples). Both types of samples were collected from each of the six sites.

Physical habitat parameters (bankfull and wetted width, depth, substrate composition, cobble embeddedness, algal cover, riparian vegetation, in stream habitat complexity, canopy cover, human influence, bank stability, etc.) were evaluated at a combination of 11 primary and 10 secondary cross-sectional transects located along the 150m reach. Stream gradient, sinuosity, and discharge were also measured for each survey reach. The upper, middle and lower portions of each survey reach were documented with photographs taken in both the upstream and downstream directions, and both ends of each reach were marked using GPS.

4.2.3 Data Analysis and Validation

Following the completion of the field work, the data were compiled and entered into electronic data tables then reviewed by a secondary staff member who was also responsible for back-checking any corrections that were required. All field datasheets were then stored and will be kept on file for a minimum of five years following the completion of the project.

Bioassessment samples were sent to accredited taxonomic experts for processing, enumeration, and identification. Squaw Creek samples were processed by Jon Lee Consulting; Martis Creek samples were processed by Wayne Fields of Hydrozoology. Both taxonomists identify taxa to the

genus/species level wherever possible (*i.e.*, standard Level II effort as defined by the Southwest Association of Freshwater Taxonomists [SAFIT 2006]).

Taxonomic data from each site were randomized and consolidated into a 500-fixed-count taxa list representing that site (per the analytical approach described in the TRWQMP). These data were analyzed and reported at the SAFIT Level II standard taxonomic effort. All biological metric calculations were based on the standardized 500-fixed-count-sample data for each site. The Eastern Sierra Nevada Index of Biotic Integrity (IBI) was calculated for all Squaw Creek and Martis Creek sites as described in the TRWQMP (and following Herbst and Sildorff [2009]). For the three Squaw Creek sites, a separate index (*i.e.*, the Biological Condition Score or BCS) was also calculated as specified in the TMDL sampling and analysis requirements for Squaw Creek (LRWQCB 2008). BCS and IBI scores were calculated and reported for targeted riffle composite samples only because these indices were developed from riffle-only data. In addition, targeted riffle samples were collected at all Squaw and Martis Creek sites, whereas multi-habitat (reachwide benthos) samples were only collected at Martis Creek sites per the established sampling protocols.

For bioassessment monitoring, no duplicate samples are collected in the field; however an external QA/QC check for taxonomic and enumeration accuracy is required for 10% of macroinvertebrate samples and all uncertain taxa, with a minimum of one per calendar year. The external QA/QC check is performed by the California Department of Fish and Game's (CDFG) Aquatic Bioassessment Laboratory.

4.3 Community Level Water Quality Monitoring

Community level water quality monitoring was performed at a total of eleven sites during WY 2012.

Two sites (DSC-MC2 and DSC-MC3) were monitored by Placer County in the Martis Creek sub-watershed. WY 2012 was the second year that Placer County monitored these two sites. Planning and preparation activities including site selection, environmental analysis and documentation, and the development of access agreements with private landowners were conducted during the initial year (WY 2010) of TRWQMP implementation. A vicinity map for the Placer County monitoring locations is presented in Figure 4-4.

Nine sites (DSC-TT1, DSC-TT2, DSC-TT3, DSC-TT4, DSC-TT5, DSC-TC1, DSC-TC2, DSC-DC1, and DSC-MC1) were monitored by the Town of Truckee. In February of 2012, six new monitoring locations were added to the program and monitoring ceased at one location. These modifications were based on information gained during the initial two years of monitoring and the revised monitoring objective of characterizing a larger number of locations. The increased cost of monitoring additional stations was offset by reducing the analytical list of each sample to include only TSS. The turbidity, pH and electrical conductivity levels of the samples were also measured using a portable meter rather than by a commercial laboratory.

WY 2012 was the third year that sites DSC-TT1 and DSC-TC1 were monitored, the second year that DSC-MC1 was monitored, and the first year that sites DSC-TT2, DSC-TT3, DSC-TT4, DSC-TT5, DSC-TC2, and DSC-DC1 were monitored. A vicinity map for the Town of Truckee monitoring locations is provided in Figure 4-5.

4.3.1 Monitoring Site Descriptions

The TRWQMP provided general locations and guidance for selecting the community level discrete sampling sites. Per this guidance, monitoring sites should represent both highly developed areas to monitor impacts of human activities, as well as minimally developed areas to provide baseline data and an understanding of realistic water quality objective goals. Potential sites were evaluated with consideration of safety and access, representativeness, permitting requirements, and ease of installation. The sites were then scored and ranked based on these criteria and recommendations were developed for the final monitoring locations. Each site is described below with general explanations on how the water quality data from the site is initially planned to be used.

- **Airport Business Park Outfall (DSC-MC1)** – This site is located within the Town’s jurisdiction in the Martis Creek sub-watershed. The main land use in the area draining to this location is commercial although a portion of the Truckee Tahoe Airport is also within the sub-watershed. Truckee Airport Road and Soaring Way also drain to this site with moderate to heavy local truck and auto traffic. Drainage design for many of the roads, commercial buildings and parking lots includes facilities that treat stormwater runoff prior to discharge. Monitoring at this site was discontinued in February of 2012.
- **Lahontan Golf Club (DSC-MC2)** – This site is located within the County’s jurisdiction in the Martis Creek sub-watershed. It is located within the private Lahontan Golf Club community and represents stormwater runoff from multiple land uses including a golf course, single family residential homes, paved roads, foot trails, and natural forested upland areas. This community is a modern development and includes facilities that treat stormwater runoff prior to discharge.
- **Northstar (DSC-MC3)** – This site is located within the County’s jurisdiction in the Martis Creek sub-watershed. It is located on public property within the Skidder Trail Right-of-Way. The site receives runoff from multiple land uses including a large ski area parking lot, a dirt road, a paved residential road, natural wooded upland areas, and residential homes. Some portions of the drainage area, such as the large parking lot for Northstar ski resort, do have some facilities that treat a portion of stormwater prior to discharge including sediment traps in the drainage inlets and a large infiltration/sedimentation basin. The residential and roadway runoff at this site does not receive treatment prior to passing the sample collection point, but does receive additional downstream treatment prior to entering West Martis Creek.
- **Brickelltown Outfall (DSC-TT1)** – This site is located within the Town’s jurisdiction and is within the Truckee Town Corridor sub-watershed. The land uses within the watershed include light industrial, dense commercial, Union Pacific Railroad, residential, primary and secondary roadways, unpaved parking areas and forested upland. This includes some of the oldest areas of Truckee that mostly lack stormwater treatment facilities. Some redevelopment has occurred in the area and more is planned that will likely include water quality improvements.
- **Bridge Street SW Outfall (DSC-TT2)** – This site is located within the Town’s jurisdiction and is within the Truckee Town Corridor sub-watershed. This site receives runoff from older development in the Hilltop area, South River Street and Brockway Road. The land uses in the watershed include commercial, primary roadways, and secondary roadways. A large stormwater vault provides treatment of runoff prior to discharge to the Truckee River. This site receives a portion of its runoff from a cut slope and spring adjacent to Brockway Road.

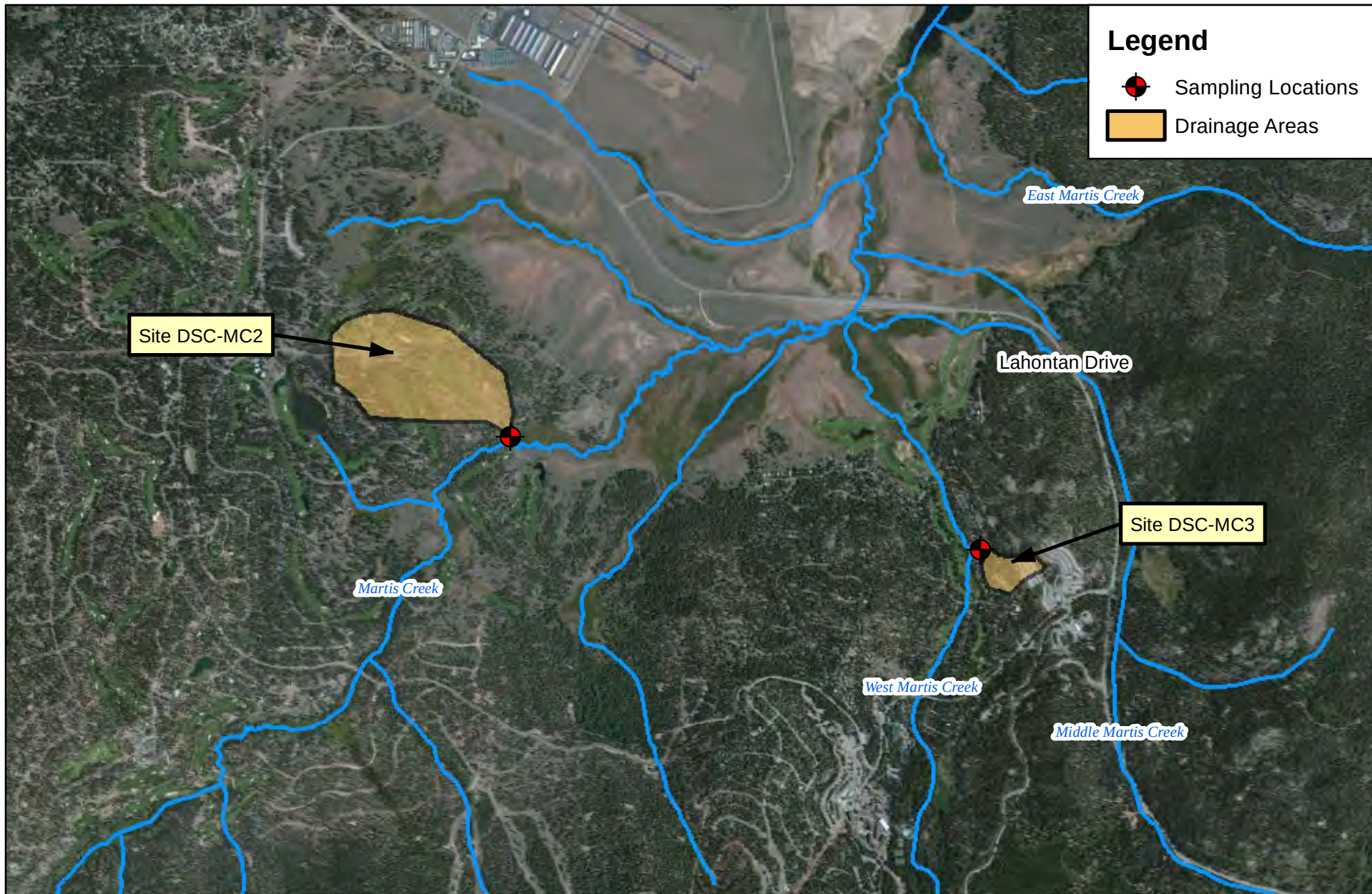
- **Bridge Street SE Outfall (DSC-TT3)** - This site is located within the Town's jurisdiction and is within the Truckee Town Corridor sub-watershed. The site receives runoff from portions of Southeast River St. and Brockway Road. The land uses in the watershed include commercial and primary roadways, and the drainage system includes treatment vaults to remove sediment from runoff prior to discharge. The treatment vault immediately upstream of the site has a large capacity and, with infiltration volume reductions, is able to contain small to moderate runoff events.
- **Bridge Street NW Outfall (DSC-TT4)** - This site is located within the Town's jurisdiction and is within the Truckee Town Corridor sub-watershed. This site receives runoff from some of the oldest areas of downtown Truckee that are mostly lacking stormwater treatment facilities. The land uses within the watershed include light industrial, dense commercial, Union Pacific Railroad, residential, primary roadways and secondary roadways. Downstream vaults are installed in the system to remove sediment from runoff prior to discharge. In the summer of 2012 a new parking area with curb and gutter and a drainage inlet were installed immediately upstream of the site. The Truckee Depot project also included an underground detention/infiltration chamber system. However, this system and improvements to the parking do not actually connect to Bridge Street NW outfall. It is a 'dead end' and only discharges by sheet flow if it overflows. The improvements adjacent to the chocolate shop did not add any additional treatment.
- **West River Street Outfall (DSC-TT5)** - This site is located within the Town's jurisdiction and is within the Truckee Town Corridor sub-watershed. The runoff from this site represents a portion of West River Street as well as adjacent commercial properties. The land uses within the watershed include light industrial with large dirt areas and primary roadways. The runoff from West River Street enters a vegetated swale and a culvert under West River Street prior to sample collection. Some of the runoff from the commercial area enters the culvert immediately upon entering the swale, and receives little or no treatment.
- **Trout Creek SE Outfall (DSC-TC1)** - This site is located within the Town's jurisdiction in the Trout Creek sub-watershed. The land uses draining to this site include commercial, residential, secondary roadways and paved parking areas. The data from this site will also represent runoff from older development in downtown Truckee; however, there are also some existing water quality improvements in the drainage area and the roads in the drainage area carry smaller traffic volumes.
- **Trout Creek NW Outfall (DSC-TC2)** - This site receives runoff from both old and new residential development in Truckee including Donner Pass Road, Keiser Avenue, Jiboom Street, and a Caltrans Highway Maintenance Station. The land uses draining to this site include commercial, residential, secondary roadways and primary roadways. Water quality improvements such as drainage inlets with sumps exist in the new development near the top of the watershed, but little improvements exist in the older developments. An earthen channel on upstream of the outfall does provides some level of treatment.
- **Donner Creek Outfall (DSC-DC1)** - This site is located within the Town's jurisdiction and is within the Truckee Town Corridor sub-watershed. This site receives runoff from approximately ¼ mile of Highway 89, the west end of West River Street, the Donner Trail trailer park, and forested upland. The upstream portion of this drainage area consists of an intermittent stream

channel which mixes with the runoff from the rest of the drainage area during high flow periods. An earthen channel provides some level of treatment prior to sample collection.

Table 4-3 presents the key characteristics of the community level monitoring sites including: station ID, locations and jurisdictions, latitude, longitude, elevations and information about the drainage area. Aerial maps showing the sampling point locations and their tributary drainage areas are presented in Figures 4-4 and 4-5.

Table 4-3. Discrete Monitoring Site Characteristics

	Brickelltown Outfall	Trout Creek SE Outfall	Airport Business Park	Bridge St. NW Outfall	Bridge St. SW Outfall	Bridge St. SE Outfall	Donner Creek Channel	Trout Creek NW Outfall	West River St Outfall
Station ID	DSC-TT1	DSC-TC1	DSC-MC1	DSC-TT4	DSC-TT2	DSC-TT3	DSC-DC1	DSC-TC2	DSC-TT5
Receiving Water	Truckee River	Trout Creek	Martis Creek	Truckee River	Truckee River	Truckee River	Donner Creek	Trout Creek	Truckee River
County	Nevada	Nevada	Placer	Nevada	Nevada	Nevada	Nevada	Nevada	Nevada
Regional Water Board	Lahontan Region 6	Lahontan Region 6	Lahontan Region 6	Lahontan Region 6	Lahontan Region 6	Lahontan Region 6	Lahontan Region 6	Lahontan Region 6	Lahontan Region 6
Latitude	N39°19.590'	N39°19.862'	N39°18.938'	N39° 19.603'	N39° 19.577'	N39°19.585'	N39°18.985'	N39° 19.856'	N39°19.071'
Longitude	W120°11.217'	W120°10.863'	W120°08.863'	W120° 11.011'	W120° 10.993'	W120°10.981'	W120°12.079'	W120° 10.886'	W120°11.930'
Elevation (ft)	5,820	5,800	5,890	5,798	5,798	5,798	5,846	5,812	5,840
Roadway Access	West River Street	Donner Pass Road	Airport Road	Bridge Street	Bridge Street	Bridge Street	West River Street	Donner Pass Road	West River Street
Monitoring Location	Drainage Inlet	18-inch Outfall	Stormdrain Manhole	24-inch Outfall	18-inch Outfall	18-inch Outfall	Channel	Channel	18-inch Outfall
Runoff Type	• Commercial • Residential • Primary Roadway • Forested Uplands • Railroad Tracks	• Commercial • Residential • Secondary Roadway • Power Station	• Commercial • Primary Roadway • Secondary Roadway • Airport	• Commercial • Primary Roadway • Secondary Roadway • Railroad Tracks	• Commercial • Primary Roadway • Secondary Roadway	• Commercial • Primary Roadway • Secondary Roadway	• Residential • Primary Roadway • Forested Uplands	• Commercial • Residential • Secondary Roadway • Power Station • Primary Roadway	• Commercial • Primary Roadway
Approximate Drainage Area (acres)	34	6.6	79.1	25.5	11.7	0.5	23	30.6	15
% Impervious Area	40%	75%	65%	65	24	100	23	42	10
Installation Date	Fall 2009	Fall 2009	Spring 2010	Winter 2012	Winter 2012	Winter 2012	Winter 2012	Winter 2012	Winter 2012



Source: Aerial imagery from Bing, Microsoft 2010

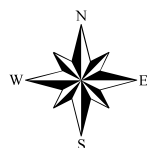
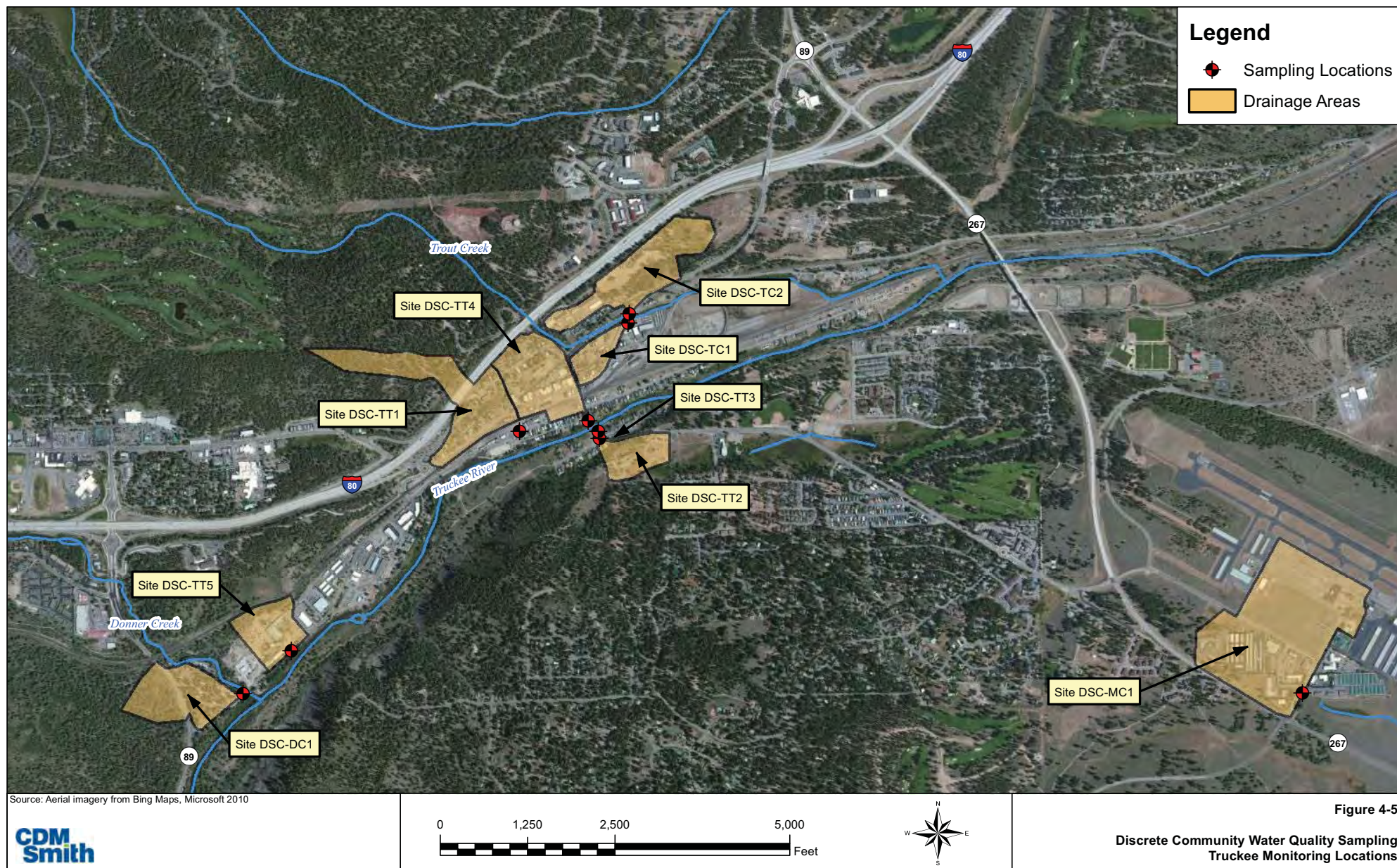


Figure 4-4

**Discrete Community Water Quality Sampling
Placer County Monitoring Locations**



4.3.2 Field Evaluation Protocols

The community level sampling protocols include the use of passive sampling devices at stormwater drainage outfalls or other appropriate locations for the collection of discrete stormwater runoff samples (grab samples) from targeted communities. This water quality monitoring targets stormwater runoff from developed areas generated from events considered to have the highest potential for mobilizing and transporting the pollutants of concern. Examples are runoff events that occur after extended dry periods or that result in substantial increases of stormwater runoff flows at the monitoring locations. The use of passive samplers allows the collection of samples from the same part of the rising hydrograph limb during each event resulting in higher quality comparisons among sites and over time.

The monitoring team tracks weather conditions and potential storms that may produce stormwater runoff at the monitoring stations. Events are characterized by their type (snowmelt, winter rain/snow (mixed), and spring, summer or fall rain) and the number of days prior to the event without rainfall or runoff (dry antecedent conditions). The events to be monitored are selected based on the antecedent conditions and the predicted amount of precipitation, or the predicted temperature and amount of snow in the drainage area if snowmelt flows are being targeted.

To collect the samples, clean samplers and containers are installed at the monitoring sites prior to the targeted event. Runoff enters the container when the flow reaches a predetermined depth at the sampling point. When the container is full, a floating ball valve seals the bottle. After the event, the passive samplers are carefully examined to ensure the samples were collected as planned and the bottles sealed adequately to prevent contamination. After retrieving the samples, the site is secured and samples are prepared for shipment to the laboratory.

4.3.3 Data Management and Analysis

Samples are delivered to the laboratory under chain of custody documentation to track the samples and the requested analyses. Lab analysis is performed in accordance with standardized analytical and QA/QC methods. Lab reports containing the analytical results and QA/QC documentation are then validated prior to entering into project database. Each analytical report is thoroughly reviewed and the data evaluated to determine if its data met the data quality objectives described below. Once the data has been validated, it is ready for statistical analyses, evaluation and comparisons. The results will be compared across sites and over time to identify potential pollutant sources, determine how community discharges are impacting water quality objectives and if SWMP actions are reducing pollutant discharges.

The list of laboratory analytical constituents was developed based on the water quality pollutants of concern for the Truckee River and the available funding. Table 4-4 lists the constituents, sample type (sample collection method), U.S. Environmental Protection Agency (EPA) analytical method, sample bottle type, target reporting limit, volume required for analysis, sample preservation, and maximum holding times. These are also the standard operating procedures for Western Environmental Testing Laboratory (WETLAB). WETLAB was the selected analytical laboratory for community stormwater samples. The community stormwater samples within the County's jurisdiction were analyzed for all of the constituents presented in Table 4-4. The Town samples were analyzed for the same list except for ammonia, dissolved phosphorus, and dissolved orthophosphate. Beginning in March 2012, the Town samples were analyzed for TSS by the lab and for turbidity, pH and electrical conductivity with a portable water quality meter prior to shipping the sample to the commercial lab.

Table 4-4. Analytical List for Community Level Water Quality Samples

Constituent ¹	Sample Type	EPA Method	Sample Collection Bottle Type (Nalgene Cat No)	Target Reporting Limit ²	Volume (mL)	Preservation ³	Holding Time
TSS	Discrete	SM 2540D	HDPE ⁴ (1100-1000)	1 mg/L	1000	4°C	7 days
Turbidity		180.1		0.1 NTU	50		48 hours
Ammonia		SM 4500NH3 D		0.05 mg/l	500	H ₂ SO ₄ (added at lab)	28 days
TKN		351.2		0.05 mg/L	100	H ₂ SO ₄ (added at lab)	28 days
NO ₃ -N + NO ₂ -N		353.2		0.01 mg/L	100	4°C	48 hours
Total Nitrogen (calculated)		--		0.07 mg/L	--		--
Total Phosphorus		365.3		0.01 mg/L	100		28 days
Dissolved Phosphorus		365.3		0.01 mg/L	100		28 days
Dissolved Ortho-Phosphate		365.3		0.01 mg/L	100		48 hours

¹ TSS = total suspended solids; NO₃-N = nitrate as nitrogen; NO₂-N = nitrite as nitrogen; TKN – total Kjeldahl nitrogen.

² mg/L = milligrams per liter; NTU = nephelometric turbidity units.

³ H₂SO₄ = Sulfuric acid, °C = Celsius

⁴ HDPE = High-density polyethylene

4.4 Tributary Level Water Quality Sampling

Tributary level water quality data collection and analysis activities were performed at six sites along multiple branches of Martis Creek within Placer County during WY 2012. This was the second year of data collection at these sites.

4.4.1 Monitoring Site Descriptions

The Martis Creek tributary sampling locations are sited to provide water quality information on Martis Creek and its main tributaries. The locations focus on the various developed areas within the Martis Creek watershed and with the goal of indentifying potential pollutant source areas and identifying and tracking water quality trends. The upstream and downstream configuration of some of these sampling locations will also be helpful to characterize any water quality changes that occur as flow travels through the Martis Valley floodplain and meadow system.

The key characteristics of the Martis Creek tributary monitoring locations are presented in Table 4-5 and the locations are shown in Figure 4-6. Figure 4-6 also includes the location of the Martis Creek stream gauging station which is discussed below in Section 4.5. Photographs of the each of the tributary monitoring sites are presented in Figure 4-7.

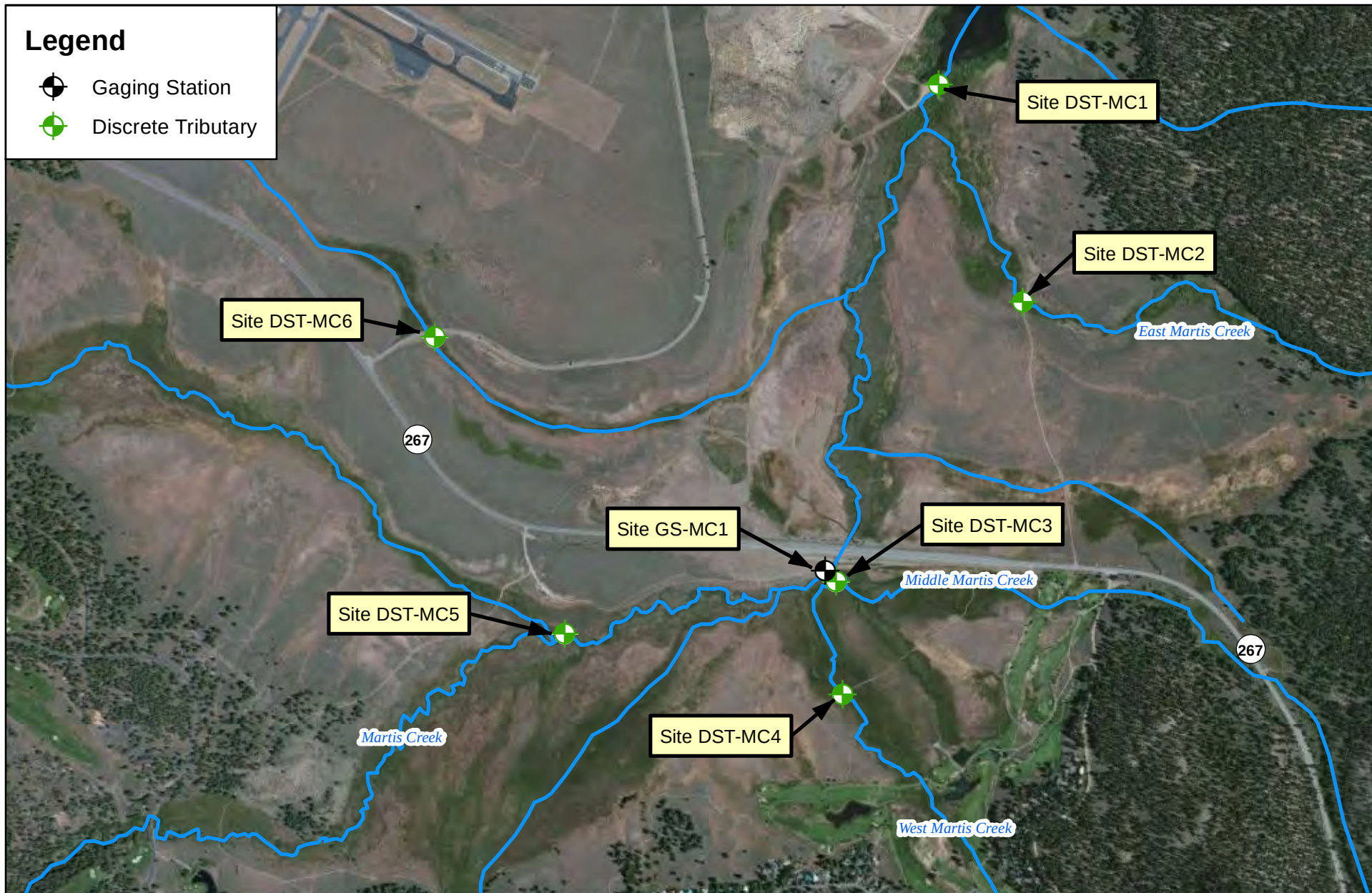
Table 4-5. Tributary Level Discrete Monitoring Site Characteristics

Water Body	Martis Creek Main Stem Outfall	East Martis Creek	Middle Martis Creek	West Martis Creek	Martis Creek Main Stem	Unnamed Martis Tributary
Station ID	DST-MC1	DST-MC2	DST-MC3	DST-MC4	DST-MC5	DST-MC6
Location Description	Mouth of creek at Martis Creek Lake	Downstream of concrete bridge	Upstream of confluence with main stem	Downstream of Northstar Golf Course	Downstream of Lahontan and Martis Camp	Downstream of Martis Ck Rd.
Latitude ⁽¹⁾	N 39° 18' 53.48"	N 39° 18' 32.63"	N 39° 18' 6.67"	N 39° 17' 55.67"	N 39° 18' 1.54"	N 39° 18' 30.39"
Longitude ⁽¹⁾	W 120° 7' 1.54"	W 120° 6' 51.70"	W 120° 6' 58.16"	W 120° 7' 14.90"	W 120° 7' 50.42"	W 120° 8' 3.71"
Elevation (ft)	5,830	5,840	5,845	5,845	5,850	5,850
Major landuse descriptions in tributary watershed	Ski Area; Commercial; Single and Multi-Family Residential; Primary and Secondary Roadway; Forested Uplands; Golf Courses; Unpaved Roads and Trails	Forested Uplands; Unpaved Roads and Trails	Primary Roadway; Forested Uplands; Unpaved Roads and Trails	Ski Area; Commercial; Single and Multi-Family Residential; Secondary Roadway; Forested Uplands; Golf Course; Unpaved Roads and Trails	Ski Area; Single Family Residential; Secondary Roadway; Forested Uplands; Golf Courses; Unpaved Roads and Trails	Airport; Commercial; Secondary Roadway;
Drainage Area Size (ac)	21,900	4,550	3,000	3,200	8,800	200

¹ Coordinate System: NAD 1983 State Plane California II FIPS 0402 Feet

Legend

-  Gaging Station
-  Discrete Tributary



Source: Aerial imagery from Bing, Microsoft 2010

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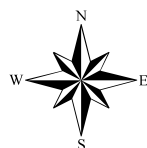


Figure 4-6

**Discrete Tributary Water Quality Sampling
and Stream Gaging Monitoring Locations**



FIGURE 4-7a. DST-MC1 monitoring location on Martis Creek near Martis Creek Lake.



FIGURE 4-7b. DST-MC2 monitoring location on East Martis Creek.



FIGURE 4-7c. Middle Martis Creek confluence. DST-MC3 monitoring location is just upstream.



FIGURE 4-7d. DST-MC4 monitoring location on West Martis Creek.



FIGURE 4-7e. DST-MC5 monitoring location is on Martis Creek just downstream of an unnamed tributary confluence.



FIGURE 4-7f. DST-MC6 monitoring location on unnamed tributary near Martis Creek Road.

Figure 4-7
Tributary Level Discrete Monitoring Sites

4.4.2 Field Evaluation Protocols

The TRWQMP methodology for tributary discrete snowmelt sampling has been adapted for all tributary discrete sampling events. The sampling method follows USGS equal width increment (EWI) protocols for collecting depth-integrated, discharge-weighted samples from targeted flow conditions. To collect the samples, a transect is established across the stream channel and the wetted width is divided into a series of equally spaced increments. Sub-samples are collected at the center of each increment using a depth-integrated sediment sampler that is lowered and raised through the water column. The subsample volumes produced are proportional to the amount of flow occurring in each increment and are composited into a single composite sample to be submitted to the lab.

Similar to the community level sampling, these in-stream water quality measurements focus on events when high pollutant concentrations and/or loads are expected to be present within surface waters (i.e., the worst case scenarios). Sampling times target the rising limb of the event hydrograph and are coordinated across the project area to allow for the most direct comparisons between tributary stations. A range of runoff event types and magnitudes are typically sampled during the monitoring season.

4.4.3 Data Management and Analysis

The data management and analysis procedures for the community and tributary level water quality monitoring are generally similar although modified laboratory analytical methods are needed to detect the very low pollutant concentrations typically present in the regions natural surface waters. Table 4-6 lists the constituents, sample type, U.S. Environmental Protection Agency (EPA) analytical method, sample bottle type, target detection limit, volume required for analysis, sample preservation requirements, and maximum holding times for each constituent.

Table 4-6. Analytical List for Tributary Level Water Quality Samples

Constituent ¹	Sample Type	EPA Method	Sample Collection Bottle Type (Nalgene Cat No)	Detection Limit ²	Volume (mL)	Preservation ³	Holding Time to Lab
TSS	Depth integrated, discharge weighted	160.2	HDPE ⁵ (1100-1000)	0.1 mg/L	A total volume of 1000 mL is sufficient for all analysis	4°C	48 hours
Turbidity		180.1		0.1 NTU		4°C	48 hours
Ammonia ⁴		350.1		1 µg/L		4°C	48 hours
NO ₃ -N, NO ₂ -N ⁴		353.1		1 µg/L		4°C	48 hours
TKN		351.2		35 µg/L		4°C & H ₂ SO ₄ (added at lab)	28 days
Total Phosphorus		365.3		1 µg/L		4°C & H ₂ SO ₄ (added at lab)	28 days
Dissolved Phosphorus ⁴		365.3		1 µg/L		4°C & H ₂ SO ₄ (added at lab)	28 days
Dissolved Ortho-Phosphate ⁴		SM 4500-PE		1 µg/L		4°C	48 hours

¹ TSS = total suspended solids; NO₃-N = nitrate as nitrogen; NO₂-N = nitrite as nitrogen; TKN – total Kjeldahl nitrogen.

² µg/L = micrograms per liter; mg/L = milligrams per liter; NTU = nephelometric turbidity units.

³ H₂SO₄ = Sulfuric acid, °C = Celsius

⁴ Filtered immediately with a 0.45 micron nylon filter for the dissolved portions of the assay

⁵ HDPE = High-density polyethylene

4.5 Martis Creek Stream Flow Monitoring

A stream gauging station was installed in the fall of 2010 to measure discharge in the main stem of Martis Creek. Station operations during WY 2012 included the continued collection of data for the development of a stage to discharge rating curve. This was the second year of data collection at this site. Planning activities to select the site, conduct environmental analysis and documentation, and obtain the necessary permits were conducted during WY 2010. The discharge data generated at this site will also be useful in estimating relative discharge volumes in other Martis Creek tributaries and for the development of pollutant load estimates.

4.5.1 Monitoring Site Description

The Maris Creek gauging station is located approximately 150 ft upstream of the State Route 267 crossing. The station was assigned the ID code GS-MC1 and its location is shown in Figure 4-6 with the Martis Creek tributary level sites.

4.5.2 Installation and Operation

Installation activities occurred in the fall of 2010 and included surveying channel cross-sections and longitudinal profile, establishment of a local benchmark, and installation of a staff gauge and pressure transducer.

A staff gauge was installed in the stream channel to allow visual depth measurements by field personnel from the bank and confirmation of automated stage measurements by a vented *In-Situ Level Troll 500* pressure transducer. The pressure transducer is used to measure and log 15-minute average stage data at the measurement point. The pressure transducer is securely mounted on the same post as the staff gauge with the cable installed in PVC conduit leading to an accessible location on the bank. The conduit is perforated along the bottom 2 feet and anchored to the bank by stakes and rocks. The instrument elevation was surveyed during installation and tied to the benchmark.

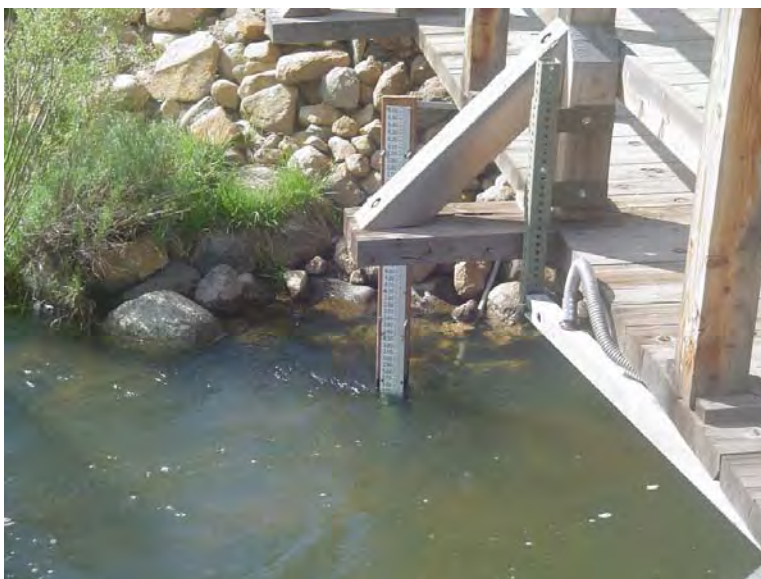


Figure 4-8
Staff Gauge at the Martis Creek Gauging Station

4.5.3 Discharge Estimation

A stage to discharge rating curve was developed during 2011 and 2012. To develop the rating curve, velocity measurements were obtained using a *Swoffer 2100* current velocity meter at various stream stages. Velocity measurements were collected using the 0.6 depth methodology outlined in the USGS Measurement and Computation of Streamflow Manual (USGS, 1982). Velocity measurements were collected at one foot intervals along a transect to account for varying flow conditions across the stream channel. The mean velocity at each stage was then multiplied by the corresponding cross-sectional area of flow to obtain the stream discharge at the time the measurements were taken.

A regression analysis was on the stage and discharge data and the results were used to calculate a continuous discharge using the logged stage data from the pressure transducer.

During rating curve development, an effort was made to obtain velocity data at a range of stages including upper and lower extremes. This limited extrapolation requirements to stages that were very high where velocity measurements could not safely be collected.

4.5.4 Data Management and Analysis

After downloading the stage data from the pressure transducer, it is reviewed for any anomalies or data gaps and then imported into a spreadsheet to calculate the discharge. The data is checked against manual stage measurements and any unusual conditions observed in the field to confirm the quality of data and make adjustments if deemed necessary. Precipitation data is also reviewed and compared to stream discharge to help define the runoff response times used to guide the timing of the tributary water quality sampling.

One of the main purposes of collecting the stream discharge data is to provide a means of estimating pollutant loads carried by Martis Creek and its major tributaries. Using the discharge data and the water quality data collected at the tributary discrete monitoring locations, annual load estimates are calculated using the following equation:

$$\text{Annual Load} = \text{Total Annual Discharge} \times \text{Mean Annual Pollutant Concentration}$$

4.6 Data Quality Objectives

Data quality objectives (DQOs) for the program were developed to establish acceptable measures of quality for monitoring data and increase its defensibility. The DQOs developed for this project include specifications for field sampling and analytical procedures and performance criteria for laboratory analytical work. The DQOs are applied to all data collection activities and analyses conducted under the implementation of the TRWQMP.

For water quality sampling activities, field precision was determined through the collection of field triplicates and the calculation of the average percent error. Laboratory accuracy was evaluated by reviewing Matrix Spike/Matrix Spike Duplicate (MS/MSD) and Laboratory Control Spike (LCS) recoveries. Laboratory precision was evaluated by reviewing MSD and laboratory sample duplicate relative percent differences (RPDs). Field QA/QC samples were analyzed for the same analytical suite as the water quality samples collected at the respective site. Laboratory performance control limit criteria for precision and accuracy is provided in the TRWQMP and presented below in Table 4-7.

For bioassessment samples, an external QA/QC check for taxonomic and enumeration accuracy is required for 10% of macroinvertebrate samples and all uncertain taxa to ensure there is less than a 5% error in removing all specimens from subsamples. Variability is established through separate counts on lab subsamples from within one sample. Less than a 10% difference in IBI calculations between the samples is expected. The external QA/QC check is performed by the California Department of Fish and Game's (CDFG) Aquatic Bioassessment Laboratory.

Table 4-7. Control Limits for Precision and Accuracy for Water Samples

Constituent ¹	EPA Method	Accuracy	Precision	Recovery
TSS	SM 2540D ² , 160.2 ³	70-130% recovery	Replicates within +/- 10%	70-130%
Turbidity	180.1			
Ammonia	SM 4500NH3 D ² , 350.1 ³	Standard Reference Materials (SRM, CRM) within 95% of CI stated by provider of material.	Laboratory control sample; Blind field triplicate; Replicates within +/- 20%	Matrix spike 80-120 % or control limits +/- 3 standard deviations based on actual lab data.
NO ₃ -N + NO ₂ -N	353.2 ² , 353.1 ³			
TKN	351.2			
Total Phosphorous	365.3			
Dissolved Phosphorous	365.3			
Dissolved Orthophosphate	365.3 ² , SM 4500-PE ³			

¹ TSS = total suspended solids; NO₃-N = nitrate as nitrogen; NO₂-N = nitrite as nitrogen; TKN – total Kjeldahl nitrogen.

² WETLAB EPA Test Method

³ High Sierra Lab EPA Test Method

4.7 Statistical Analyses

Statistical testing is conducted to further characterize the data sets and determine whether various groups of data exhibit significant differences or trends. In cases where results are inconclusive, power analyses can be conducted to estimate the sample size (number of total measurements) required to discern a statistical difference.

4.8 Monitoring Modifications

The methodologies presented in Section 4 were developed using guidance provided in the TRWQMP, and are consistent with the protocols and methods described in the Sampling and Analysis Plans prepared for Placer County and the Town of Truckee. WY 2012 modifications to the monitoring approaches are documented in the SAPs and summarized below:

- **Rapid Assessment Methodology** – For WY 2012, the transect spacing was reduced to 15m for all monitored intervals except for the Truckee River. Data analysis was modified to present more detailed results, and elevation data were used to evaluate the effects of channel gradient on fine sediment deposition patterns. Rapid assessment monitoring was reduced to priority areas on the Truckee River within the Town limits. This was reduced to ten reaches due to funding limitations and additional focus on Community Level Water Quality Sampling.
- **Bioassessments** – The schedules for performing bioassessments were modified to allow for data collection to be conducted during the same years. Previously, Squaw Creek bioassessments

were specified to be performed during odd years while Martis Creek bioassessments were performed during even years.

- **Community Level Water Quality Sampling** – Six new sites were added to the Town’s monitoring efforts during WY 2012 to assess and prioritize a larger number of drainage outfalls for their pollutant contributions to the Truckee River. The samples were analyzed for TSS by a certified lab and for turbidity, pH and electrical conductivity using portable water quality meters.
- **Tributary Level Water Quality Sampling** – No changes were made to the tributary level water quality sampling during WY 2012.
- **Stream Gauging Station** – Velocity measurements were continued during WY 2012 in order to develop a revised rating curve due to the establishment of a beaver dam that influenced the stream stage.

Section 5

Monitoring Results

This section presents the monitoring results from the first three years of TRWQMP implementation (WY 2010 to WY 2012). Results are presented for rapid assessments, bioassessments, community and tributary level water quality sampling and the Martis Creek continuous discharge monitoring. A load based evaluation for the Martis Creek watershed, based on mean concentrations and stream discharge estimates, is also presented.

5.1 Rapid Assessment Methodology

This section presents the results of the WY 2012 RAM surveys and discusses differences observed from the WY 2010 results. Monitoring using the rapid assessment methodology (RAM) was conducted in Squaw Creek, Bear Creek, Martis Creek, West Martis Creek, East Martis Creek, Donner Creek, Trout Creek, and the Truckee River within the Town corridor. The 2012 rapid assessments were conducted in the fall during periods of low flow when discharge at the Tahoe City dam ranged from about 150 – 350 cfs. Discharge in the tributaries was very low during this time period due to the dry preceding winter.

The reach level RAM results tables and the original field data forms are provided in Appendix A. The RAM results were also incorporated into the project database and includes the name of the stream interval, reach ID, observation dates, discharge rate at the Tahoe City dam, the percentage of particle measurements less than 2mm in diameter, the average percent cobble embeddedness, and median particle diameter (D50) calculated for each reach. Combined average values for the entire surveyed stream segment are also provided.

An overall summary of the RAM results is presented in Figure 5-1 which illustrates the percentage of reaches falling into each 10 percent category in each of the stream intervals surveyed during WY 2012. The results indicate that Bear Creek has the least amount fine sediment on the channel bottom with over 70 percent of the surveyed reaches falling into the 0 – 10 percent range and the remainder falling in the 11-20 and 21-30 percent ranges. On average, 9 percent of the Bear Creek stream bottom was covered in particles less than 2mm. The channel substrate in the main stem of Martis Creek, the Truckee River, Donner Creek, and East Martis Creek consists of less than 20 percent fine particles. Squaw Creek, West Martis Creek, and Trout Creek each contain the largest percentages of fine sediment substrate with values of 25, 38, and 52 percent, respectively. West Martis Creek and Trout Creek were the only monitored streams to contain reaches with 71-80 percent fine sediment substrate.

The WY 2012 RAM results were compared to results collected at the same locations in WY 2010 to determine whether stream conditions are changing with time. Table 5-1 provides a summary of these comparisons showing the total number of reaches where increases or decreases in fine sediment were observed and the average change in fine sediment substrate for the entire stream segment. These results should be qualified due to the increased measurements that were collected in 2012 for each monitoring reach (11 transects in 2012 compared to 6 transects in 2010). For the Truckee River, the comparisons only include reaches surveyed in both 2010 and 2012.

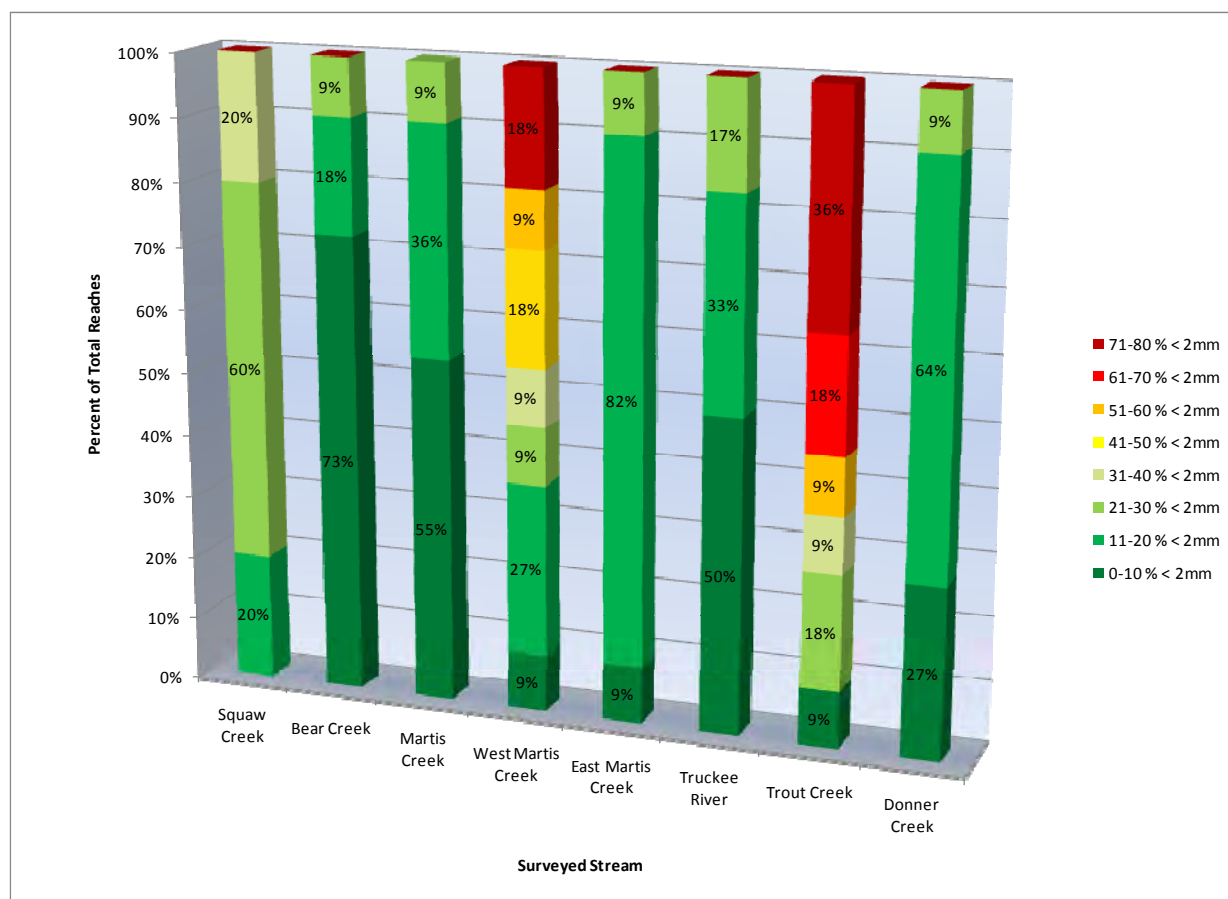


Figure 5-1
Summary of RAM Results

Table 5-1. Comparison of 2010 vs. 2012 Results

Stream Name	No. of Reaches with Increases	No. of Reaches with Decreases	Average Percent Change
Squaw Creek	4	1	7.2
Bear Creek	3	8	-2.7
Martis Creek	1	10	-10.2
West Martis Creek	7	4	10.0
East Martis Creek	4	7	-7.2
Donner Creek	1	10	-7.5
Trout Creek	5	6	0.0
Truckee River	6	5	-2.1

The subsections below discuss RAM results for each surveyed stream segment in detail. The discussions are organized to include the WY 2012 RAM results, a temporal analysis to compare the WY 2010 versus WY 2012 results and a stream gradient analysis to explore potential correlations with sediment deposition areas.

The RAM results for WY 2012 are presented in maps showing the locations of reaches and their fine sediment classifications. The results of the temporal analysis are also shown on the maps. For the gradient analysis, a USGS Digital Elevation Model (DEM) was used to estimate stream gradient. The resolution of the DEM is 1/3 arc second (10 meters), and it is not highly accurate for calculating small differences in slope. A single plot was developed for each stream to illustrate the average gradient and the percentage of fine sediment substrate in each reach for both 2010 and 2012. As expected, the results generally show that fine substrate increases as the stream gradient decreases; however, there are some exceptions. The photographs in Figures 5-2 and 5-3 provide examples of typical channel substrate conditions in higher and lower gradient reaches. Another major factor that influences fine sediment deposition is the existence of beaver dams.



Figure 5-2. Upper West Martis Creek: Example of Low Percentage Fine Sediment Substrate



Figure 5-3. Martis Creek: Example of High Percentage Fine Sediment Substrate

Squaw Creek

The gradient analysis for does not clearly indicate a consistent correlation between gradient and the amount of fine substrate. Figure 5-4 shows that in WY 2010 fine substrate generally increased as the gradient decreased but in WY 2012 the deposition patterns did not follow this trend.

In WY 2012, all reaches within the surveyed segment of Squaw Creek contained 11 to 40 percent fine substrate with an average value of 25 percent. Almost all of the fine substrate was classified as sand rather than fines. The stream segment contains a large number of cobbles with a median diameter of 96mm. The percentage of fine substrate increased in all reaches except for the reach farthest downstream. The amount of fine substrate in Reach 4 increased by 22 percent even though this reach has the steepest gradient. These results are presented graphically in Figure 5-5 below.

After the 2010 RAM surveys, a very large winter, and spring runoff event, occurred which could explain the consistent increase in fine sediment throughout the stream segment. The land adjacent to the monitored segment of Squaw Creek consists of natural forested areas with some private residences. The upstream watershed consists of steep slopes with a large ski resort and high traffic roadways, commercial and residential land uses also exist. Each of these conditions contributes a portion of the fine sediment that is present in the Squaw Creek channel.

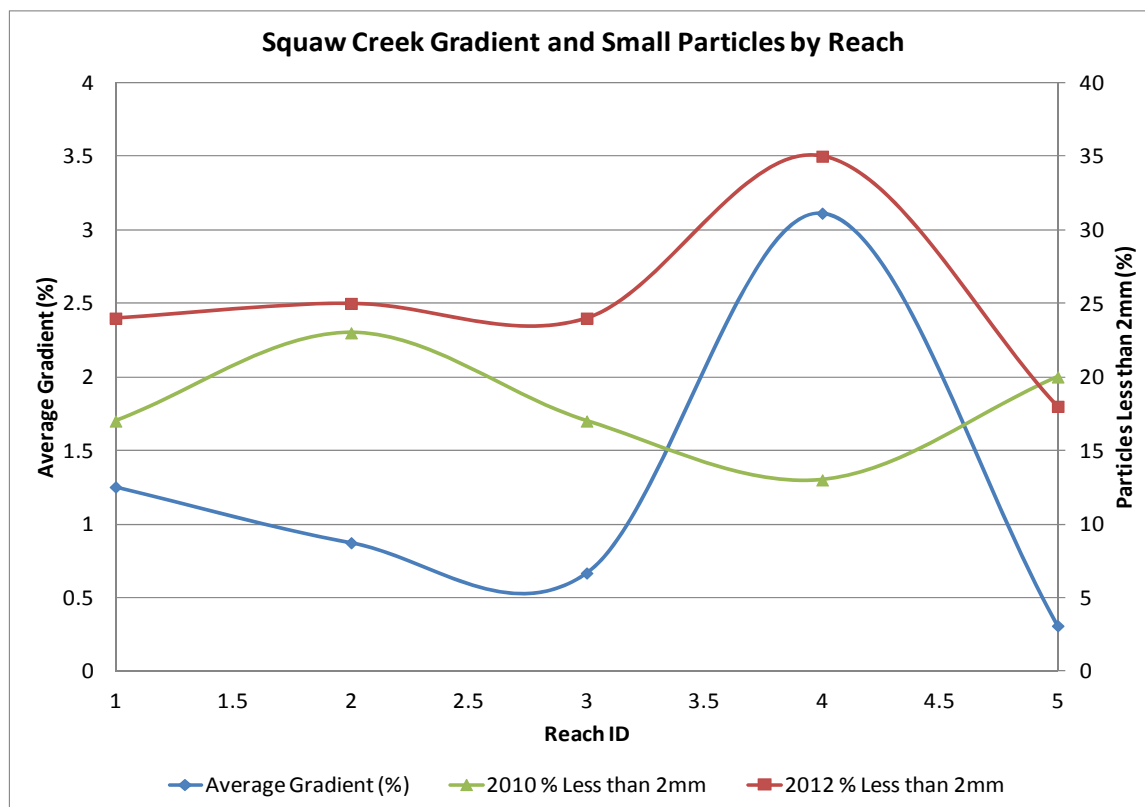
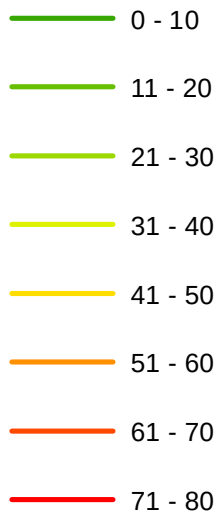


Figure 5-4
Squaw Creek Gradient vs. Fine Sediment

Reach Designations

2012 % < 2mm



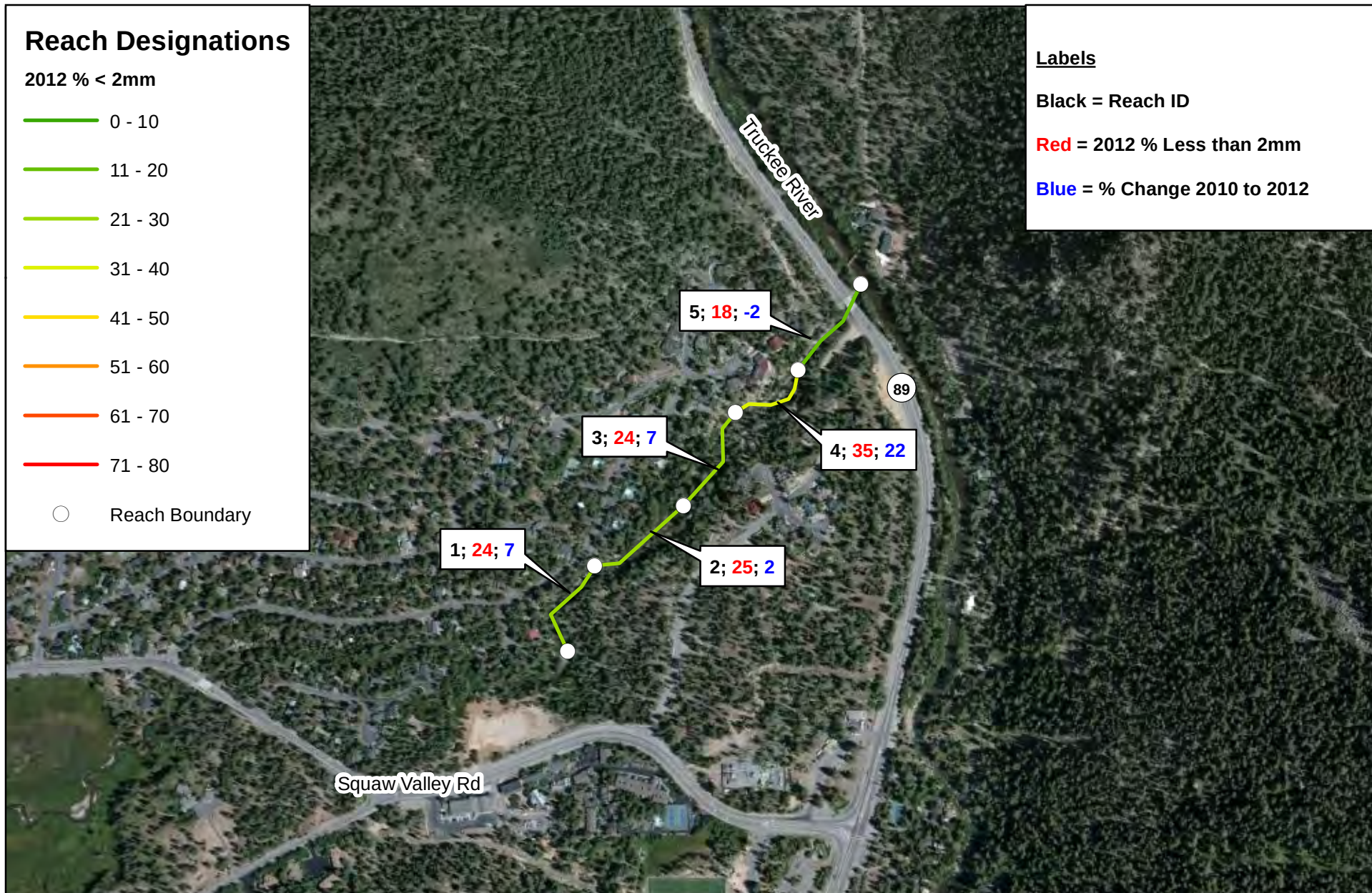
○ Reach Boundary

Labels

Black = Reach ID

Red = 2012 % Less than 2mm

Blue = % Change 2010 to 2012



Source: Aerial Imagery from Bing, Microsoft 2010

**CDM
Smith**



Figure 5-5
Rapid Assessment Methodology
Squaw Creek Reach Designations

Bear Creek

The stream gradient analysis at Bear Creek for WY 2010 and WY 2012 in Figure 5-6 was affected by beaver dams which slow flows and provide additional opportunity for sedimentation. The largest percentages of fine sediment occurred in the lower gradient reaches and in ponded areas behind the beaver dams.

In WY 2012, all reaches of Bear Creek contained between 0 and 30 percent fine substrate with an average value of 9 percent. This was the lowest value observed for all streams monitored in WY 2012. Six percent of this substrate was classified as sand and 2 percent was classified as fines. The surveyed portion of the stream contains a high percentage of cobbles, and the median diameter particle size was 89mm. The amount of fine substrate varied on reach by reach basis; however, the overall amount of remained fairly consistent from WY 2010 to WY 2012. This is attributed to the existence of beaver dams in the creek. Reaches with large increases in fine substrate were observed to have beaver dams in WY 2012 where none existed in WY 2010. For the largest decreases, beaver dams existed in WY 2010 that were no longer present in WY 2012. These results are presented graphically in Figure 5-7 below.

The land adjacent to the monitored segment of Bear Creek consists of forested areas that generally provide a good buffer from nearby roadways. The upstream watershed consists of steep hillsides with a large ski resort and residential development both of which contribute excess sediment to this stream.

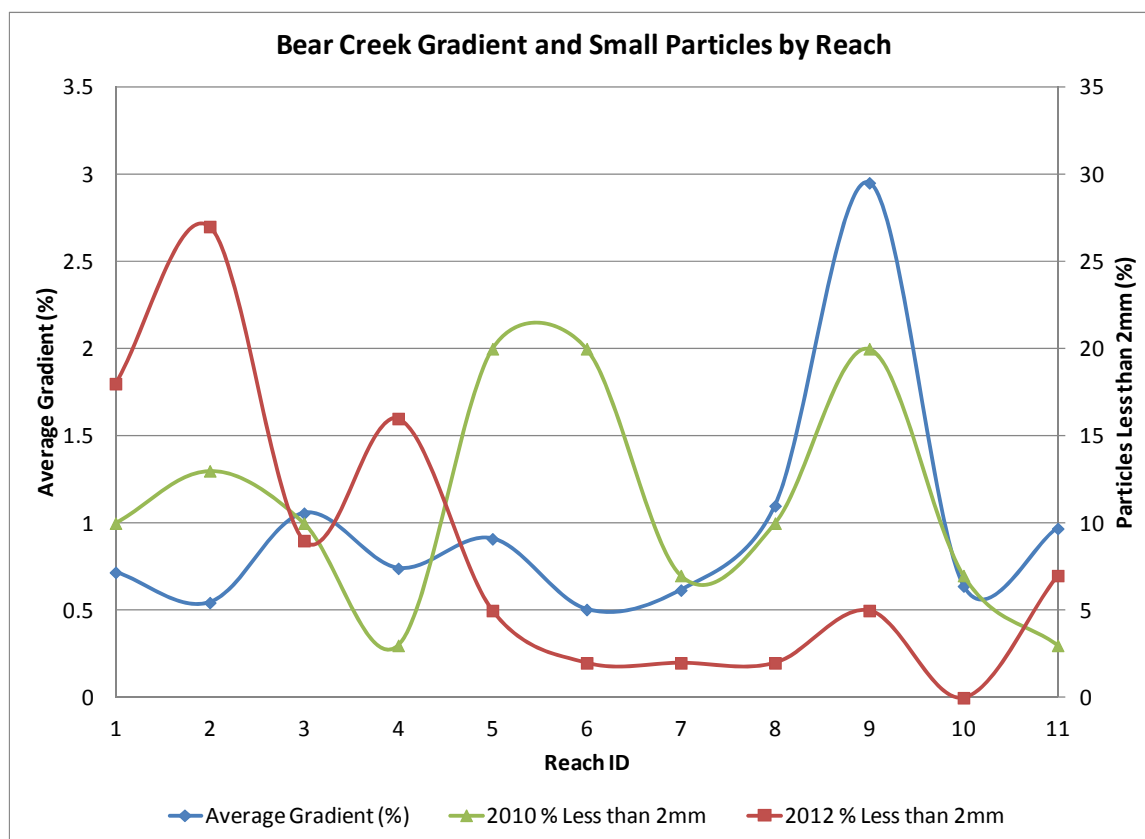
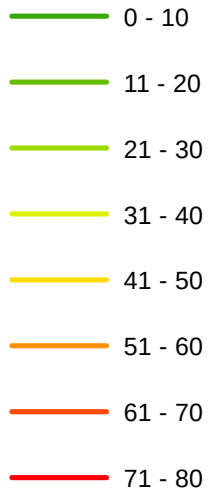


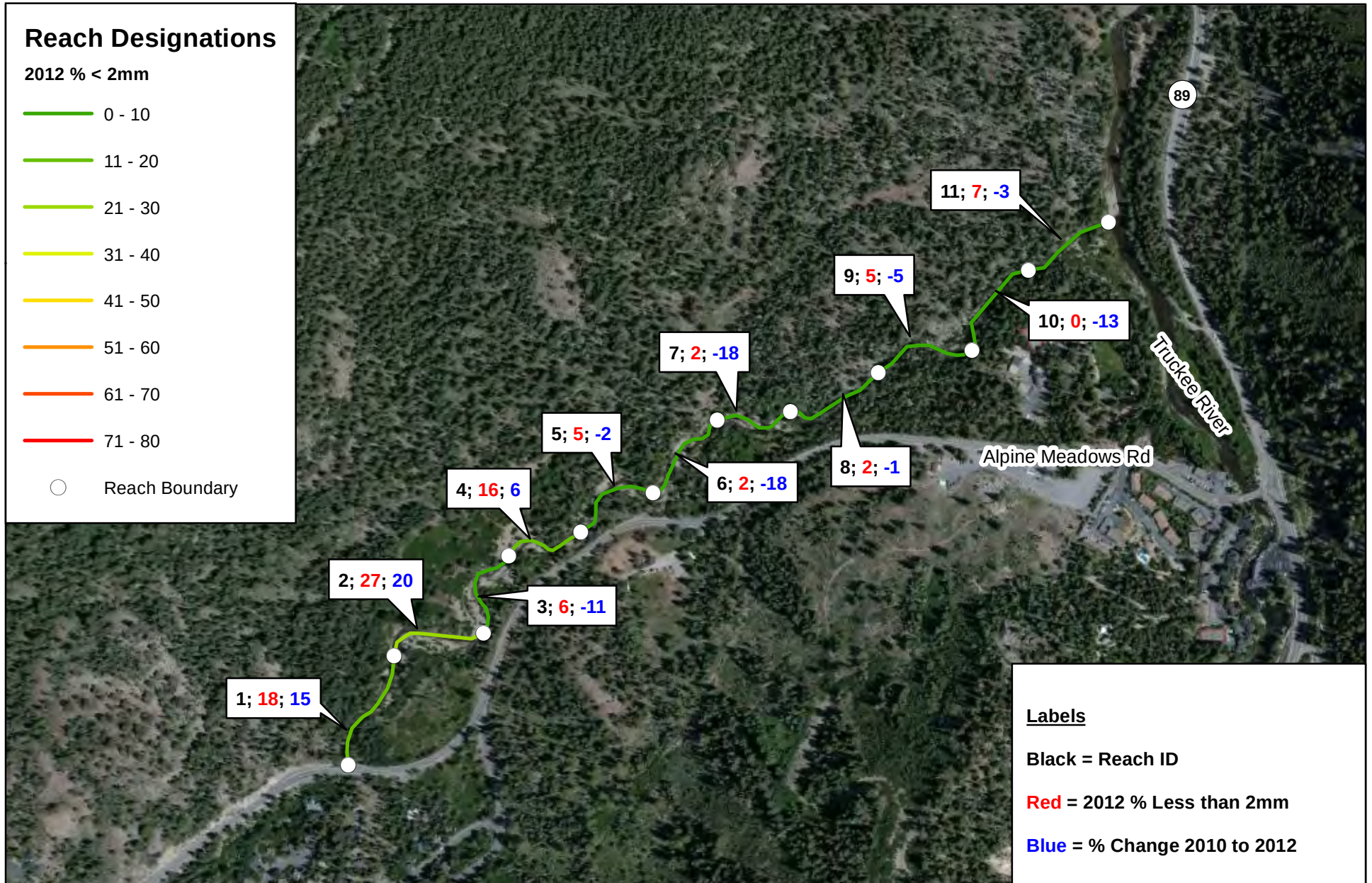
Figure 5-6
Bear Creek Gradient vs. Fine Sediment

Reach Designations

2012 % < 2mm



○ Reach Boundary



Labels

Black = Reach ID

Red = 2012 % Less than 2mm

Blue = % Change 2010 to 2012

Source: Aerial Imagery from Bing, Microsoft 2010

**CDM
Smith**



Figure 5-7
Rapid Assessment Methodology
Bear Creek Reach Designations

Martis Creek Main Stem

The stream gradient analysis at Martis Creek for WY 2010 and WY 2012 in Figure 5-8 was affected by beaver dams which slow flows and increase time for sedimentation. The reach with the highest percentage of fine substrate was located at the downstream end of the monitoring segment where the slope increases but a beaver dam exists downstream.

In WY 2012, all reaches of the main stem of Martis Creek were categorized as having 0 to 30 percent fine substrate with an average value of 12 percent. Four percent of this substrate was classified as sand and 8 percent was classified as fines. The surveyed portion of the stream contains a low percentage of cobbles, and the median diameter particle size was 35mm. The amount of fine substrate decreased substantially from WY 2010 to WY 2012. This could be attributed to the large spring runoff in 2011 which may have caused scouring and transportation of fine substrate downstream. The section of stream monitored during the RAM was relatively flat with a longitudinal slope ranging from near 0 to 0.7 percent. These results are presented graphically in Figure 5-9 below.

The land adjacent to the monitored segment of Martis Creek consists of a large meadow and public use trails (non-motorized). The upstream watershed consists of moderately steep hillsides and contains a portion of the Northstar Ski Resort. The upper portions of the creek pass through a large area of undeveloped forest land before reaching the Martis Camp and Lahontan residential communities. The monitored segment of Martis Creek lies in Martis Valley downstream of these communities and their incorporated golf courses.

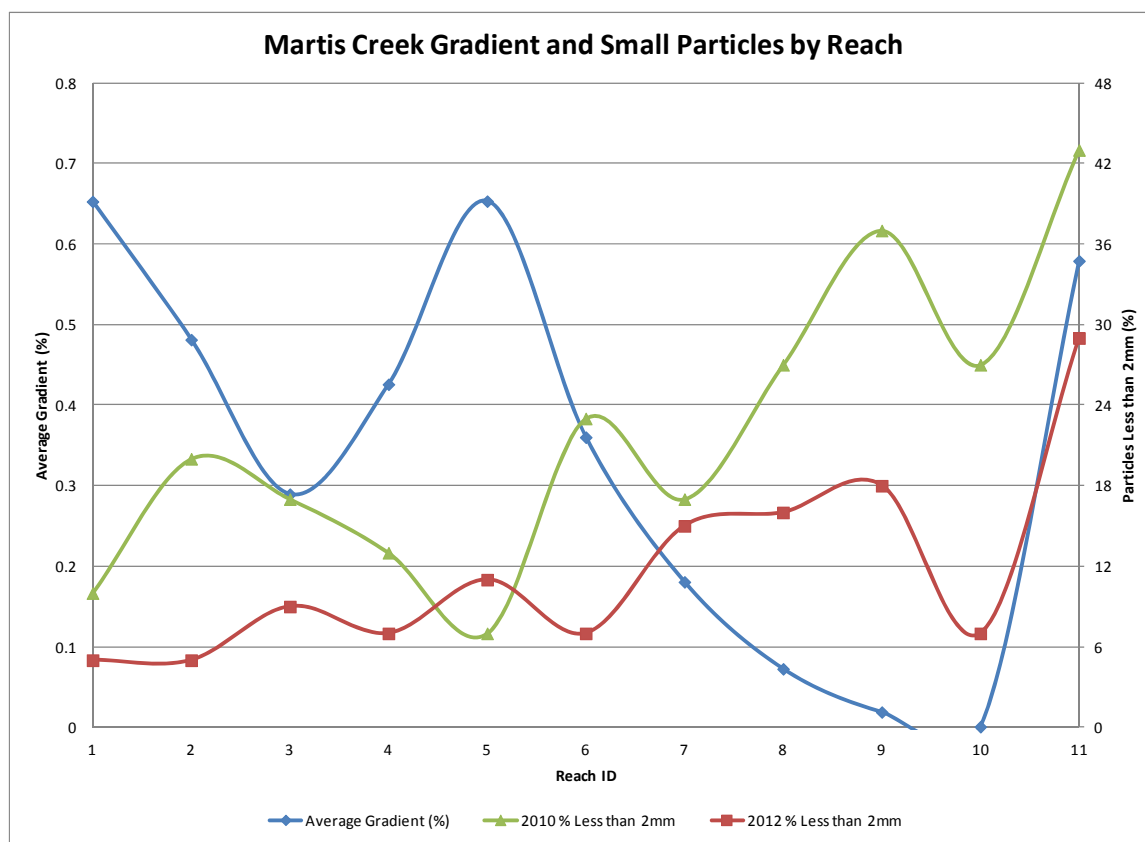


Figure 5-8
Martis Creek Gradient vs. Fine Sediment

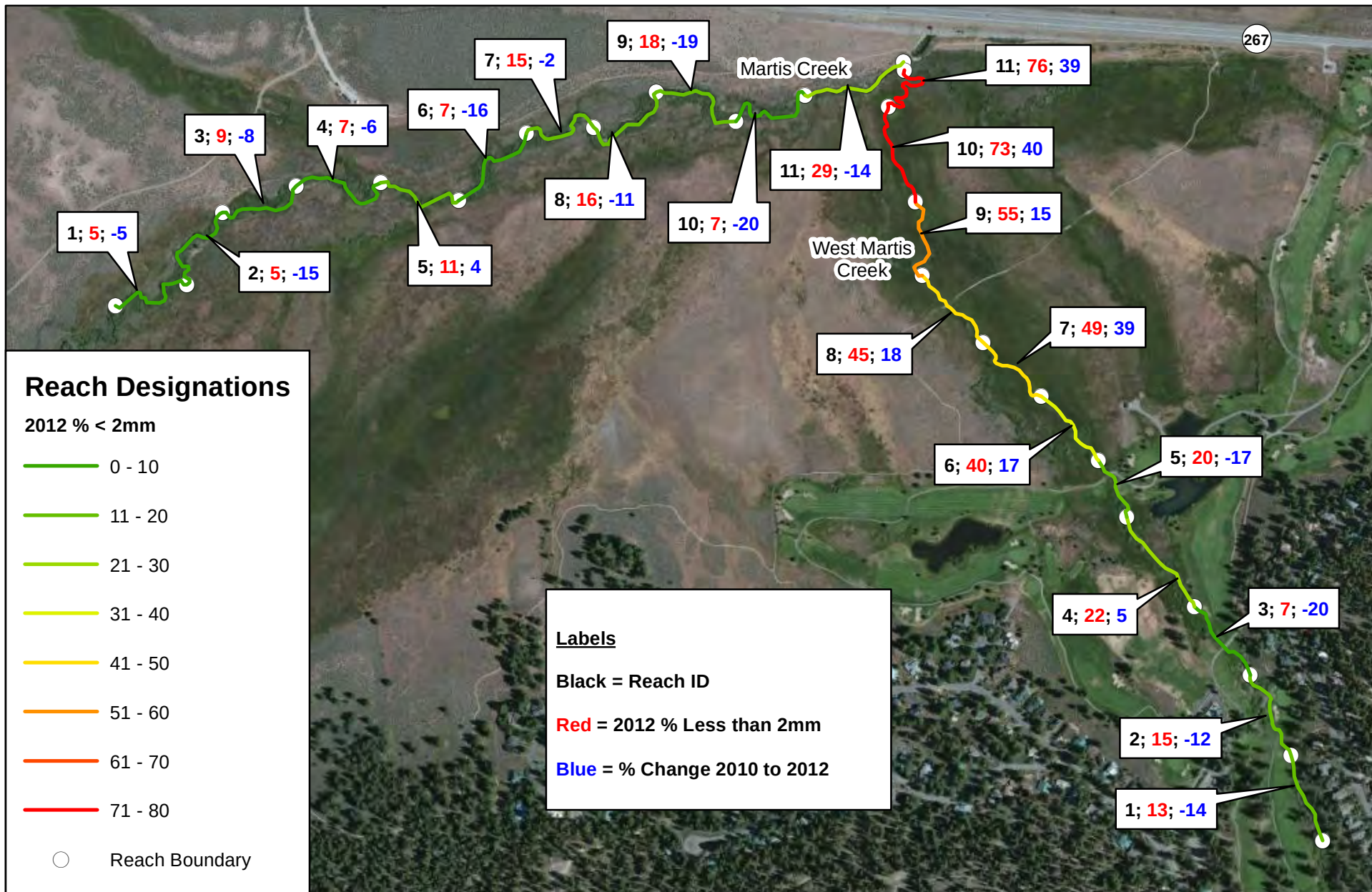


Figure 5-9
Rapid Assessment Methodology
Martis Creek and West Martis
Creek Reach Designations

West Martis Creek

The gradient analysis for West Martis Creek shown in Figure 5-10 clearly shows the relationship between fine sediment deposition and the channel gradient with the amount of fine substrate increasing as slope decreases. The pattern is more pronounced in WY 2012 and may also be partially attributed to a beaver dam that was recently established downstream of the surveyed segment.

In WY 2012, the West Martis Creek RAM Segment contained between 0 and 80 percent fine substrate (82 percent). West Martis Creek had the second highest average percentage of fine substrate during WY 2012 at 38 percent. Thirteen percent of this substrate was classified as sand and 25 percent was classified as fines. The surveyed portion of the stream contains a low percentage of cobbles at its lower end in the meadow, and a moderate amount of cobbles in the upper extent outside the meadow. The median diameter particle size was 26mm. The amount of fine sediment in WY 2012 decreased in the upper reaches where stream gradient was greatest and increased in the lower meadow reaches. It is possible that fine substrate from the upper reaches was flushed downstream during the large WY 2011 but it is not clear why new sediment loads from upstream did not replace it. These results are presented graphically in Figure 5-9 above.

The land adjacent to the monitored segment of Martis Creek consists of a natural meadow, public use trails, a golf course, and residential development. The upstream watershed consists of moderately steep hillsides and a large portion of the Northstar Ski Resort. Commercial, residential, and golf course land uses also exist in the upper watershed. A comparison of RAM results between other surveyed Martis Creek segments and West Martis Creek indicates that the highly developed watershed of West Martis Creek is likely contributing to the elevated amount of fine substrate observed in the channel.

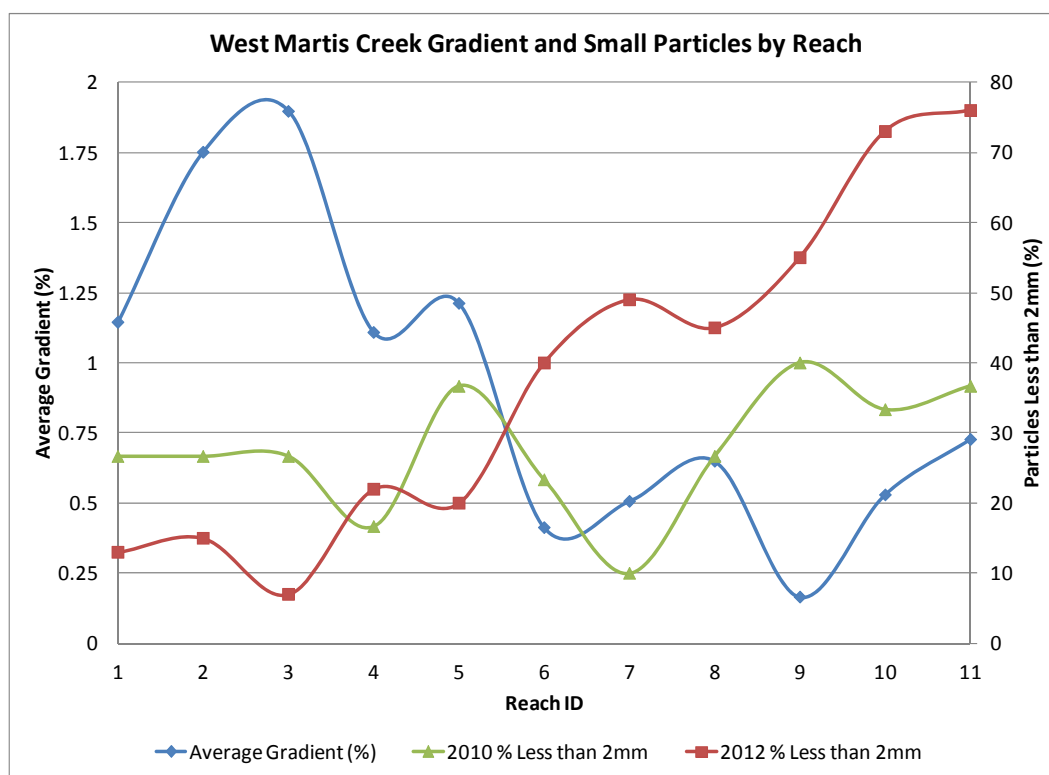


Figure 5-10
West Martis Creek Gradient vs. Fine Sediment

East Martis Creek

The stream gradient analysis for East Martis Creek, illustrated in Figure 5-11, shows some correlation between fine deposition and channel gradient but the pattern is not as clear as in other surveyed streams.

In WY 2012, all reaches of East Martis Creek were categorized as having 0 to 30 percent fine substrate with an average value of 16 percent. Five percent of this substrate was classified as sand and 11 percent was classified as fines. The surveyed portion of the stream contains a low percentage of cobbles at its lower end in the meadow, and a moderate amount of cobbles in the upper extent outside the meadow. The median diameter particle size was 39mm. The amount of fine substrate was fairly consistent between WY 2010 and WY 2012 but there was an overall decrease of 7 percent. The greatest change was in Reach 11 where previously deposited lake sediments may have been flushed downstream by the large WY 2011 runoff events. These results are presented graphically in Figure 5-12 below.

The land adjacent to the monitored segment of Martis Creek consists of a natural meadow, public use trails and unpaved roads. The upstream watershed is moderately steep with undeveloped forested hillsides and some existing dirt roads.

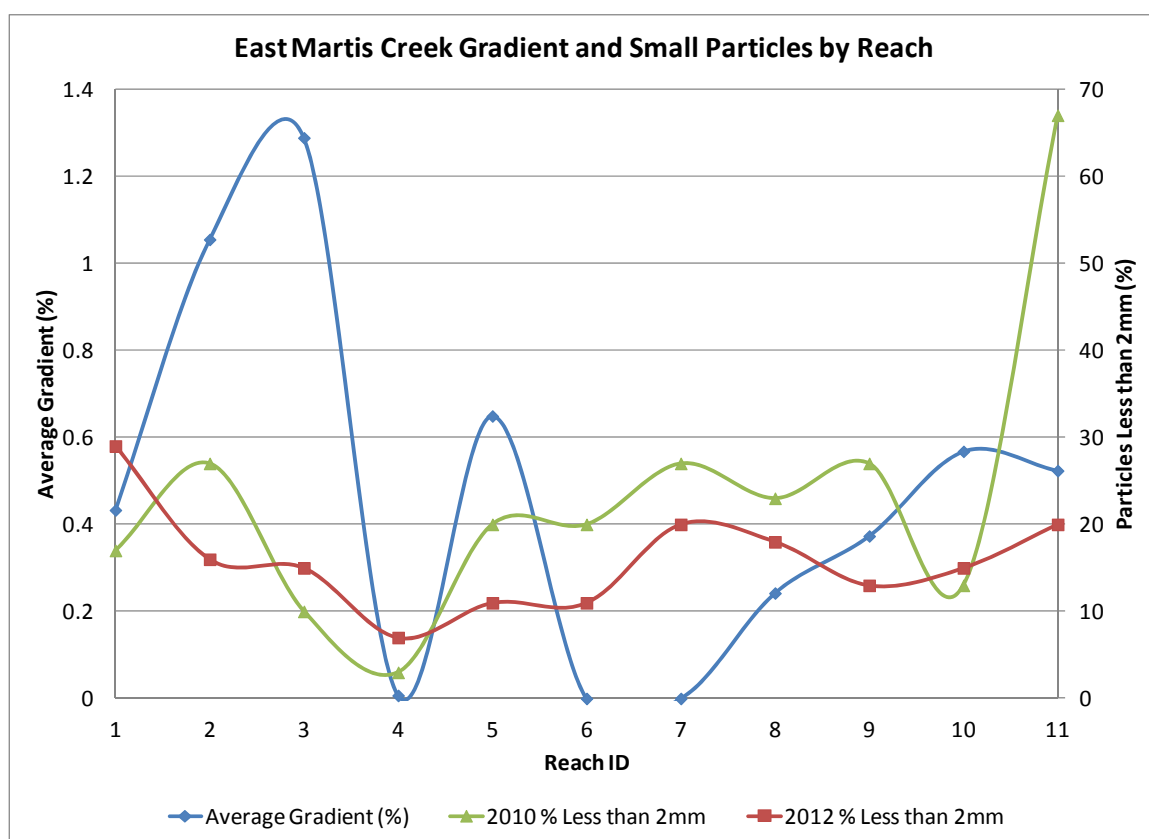
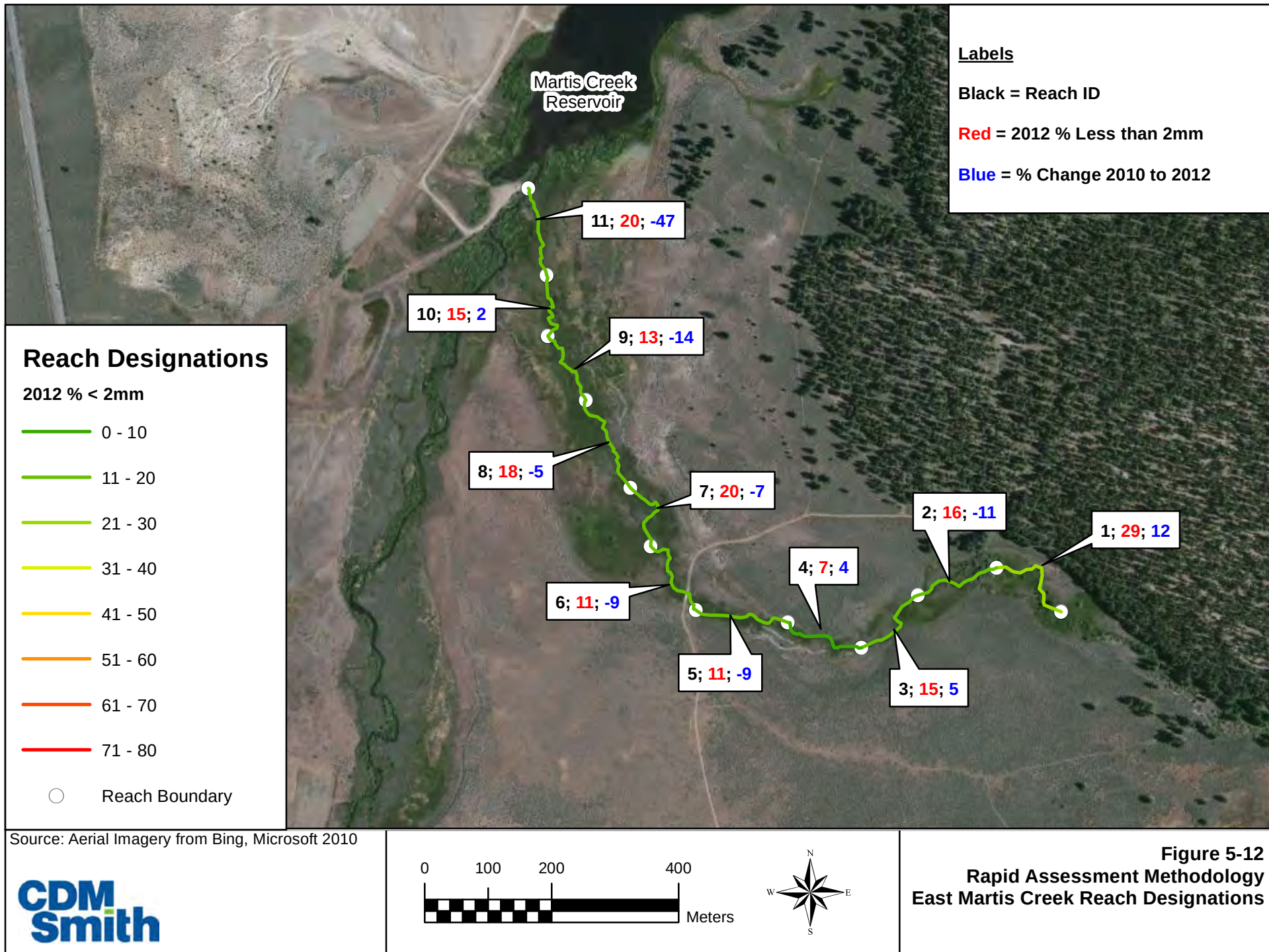


Figure 5-11
East Martis Creek Gradient vs. Fine Sediment



Donner Creek

The stream gradient analysis at Donner Creek for WY 2010 and WY 2012 in Figure 5-13 illustrates the limitations in the available topographic data. This data indicates that Reaches 4-7 have a zero percent gradient while it is known that this is not the case. Fine sediment deposition patterns do not appear to have a strong correlation with gradient in this case.

In WY 2012, all reaches of Donner Creek were categorized as having 0 to 30 percent fine substrate with an average value of 13 percent. Six percent of this substrate was classified as sand and 7 percent was classified as fines. The surveyed portion of the stream contains a high percentage of cobbles, and the median diameter particle size was 117mm. The amount of fine substrate decreased between WY 2010 and WY 2012 in all but one reach with an average decrease of 8 percent. These results are presented graphically in Figure 5-14 below.

The land adjacent to the monitored segment of Donner Creek includes primary roadways, a railroad, commercial and residential areas. Flows in the monitored portion of Donner Creek are combined discharges from Donner Lake (regulated) and Coldstream Creek (unregulated). The upstream watershed below Donner Lake is relatively flat along Interstate 80. The Coldstream Creek watershed is steep and consists of undeveloped forested hillsides with some existing dirt roads, a railroad, and legacy mining impacts.

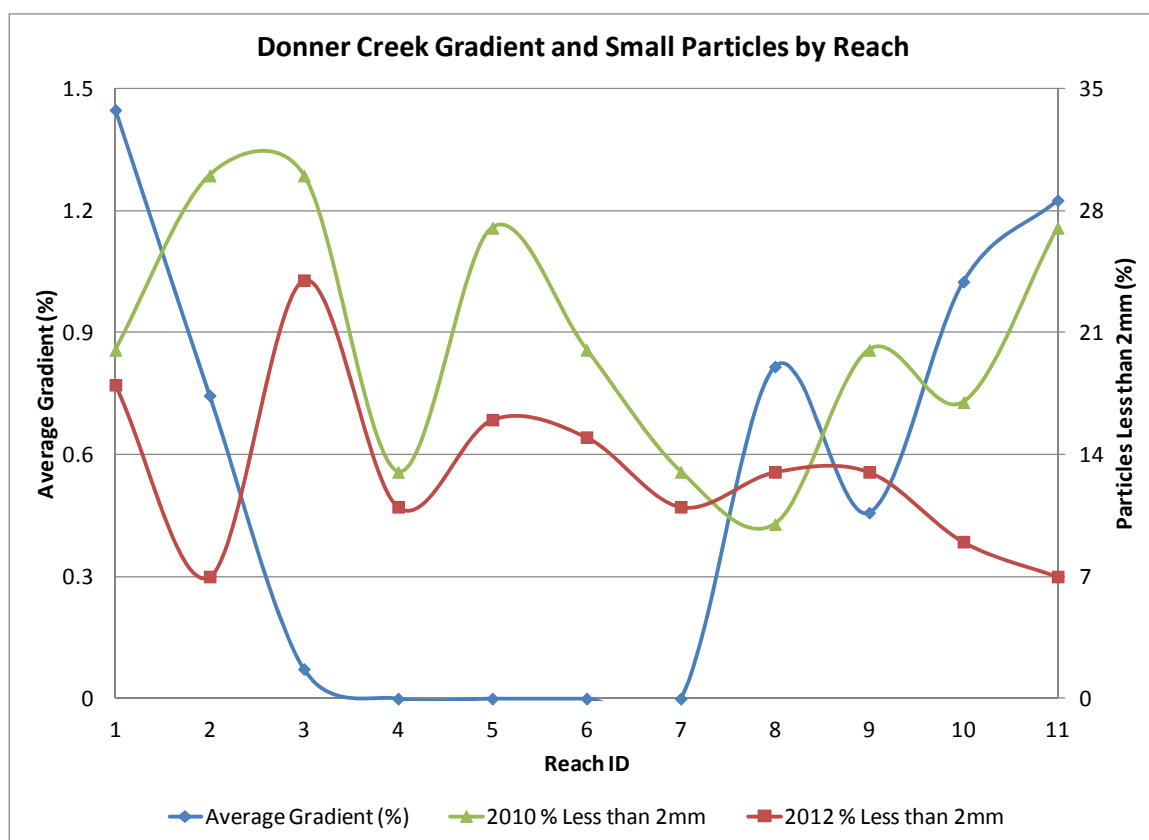
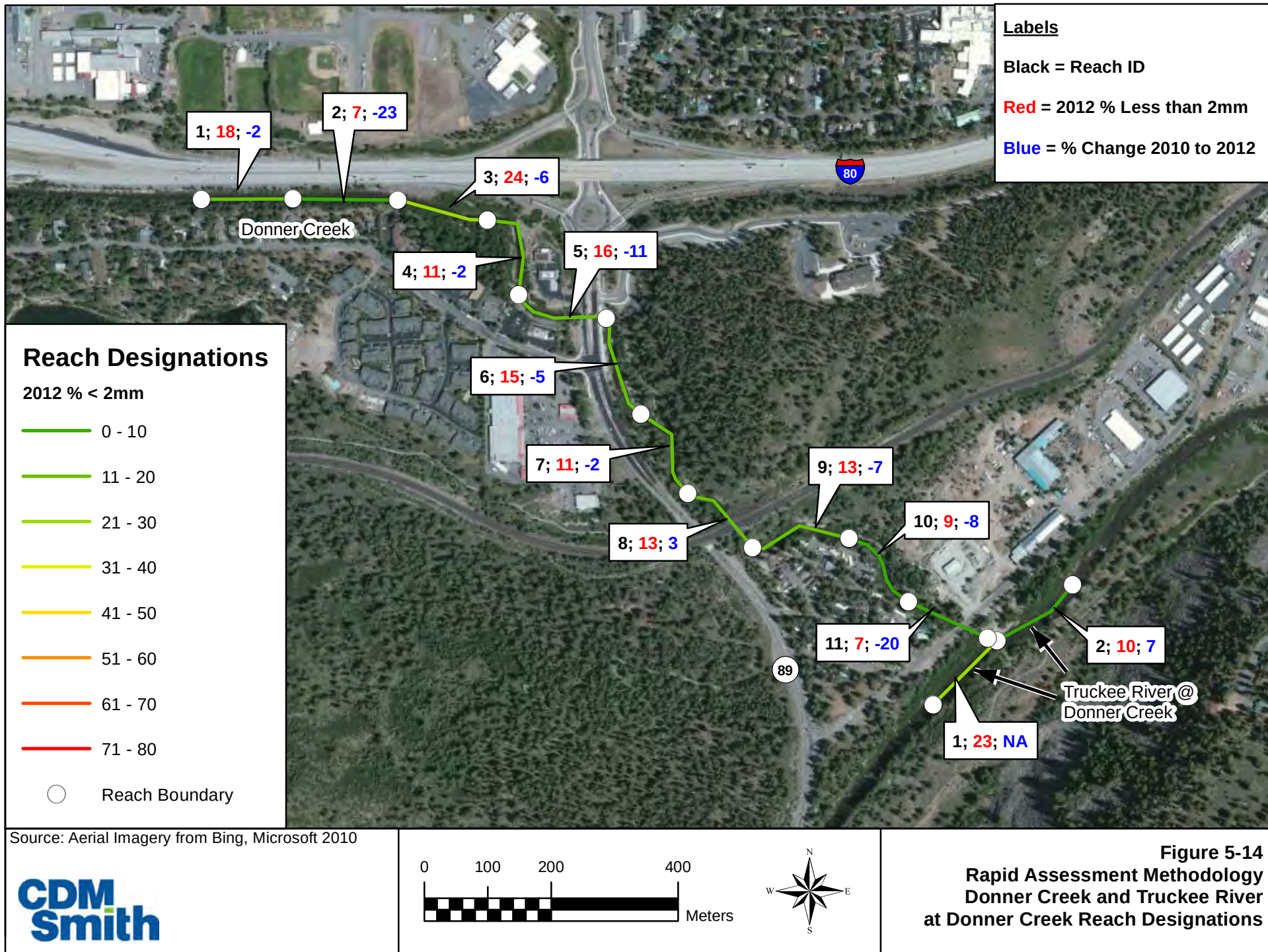


Figure 5-13
Donner Creek Gradient vs. Fine Sediment



Trout Creek

The stream gradient analysis at Trout Creek for WY 2010 and WY 2012 presented in Figure 5-15 illustrates that the amount of fine substrate in this creek increases as stream gradient decreases. This figure also shows the consistency in results from WY 2010 to WY 2012. Beaver dams throughout the surveyed segment also influence deposition patterns.

In WY 2012, approximately 60 percent of the surveyed reaches in Trout Creek were categorized as having 51 to 80 percent fine substrate with an average value of 52 percent. This was the highest value observed during WY 2012. Five percent of this substrate was classified as sand and 47 percent was classified as fines. The surveyed portion of the stream contains a low percentage of cobbles at its downstream end while the recently restored area in the upper reaches contain a moderate amount of cobbles and the median diameter particle size was 53mm. The amount of fine substrate in Trout Creek remained fairly consistent from WY 2010 to WY 2012 but decreased in Reaches 2-3 in the restored portion of the channel. These results are presented graphically in Figure 5-16 below.

The land adjacent to the monitored segment of Trout Creek consists of industrial and commercial areas, primary roadways and a railroad. The upstream watershed is moderately steep and consists of a large residential community and incorporated golf courses. Due to the amount of fine substrate in the upper restored, it appears that development and activities upstream are a significant source of fine sediment to Trout Creek.

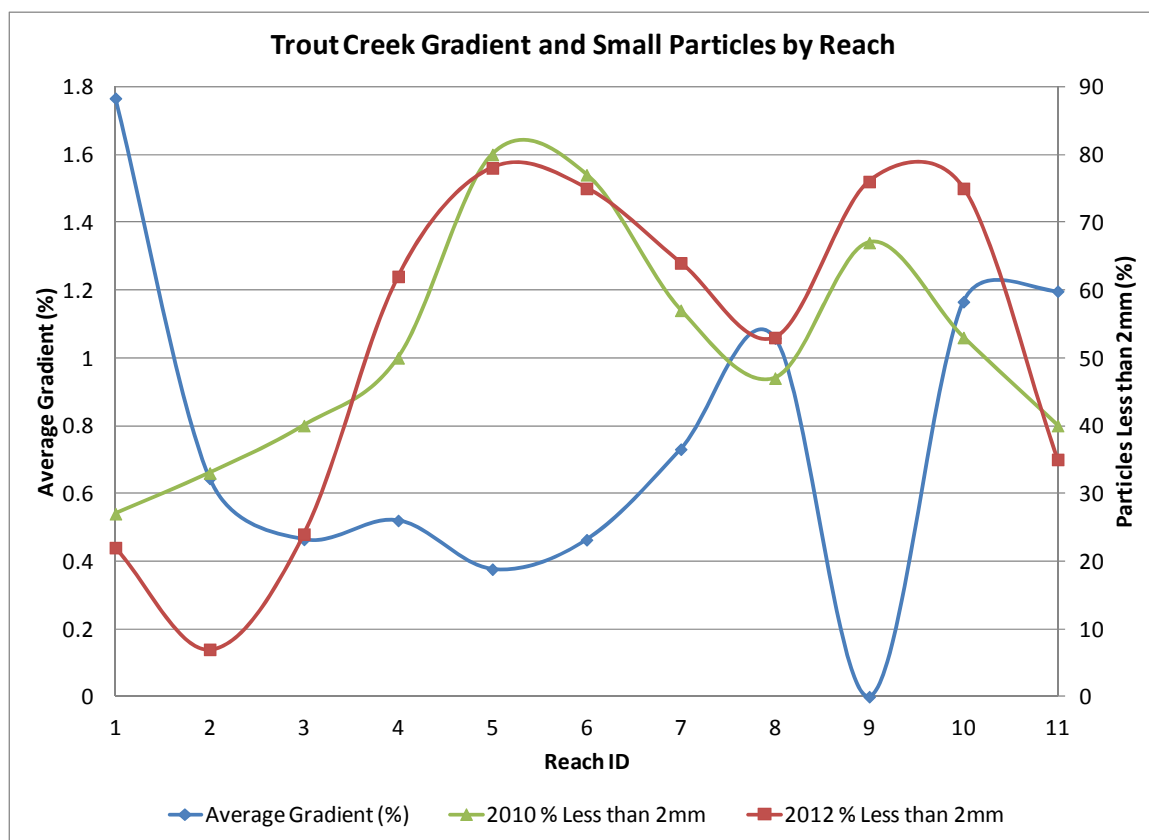
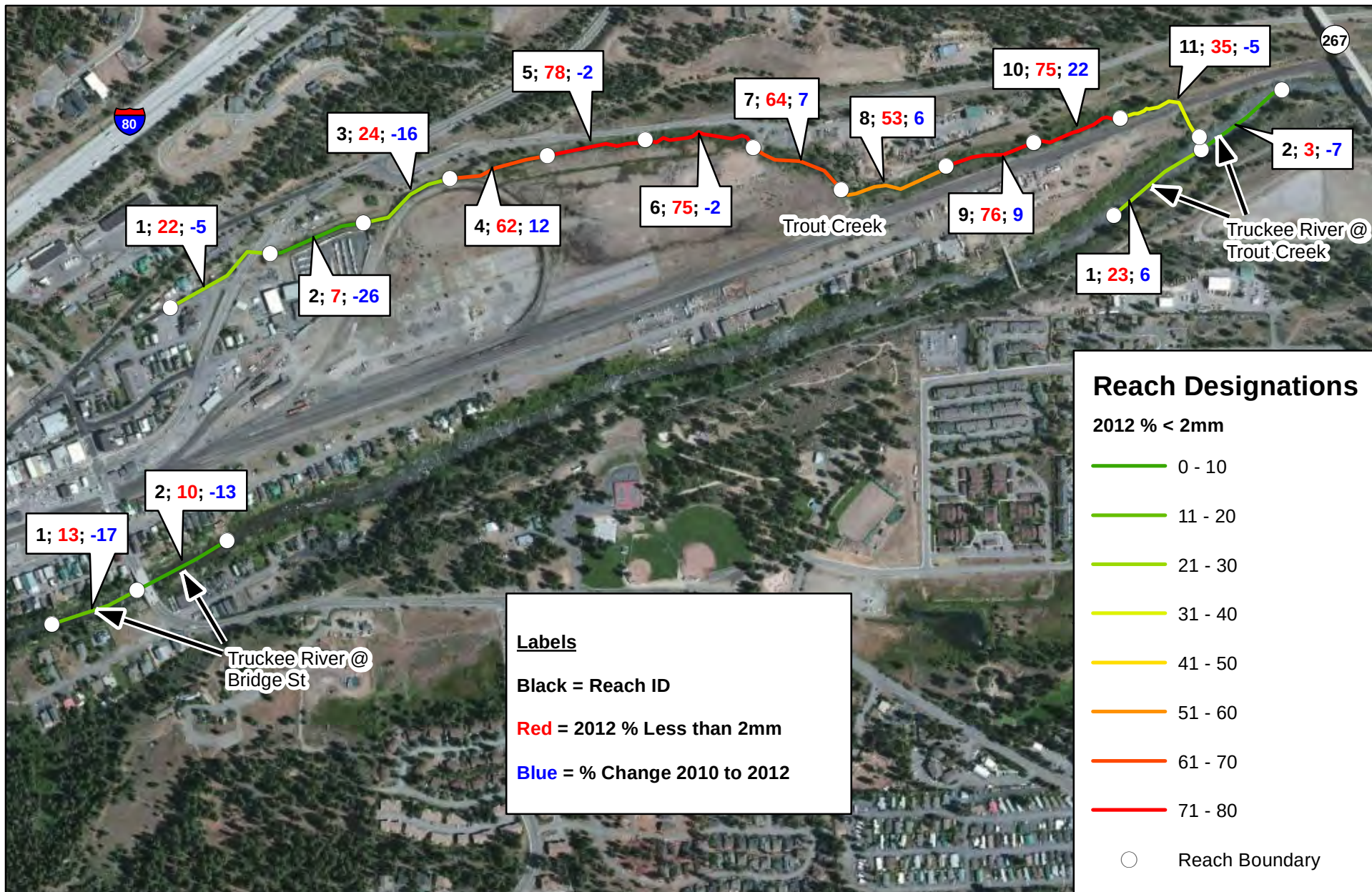


Figure 5-15
Trout Creek Gradient vs. Fine Sediment



Source: Aerial Imagery from Bing, Microsoft 2010

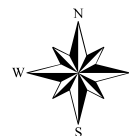


Figure 5-16
Rapid Assessment Methodology
Trout Creek and Truckee River
Reach Designations

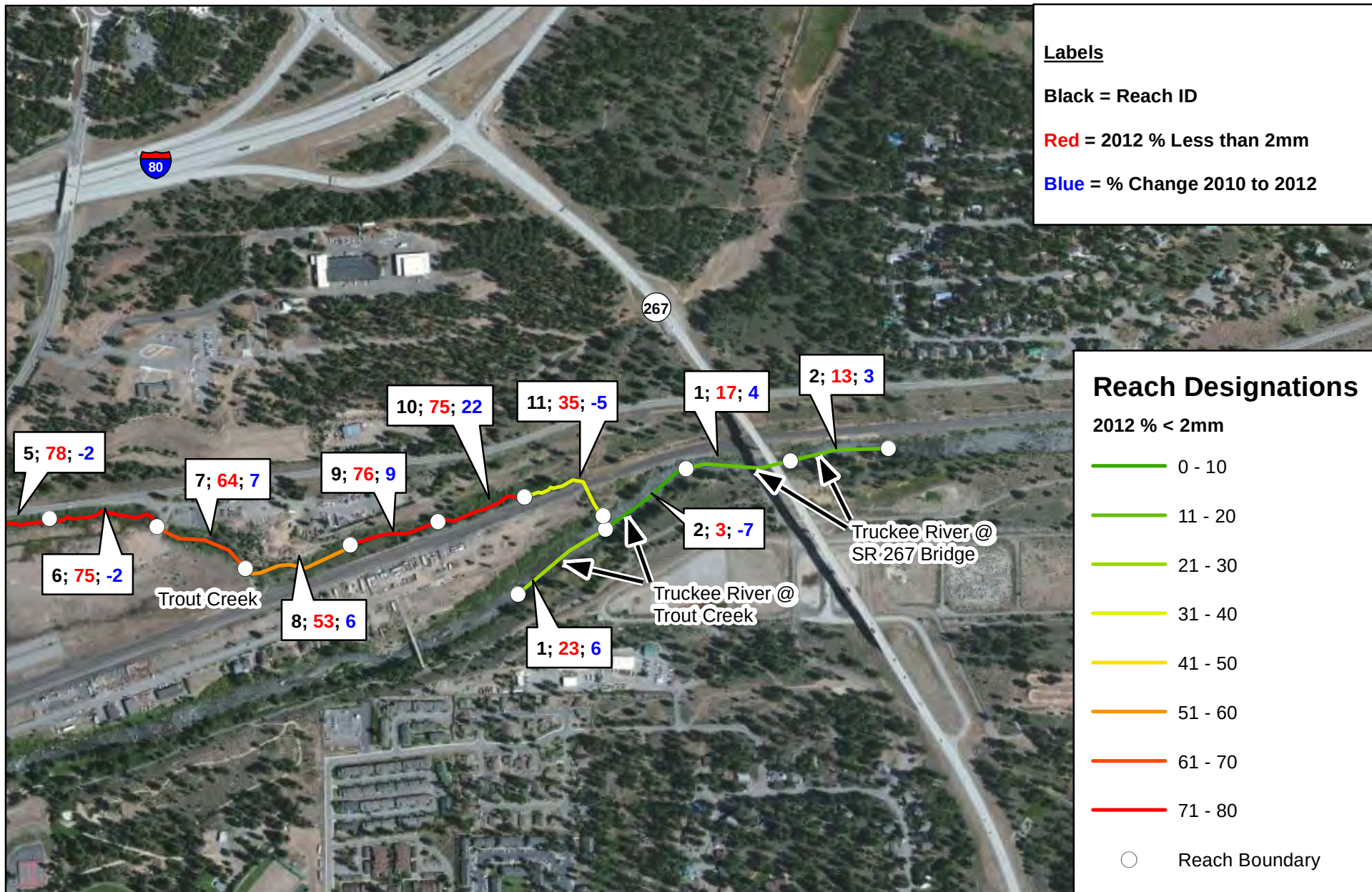
Truckee River

The stream gradient analysis for the Truckee River generally shows that the fine substrate decreases as stream gradient increases; however, due to the length of the surveyed segment and differences between the survey locations between 2010 and 2012, the data is too complex to graph effectively.

In WY 2012, all of the reaches surveyed in the Truckee River were categorized as having 0 to 30 percent fine substrate with an average value of 13 percent. All of this substrate was classified as sand with no fines observed. The surveyed portion of the river contains a high percentage of cobbles, and median diameter particle size was 195mm. The results indicate that all reaches had relatively low levels of fine substrate and that conditions remained fairly consistent from WY 2010 to WY 2012. Although monitoring efforts were focused on reaches directly upstream and downstream of key stream confluences and road crossings, no clear evidence exists regarding the impact these have on fine sediment in the river. It is likely that most of the fine substrate is transported downstream during periods of high discharge where it settles in locations that have flatter slopes and less energy. The results are presented graphically in Figures 5-14 and 5-16, above, and 5-17 and 5-18 below.

In addition to the reach based analysis, a more focused analysis was developed for the Truckee River in an attempt to identify areas of concern even though the average percent of fine substrate by reach is low. In this approach, both 2010 and 2012 RAM data was analyzed by examining the individual measurement locations to discern patterns of fine sediment deposition. The results indicate that most fine sediment is deposited along the edges of the stream channel, presumably due to the lower flow velocities that occur in these locations. Figures 5-19 through 5-24 illustrate these results, showing the locations where fine substrate was measured in WY 2010 and WY 2012. In the future, the RAM may be modified with more detailed surveys that focus on identified areas of concern.

The land uses adjacent to the monitored reaches of the Truckee River vary widely and include primary and secondary roadways, a railroad, industrial, commercial and residential areas and natural open space.

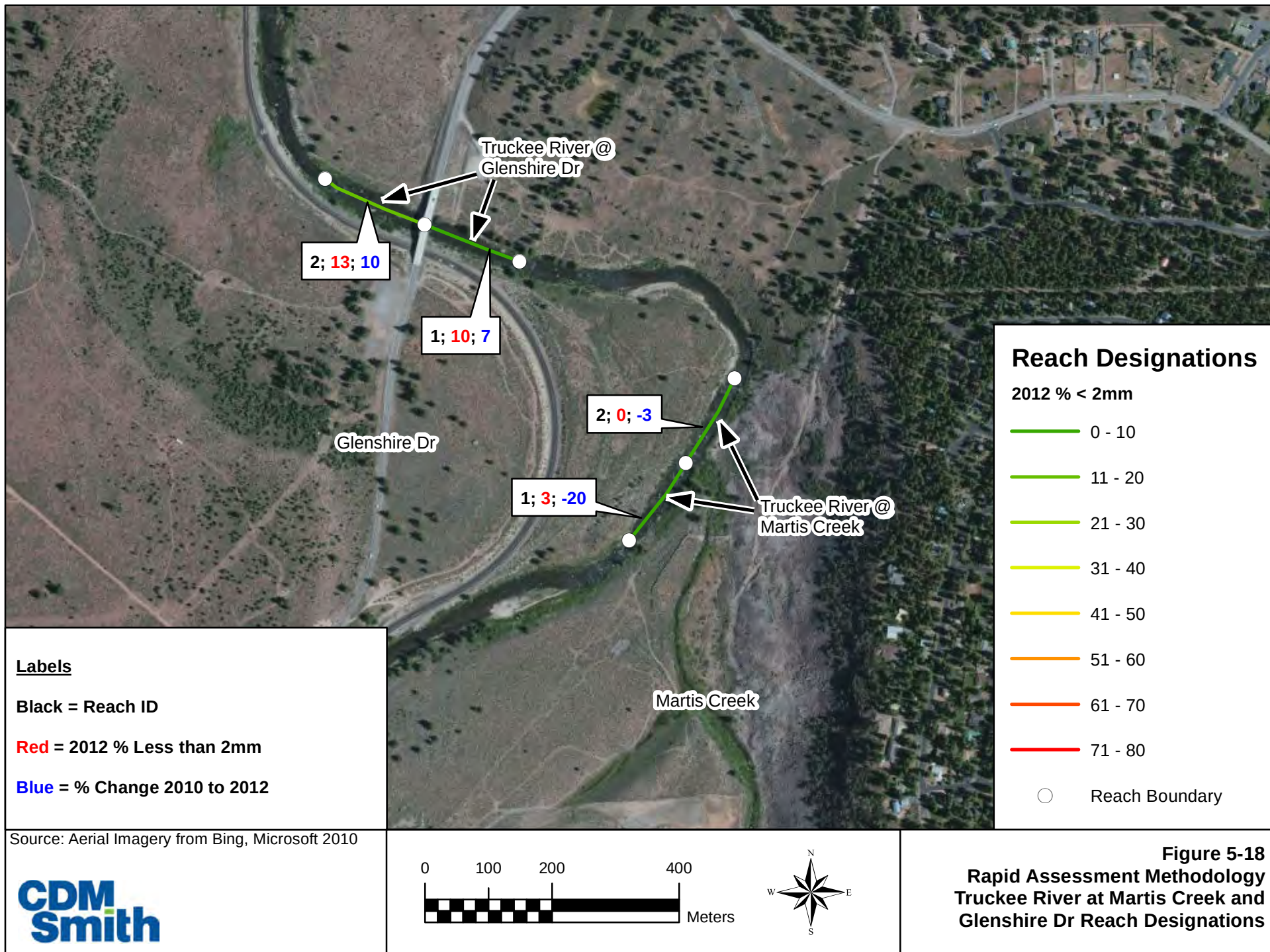


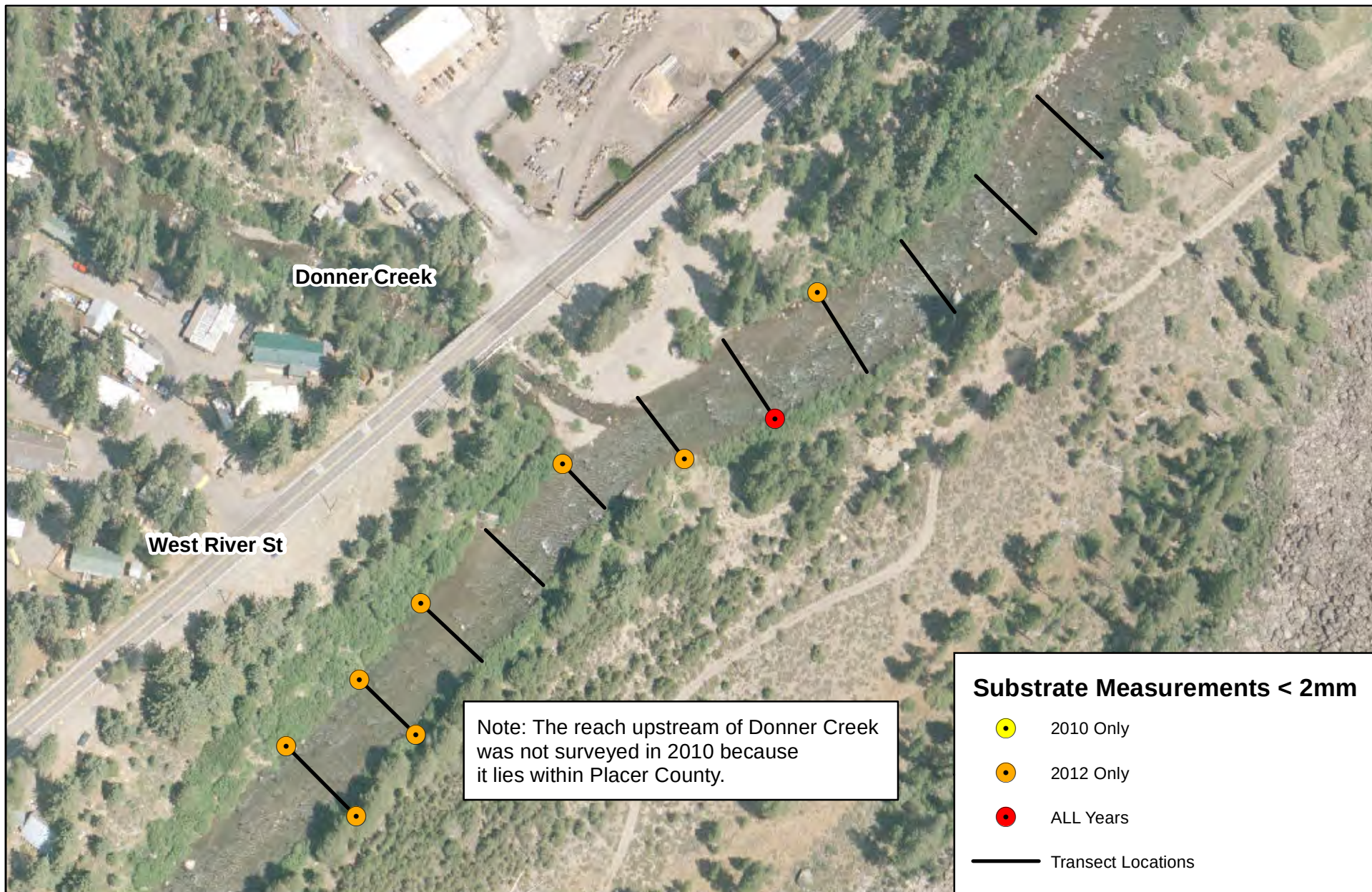
Source: Aerial Imagery from Bing, Microsoft 2010

**CDM
Smith**



Figure 5-17
Rapid Assessment Methodology
Truckee River at Trout Creek and
the SR 267 Bridge Reach Designations





Source: Aerial photograph provided by Town of Truckee

**CDM
Smith**

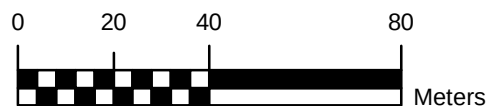
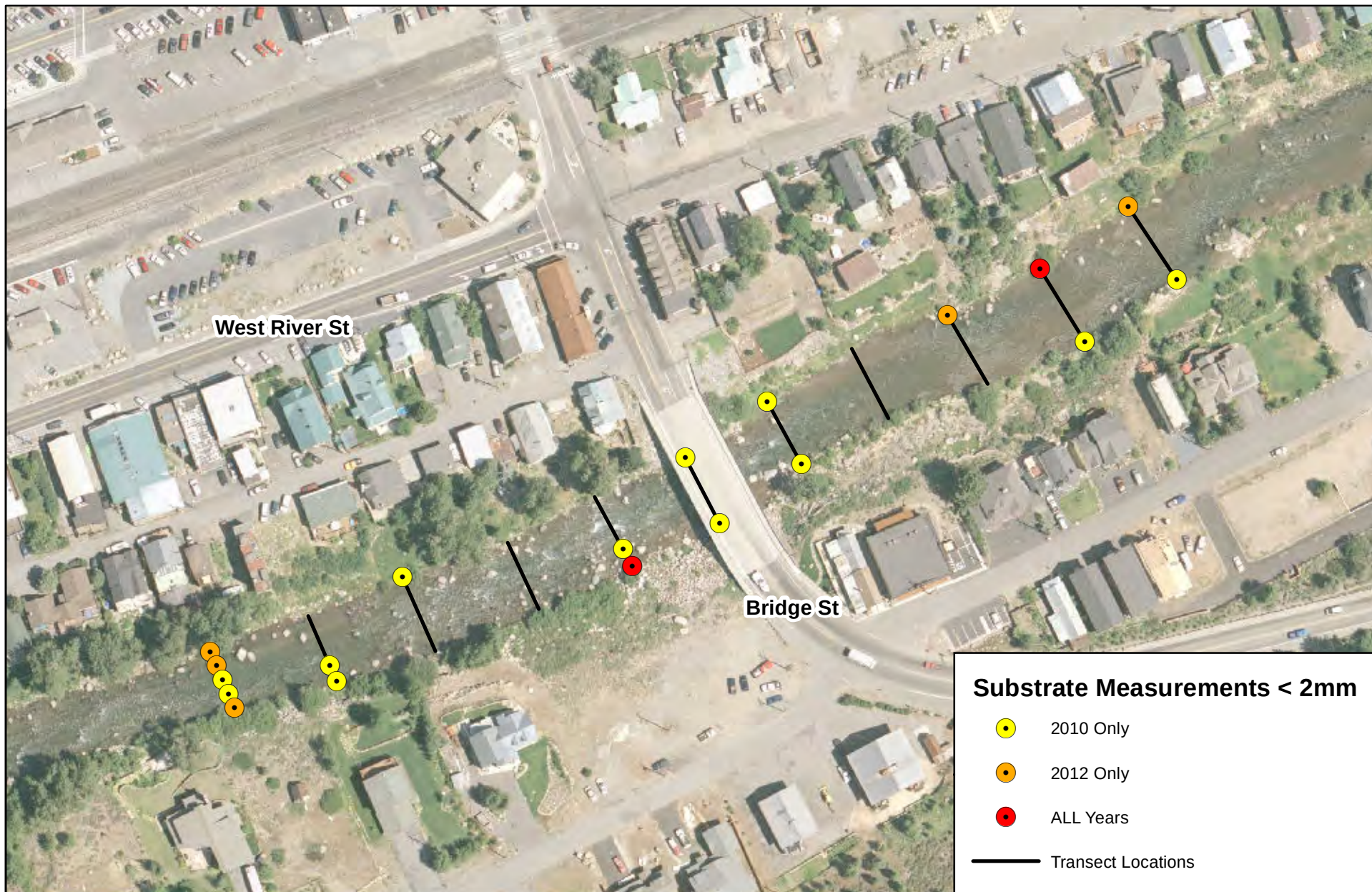


Figure 5-19
Rapid Assessment Methodology
Measurements Less than 2mm
Truckee River at Donner Creek



Source: Aerial photograph provided by Town of Truckee

**CDM
Smith**

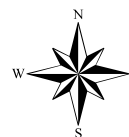
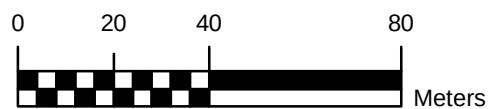
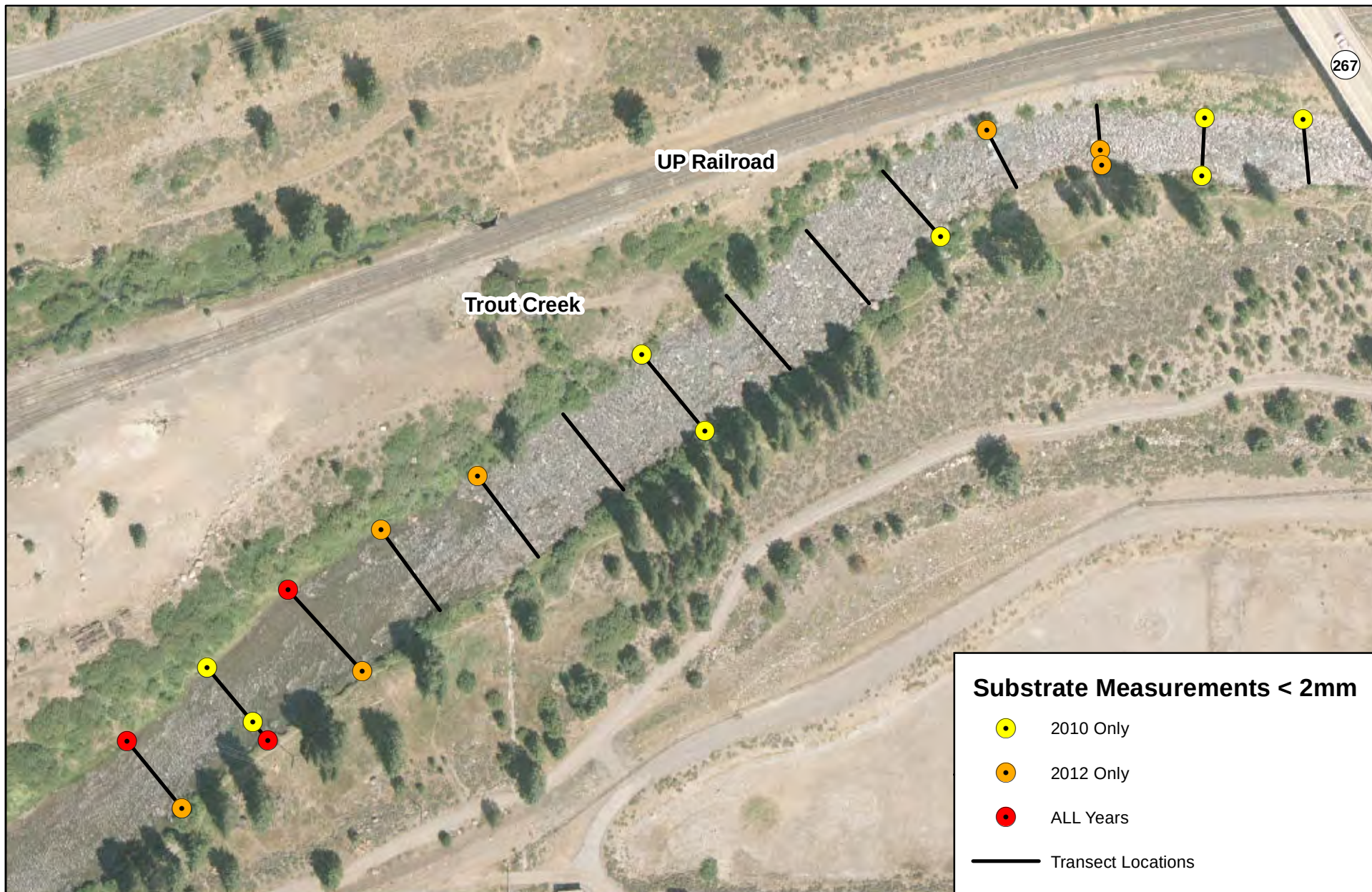


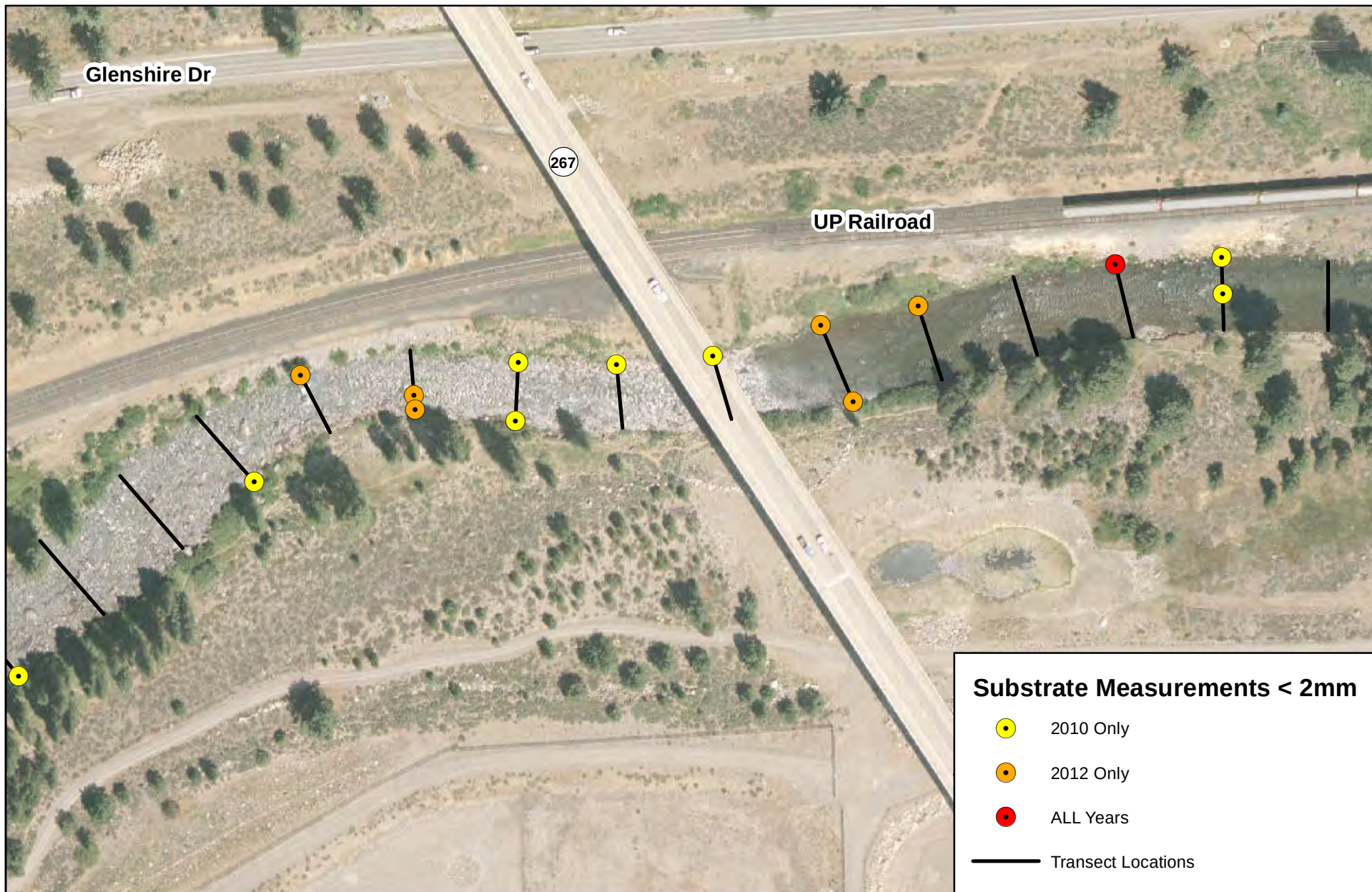
Figure 5-20
Rapid Assessment Methodology
Measurements Less than 2mm
Truckee River at Bridge Street



Source: Aerial photograph provided by Town of Truckee

**CDM
Smith**

Figure 5-21
Rapid Assessment Methodology
Measurements Less than 2mm
Truckee River at Trout Creek



Source: Aerial photograph provided by Town of Truckee

**CDM
Smith**

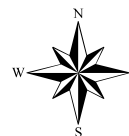
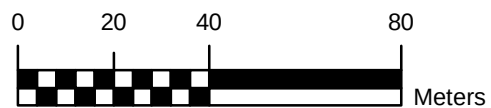
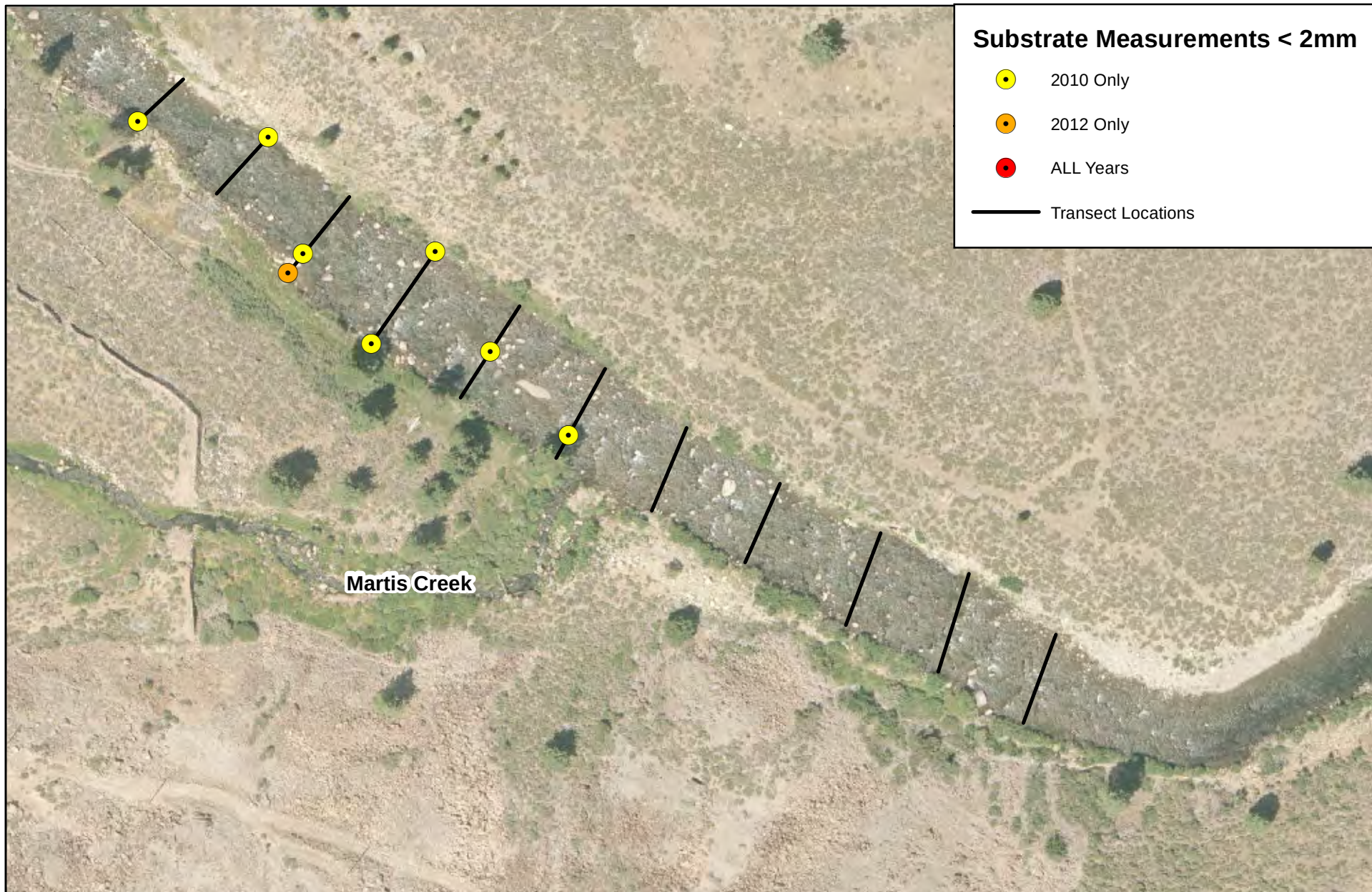


Figure 5-22
Rapid Assessment Methodology
Measurements Less than 2mm
Truckee River at SR 267



Source: Aerial photograph provided by Town of Truckee

**CDM
Smith**

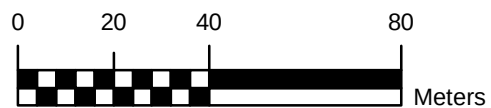
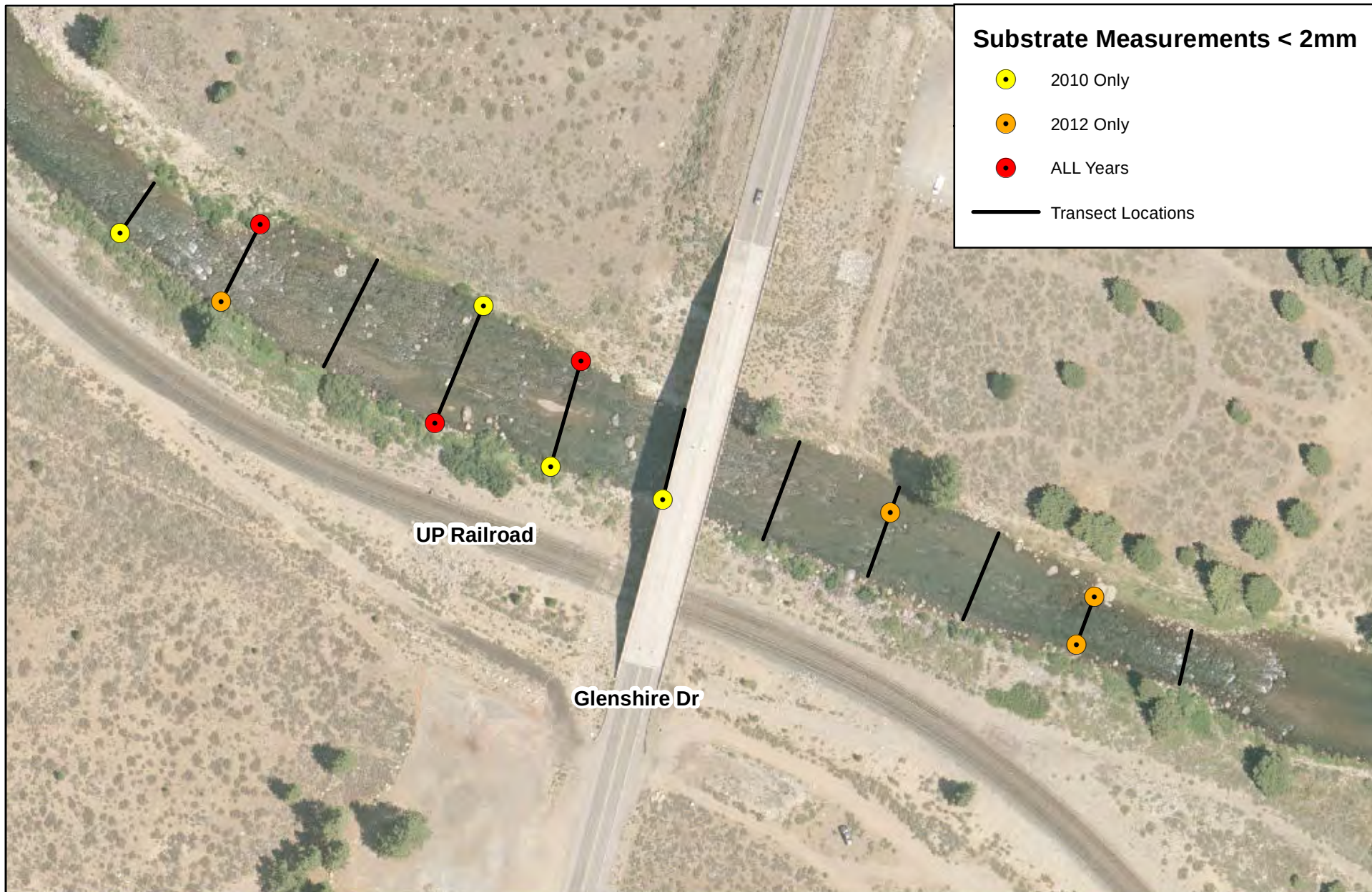


Figure 5-23
Rapid Assessment Methodology
Measurements Less than 2mm
Truckee River at Martis Creek



Substrate Measurements < 2mm

● 2010 Only

● 2012 Only

● ALL Years

— Transect Locations

UP Railroad

Glenshire Dr

Source: Aerial photograph provided by Town of Truckee

**CDM
Smith**

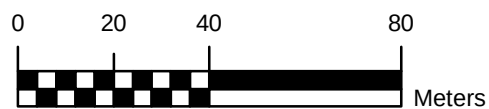


Figure 5-24
Rapid Assessment Methodology
Measurements Less than 2mm
Truckee River at Glenshire Drive

5.2 Bioassessments

Bioassessments were conducted in Squaw and Martis Creeks during the summer and fall of 2012. Squaw Creek surveys were completed in late July and Martis Creek surveys were completed in August and September. The bioassessment results are presented below beginning with a documentation of the monitoring locations.

5.2.1 Monitoring Site Locations

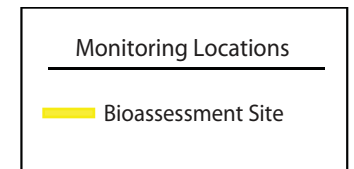
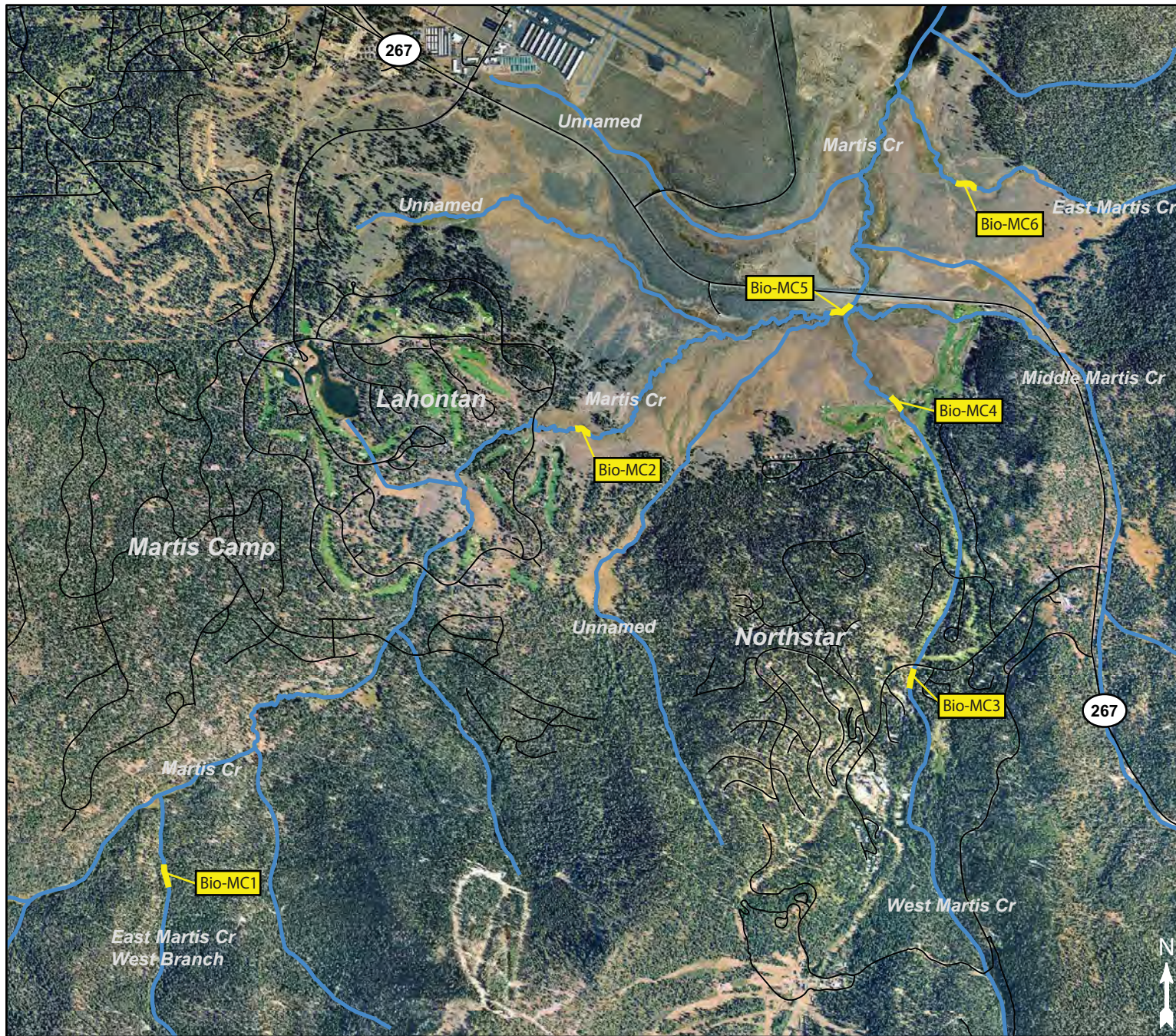
The stream and station descriptions where bioassessments occurred during the 2012 monitoring period are summarized in Table 5-2 and the locations are displayed graphically in Figures 5-25 and 5-26. All 2012 bioassessment monitoring locations were identical to those surveyed in 2010.

Table 5-2. Bioassessment Locations

Surface Water	Reach Length (meter)	Station ID	Reach Latitude / Longitude ¹	
			Upstream Endpoint	Downstream Endpoint
Squaw Creek	150	Bio-SC1	39° 12' 5.02" N 120° 13' 10.68" W	39° 12' 2.60" N 120° 13' 12.11" W
	150	Bio-SC2	39° 12' 18.53" N 120° 12' 56.59" W	39° 12' 17.18" N 120° 13' 1.98" W
	150	Bio-SC3	39° 12' 18.99" N 120° 12' 44.69" W	39° 12' 19.19" N 120° 12' 49.61" W
Martis Creek	150	Bio-MC2	39° 16' 17.83" N 120° 10' 14.00" W	39° 16' 22.019" N 120° 10' 14.17" W
	150	Bio-MC5	39° 17' 42.42" N 120° 8' 24.82" W	39° 17' 43.51" N 120° 8' 28.81" W
Upper Martis Creek	150	Bio-MC1	39° 16' 53.99" N 120° 7' 2.22" W	39° 16' 49.88" N 120° 7' 3.63" W
West Martis Creek	150	Bio-MC3	39° 17' 45.9" N 120° 7' 4.1" W	39° 17' 48.8" N 120° 7' 7.0" W
	150	Bio-MC4	39° 18' 7.39" N 120° 7' 16.83" W	39° 18' 5.88" N 120° 7' 22.18" W
East Martis Creek	150	Bio-MC6	39° 18' 31.34" N 120° 6' 48.84" W	39° 18' 30.26" N 120° 6' 43.47" W

¹ Coordinate System: NAD 1983 State Plane California II FIPS 0402 Feet





5.2.2 Bioassessment Results

Bioassessment results are presented in this section beginning with a discussion of field conditions and measurements and followed with the presentation of detailed laboratory results and calculations. A complete set of the original field data forms are provided in Appendix B.

Squaw Creek

Weather conditions were fair and warm during the July bioassessment surveys in Squaw Creek. Brief thundershowers occurred on one of the survey days (7/23/12). Stream temperatures ranged from 17.5 to 22.5 °C and pH ranged from 7.5 to 8.0. Conductivity ranged from 153 to 161 µS/cm and dissolved oxygen ranged from 4.3 to 10.7 milligrams/liter at 48 to 193 percent saturation.

Flows in Squaw Creek were between 0.6 and 1.8 ft³/sec during the surveys (thundershowers increased discharge slightly during one of the three survey days). Surface flows between pool-riffle-run sequences were continuous (i.e., no intermittent flows or dry channel sections were present along the longitudinal profile). Mean wetted width was between 4.9 and 5.5 meters and mean depth was between 21 and 34 centimeters. Median particle size (D50) was between 5 and 6 millimeters. Particles less than 2 millimeters in diameter (fines and sands) comprised between 33 and 35 percent of the streambed. Cobbles were scarce, with mean cobble embeddedness between 10 and 29 percent. Filamentous algae growth was substantial, particularly along the stream margins, but not overwhelming as can be the case during lower and/or intermittent flow conditions typical of later in the year. Aquatic macrophytes were also common in depositional and lower gradient areas within the stream. Representative photos of each site are provided in Figure 5-27.

The channel in this meadow section of Squaw Creek is very low gradient (0.01% to 0.35% slope) with relatively high sinuosity (1.1 to 1.9). The channel is typically open and un-shaded (mean canopy cover was between 0% and 1%). Stream banks are lined with low herbaceous cover (grasses, sedges, etc.) and sparse willow bushes. The channel appeared incised with a high percentage of eroded stream banks (69% to 88%). Several banks had boulder rip-rap placed as protection although some of this was failing.



FIGURE 5-27a. Collecting benthic macroinvertebrate samples in Squaw Creek (7/23/12).



FIGURE 5-27b. Measuring stream discharge in Squaw Creek (7/23/12).



FIGURE 5-27c. Looking upstream from the middle of the Lower Meadow site (7/23/12).



FIGURE 5-27d. Looking upstream from near the top of the Middle Meadow site (7/24/12).



FIGURE 5-27e. Looking upstream from the middle of the Upper Meadow site (7/30/12).



FIGURE 5-27f. Deposition of DG sand and fine sediments along the Lower Meadow site (7/23/12).

Figure 5-27
Bioassessment Photographs – Squaw Creek

Martis Creek

Weather conditions were fair during the August and September bioassessment surveys in Martis Creek. Stream temperatures ranged from 8.8 to 11.9 °C and pH ranged from 6.9 to 7.5. Conductivity ranged from 84 to 140 µS/cm and dissolved oxygen ranged from 10.3 to 11.5 mg/L at 89 to 106 percent saturation.

Generally discharge was lower in the upper portions of the watershed (e.g., 1.7 cfs in the upper West Branch [site Bio-MC3] and 1.4 cfs in the Schaeffer Branch [site Bio-MC1]) and greater in the lower portions of the watershed (e.g., 6.1 cfs in the lower mainstem). Mean wetted width was between 0.8 and 3.5 meters and mean depth was between 9 and 24 centimeters. Median particle size (D_{50}) was between 14 and 42 millimeters. Particles less than 2 millimeters in diameter (fines and sands) comprised between 13 and 30 percent of the streambed. Mean cobble embeddedness was between 4 and 19 percent. Representative photos of each site are provided in Figure 5-28.

The channel in the upstream headwater sections of Martis Creek is relatively high gradient (e.g., 4.9% slope in the upper West Branch [site Bio-MC3] and 3.1% in the Schaeffer Branch [site Bio-MC1]) with relatively low sinuosity (1.1 to 1.2). Stream gradient in the downstream meadow sections of Martis Creek is lower (between 0.4% and 2.5%) with slightly higher sinuosity (between 1.1 and 1.4). In the upper reaches, the channel is typically well shaded by alder and willow bushes and an overstory of conifers (e.g., mean canopy cover was 87% and 89% in the upper West Branch [site Bio-MC3] and the Schaeffer Branch [site Bio-MC1], respectively); whereas in the lower reaches, no overstory is present and stream banks are lined with low herbaceous cover (grasses, sedges, etc.) and some sparse willow bushes (mean canopy cover in the lower reaches was between 4% and 27%). At several locations in the lower reaches, the channel appeared somewhat incised with some eroding or vulnerable stream banks (the highest percentage of eroded banks was 86% in the middle mainstem of Martis Creek [site Bio-MC2]). The lowest percentages of eroded banks were in the upper and lower West Branch (sites Bio-MC3 and Bio-MC4) and East Branch (site Bio-MC6); at all three of these sites, zero percent of stream banks were described as eroded or vulnerable.



FIGURE 5-28a. Looking upstream from the bottom of site Bio-MC1 in the Schaeffer Branch (8/21/12).



FIGURE 5-28b. Looking upstream from the bottom of site Bio-MC2 in middle Martis Creek (8/24/12).



FIGURE 5-28c. Looking upstream from the bottom of site Bio-MC3 in the upper West Branch (9/6/12).



FIGURE 5-28d. Looking upstream from the bottom of site Bio-MC4 in the lower West Branch (9/17/12).



FIGURE 5-28e. Looking upstream from the bottom of site Bio-MC5 in lower Martis Creek (9/14/12).

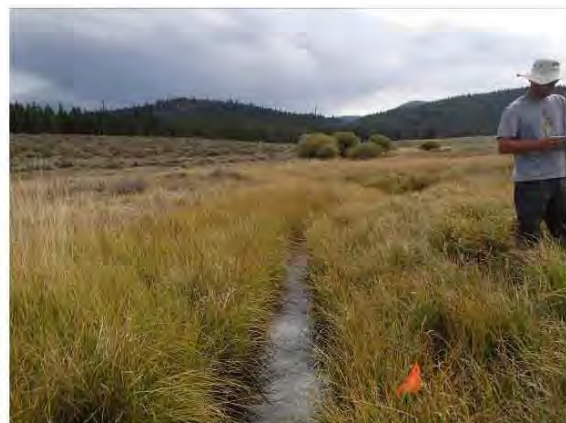


FIGURE 5-28f. Looking upstream from the bottom of site Bio-MC6 in the lower East Branch (9/29/12).

Figure 5-28
Bioassessment Photographs - Martis Valley

5.2.3 Bioassessment Laboratory Results

The most common taxa collected in Squaw Creek during 2012 were aquatic earthworms (Oligochaeta), nemourid stoneflies of the genus *Zapada*, and chironomid midges of the *Orthocladius* complex and *Micropsectra*. Other abundant taxa included chironomid midges of the genus *Stictochironomus*, and mayflies of the genus *Paraleptophlebia*. Benthic density was relatively high in Squaw Creek during 2012, averaging 2,606 individuals/ft² for all riffle samples.

The most common taxa collected in Martis Creek during 2012 were aquatic earthworms (Oligochaeta), chloroperlid stoneflies of the genus *Sweltsa*, mayflies of the genus *Paraleptophlebia*, and chironomid midges of the genus *Micropsectra*. Other abundant taxa included flatworms of the class Turbellaria and the ubiquitous baetid mayfly *Baetis tricaudatus*. Benthic density averaged 1,049 individuals/ft² for 2012 Martis Creek riffle samples.

Eastern Sierra IBI scores and values for the component IBI metrics are listed in Table 5-3 for all riffle composite samples. A complete 500-fixed-count taxa list for all of these samples from Squaw Creek and Martis Creek sites is provided in Table 5-4. Generally, most sites sampled in 2012 had relatively good IBI scores, although Squaw Creek sites had slightly lower IBI scores (46 to 93 out of a possible 100) and Martis Creek sites had slightly higher IBI scores (62 to 97 out of a possible 100). Low IBI scores were typically attributable to low taxa richness (i.e., low total richness, as well as low caddisfly [Trichoptera], and mite [Acari] richness in particular), high dominance, and high weighted tolerance (i.e., high Hilsenhoff Biotic Index scores) presumably due to poor habitat conditions associated with excessive fines. The highest IBI score was from the upstream headwater site in the Schaeffer Branch (Bio-MC1) of Martis Creek (97 out of a possible 100). The lowest IBI score was from the upper meadow site (Bio-SC1) in Squaw Creek (46 out of a possible 100). The differences in survey period between Squaw Creek (sampled in July) and Martis Creek (sampled in August and September) are not likely to have contributed to the differences in IBI scores.

Biological Condition Scores for two of the three Squaw Creek sites were relatively high (25 and 27 out of a possible 35 for the middle [Bio-SC2] and lower meadow [Bio-SC3] sites, respectively). However, BCS was very low for the upper meadow (Bio-SC1) site (7 out of a possible 35).

Table 5-3. Summary of 2012 TRWQMP Bioassessment Results (Squaw Creek and Martis Creek Riffle Samples)

BIOASSESSMENT STATION ID		BIO-SC1	BIO-SC2	BIO-SC3	BIO-MC1	BIO-MC2	BIO-MC3	BIO-MC4	BIO-MC5	BIO-MC6
LOCATION (Stream Reach)		Squaw Upper Meadow	Squaw Middle Meadow	Squaw Lower Meadow	Martis Schaeffer Branch	Martis Middle Mainstem	Martis Upper West Branch	Martis Lower West Branch	Martis Lower Mainstem	Martis East Branch
GENERAL	Survey Date	7/25/12	7/24/12	7/23/12	8/21/12	8/24/12	9/6/12	9/17/12	8/27/12	9/6/12
	Discharge (cfs)	0.7	0.6	1.8	1.4	4.2	1.9	0.7	6.1	1.9
	Reach Slope (%)	0.01	0.35	0.20	3.10	0.61	4.86	1.65	0.41	2.46
	Reach Sinuosity	1.9	1.1	1.2	1.2	1.2	1.1	1.4	1.1	1.1
	Mean Wetted Width (m)	5.5	4.9	5.0	1.8	2.4	1.8	0.8	3.5	1.1
	Mean Depth (cm)	34	21	28	9	21	11	9	24	18
BED	Median Particle Size (mm)	5	6	6	26	17	39	17	14	42
	% Particles < 2 mm	35	33	33	13	30	18	13	30	15
	Mean Cobble Embedded (%)	10	29	23	18	4	9	19	6	11
BANK	Stable Banks (%)	19	12	31	86	14	100	100	64	100
	Eroded Banks (%)	81	88	69	14	86	0	0	36	0
	Mean Canopy Cover (%)	1	0	1	89	27	87	7	4	8
WATER QUALITY	Survey Time (hrs)	1200	1200	1200	1130	1145	1200	1030	1100	1000
	Water Temperature (°C)	17.5	22.5	20.8	9.2	11.9	11.4	8.8	8.8	9.1
	pH	7.5	7.8	8.0	7.0	7.2	7.6	6.9	7.5	7.5
	DO Concentration (mg/L)	9.3	10.7	4.3	10.9	11.5	10.4	10.3	11.0	11.3
	DO Saturation (%)	98	193	48	95	106	96	89	95	98
	Conductivity (µS)	153	161	158	84	106	140	134	99	120
BIOLOGICAL METRICS	Total Taxa Richness	40	60	52	47	44	53	38	40	37
	Ephemeroptera Richness	5	10	10	9	7	9	5	7	9
	Plecoptera Richness	4	11	6	8	5	13	5	4	4
	Trichoptera Richness	3	6	5	7	6	5	5	4	3
	Acari Richness	1	1	1	6	3	1	2	2	0
	% Chironomidae Richness	45	30	37	6	25	23	13	33	24
	% Tolerant Taxa	18	5	10	0	9	23	11	18	19
	% Shredders	3	19	23	22	2	12	5	4	8
	% Dominant 3 Taxa	56	36	43	38	37	37	41	44	45
	Hilsenhoff Biotic Index	6.0	3.8	3.9	3.1	4.0	3.3	4.0	3.4	5.5
	Eastern Sierra IBI	46	93	90	97	78	82	72	69	62

Table 5-4. Taxa Listings for 500-Fixed-Count Samples from 2012 Squaw Creek and Martis Creek Bioassessments (Riffle Composite Samples)

SAFIT Level II Final ID	BIO-SC1	BIO-SC2	BIO-SC3	BIO-MC1	BIO-MC2	BIO-MC3	BIO-MC4	BIO-MC5	BIO-MC6
Turbellaria				38	15	31	60		2
Oligochaeta	138	37	44	11	7	35	108	32	36
Hydra		2							
Ostracoda	7	2	1	5		5	1		
Hyalella									112
Pacifastacus leniusculus								1	1
Physa	1		1						
Pisidium casertanum				1		6	11		2
Atractides	5	5	9						
Hygrobates	1	1	1						
Feltria		1	1						
Protzia			1	28	3	12		3	
Lebertia	2	3	3	2	10		12	3	
Wandesia				1					
Hydryphantidae				1					
Sperchon			1	2	1		3		
Torrenticola		3	4	1					
Trimalaconothrus	2	5	2						
Ameletus						3	1	2	
Baetis tricaudatus	5	1	1	62	29	15	35	3	13
Diphetor hageni		3	1			1		3	11
Ameletus		4	7						
Caudatella heterocaudata				8					
Drunella		1	3		3				
Drunella doddsi				37	2				
Drunella flavilinea				2					
Drunella grandis		11	11	4		6	1		1
Ephemerella dorothea					8			137	2
Ephemerella tibialis				1	2	1			1
Matriella teresa					1				
Serratella	1	7	16						
Cinygma						3		1	7
Cinygmula	2	12	13	31	3	26	5	3	13
Ecdyonurus		5	2						
Ironodes				18		32			7
Rhithrogena		10	4						
Paraleptophlebia	14	36	35	11	4	13	4	34	84
Siphonurus	4								
Capniidae	6	12	8						
Eucapnopsis brevicauda		1							
Paraperla						1			
Sweltsa	5	17	11	11	71	41	19	33	

Table 5-4. Taxa Listings for 500-Fixed-Count Samples from 2012 Squaw Creek and Martis Creek Bioassessments (Riffle Composite Samples)

SAFIT Level II Final ID	BIO-SC1	BIO-SC2	BIO-SC3	BIO-MC1	BIO-MC2	BIO-MC3	BIO-MC4	BIO-MC5	BIO-MC6
<i>Suwallia</i>		1							
<i>Moselia</i>						1			
Leuctridae				2		1	3		
<i>Malenka</i>		7	5			6		8	13
<i>Soyedina</i>						1			
<i>Visoka cataractae</i>				1					
<i>Zapada</i>	6	73	99	3		1			
<i>Zapada cinctipes</i>				9	6	32	21	11	21
<i>Doroneuria baumanni</i>		2	1	13		8			
<i>Frisonia picticeps</i>		1							
<i>Isoperla</i>		4					3		
<i>Kogotus/Rickera</i>	2	3							
<i>Skwala</i>		5	5		8			22	2
<i>Yoraperla nigrisoma</i>				92	2	10	1		4
<i>Calineuria californica</i>						9			
<i>Perlinodes aurea</i>					1				
Perlodidae						3			
<i>Pteronarcys princeps</i>				5		3			
<i>Apatania</i>		1	1						
<i>Amiocentrus</i>		1	1						
<i>Brachycentrus americanus</i>				1	1		33		
<i>Micrasema</i>					32		20		
<i>Anagapetus</i>				5		13	1		
<i>Glossosoma</i>					1				
<i>Hydroptila</i>	1	3	4					1	2
<i>Hydropsyche</i>	1	28	13		17		1	19	9
<i>Parapsyche</i>				11					
<i>Cryptochia</i>						1			
<i>Ecclisomyia</i>						1			
<i>Dolophilodes</i>				3					
<i>Rhyacophila</i>				11	3	19	5		1
<i>Rhyacophila arnaudi</i>				1					
<i>Rhyacophila brunnea</i> group				3	1	4			
<i>Lepidostoma</i>		3	1					2	
<i>Dicosmoecus</i>		1						1	
<i>Onocosmoecus</i>	3								
<i>Oreodytes scitulus scitulus</i>	1								
<i>Stictotarsus striatellus</i>	3								
<i>Optioservus quadrimaculatus</i>		1			59		31	46	
<i>Agabus</i>							1		
<i>Ochthebius</i>					1				
<i>Eubrianax edwardsi</i>									2
<i>Cleptelmis addenda</i>							34		20

Table 5-4. Taxa Listings for 500-Fixed-Count Samples from 2012 Squaw Creek and Martis Creek Bioassessments (Riffle Composite Samples)

SAFIT Level II Final ID	BIO-SC1	BIO-SC2	BIO-SC3	BIO-MC1	BIO-MC2	BIO-MC3	BIO-MC4	BIO-MC5	BIO-MC6
<i>Heterlimnius corpulentus</i>				26		111	1		
<i>Lara avara</i>				4		8			
<i>Narpus</i>						4			
<i>Rhizelmis nigra</i>						1			
<i>Zaitzevia parvula</i>					14		21	5	1
<i>Sialis</i>							1		
<i>Atrichopogon</i>				1					
<i>Bezzia</i>					1		1		
<i>Bezzia/Palpomyia</i>		11	5						
<i>Dasyhelea</i>		2							
<i>Boreochlus</i>						1			
<i>Conchapelopia</i>						1		2	1
<i>Paramerina</i>									1
<i>Diamesa</i>					2				1
<i>Pagastia</i>								2	
<i>Potthastia gaedii</i> group					1				
<i>Brillia</i>						1			
<i>Chaetocladius</i>						9			
<i>Corynoneura</i>	6	1	1			2			
<i>Pagastia</i>		1	1						
<i>Potthastia gaedii</i> group			1						
<i>Conchapelopia</i>	1	4	9						
<i>Pentaneura</i>	2	10	16						
<i>Rheopelopia</i>			1						
<i>Thienemannimyia</i> group	27								
<i>Zavreliomyia</i>	2								
<i>Cricotopus</i>					16			20	4
<i>Cricotopus bicinctus</i> group					9		5		
<i>Cricotopus nostocicola</i>					2			1	1
<i>Eukiefferiella claripennis</i>	3	1							
<i>Eukiefferiella devonica</i>						1		5	8
<i>Eukiefferiella gracei</i>					2			6	9
<i>Georthocladius</i>						1			
<i>Orthocladius</i>	55	53	64		2				
<i>Orthocladius</i> complex					1			4	
<i>Parametriocnemus</i>				2			1	1	
<i>Rheocricotopus</i>						2	2		
<i>Synorthocladius</i>								1	
<i>Thienemanniella</i>									
<i>Tvetenia</i>				5	35	1	6	13	25
<i>Pseudochironomus richardsoni</i>						1		1	
<i>Heterotrissocladius marcidus</i>	7								

Table 5-4. Taxa Listings for 500-Fixed-Count Samples from 2012 Squaw Creek and Martis Creek Bioassessments (Riffle Composite Samples)

SAFIT Level II Final ID	BIO-SC1	BIO-SC2	BIO-SC3	BIO-MC1	BIO-MC2	BIO-MC3	BIO-MC4	BIO-MC5	BIO-MC6
group									
<i>Limnophyes</i>			1						
<i>Nanocladius</i>		1							
<i>Parakiefferiella</i>			2						
<i>Parametriocnemus</i>	1		5						
<i>Psectrocladius</i>	24	4	1						
<i>Rheocricotopus</i>	2	9							
<i>Synorthocladius</i>		1							
<i>Thienemanniella</i>		1							
<i>Tvetenia bavarica</i> group	5	10	5						
<i>Cladotanytarsus</i>		1							
<i>Micropsectra</i>	47	53	53	15	57	2	2	37	45
<i>Microtendipes</i>						1			
<i>Microtendipes pedellus</i> group	2	1	5						
<i>Phaenopsectra</i>	2								
<i>Polypedilum</i>		1	4						
<i>Pseudochironomus</i>	1		2						
<i>Rheotanytarsus</i>		6	9						
<i>Stictochironomus</i>	87								
<i>Tanytarsus</i>	3	2	5						
<i>Paratanytarsus</i>					1				
<i>Rheotanytarsus</i>					2			4	
<i>Limnophora</i>		3							
Muscidae		1							
<i>Prosimulium</i>				1					
<i>Simulium</i>	13	10		3	9	2	7	11	24
<i>Simulium piperi</i>							33	2	10
<i>Pericoma</i>				2	35	3	1	11	
<i>Antocha monticola</i>					17	1		5	
<i>Dicranota</i>					4		4	3	3
<i>Hexatoma</i>				1	1		1		
<i>Tipula</i>				1		1		1	
<i>Neoplasta</i>				2					1
<i>Glutops</i>				2	1	2			

The biological metrics from Squaw Creek bioassessment sites were markedly improved in 2012 over previous study years for two of the three survey locations. IBI scores at the upper, middle and lower meadow sites (Bio-SC1, Bio-SC2 and Bio-SC3) were 46, 93, and 90. The Squaw Creek specific Biological Condition Scores were 7, 25, and 27 out of a possible 35 for upper, middle, and lower meadow sites, respectively. Per the Squaw Valley TMDL, minimum target BCS values of 25 are considered to represent reasonably achievable desired conditions for benthic aquatic life that are protective of beneficial uses in Squaw Creek (LRWQCB 2008). Data from previous Squaw Creek sampling events in 2000, 2001 (see LRWQCB 2006), and 2010 indicate that this minimum BCS level had not previously yet to been attained achieved for any of the Squaw Creek meadow sites (Figure 5-29). However, 2012 data indicate that this level was attained and even exceeded at the middle and lower meadow sites this year, whereas the upper meadow site again ranked very low in terms of both BCS and IBI scores in 2012 (Figure 5-30).

Overall, higher BCS and IBI scores at two of the three Squaw Creek sites (Bio-SC2 and Bio-SC3) in 2012 were related to greater taxa richness and fewer tolerant taxa than in previous survey years (e.g., 60 and 52 total taxa at Bio-SC2 and Bio-SC3 in 2012 vs. 30 and 39 in 2010). The taxa list for these sites indicate a generally more robust benthic community present in 2012 (in terms of richness, composition, tolerance, and functional feeding group measures). It is likely that Squaw Creek may have experienced fewer disturbances associated with reduced surface flows and intermittency during the summer of 2011. Snowmelt and saturated ground conditions from the record snowpack of the 2010-2011 winter likely sustained surface flows in Squaw Creek further into the summer and fall than usual in 2011, thereby allowing a more robust benthic community to develop during this period. Furthermore, record low precipitation during the subsequent mild 2011-2012 winter produced fewer flood disturbances such that the benthic community that was sampled in July 2012 was likely more robust and well-developed than in other years when disturbances were more regular. It is suspected that lower BCS and IBI scores at the upper meadow site (Bio-SC1) in 2012 may have in part been related to the presence of a beaver dam downstream of the site that effectively reduced the local reach slope and partially backwatered some riffle habitats upstream (i.e., reducing overall amount and quality riffle habitats in the vicinity).

Bioassessment results for Martis Creek indicate that the upper tributaries with less disturbance had the highest IBI scores with values of 97 and 82 out of 100 at the Schaeffer (Bio-MC1) and Upper West (Bio-MC3) Sites, respectively. These two survey locations also had a low percentage of fine sediment on the streambed. The remaining Martis Creek bioassessment locations received IBI scores ranging from 62 at East Martis Creek (Bio-MC6) to 78 at the middle mainstem Martis (Bio-MC2).

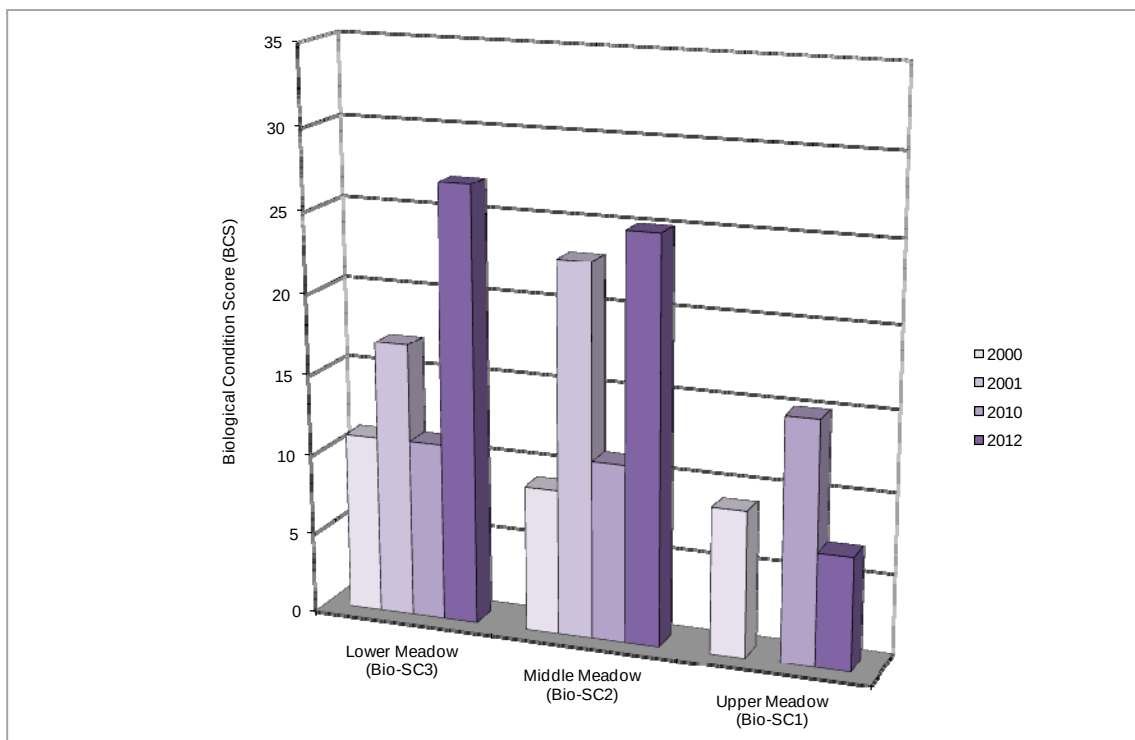


Figure 5-29
Biological Condition Scores for Squaw Creek

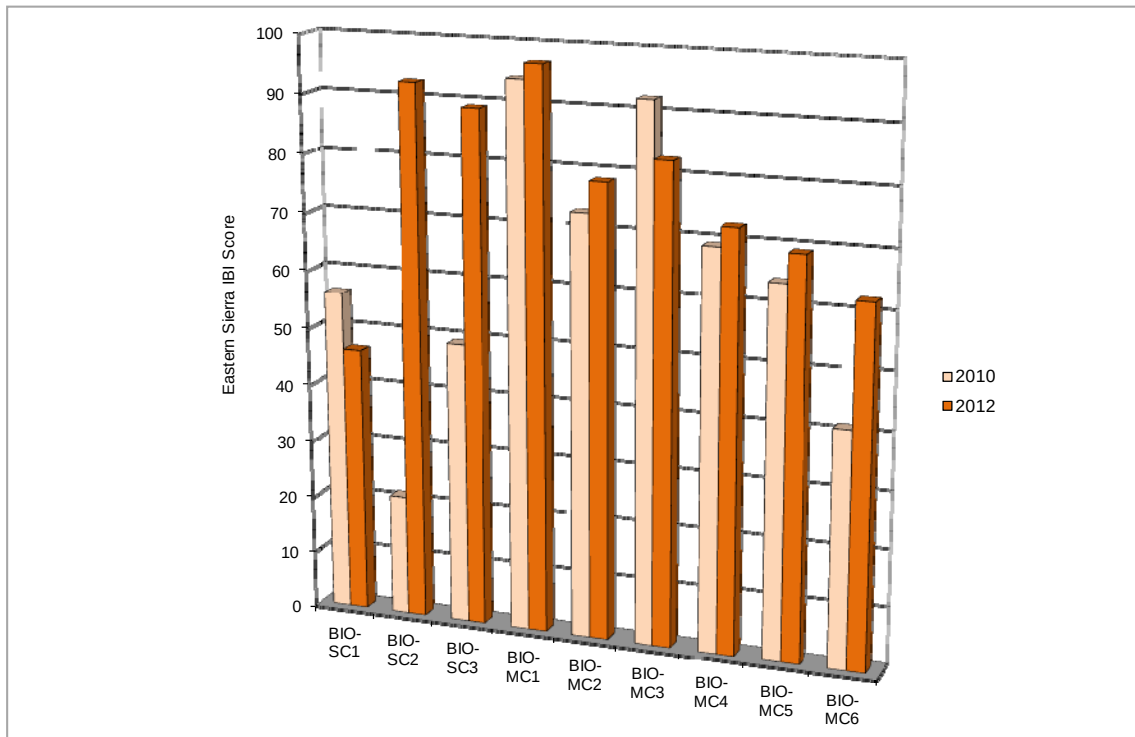


Figure 5-30
Eastern Sierra IBI Scores

5.2.4 Laboratory Quality Assurance

Ten percent of benthic macroinvertebrate samples processed (2 samples each from Squaw Creek and Martis Creek) have been sent to CDFG's Aquatic Bioassessment Laboratory for a QA/QC check of taxonomic and enumeration accuracy. The QA/QC check is performed to provide a secondary review of taxonomy and enumeration. If significant errors or other problems are identified through this process, they will be reported separately.

5.3 Community Level Water Quality Monitoring

This section describes the monitored community level runoff events and then presents the water quality data with a statistical analysis and the QA/QC results.

5.3.1 Monitored Events

During WY 2012, discrete stormwater runoff samples were collected from the two County and nine Town sites described in Section 4. Seventeen separate runoff events were monitored between October, 2011 and August, 2012. Five samples were collected at each site, except for: the Town Airport site (DSC-MC1) where three samples were collected, the County Lahontan site (DSC-MC2) where eight samples were collected, and the Town Bridge St NW site (DCS-TT4) where 6 samples were collected. Monitoring at the Airport site (DSC-MC1) was ceased with the addition of six new Town sites (DSC-DC1, DSC-TC2, DSC-TT2 through DSC-TT5) in February, 2012. At the County Northstar site (DSC-MC3), the large infiltration basin and pervious drainage area contributed to lower flow rates and frequencies, especially from snowmelt events at this site. A summary of the monitored runoff events during WY 2010 through WY 2012 are presented in Table 5-5.

The antecedent dry time is the period without measurable precipitation prior to each monitored event. While longer antecedent periods can allow more pollutants to accumulate and wash off with stormwater runoff, larger runoff events in the mid-winter also result in increased pollutant loads due to factors such as increased deicer and abrasives applications and greater energy flows. The high frequency of storm events during WY 2011 generally reduced dry periods between sampling events. During WY 2012, longer dry periods occurred at the beginning and end of the water year.

Table 5-5. 2010, 2011, & 2012 Water Years Community Level Water Quality Monitoring Event Summary

Event Date	Event Type ¹	Antecedent Dry Time (Days)	Total Precip (inches)	Samples Collected										
				Town	Town	County	County	Town	Town	Town	Town	Town	Town	Town
				Donner Creek (DSC-DC1)	Airport (DSC-MC1)	Lahontan (DSC-MC2)	Northstar (DSC-MC3)	Trout Creek SE (DSC-TC1)	Trout Creek NW (DSC-TC2)	Brickelltown (DSC-TT1)	Bridge St SW (DSC-TT2)	Bridge St SE (DSC-TT3)	Bridge St NW (DSC-TT4)	West River (DSC-TT5)
Water Year 2010														
2/5/2010	S	0	NA							X				
2/24/2010	M	2	0.6					X		X				
2/26/2010	M	1	0.9					X		X				
3/12/2010	M	2	1.2							X				
3/29/2010	R	4	1					X		X				
4/22/2010	S	0	NA					X		X				
4/27/2010	R	5	0.5					X		X				
5/10/2010	M	12	0.6							X				
5/25/2010	R	3	0.2					X						
Water Year 2011														
10/4/2010	R	42	0.8		X			X						
10/24/2010	R	5	4.9		X			X		X				
12/14/2010	M	7	1.3		X	X	X	X		X				
12/18/2010	M	2	3			X	X	X						
12/28/2010	M	3	1.3					X						
1/17/2011	S	4	NA			X				X				
2/22/2011	S	4	NA					X						
3/2/2011	M	4	0.3		X	X				X				
3/6/2011	M	2	0.3		X			X						
3/10/2011	M	3	0.2			X								
3/14/2011	S	0	NA			X	X	X		X				
3/28/2011	S	1	NA		X					X				
3/31/2011	S	4	NA			X	X			X ²				
4/11/2011	S	3	NA		X									
4/17/2011	M	4	0.1				X							
4/20/2011	M	3	0.2							X				

Table 5-5. 2010, 2011, & 2012 Water Years Community Level Water Quality Monitoring Event Summary

Event Date	Event Type ¹	Antecedent Dry Time (Days)	Total Precip (inches)	Samples Collected										
				Town	Town	County	County	Town	Town	Town	Town	Town	Town	Town
				Donner Creek (DSC-DC1)	Airport (DSC-MC1)	Lahontan (DSC-MC2)	Northstar (DSC-MC3)	Trout Creek SE (DSC-TC1)	Trout Creek NW (DSC-TC2)	Brickelltown (DSC-TT1)	Bridge St SW (DSC-TT2)	Bridge St SE (DSC-TT3)	Bridge St NW (DSC-TT4)	West River (DSC-TT5)
5/25/2011	R	6	0.8		X	X				X				
6/6/2011	M	2	0.5				X							
Water Year 2012														
10/5/2011	R	21	0.75		X		X			X				
1/20/2012	M	23	1.8			X		X		X				
1/21/2012	S	2	NA		X									
1/25/2012	S	2	NA			X								
1/26/2012	S	3	NA		X					X				
3/1/2012	S	0	NA								X		X	
3/2/2012	S	1	NA											X
3/5/2012	S	4	NA			X							X	X
3/8/2012	S	2	NA								X			
3/13/2012	M	7	0.5			X			X		X		X	X
3/15/2012	M	0	0.6	X										
3/16/2012	M	0	1.8	X		X	X	X	X	X	X	X	X	X
3/21/2012	S	3	NA			X	X	X	X				X	
3/28/2012	M	1	0.8	X		X		X	X	X	X	X	X	X
4/12/2012	S	1	NA	X					X			X		
4/26/2012	R	11	0.8	X		X	X	X				X		
8/14/2012	R	23	0.8				X					X		
Total				5	11	16	11	19	5	21	5	5	6	5

¹M = Mixed Snow/Rain, R = Rain, S = Snowmelt.

²TPH grab sample. Sample not analyzed for standard constituent list.

5.3.2 Water Quality Results

Tables containing the complete analytical results for the community level water quality monitoring are presented in Appendix C. The results for TSS, turbidity, total nitrogen, and total phosphorus are also presented graphically in Figures 5-31, 5-32, 5-33, and 5-34, respectively. Figure 5-31 includes the six new Town monitoring sites and shows all 11 sites side by side to allow for direct visual comparisons. Data from the five original monitoring locations are plotted side by side for comparisons in Figures 5-32, 5-33, and 5-34. The figures indicate that samples from the Brickelltown site (DSC-TT1) contained the highest mean concentrations of each constituent and samples from the Lahontan site (DSC-MC2) had the lowest mean concentrations. The six new Town sites all had relatively high concentrations of TSS, second only to Brickelltown (DSC-TT1).

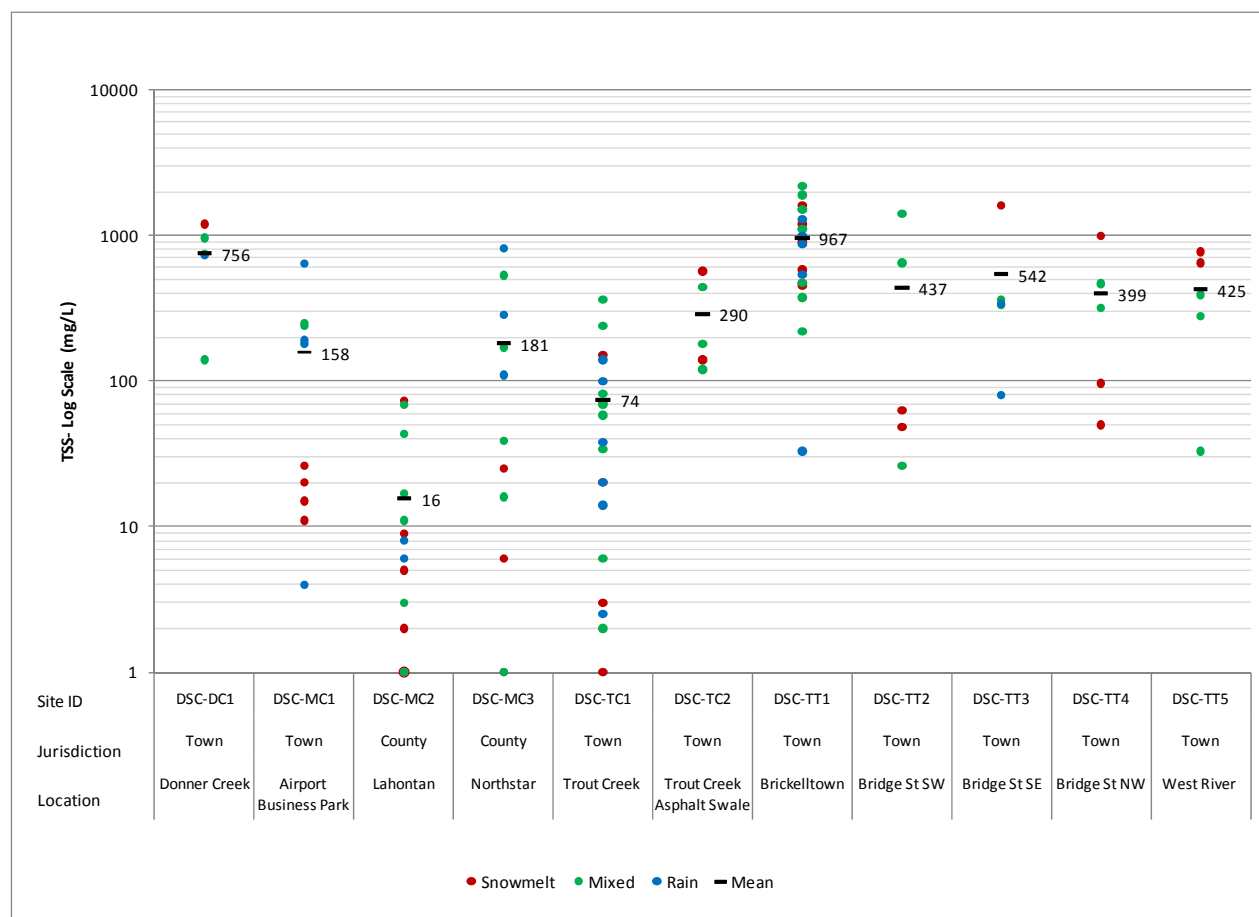


Figure 5-31
Site Comparisons – TSS

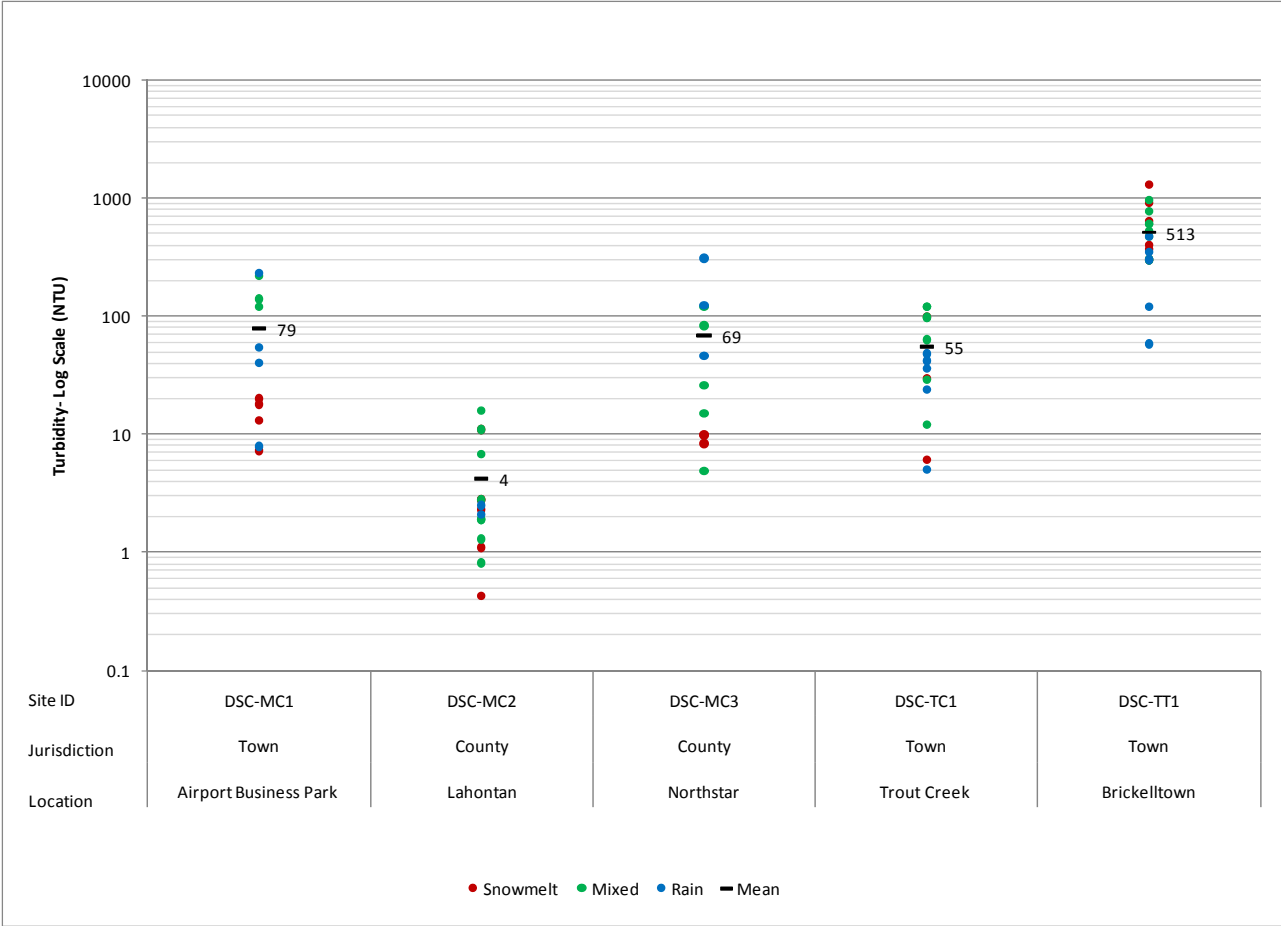


Figure 5-32
Site Comparisons – Turbidity

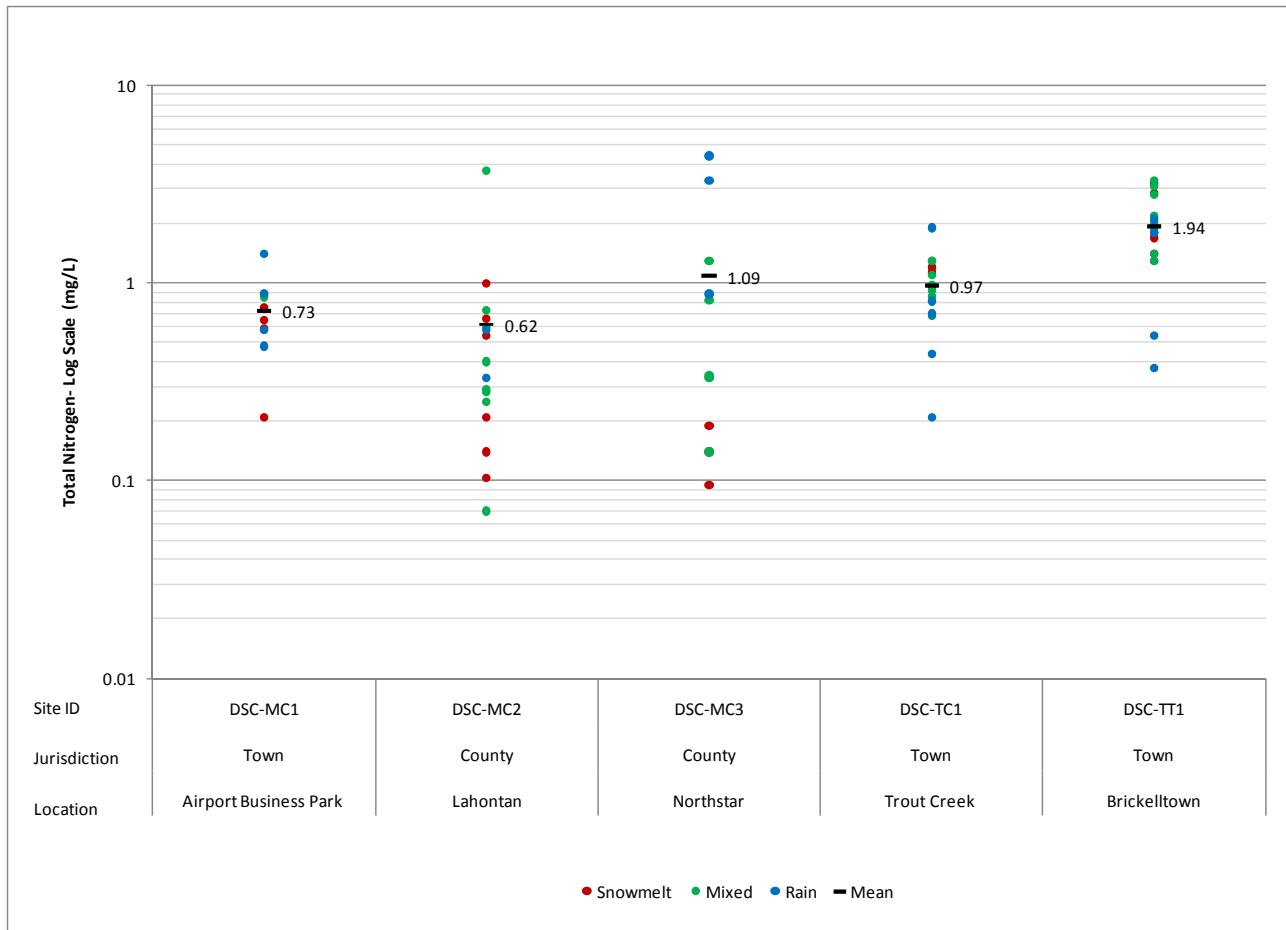


Figure 5-33
Site Comparisons – Total Nitrogen

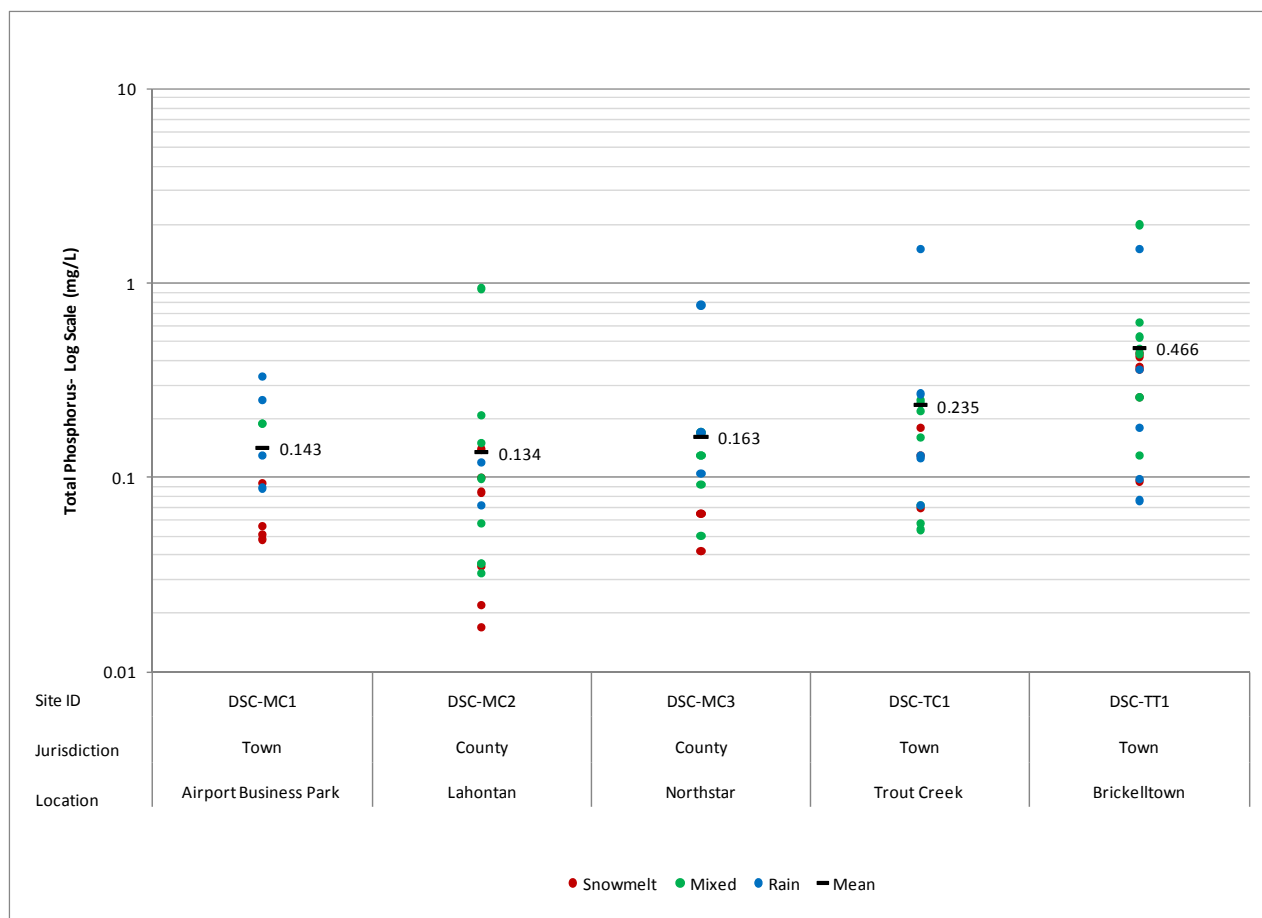


Figure 5-34
Site Comparisons – Total Phosphorus

5.3.3 Statistical Analyses

Statistical analyses were performed to further evaluate the community level monitoring results. These analyses consisted of summary statistics, t-tests at the 95 percent confidence level, and Mann-Kendall trend analyses.

5.3.3.1 Summary Statistics

Summary level statistics were generated to characterize and summarize the data set for each site and are presented below in Tables 5-6 thru 5-11. The summary statistics tables include: the number of samples, percent of samples with detected pollutant concentrations, minimum, maximum, mean and median concentrations and the standard deviation and coefficient of variation (CV). The only constituent collected for new sites was total suspended solids (TSS). Therefore, Table 5-11 includes TSS summary statistics for all old and new sites.

An evaluation of the summary statistics show that nitrogen species (nitrate, nitrite, ammonia and TKN) had the highest number of non-detectable concentrations. Samples with non-detectable concentrations of TSS were also collected at the Lahontan site (DSC-MC2) and the Northstar site (DSC-MC3). The coefficient of variation (CV) values are high at all sites indicating a large amount of variability in the data.

Table 5-6. Airport Business Park Community Level Summary Statistics (Site DSC-MC1)

Constituent	Units	n	Percent Detection	Range		Mean	Median	Standard Deviation	CV
				Min	Max				
Combined 2011 & 2012 Water Years									
Total Suspended Solids	mg/L	10	100%	4	640	157.6	103	197.6	1.25
Turbidity	NTU	11	100%	7.3	230	79.1	40	84.8	1.07
Nitrate as N	mg/L	11	82%	0.01	0.59	0.27	0.24	0.15	0.58
Nitrite as N	mg/L	11	9%	0.01	0.03	NC	0.01	NC	NC
Total Kjeldahl Nitrogen (TKN)	mg/L	10	100%	0.06	1.4	0.48	0.41	0.39	0.82
Total Nitrogen as N	mg/L	10	100%	0.21	1.4	0.73	0.70	0.31	0.43
Total Phosphorus	mg/L	10	100%	0.05	0.33	0.14	0.11	0.10	0.67

Notes

mg/L = milligrams per liter, NTU = nephelometric turbidity units.

n = Number of samples

Total Nitrogen is the sum of nitrite (as N), nitrate (as N) and total Kjeldahl nitrogen

NC = Not calculated; insufficient number of detections to generate statistics

The robust regression on order statistical (ROS) method was used for datasets containing detectable concentrations

Percent Detection = percent of samples that were detected above the reporting limit

CV = coefficient of variation

Table 5-7. Lahontan Golf Club Community Level Summary Statistics (Site DSC-MC2)

Constituent	Units	n	Percent Detection	Range		Mean	Median	Standard Deviation	CV
				Min	Max				
Combined 2011 & 2012 Water Years									
Total Suspended Solids	mg/L	16	75%	1	73	15.5	5.5	24.1	1.6
Turbidity	NTU	16	100%	0.43	16	4.2	2.4	4.5	1.1
Nitrate as N	mg/L	16	69%	0.01	0.39	0.10	0.04	0.11	1.16
Nitrite as N	mg/L	16	0%	0.01	0.03	NC	0.01	NC	NC
Ammonia as N	mg/L	16	19%	0.05	0.08	0.04	0.05	0.02	0.44
Total Kjeldahl Nitrogen (TKN)	mg/L	16	94%	0.05	3.7	0.52	0.28	0.87	1.65
Total Nitrogen as N	mg/L	16	94%	0.07	3.7	0.62	0.37	0.86	1.40
Dissolved Phosphorus as P	mg/L	16	100%	0.01	0.96	0.10	0.03	0.23	2.29
Dissolved Orthophosphate as P	mg/L	16	94%	0.01	1.1	0.10	0.03	0.27	2.60
Total Phosphorus as P	mg/L	16	100%	0.02	0.94	0.13	0.08	0.22	1.65

Notes

mg/L = milligrams per liter, NTU = nephelometric turbidity units.

n = Number of samples

Total Nitrogen is the sum of nitrite (as N), nitrate (as N) and total Kjeldahl nitrogen

NC = Not calculated; insufficient number of detections to generate statistics

The robust regression on order statistical (ROS) method was used for datasets containing detectable concentrations

Percent Detection = percent of samples that were detected above the reporting limit

CV = coefficient of variation

Table 5-8. Northstar Community Level Summary Statistics (Site DSC-MC3)

Constituent	Units	n	Percent Detection	Range		Mean	Median	Standard Deviation	CV
				Min	Max				
Combined 2011 & 2012 Water Years									
Total Suspended Solids	mg/L	11	91%	1.00	810	181.3	39	264.8	1.5
Turbidity	NTU	11	100%	4.90	310	68.8	26	91.6	1.3
Nitrate as N	mg/L	11	55%	0.01	0.81	0.10	0.01	0.24	2.53
Nitrite as N	mg/L	11	18%	0.01	0.05	0.01	0.01	0.02	2.60
Ammonia as N	mg/L	11	27%	0.05	0.17	0.045	0.05	0.06	1.40
Total Kjeldahl Nitrogen (TKN)	mg/L	11	100%	0.10	3.6	0.99	0.34	1.25	1.27
Total Nitrogen as N	mg/L	11	100%	0.10	4.4	1.09	0.34	1.44	1.33
Dissolved Phosphorus as P	mg/L	11	100%	0.01	0.41	0.08	0.04	0.12	1.47
Dissolved Orthophosphate as P	mg/L	11	91%	0.01	0.58	0.09	0.03	0.17	1.82
Total Phosphorus as P	mg/L	11	100%	0.04	0.77	0.16	0.10	0.21	1.27

Notes

mg/L =milligrams per liter, NTU = nephelometric turbidity units.

n = Number of samples

Total Nitrogen is the sum of nitrite (as N), nitrate (as N) and total Kjeldahl nitrogen

NC = Not calculated; insufficient number of detections to generate statistics

The robust regression on order statistical (ROS) method was used for datasets containing detectable concentrations

Percent Detection = percent of samples that were detected above the reporting limit

CV = coefficient of variation

Table 5-9. Trout Creek SE Community Level Summary Statistics (Site DSC-TC1)

Constituent	Units	n	Percent Detection	Range		Mean	Median	Standard Deviation	CV
				Min	Max				
Combined 2010, 2011, & 2012 Water Years									
Total Suspended Solids	mg/L	19	100%	1.00	360	74.1	38	93.7	1.3
Turbidity	NTU	15	100%	5.1	120	55.3	42	41.1	0.74
Nitrate as N	mg/L	15	100%	0.02	1.6	0.46	0.36	0.46	1.01
Nitrite as N	mg/L	15	13%	0.01	0.07	0.01	0.01	0.02	2.05
Total Kjeldahl Nitrogen (TKN)	mg/L	15	100%	0.18	1.2	0.49	0.42	0.28	0.56
Total Nitrogen as N	mg/L	15	100%	0.21	1.9	0.97	0.96	0.40	0.41
Total Phosphorus	mg/L	15	100%	0.05	1.5	0.24	0.13	0.36	1.52

Notes

mg/L =milligrams per liter, NTU = nephelometric turbidity units.

n = Number of samples

Total Nitrogen is the sum of nitrite (as N), nitrate (as N) and total Kjeldahl nitrogen

NC = Not calculated; insufficient number of detections to generate statistics

The robust regression on order statistical (ROS) method was used for datasets containing detectable concentrations

Percent Detection = percent of samples that were detected above the reporting limit

CV = coefficient of variation

Table 5-10. Brickelltown Community Level Summary Statistics (Site DSC-TT1)

Constituent	Units	n	Percent Detection	Range		Mean	Median	Standard Deviation	CV
				Min	Max				
Combined 2010, 2011, & 2012 Water Years									
Total Suspended Solids	mg/L	21	100%	33	2200	967	900	567.9	0.59
Turbidity	NTU	19	100%	58	1300	513.5	470	306.0	0.60
Nitrate as N	mg/L	18	100%	0.03	0.79	0.20	0.15	0.18	0.86
Nitrite as N	mg/L	18	44%	0.01	0.33	0.04	0.01	0.08	2.19
Total Kjeldahl Nitrogen (TKN)	mg/L	19	100%	0.21	3	1.68	1.7	0.80	0.47
Total Nitrogen as N	mg/L	19	100%	0.37	3.3	1.94	1.80	0.83	0.43
Total Phosphorus	mg/L	19	100%	0.08	2	0.47	0.36	0.49	1.04

Notes

mg/L = milligrams per liter, NTU = nephelometric turbidity units.

n = Number of samples

Total Nitrogen is the sum of nitrite (as N), nitrate (as N) and total Kjeldahl nitrogen

NC = Not calculated; insufficient number of detections to generate statistics

The robust regression on order statistical (ROS) method was used for datasets containing detectable concentrations

Percent Detection = percent of samples that were detected above the reporting limit

CV = coefficient of variation

Table 5-11. Community Level Summary Statistics for TSS at All Sites

Jurisdiction	Site ID	Site	Water Year(s)	Units	n	Percent Detection	Range		Mean	Median	Standard Deviation	CV
							Min	Max				
Town	Donner Creek	DSC-DC1	2012	mg/L	5	100%	140	1200	756	750	393.4	0.52
Town	Airport Business Park	DSC-MC1	2011, 2012	mg/L	10	100%	4	640	157.6	103	197.6	1.25
County	Lahontan	DSC-MC2	2011, 2012	mg/L	16	75%	1	73	15.5	5.5	24.1	1.55
County	Northstar	DSC-MC3	2011, 2012	mg/L	11	91%	1	810	181.3	39	264.8	1.46
Town	Trout Creek SE	DSC-TC1	2010, 2011, 2012	mg/L	19	100%	1	360	74.1	38	93.7	1.26
Town	Trout Creek NW	DSC-TC2	2012	mg/L	5	100%	120	570	290	180	202.7	0.70
Town	Brickelltown	DSC-TT1	2010, 2011, 2012	mg/L	21	100%	33	2200	967	900	567.9	0.59
Town	Bridge St SW	DSC-TT2	2012	mg/L	5	100%	26	1400	437.4	63	598.5	1.37
Town	Bridge St SE	DSC-TT3	2012	mg/L	5	100%	80	1600	542	340	602.4	1.11
Town	Bridge St NW	DSC-TT4	2012	mg/L	6	100%	50	1000	399.3	390	343.5	0.86
Town	West River	DSC-TT5	2012	mg/L	5	100%	33	770	424.6	390	293.9	0.69

Notes

mg/L =milligrams per liter

n = Number of samples

The robust regression on order statistical (ROS) method was used for datasets containing detectable concentrations

Percent Detection = percent of samples that were detected above the reporting limit

CV = coefficient of variation

5.3.3.2 Statistical Comparisons

Statistical comparisons (t-tests at the 95 percent confidence level and Mann-Kendall trend analyses) were conducted on select data groups to determine whether observed spatial or temporal differences in water quality were significant. The results of the individual trend analyses are included in Appendix D, and are summarized in Table 5-12. The new community sites monitored for the Town are not included in these analyses because of the limited amount of data available. The results of the trend analysis are very sensitive to the more extreme values in this limited dataset and are not clearly indicative of changes/activities in the watersheds. Since data is limited, individual high or low concentrations can have significant impacts on the results. As the program continues, these tests will become more reliable in determining if long-term trends exist. If long-term trends are identified, correlations between these results and changes to the conditions or management in the watersheds will be investigated.

The statistical analyses allowed for the following conclusions to be made:

- The results of the t-tests indicate that samples collected at the Brickelltown site had statistically higher mean concentrations than samples from Trout Creek, Lahontan, Airport Business Park, and Northstar sites for all four parameters compared (TSS, turbidity, total nitrogen, and total phosphorus). Brickelltown also had a significantly higher mean TSS concentration than the Trout Creek site, but was not significantly higher than the remainder of the new Town sites. All of the new Town sites, with the exception of the new Trout Creek site, had significantly higher mean TSS concentrations than the Trout Creek, Airport Business Park, Lahontan, and Northstar sites.
- The samples collected at the Lahontan site had statistically lower mean concentrations than samples from the Brickelltown and the Trout Creek sites for all four constituents. The mean TSS concentration at the Lahontan site was significantly less than the mean at all other community sites, and the mean turbidity value was significantly less than the means at the Northstar and Airport Business Park sites.

The differences among mean concentrations at the remaining sites are not as large and statistical differences cannot yet be discerned with the limited amount of data collected to date. The number of additional samples required to determine significance increases if the mean values between the two groups are similar and there is large variability in the individual data points.

Table 5-12. Statistical Trends of Constituents of Concern at Community Monitoring Sites

		TSS	Turbidity	Total Nitrogen	Total Phosphorus	Diss. Phosphorus
Placer County	DSC-MC2 Lahontan			Increasing	Slightly Increasing	
	DSC-MC3 Northstar		Slightly Increasing			
Town of Truckee	DSC-TC1 Trout Creek SE			Increasing		
	DSC-TT4 Bridge St NW	Slightly Decreasing				
	DSC-TC2 Trout Creek NW	Slightly Increasing				

Note: Mann-Kendall (MK) Trend Analyses used to determine significance. See Appendix D for detailed results.

Only site with statistically significant trends are included. A blank cell signifies no discernible trends or insufficient data.

5.3.4 Community Level Discussion

A summary of the community level discrete water quality sampling results is presented in Table 5-13. This table compares the mean TSS, turbidity, total nitrogen, and total phosphorus concentrations at each of the monitoring sites and provides a ranking of the sites in order of increasing mean pollutant concentration. Consistent with previous findings, the Lahontan site had the lowest concentrations, while Brickelltown had the highest concentrations for all four constituents. Aside from Brickelltown, the newly established Town sites all had higher mean TSS concentrations than the other locations.

To put this results into a regional context, the event mean concentrations (EMCs) developed for the Lake Tahoe Total Maximum Daily Load (TMDL)(LRWQCB and NDEP, 2008) for TSS, total nitrogen, and total phosphorus in stormwater runoff from various land use categories are provided in Table 5-14 for comparison with the community level results. Overall the community level results are consistent with the Tahoe TMDL values. The TSS concentrations in runoff from the downtown Truckee area are consistent with EMCs for primary roadways and commercial areas. The Total Nitrogen and Total Phosphorus concentrations from the community level sites are slightly lower than the EMCs for comparable landuses used in the Tahoe TMDL.

Discussions regarding the results from each individual community level water quality monitoring site are presented below. The discussions focus on watershed characteristics and how they may relate to water quality results for the key constituents (TSS, turbidity, total phosphorus, and total nitrogen).

Table 5-13. Community Level Site Rankings Based on Mean Pollutant Concentrations

Sites		Jurisdiction	Mean TSS (mg/L)	Mean Turbidity (NTU)	Mean Total Nitrogen (mg/L)	Mean Total Phosphorus (mg/L)
Lahontan	DSC-MC2	County	16	4	0.62	0.13
Airport Business Park	DSC-MC1	Town	158	79	0.73	0.14
Trout Creek SE	DSC-TC1	Town	74	55	0.97	0.24
Northstar	DSC-MC3	County	181	69	1.09	0.16
Brickelltown	DSC-TT1	Town	967	513	1.94	0.47
Trout Creek NW	DSC-TC2	Town	290	--	--	--
Bridge St NW	DSC-TT4	Town	399	--	--	--
West River	DSC-TT5	Town	425	--	--	--
Bridge St SW	DSC-TT2	Town	437	--	--	--
Bridge St SE	DSC-TT3	Town	542	--	--	--
Donner Creek	DSC-DC1	Town	756	--	--	--

Notes: A ranking of 1 equals the lowest mean value, a ranking of 2 equals the second lowest mean value, and so on.

Ranking of 1 =	
Ranking of 2 =	
Ranking of 3 =	
Ranking of 4 =	
Ranking of 5 through 11 =	

Table 5-14. Tahoe TMDL Event Mean Concentrations

Land Use Category	TSS (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
Vegetation/Turf	12	4.88	1.50
Single Family Residential	56	1.75	0.47
Multi-Family Residential	150	2.84	0.59
Commercial/Institutional/ Communications/Utilities	296	2.47	0.70
Primary Roads	952	3.92	1.98
Secondary Roads	150	2.84	0.59

Airport Business Park (DSC-MC1)

Much of the Airport Business Park drainage area consists of newer development which incorporates infiltration and settling basins, vegetated swales, and sediment traps. However, the drainage area also includes paved roadways with moderate traffic that are directly connected to the outfall with little to no treatment (see Figure 5-35). The low to moderate pollutant concentration levels observed at this site correlate well with the landuses and water quality improvements at this site.



Figure 5-35
Airport Business Park Drainage Area on October 24, 2010

The water quality at the Airport Business Park site is also influenced by groundwater that infiltrates into the drainage system when the water table elevation rises. The groundwater appears to be very clean, and likely dilutes the stormwater runoff that is sampled (Figure 5-36). The groundwater is at its lowest rate in the fall, and the flow increases throughout the winter and spring. Monitoring at this site has been discontinued.



Figure 5-36
Airport Business Park Groundwater Intrusion on November 5, 2012

Lahontan Golf Club (DSC-MC2)

Two years of data at this site indicate it has the lowest mean values for TSS, turbidity, total phosphorus, and total nitrogen. The drainage area consists of modern development that includes a golf course and residential area with minimal impervious area. This community also includes facilities that treat stormwater runoff prior to discharge including a long vegetated channel. The sampling location is within a drainage channel that experiences a large amount of continuous baseflow in the winter and spring as shown in Figure 5-37. The baseflow appears to be very clean, and likely dilutes the stormwater runoff that is sampled. In the summer and fall when no baseflow exists, runoff tends to infiltrate prior to reaching the sampling location unless the event is very large (Figure 5-38).

Unusually high nutrient concentrations were observed during one large event on January 20, 2012 when no baseflow existed. This could be attributed to the amount of decaying vegetation that existed in the channel at this time (Figure 5-38) or possibly by fertilizer applications on the upstream golf course.



Figure 5-37
Baseflow at the Lahontan Site on March 14, 2012



Figure 5-38
Dry Conditions at the Lahontan Site on January 18, 2012

Northstar (DSC-MC3)

The site receives runoff from multiple land uses including a large ski area parking lot, a dirt road, a paved residential road, natural wooded upland areas, and residential homes. The large parking lot for Northstar ski resort incorporates sediment traps in the drainage inlets and a large infiltration/ sedimentation basin which is shown in Figure 5-39. This basin must fill completely before runoff from the parking lots is conveyed downstream to the sample location. During large events, runoff is conveyed down a steep hill where erosion has been observed as shown in Figure 5-40. The runoff then travels along an unpaved road where loose soil is present prior to being conveyed in an earthen channel that leads to the sample location. Groundwater seepage occurs in the earthen channel during the winter and spring which dilutes the stormwater runoff being sampled. The residential and roadway runoff at the Northstar site does not receive treatment prior to reaching the sample collection point.

Mean concentrations increased at this site with the incorporation of data from WY 2012 and this site ranked in the mid to higher mean

concentration levels when compared to other community sites. This is in large part attributed to one intense Thunderstorm event that was sampled on August 14, 2012. This sample had the highest concentrations of pollutants observed to date. During this event, the upstream infiltration basin filled completely, and high flow rates were observed on the residential street (Skidder Trail) as shown in Figure 5-41.



Figure 5-39
Infiltration/Sedimentation Basin at Northstar



Figure 5-40
Erosion Downstream of
Infiltration/Sedimentation Basin



Figure 5-41
High Flow Rates at Northstar Site during
Thunderstorm on August 14, 2012

Trout Creek SE Outfall (DSC-TC1)

The Trout Creek drainage area includes portions of the oldest parts of downtown Truckee and includes a high percentage of impervious area with commercial and residential activities and large parking areas. Most of these areas drain to a stable vegetated channel (Figure 5-42) and then through a stormwater treatment vault prior to discharging to Trout Creek. Localized sheet flow from a portion of Donner Pass Road enters a similar vegetated channel on the opposite side of the roadway where flow has been observed to be minimal. The combination of these factors explain the relatively low TSS and turbidity concentrations observed in the samples from this site. Field observations also indicate that the vegetated swale infiltrates a significant portion of the runoff. Some samples have contained higher nutrient concentrations which may be a result of decomposing vegetation in the earthen channel, fertilizer use for landscaping, and wildlife (raccoons) which have been observed in the storm drain system upstream of the sample location. One unusually high total phosphorus concentration was observed during a large rain event on October 4, 2010.



Figure 5-42
Vegetated Channel Draining Towards the Trout Creek SE Outfall (DSC-TC1)

Trout Creek NW Outfall (DSC-TC2)

This site was installed in March 2012 and monitored for TSS, turbidity, pH, and conductivity only. TSS was laboratory analyzed, but the other constituents were measured using field instruments. The catchment area for this site includes the recent Stoneridge multifamily development, a Caltrans maintenance station and high traffic roads and intersections that receive frequent traction sand treatment during winter months. Runoff travels through a series of earthen and paved swales with no treatment prior to discharging to Trout Creek. A steep rocky channel conveys flows from Jiboom Street onto the asphalt shoulder of Donner Pass Road where it is conveyed to the outfall (Figures 5-43 and 5-44).

Five samples have been collected to date. The mean TSS concentration at this site was in the intermediate range when compared to other sites. When comparing this site to only the new Town sites, it had the lowest mean TSS concentration which was unexpected due to the surrounding land uses. It is possible that with additional sampling, a more representative dataset could show higher TSS concentrations at this location. Field observations have indicated large sediment loads entering Trout Creek at this location.



Figure 5-43
Asphalt Swale Leading to Trout Creek



Figure 5-44
Steep Channel above Trout Creek NW Site

Brickelltown (DSC-TT1)

The Brickelltown site had higher mean values of TSS, turbidity, total phosphorus, and total nitrogen than all of the other community level sites. The Brickelltown drainage area represents older development with high imperviousness and little or no water quality controls. It also includes multiple high traffic roadways and unpaved parking lots that are directly adjacent to the drainage inlets (Figure 5-45). These roads receive frequent traction sand applications during winter months and vehicle traffic tracks additional road sand from Interstate 80 as well as from pulling in and out of the unpaved parking areas. Snow removal operations frequently disturb soils which later erode during snowmelt or stormwater runoff events. This site also has trace levels of petroleum hydrocarbon contamination based on visual observations of sheen and the results of a grab sample collected during WY 2011. No groundwater intrusion has been observed coming into the drainage system at this site.

In November of 2011 the drainage system upstream of the sampling point was cleaned by Town maintenance crews. Four samples were collected at the site after the cleaning operations which did not indicate a clear improvement in water quality but this may be due to the limited amount of data.



Figure 5-45
Runoff from Unpaved Parking Lots in Brickelltown Catchment Area

Bridge Street SW Outfall (DSC-TT2)

This site was installed in March 2012 and monitored for TSS, turbidity, pH, and conductivity only. TSS was laboratory analyzed, but the other constituents were measured using field instruments. Five samples have been collected to date. The mean TSS concentration measured at this site was higher than most of the community level sites. Runoff for this site originates from Brockway Road and the Hilltop development. A spring also discharges into the drainage area which likely dilutes the runoff being sampled at this site. Traction sand is frequently applied to this portion of Brockway Road and erosion is occurring on the cut slope above the site as shown in Figure 5-46. The results at this site were highly variable ranging from 26 mg/L to 1400 mg/L, both of which were from mixed rain and snow events. In this case, the higher concentration was from a larger precipitation event (1.8 inches versus 0.8 inches).



Figure 5-46
Sediment Accumulations on Brockway Road Draining to DSC-TT2

Bridge Street SE Outfall (DSC-TT3)

This site was installed in March 2012 and monitored for TSS, turbidity, pH, and conductivity only. TSS was laboratory analyzed, but the other constituents were measured using field instruments. Five samples have been collected to date. This site had the third highest TSS mean concentration after the Donner Creek and Brickelltown sites. This site has a small drainage area consisting of a section of Brockway Road that receives significant amounts of traction sand during the winter months as shown in Figure 5-47. A large stormwater vault just upstream of the sampling point provides treatment prior to discharge. Small runoff events typically do not discharge from the outfall as a result of this vault. A very high TSS concentration was observed during an April 12, 2012 snowmelt event, and a low value was observed during an August 14, 2012 rain event. This was likely due to the amount of traction sand present on the roadway at the time of the event.



Figure 5-47
Sediment Accumulations on Brockway Road Draining to DSC-TT3

Bridge Street NW Outfall (DSC-TT4)

This site was installed in March 2012 and monitored for TSS, turbidity, pH, and conductivity only. TSS was laboratory analyzed, but the other constituents were measured using field instruments. Five samples have been collected to date. The mean TSS concentration at this site was in the middle of the range when compared to all other sites. This site receives runoff from historic downtown Truckee with little upstream stormwater treatment. The results at this site were also variable ranging from 50 mg/L to 1000 mg/L, both for snowmelt events. A photograph of the downtown drainage area during a rain event is provided in Figure 5-48.



Figure 5-48
Catchment Area Draining to the Bridge Street NW Outfall (DSC-TT4)

West River Street Outfall (DSC-TT5)

This site was installed in March 2012 and monitored for TSS, turbidity, pH, and conductivity only. TSS was laboratory analyzed, but the other constituents were measured using field instruments. Five samples have been collected to date. The mean TSS concentration at this site was in the middle to high range Relative to other sites. It receives runoff from commercial areas on West River Street as well as from West River Street itself. The commercial areas contain a large area of dirt open space that appears to be a major source of TSS at this site (Figure 5-49). The runoff from West River Street is conveyed to the outfall via an earthen channel where erosion is evident as shown in Figure 5-50. The culvert crossing under the road at this site is approximately 50 percent full of sediment. The two samples with the highest TSS concentrations at this site were from snowmelt events.



Figure 5-49
Catchment Area Draining to the West River Street Outfall (DSC-TT5)



Figure 5-50
Earthen Channel Upstream of the West River Street Outfall (DSC-TT5)

Donner Creek Outfall (DSC-DC1)

This site was installed in March 2012 and monitored for TSS, turbidity, pH, and conductivity only. TSS was laboratory analyzed, but the other constituents were measured using field instruments. Five samples have been collected to date. This site had the second highest mean concentration of TSS after Brickelltown. This was the only site not to have a single event concentration below 100 mg/L. The drainage area for this site includes a section of Highway 89, West River Street, and a portion of the Donner Creek Trailer Park. This is a very high traffic area that receives traction sand treatment during winter storms. Runoff is conveyed to the site via an earthen channel which shows signs of erosion (Figure 5-51). This site discharges to Donner Creek just above the confluence with the Truckee River. A sediment plume is often visible at this confluence (Figure 5-52).



Figure 5-51
Earthen Channel Leading to the Donner Creek Outfall



Figure 5-52
Sediment Plume at the Donner Creek/Truckee River Confluence

5.3.5 Field Parameters

Additional community level field measurements were collected in WY 2012 for Brickelltown (DSC-TT1), Trout Creek SE (DSC-TC1), and the six new Town sites. Portable water quality meters were used to measure turbidity, pH, and conductivity of the samples prior to sending to the lab. Field parameter data was collected as a screening type assessment tool and QA/QC check for lab data. Tables containing the results of the field measurements are presented in Appendix C, and can be identified by the “Field” label in the sample type column.

In general, higher TSS concentrations in the lab data corresponded to higher turbidity field measurements. pH values were typically between 7.0-8.75 which is considered typical for stormwater runoff. Electrical Conductivity is often used as an indicator for dissolved solids such as road deicing salt. The highest EC values were measured at the Bridge St. SE Outfall (DSC-TT3) and Trout Creek NW (DSC-TC2), both areas where salt is frequently applied to steep roadways and intersections during winter months.

5.3.6 QA/QC Results

Upon receipt from the laboratory, each analytical report was thoroughly reviewed and the data evaluated to determine if the data met the project objectives. Data reviewed included storm water samples. Initially, the data were screened for the following major items:

- A 100 percent check between electronic data provided by the laboratory and the hard copy reports;
- Conformity check between the chain-of-custody forms, compositing protocol, and laboratory reports;
- A check for laboratory data report completeness; and,
- A check for typographical errors on the laboratory reports.

After performing the aforementioned data screening, the laboratory was notified of any deficiencies, if any, detailing the problems encountered during the initial screening process.

Following the initial screening, a more complete QA/QC review was performed, which included an evaluation of method holding times, method blank contamination, and accuracy and precision. Accuracy was evaluated by reviewing MS, MSD, and LCS recoveries; precision was evaluated by reviewing field duplicate, spike duplicate and laboratory sample duplicate RPDs.

A total of 607 constituents were measured among 107 samples (including field QC samples). Data quality assessment was based upon review of holding times, laboratory blanks, laboratory control samples, laboratory duplicates, matrix spikes and matrix spike duplicates, reporting limits, and field duplicates. Based on the data review, none of the constituent results were rejected. Appendix E provides the detailed descriptions of specific items that were evaluated during the QA/QC review process and data that were qualified as estimated due to laboratory QC exceedances.

5.4 Tributary Level Discrete Water Quality Monitoring

In this section the results of the WY 2012 tributary level water quality monitoring are presented including a description of the monitored events, the water quality results, a statistical summary and analysis and a discussion of the QA/QC Results.

5.4.1 Monitored Events

During WY 2012, tributary level discrete samples were collected from all six of the monitoring locations described in Section 4. A summary of the events that were successfully monitored during WY 2012 is presented in Table 5-15. An effort was made to collect the tributary samples during the rising limb of an event, when possible, to provide data for “worst-case-scenarios.” After the samples were collected, the stage data from the Martis Creek gauging station (Station GS-MC1) was reviewed to determine whether the samples were collected during the rising limb of an event. Figures 5-53 thru 5-59 illustrate when the samples were collected in relation to stream stage. These figures show that six of the seven events were sampled during the rising limb or near the peak stage of the runoff event.

Table 5-15
2010 & 2012 Water Years Tributary Level Water Quality Monitoring Event Summary¹

Event Date	Event Type ²	Antecedent Dry Time (Days)	Total Precip (inches)
2011 Water Year			
12/14/2010	M	6	1.6
12/18/2010	M	1	2
3/15/2011	M	4	1.3
4/1/2011	S	6	NA
5/5/2011	S	10	NA
6/6/2011	M	1	1.5
6/29/2011	R	20	0.4
2012 Water Year			
1/21/2012	M	23	1.8
3/14/2012	M	7	0.7
3/16/2012	M	1	2.1
3/21/2012	S	3	NA
4/20/2012	S	7	NA
4/23/2012	S	10	NA
4/26/2012	R	11	0.9

^{1.} A sample was collected at all six sites for every event

^{2.} M = Mixed Snow/Rain, R = Rain, S = Snowmelt.

NA = not applicable

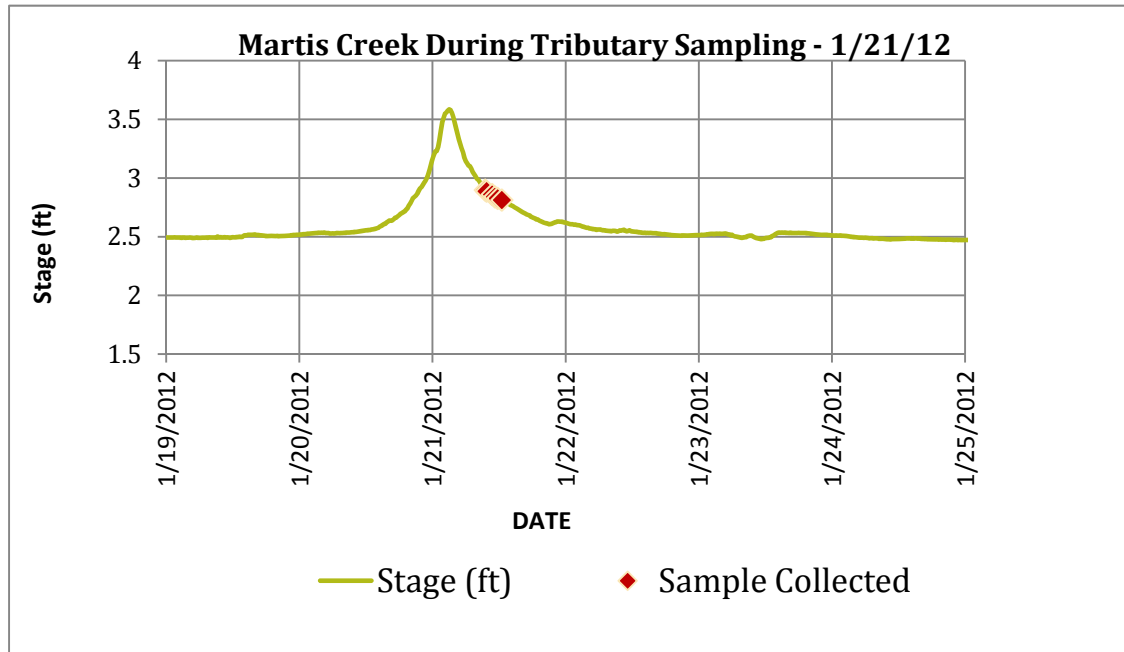


Figure 5-53
Tributary Event 1/21/2012

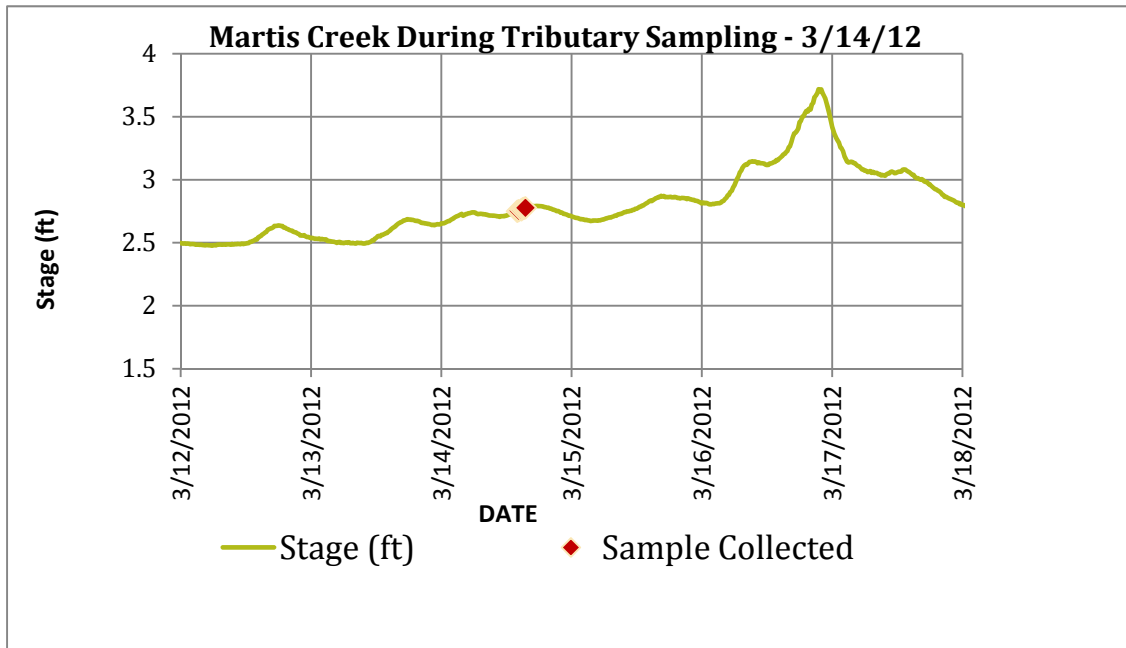


Figure 5-54
Tributary Event 3/14/2012

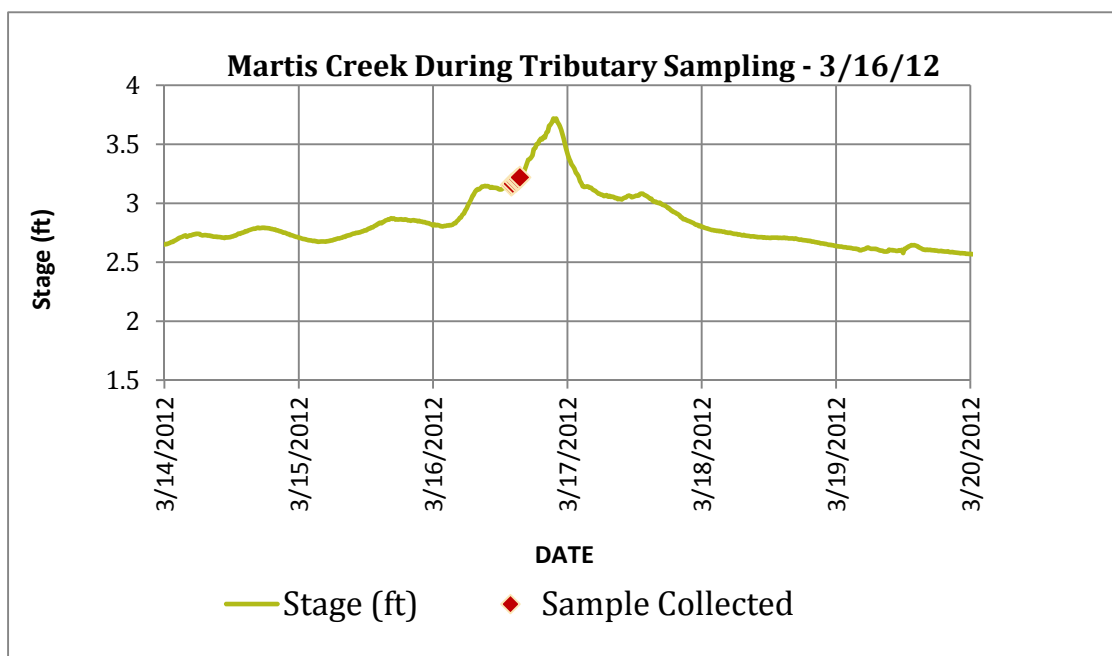


Figure 5-55
Tributary Event 3/16/2012

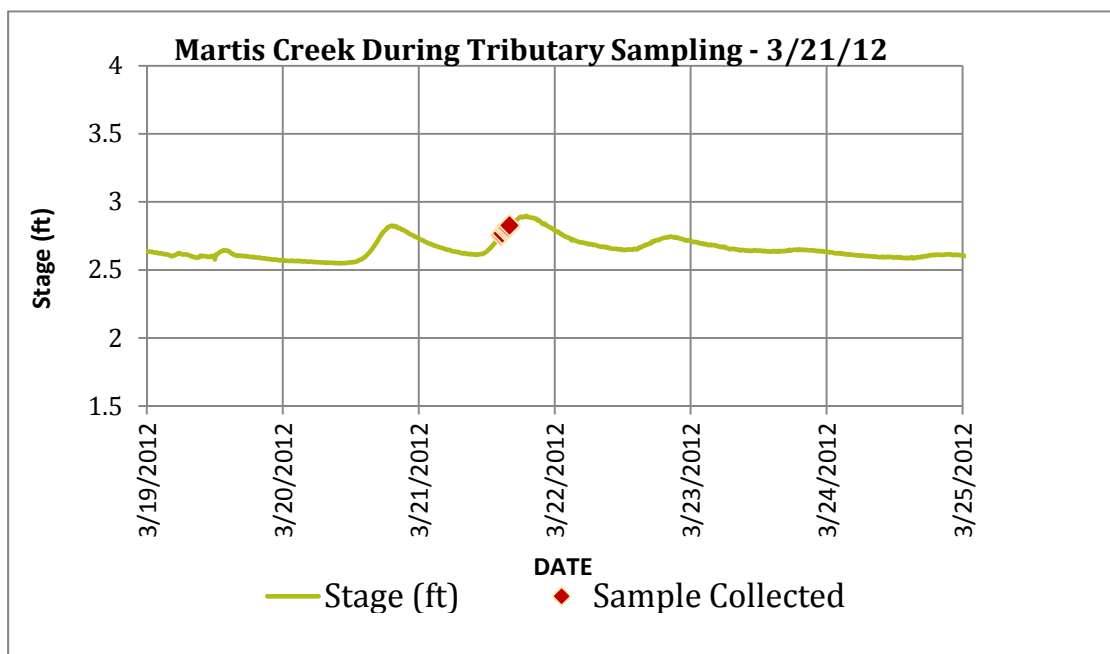


Figure 5-56
Tributary Event 3/21/2012

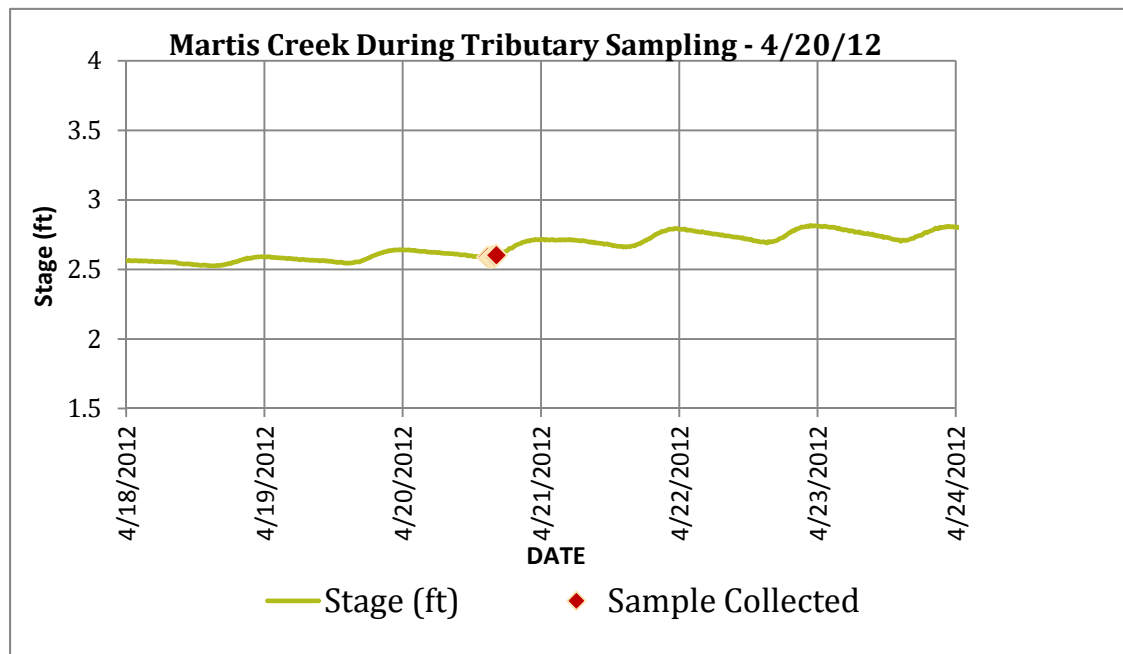


Figure 5-57
Tributary Event 4/20/2012

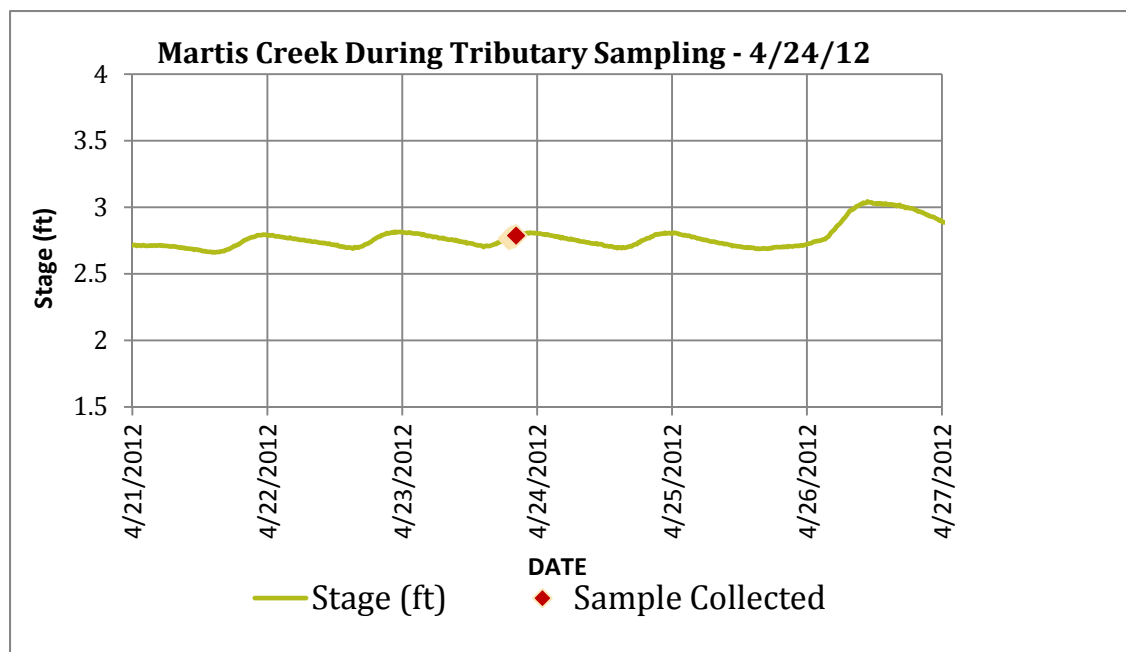


Figure 5-58
Tributary Event 4/24/2012

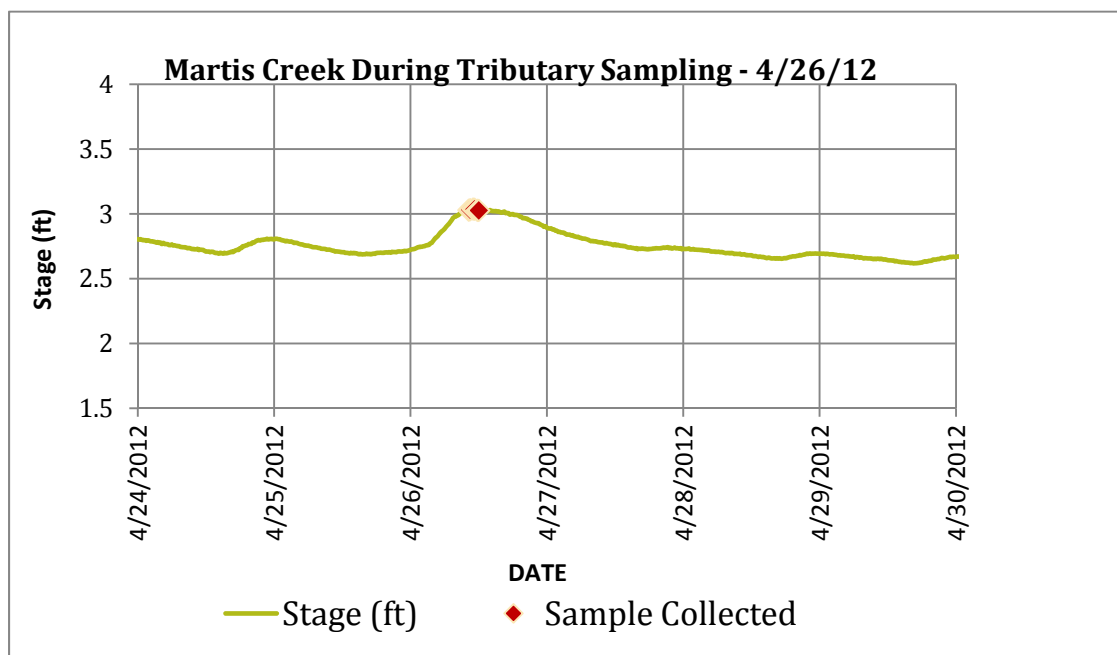


Figure 5-59
Tributary Event 4/26/2012

5.4.2 Water Quality Results

The results for TSS, turbidity, total nitrogen, and total phosphorus are also presented graphically in Figures 5-60, 5-61, 5-62, and 5-63, respectively. The figures show that the differences in mean concentrations are relatively small and no sites had consistently higher or lower mean concentrations. A review of Figures 5-53 through 5-59 indicates the largest increase in stream discharge occurred during the January 21st, March 16th and April 26th, 2012 storm events. These were either mixed rain/snow or rain events and represented the largest storms that occurred during WY 2012. As expected, pollutant concentrations were elevated during these events relative to the other smaller monitored events. The highest pollutant concentrations occurred during the January 21st event. This event had a steep increase in stream discharge, little to no snowpack in much of the tributary watershed, a large amount of precipitation (1.8 inches), and a relatively long period of dry antecedent conditions (23 days). The complete analytical results for the tributary level water quality monitoring are presented in Appendix C.

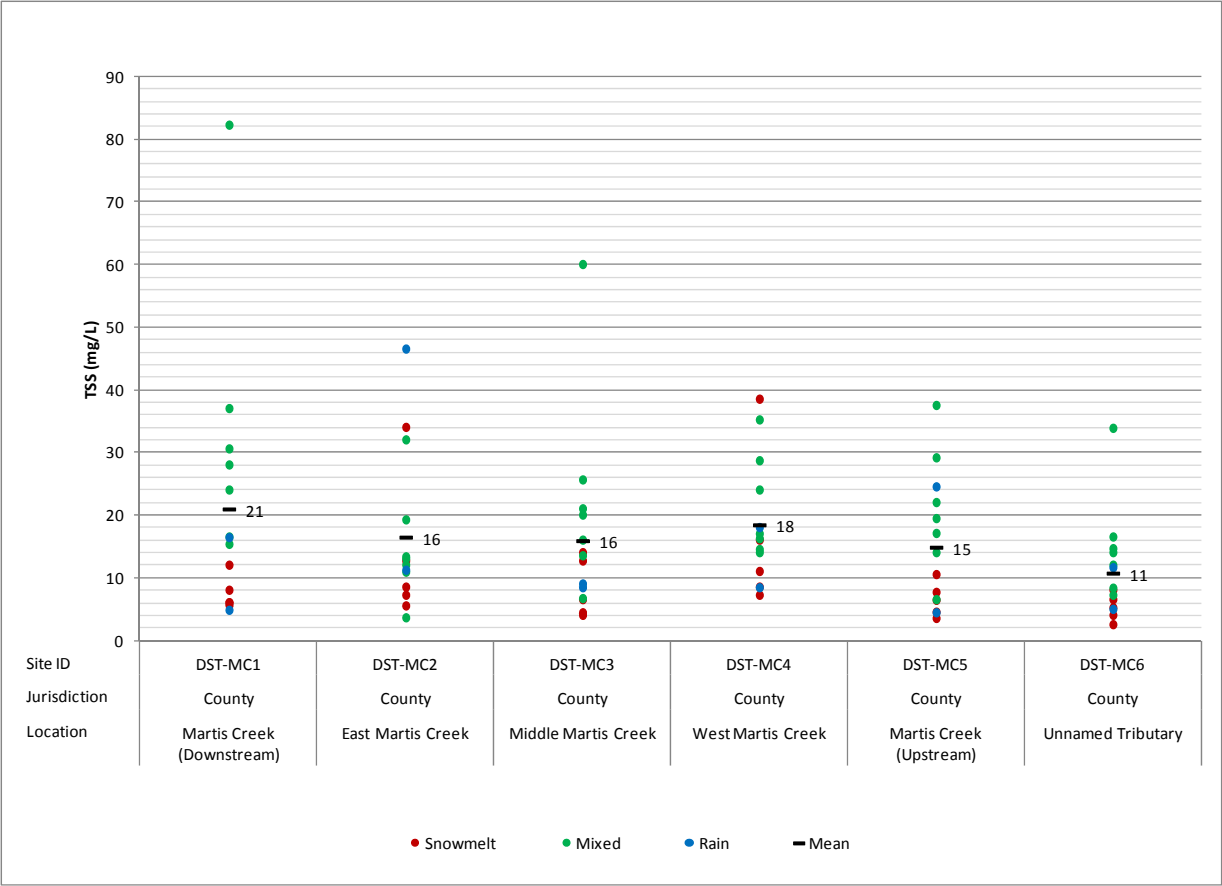


Figure 5-60
Tributary Site Comparisons – TSS

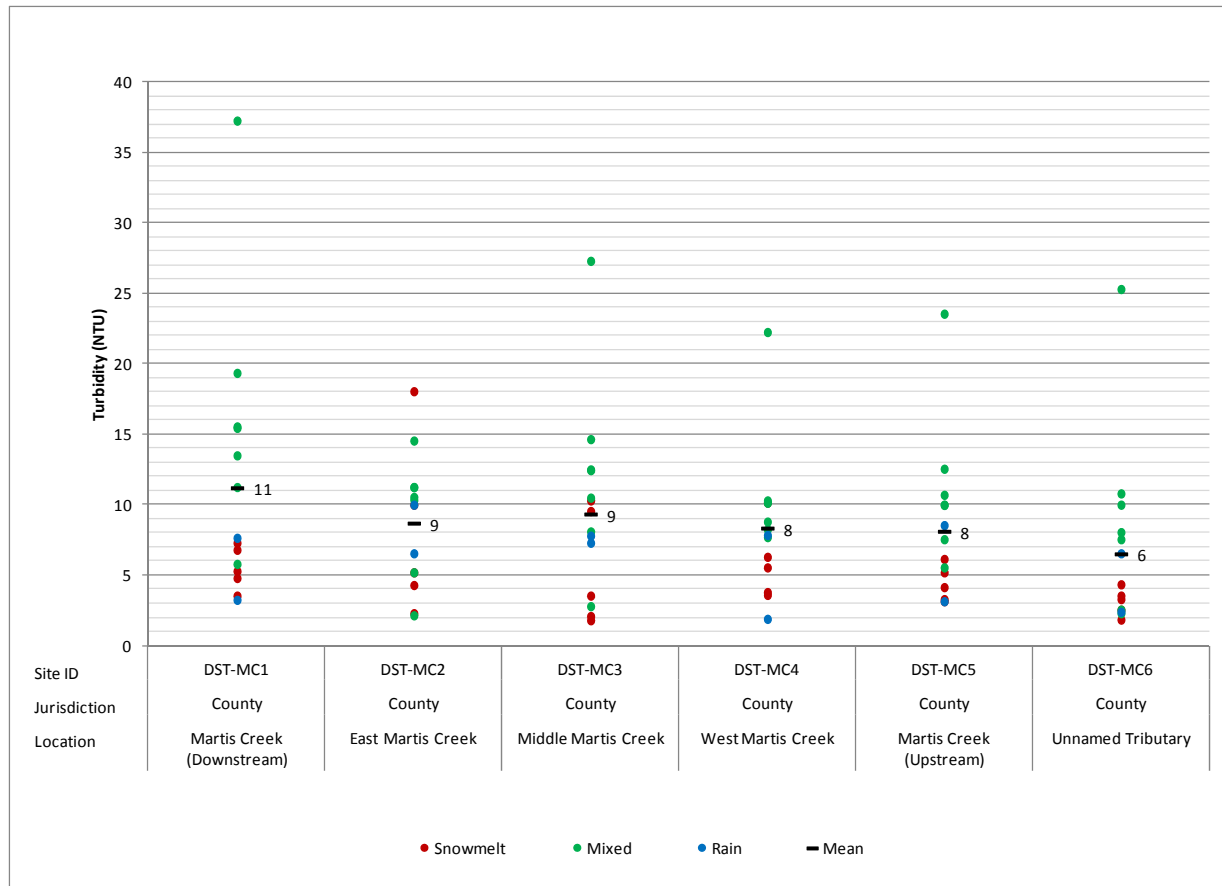


Figure 5-61
Tributary Site Comparisons – Turbidity

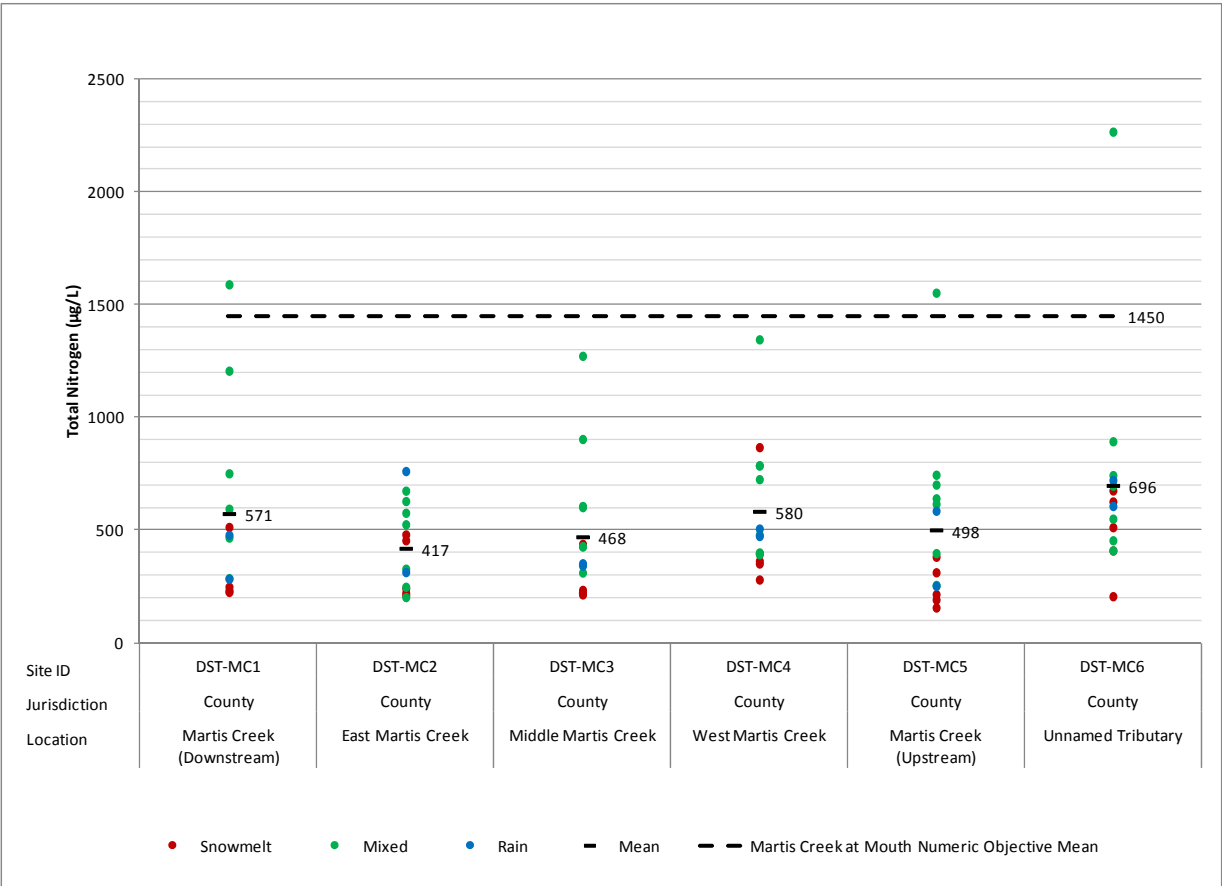


Figure 5-62
Tributary Site Comparisons – Total Nitrogen

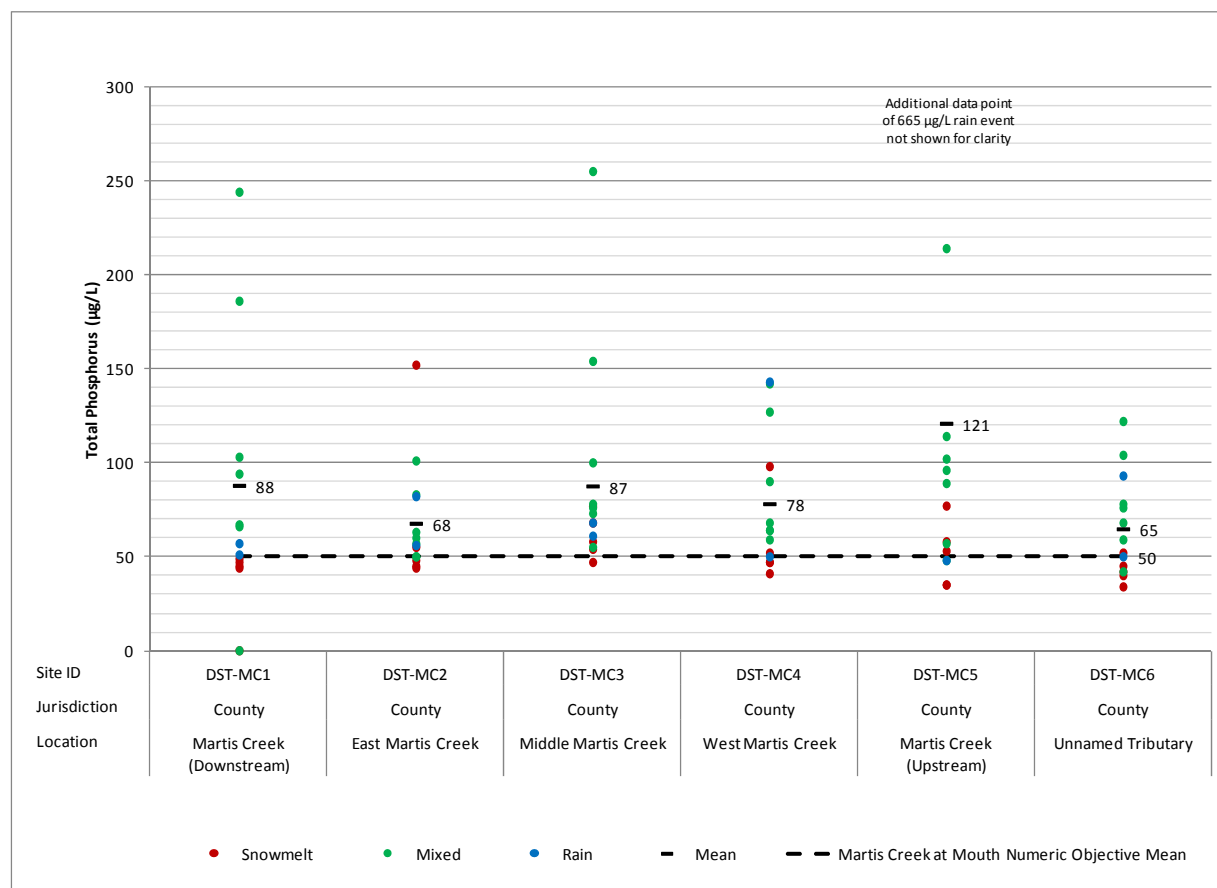


Figure 5-63
Tributary Site Comparisons – Total Phosphorus

5.4.3 Statistical Analyses

Summary level statistics (mean, standard deviation, coefficient of variation, median) are calculated from the analytical data from each monitoring site.

5.4.3.1 Summary Statistics

Summary level statistics were generated for the 2011 and 2012 monitoring seasons combined to help describe the data set for each site and are presented in Tables 5-16 thru 5-21. The summary statistics include the number of samples, percent detection, minimum, maximum, mean, median, standard deviation and CV. There were no non-detectable concentrations of the monitored constituents in any of the tributary samples. The CV values for all sites were high but less than those observed in the community level data.

Table 5-16. Water Years 2011 & 2012 Martis Creek Tributary Summary Statistics (DST-MC1)

Constituent	Units	n	Percent Detection	Range		Mean	Median	Standard Deviation	Coefficient of Variation
				Min	Max				
Total Suspended Solids	mg/L	14	100%	4.8	82	21	16	20	0.98
Turbidity	NTU	14	100%	3.2	37	11	7.4	9.0	0.81
Nitrate as N / Nitrite as N	µg/L	12	100%	4.0	435	88	22	133	1.5
Ammonia as N	µg/L	12	100%	1.0	6.0	3.8	4.0	1.5	0.38
Total Kjeldahl Nitrogen (TKN)	µg/L	12	100%	219	1152	483	414	305	0.63
Total Nitrogen as N	µg/L	12	100%	223	1587	571	470	426	0.75
Dissolved Phosphorus as P	µg/L	14	100%	21	153	41	33	33	0.80
Dissolved Orthophosphate as P	µg/L	12	100%	11	121	27	19	30	1.1
Total Phosphorus as P	µg/L	12	100%	44	244	88	62	64	0.72

Notes

mg/L =milligrams per liter. NTU = nephelometric turbidity units. µg/L = micrograms per liter

n = Number of samples

Total Nitrogen is the sum of nitrate (as N), nitrite (as N), and total Kjeldahl nitrogen

Percent Detection = percent of samples that were detected above the reporting limit

Table 5-17. Water Years 2011 & 2012 Martis Creek Tributary Summary Statistics (DST-MC2)

Constituent	Units	n	Percent Detection	Range		Mean	Median	Standard Deviation	Coefficient of Variation
				Min	Max				
Total Suspended Solids	mg/L	14	100%	3.6	47	16	12	12	0.76
Turbidity	NTU	14	100%	2.1	18	8.6	10	4.6	0.53
Nitrate as N / Nitrite as N	µg/L	14	100%	2.0	183	22	6.0	48	2.2
Ammonia as N	µg/L	14	100%	1.0	6.0	3.1	3.0	1.4	0.45
Total Kjeldahl Nitrogen (TKN)	µg/L	14	100%	192	753	395	381	180	0.46
Total Nitrogen as N	µg/L	14	100%	200	759	417	389	191	0.46
Dissolved Phosphorus as P	µg/L	14	100%	25	72	38	33	14	0.37
Dissolved Orthophosphate as P	µg/L	14	100%	12	61	21	16	14	0.66
Total Phosphorus as P	µg/L	14	100%	44	152	68	57	29	0.44

Notes

mg/L =milligrams per liter. NTU = nephelometric turbidity units. µg/L = micrograms per liter

n = Number of samples

Total Nitrogen is the sum of nitrate (as N), nitrite (as N), and total Kjeldahl nitrogen

Percent Detection = percent of samples that were detected above the reporting limit

Table 5-18. Water Years 2011 & 2012 Martis Creek Tributary Summary Statistics (DST-MC3)

Constituent	Units	n	Percent Detection	Range		Mean	Median	Standard Deviation	Coefficient of Variation
				Min	Max				
Total Suspended Solids	mg/L	14	100%	4.0	60	16	13	14	0.90
Turbidity	NTU	14	100%	1.8	27	9.3	8.8	6.6	0.71
Nitrate as N / Nitrite as N	µg/L	14	100%	1.0	302	35	4.5	79	2.2
Ammonia as N	µg/L	14	100%	2.0	10	4.1	3.5	2.3	0.56
Total Kjeldahl Nitrogen (TKN)	µg/L	14	100%	211	968	433	362	239	0.55
Total Nitrogen as N	µg/L	14	100%	212	1270	468	388	300	0.64
Dissolved Phosphorus as P	µg/L	14	100%	27	200	50	36	44	0.89
Dissolved Orthophosphate as P	µg/L	14	100%	13	181	34	23	43	1.3
Total Phosphorus as P	µg/L	14	100%	47	255	87	71	55	0.63

Notes

mg/L = milligrams per liter. NTU = nephelometric turbidity units. µg/L = micrograms per liter

n = Number of samples

Total Nitrogen is the sum of nitrate (as N), nitrite (as N), and total Kjeldahl nitrogen

Percent Detection = percent of samples that were detected above the reporting limit

Table 5-19. Water Years 2011 & 2012 Martis Creek Tributary Summary Statistics (DST-MC4)

Constituent	Units	n	Percent Detection	Range		Mean	Median	Standard Deviation	Coefficient of Variation
				Min	Max				
Total Suspended Solids	mg/L	14	100%	7.2	39	18	16	9.8	0.53
Turbidity	NTU	14	100%	1.9	22	8.3	8.0	4.8	0.58
Nitrate as N / Nitrite as N	µg/L	14	100%	16	661	132	92	161	1.2
Ammonia as N	µg/L	14	100%	1.0	15	4.6	4.5	3.5	0.75
Total Kjeldahl Nitrogen (TKN)	µg/L	14	100%	241	765	448	393	178	0.40
Total Nitrogen as N	µg/L	14	100%	278	1343	580	474	290	0.50
Dissolved Phosphorus as P	µg/L	14	100%	17	108	37	24	30	0.80
Dissolved Orthophosphate as P	µg/L	14	100%	4.0	67	21	12	20	0.97
Total Phosphorus as P	µg/L	14	100%	41	143	78	64	36	0.46

Notes

mg/L = milligrams per liter. NTU = nephelometric turbidity units. µg/L = micrograms per liter

n = Number of samples

Total Nitrogen is the sum of nitrate (as N), nitrite (as N), and total Kjeldahl nitrogen

Percent Detection = percent of samples that were detected above the reporting limit

Table 5-20. Water Years 2011 & 2012 Martis Creek Tributary Summary Statistics (DST-MC5)

Constituent	Units	n	Percent Detection	Range		Mean	Median	Standard Deviation	Coefficient of Variation
				Min	Max				
Total Suspended Solids	mg/L	14	100%	3.5	38	15	12	11	0.71
Turbidity	NTU	14	100%	3.1	24	8.1	6.8	5.4	0.67
Nitrate as N / Nitrite as N	µg/L	14	100%	5.0	361	74	43	98	1.3
Ammonia as N	µg/L	14	100%	1.0	8.0	3.7	3.2	2.0	0.54
Total Kjeldahl Nitrogen (TKN)	µg/L	14	100%	149	1189	424	324	279	0.66
Total Nitrogen as N	µg/L	14	100%	154	1550	498	387	364	0.73
Dissolved Phosphorus as P	µg/L	14	100%	21	603	85	36	154	1.8
Dissolved Orthophosphate as P	µg/L	14	100%	12	222	45	21	60	1.3
Total Phosphorus as P	µg/L	14	100%	35	665	121	68	163	1.4

Notes

mg/L = milligrams per liter. NTU = nephelometric turbidity units. µg/L = micrograms per liter

n = Number of samples

Total Nitrogen is the sum of nitrate (as N), nitrite (as N), and total Kjeldahl nitrogen

Percent Detection = percent of samples that were detected above the reporting limit

Table 5-21. Water Years 2011 & 2012 Martis Creek Tributary Summary Statistics (DST-MC6)

Constituent	Units	n	Percent Detection	Range		Mean	Median	Standard Deviation	Coefficient of Variation
				Min	Max				
Total Suspended Solids	mg/L	14	100%	2.5	34	10.7	8.2	7.9	0.74
Turbidity	NTU	14	100%	1.8	25	6.5	3.9	6.2	0.96
Nitrate as N / Nitrite as N	µg/L	14	100%	2.0	419	99	26	133	1.3
Ammonia as N	µg/L	14	100%	2.0	179	17	4.5	47	2.8
Total Kjeldahl Nitrogen (TKN)	µg/L	14	100%	188	1845	596	526	388	0.65
Total Nitrogen as N	µg/L	14	100%	204	2264	696	614	483	0.70
Dissolved Phosphorus as P	µg/L	14	100%	13	112	36	31	24	0.67
Dissolved Orthophosphate as P	µg/L	14	100%	5.0	78	17	11	18	1.1
Total Phosphorus as P	µg/L	14	100%	34	122	65	56	27	0.41

Notes

mg/L = milligrams per liter. NTU = nephelometric turbidity units. µg/L = micrograms per liter

n = Number of samples

Total Nitrogen is the sum of nitrate (as N), nitrite (as N), and total Kjeldahl nitrogen

Percent Detection = percent of samples that were detected above the reporting limit

5.4.3.2 Statistical Comparisons

Trends in concentrations over time are evaluated visually using time-series plots and formally using the Mann-Kendall test method. T-tests are used to determine if two groups of data have a significant difference.

The statistical outputs from the trend analyses are included in Appendix D and the results are summarized in Table 5-22 below.

Table 5-22. Statistical Trends of Constituents of Concern at Tributary Monitoring Sites

	TSS	Turbidity	Total Nitrogen	Total Phosphorus	Diss. Phosphorus
DST-MC1	Decreasing	Decreasing		Decreasing	
DST-MC2	Decreasing	Decreasing	Slightly Increasing		
DST-MC3	Decreasing	Decreasing		Decreasing	
DST-MC4	Slightly Decreasing	Slightly Decreasing			
DST-MC5	Slightly Decreasing	Slightly Decreasing			Slightly Increasing
DST-MC6	Decreasing	Decreasing			Slightly Increasing

Note: Mann-Kendall (MK) Trend Analyses used to determine significance.

A blank cell signifies no discernible trends or insufficient data points to analyze.

Table 5-22 shows a decreasing trend of TSS and turbidity values at the tributary sites, most likely a result of WY 2011 being an above average precipitation year, and WY 2012 being a below average precipitation year. Runoff rates and volumes during WY 2012 were much lower than the previous year and carried less sediment downstream.

Trends in nutrient concentrations are inconsistent and additional data is needed to improve confidence in these conclusions. The decreasing trends in total phosphorus are likely related to the decrease in sediment. The slightly increasing total nitrogen and dissolved phosphorus trends are most likely caused by a few more extreme values in the data set and any conclusions should be considered preliminary.

Based on the differences observed in Tables 5-16 thru 5-21, statistical comparisons (t-tests at the 95 percent confidence level) were conducted on select data groups. The only two sites with statistically significant differences in pollutant concentrations are DST-MC1 and DST-MC6 for turbidity and DST-MC2 and DST-MC6 for total nitrogen.

The differences among mean concentrations at all of the tributary sites are not large and, except for the two instances mentioned above, statistical differences cannot yet be discerned with the limited amount of data collected to date. The number of samples required to determine significance increases if the mean values between the two groups are similar and there is large variability in the data.

5.4.4 Tributary Level Discussion

The results for each of the tributary sites are discussed further in the sections below. The discussions focus on watershed characteristics and how they may relate to water quality results for the key constituents (TSS, turbidity, TKN, total phosphorus, and total nitrogen). Table 5-23 summarizes the tributary level results by presenting mean concentrations for TSS, turbidity, TKN, total nitrogen, and total phosphorus at each of the monitoring sites and provides a comparison to the relevant water quality objectives for the mouth of Martis Creek.

Table 5-23. Tributary Level Site Rankings Based on Mean Pollutant Concentrations

Sites	Jurisdiction	Mean TSS (mg/L)	Mean Turbidity (NTU)	Mean Total Kjeldahl Nitrogen (TKN) (µg/L)	Mean Total Nitrogen (µg/L)	Mean Total Phosphorus (µg/L)
Martis Creek at Mouth	TRWQMP Objectives	N/A	N/A	450	1450	50
Martis Creek at Mouth	DST-MC1	21	11	483	571	88
East Martis Creek	DST-MC2	16.4	8.6	395	417	68
Middle Martis Creek	DST-MC3	15.8	9.3	433	468	87
West Martis Creek	DST-MC4	18	8.3	448	580	78
Martis Creek (Upstream)	DST-MC5	14.8	8.1	424	498	121
Unnamed Tributary	DST-MC6	11	6	596	696	65

Notes: A ranking of 1 equals the lowest mean value, a ranking of 2 equals the second lowest mean value, and so on.

Ranking of 1 =



Ranking of 2 =



Ranking of 3 =



Ranking of 4 =



Ranking of 5 =



Ranking of 6 =



DST-MC1 (Martis Creek at Martis Creek Lake)

This monitoring site is located at the mouth of Martis Creek, and is downstream of all tributary confluences. The larger flows produced by rain and mixed events at this site (Figure 5-64) produced the highest concentrations at this location relative to the smaller snowmelt induced flows. This site had the highest levels of TSS and turbidity and the concentrations of TKN, total nitrogen, and total phosphorus were all in the higher range when compared to the other tributary sites. The mean concentrations of TKN and total phosphorus exceeded the established water quality objectives at this location while the total nitrogen concentrations were below the water quality objective.



Figure 5-64
Sampling at Site DST-MC1

DST-MC2 (East Martis Creek)

This site is located on East Martis Creek approximately 0.5 mile upstream of its confluence with the main stem. The sub-watershed for this site consists of 100 percent pervious, upland meadow and forest with some dirt roads. This site had the lowest mean concentrations for TKN and total nitrogen and the second lowest mean concentration of total phosphorus. The mean TSS and turbidity concentrations at this site ranked in the middle to higher levels when compared to the other sites. The higher particulate concentrations at this site are somewhat unexpected given the minimal development in the sub-watershed. A photograph of sampling at this site is presented in Figure 5-65.



Figure 5-65
Sampling at the DST-MC2 during 4/26/12 Rain Event

DST-MC3 (Middle Martis Creek)

This monitoring site is located on Middle Martis Creek approximately 250 feet upstream of its confluence with the main stem. The sub-watershed for this site consists of upland forest and meadow with some dirt roads as well as an approximately four mile section of SR 267. This portion of SR 267 includes a steep grade to Brockway Summit where traction sand is applied. Caltrans installed a series of new sand traps on SR 267 prior to WY 2012. During the spring snowmelt, the stream sometimes overtops its banks upstream of the monitoring location and a portion of the stream flow bypasses the site (Figure 5-66). During this time period, flows travel along preferential paths formed by previous overflow conditions at this location. Most of the flow from the breach returns to the main channel upstream of the monitoring site, but some flows into the main stem of Martis Creek just downstream of the monitoring location. The mean concentrations of TSS, turbidity, TKN, and total phosphorus were all in the mid to higher levels relative to other tributary level sites.



Figure 5-66
Middle Martis Creek Bypass

DST-MC4 (West Martis Creek)

DST-MC4 is located on West Martis Creek approximately 0.25 miles upstream of its confluence with the main stem. West Martis Creek originates within the Northstar ski resort and flows through the Northstar residential development and golf course (Figure 5-67). The mean concentrations of TSS, turbidity, TKN, total nitrogen, and total phosphorus were all in the mid to higher levels when comparing this site to the other tributary sites.



Figure 5-67
Site DST-MC4 Looking Upstream Towards Golf Course and Northstar

DST-MC5 (Martis Creek)

This site is located on the main stem of Martis Creek approximately 100 feet downstream of an unnamed tributary that receives flow from a portion of the Lahontan development and access road. This site was relocated downstream following the first monitored event in 2011 due to a breach in the unnamed tributary that caused a significant portion of the flow to bypass downstream of the original monitoring location (Figure 5-68). This site is located upstream of all major tributary confluences, and its sub-watershed consists of a portion of the Northstar ski resort, upland forest and meadow with some dirt roads, and the developed residential areas of Lahontan Golf Club and Martis Camp. This site has a large sub-watershed and receives more flow than the other tributary sites (except for DST-MC1). This site had the second lowest mean concentration for TSS, turbidity, and TKN. The mean concentration for total phosphorus went from the lowest value in WY 2011 to the highest value in the combined WY 2011 and WY 2012 data. This increased average is likely due to a mix event on January 21, 2012 and a rain event on April 26, 2012 which produced total phosphorus concentrations at this site of 214 and 665 $\mu\text{g/L}$, respectively, each much higher than any WY 2011 events.



Figure 5-68
Unnamed Tributary Breaching its Banks near Site DST-MC5

DST-MC6 (Unnamed Tributary)

This site is located on an unnamed tributary of Martis Creek approximately 100 feet downstream of Martis Lake Road. This site had the lowest flow rates of all of the tributary sites due to its relatively small sub-watershed which consists of commercial development, a portion of the Truckee Tahoe Airport and open meadow areas. After discharging from the developed areas, runoff flows through a meadow where infiltration and treatment can occur as shown in Figure 5-69. This site had the lowest mean concentrations for TSS, turbidity, and total phosphorus. The mixed snow and rain event on January 21, 2012 produced an unusually high concentration of total nitrogen which also caused the site to have the highest mean concentrations for total nitrogen and TKN.

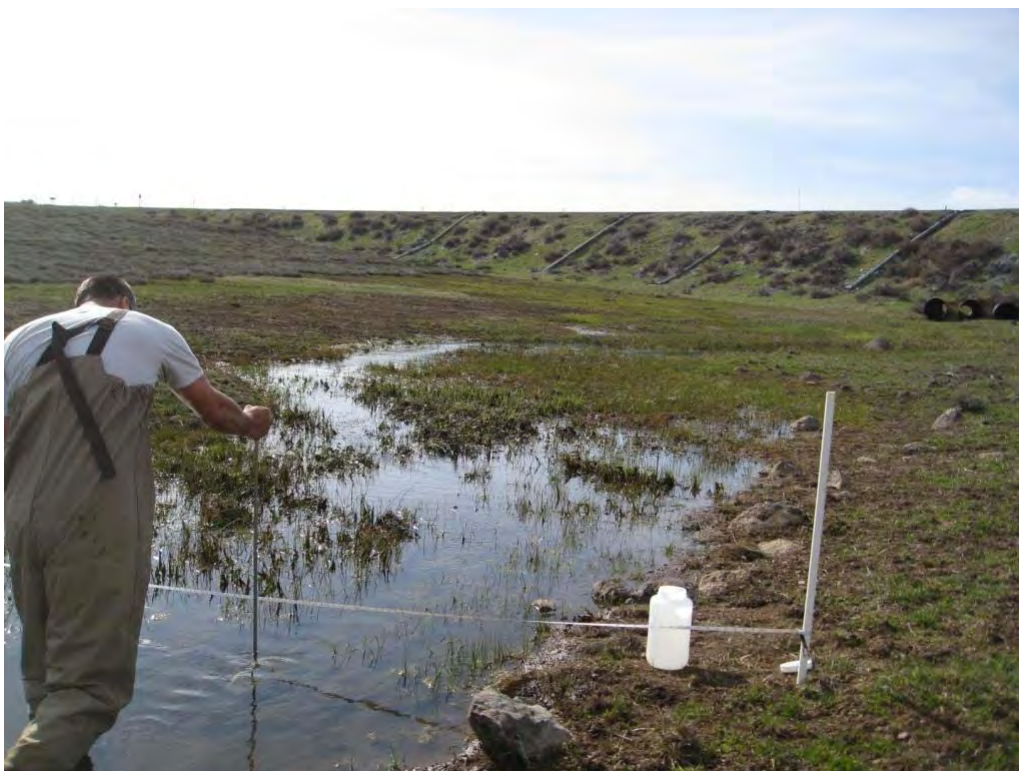


Figure 5-69

Low Flow Snowmelt Event at Site DST-MC6

5.4.5 QA/QC Results

All results were evaluated against a set of predefined quality control criteria. In the 2012 dataset, one triplicate sample was collected and analyzed to assess field precision. The field triplicate was collected from the DST-MC5 site on March 16, 2012. All results met the field precision criteria presented in Table 4-6.

The QA/QC review of analytical results found all the data to be of acceptable quality and usable for the intended purposes. For a detailed explanation of QA/QC procedures and results, refer to Appendix E.

5.5 Stream Gauging Station

The 2012 stream discharge monitoring results from the Martis Creek gauging station (GS-MC1) are presented below. The gauge was installed in November of 2011 and has been operated continuously since that time.

5.5.1 Site Operations

Field visits to the site were performed throughout WY 2012 to continue rating curve development, download data and maintain the equipment. Typical field visit tasks included measuring flow velocities, downloading the data from the pressure transducer and comparing current transducer stage readings to staff gauge readings located at the site.

5.5.2 Rating Curve Development

Due to the interfering effects of a beaver dam downstream of the stream gauge, development of the stream rating curve was continued during WY 2012 (Appendix F). During the first week of July 2011, a beaver dam/pond approximately 600 ft downstream of the Martis Creek stream gauge increased the water level at the stream gauge location. This rendered the initial rating curve developed during WY 2011 inaccurate for the time period after the dam's establishment.

Several alternatives were considered to address the problem including installing a pond leveler device, and relocating the stream gauge. After evaluating the alternatives, it was decided to continue collecting velocity measurements to develop a revised rating curve for the new condition.

The beaver dam remained stable throughout the high flow periods in WY 2012, then began to deteriorate at the end of April, 2012 causing stage measurements to decrease again. It is not clear why the dam is deteriorating but no new beaver activity was observed during the summer of 2012. Water levels in the pond did fluctuate during the summer including some increases that did not correspond to precipitation events so some beaver activity could still be occurring. It is also possible that other changes in the watershed, such as changes in groundwater pumping, could be affecting water levels at the gauging station.

5.5.3 Annual Discharge

The two rating curves developed to date were applied to the pressure transducer stage data to produce a semi- continuous record of discharge at the Martis Creek gauging station for WY 2011 and WY 2012 which is presented in Figure 5-70. The difference between the two years is readily apparent due to the large differences in precipitation amounts received. The total discharge volume in WY 2011 was almost four times as large as in WY 2012. The maximum measured stage during the entire monitored period was 4.3 feet which correlates to a discharge of approximately 420 cfs. This occurred on March 16, 2011 after nearly 4 inches of precipitation fell over a 72 hour period. The temperatures during this storm cycle were relatively warm which elevated snow levels and increased runoff. The lowest stage at the gauging station was 1.1 feet which correlates to a discharge of approximately 0.5 cfs. This occurred on August 9, 2012. In general, the discharge was greatest during the spring snowmelt cycles and was lowest during the late summer and fall.

The discharge rates shown in the graph are estimated for the periods of instability caused by the beaver dam construction or deterioration processes. During these time periods the water levels in the pond were changing and the rating curves are not applicable. Flows values were estimated by interpolating between the manual measurement points. This is apparent in the graph during the spring and summer months in both years.

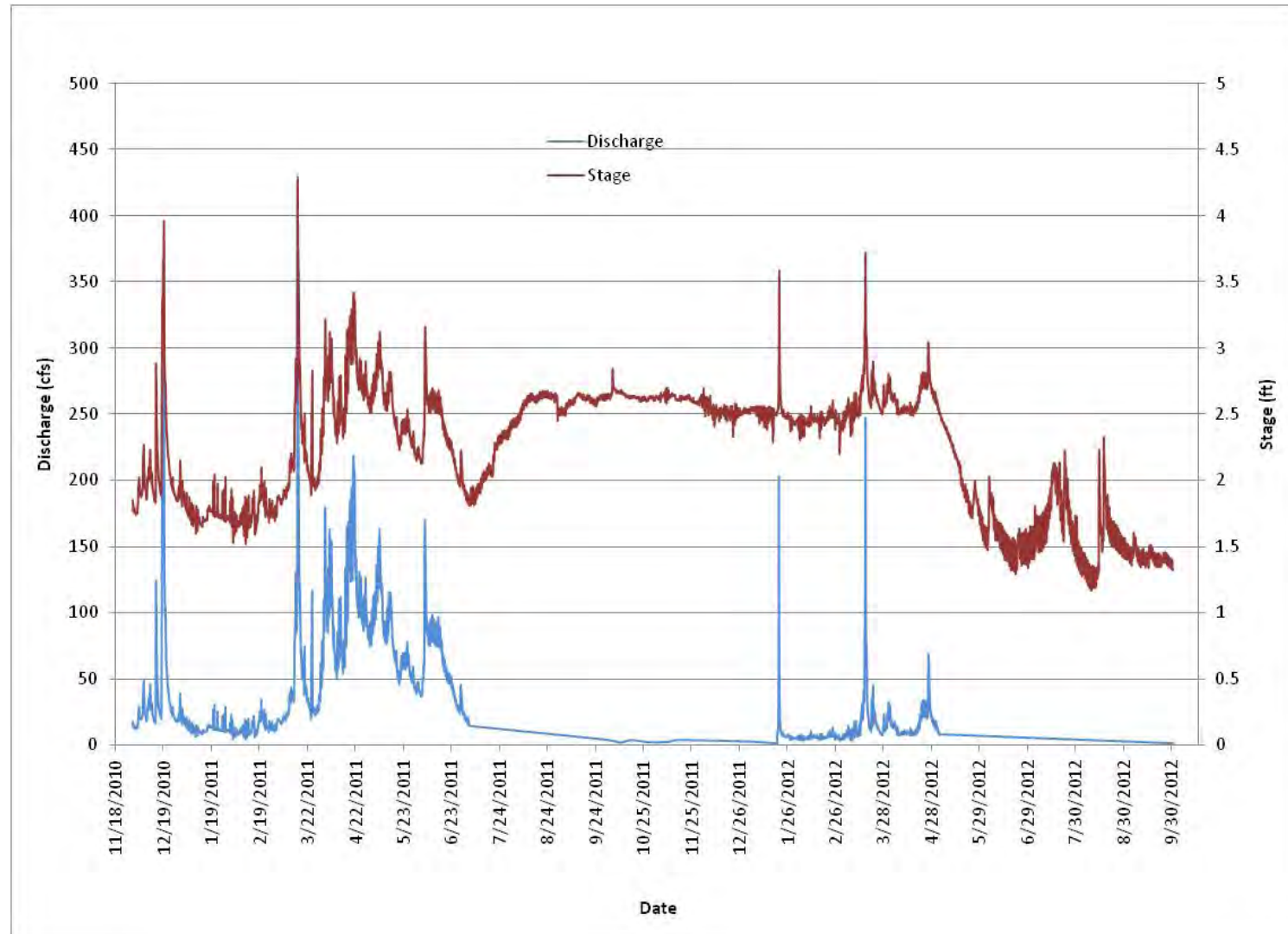


Figure 5-70
Water Years 2011 & 2012 Stage and Discharge

5.5.4 Load Estimates

Annual pollutant loads in the Martis Creek tributaries for WY 2011 and WY 2012 were estimated using the total discharge at each tributary site and the mean concentrations for each constituent. The annual discharge at each tributary sampling location was estimated based on the measured discharge at the Martis Creek gauging station (Site GS-MC1) and the size of each tributary's sub-watershed as a percentage of the total watershed size. This approach requires the assumption that the precipitation, and runoff response in the tributaries, was uniform over the entire watershed. Although differences in elevation, impervious area, land use, and other factors, likely caused variation in the amount of runoff produced in each watershed, this assumption is considered to be reasonable for the purpose of developing initial, relative annual load estimates. Future monitoring activities will include discharge measurements at two of the tributary level monitoring stations and will improve the understanding of discharge from the different Martis Creek tributaries. A map displaying the location of each tributary sampling location and their corresponding sub-watersheds is presented in Figure 5-71.

The tributary areas and relative discharge volumes for each of the Martis Creek sub-watersheds is presented Table 5-24 and the pollutant load estimates are presented in Table 5-25. The total load at each site is dependent on both the mean concentration from sampled runoff events and the discharge of the tributary. The load differences between the two years are mostly due to the differences in stream discharge volumes. Pollutant concentrations were higher in some cases, especially nutrients, but this was not enough to offset the effect of discharge volume on loads. It is also important to note that the mean constituent concentrations used in the load calculations were developed from samples of worst case scenario runoff events and therefore likely overestimate the annual loads. Future monitoring should consider sampling some lower flows, and presumably lower concentrations, to more accurately represent the full range of conditions in the stream for the annual load estimates.

In Table 5-25, site DST-MC1 had the largest loads because it receives flow from the entire Martis Creek sub-watershed. Each of the other tributary sites only receives a portion of this total flow. The pollutant loads at each tributary site generally correlated with each site's total annual discharge with the exception of sites DST-MC3 and DST-MC4 for WY 2011. Site DST-MC4 (West Martis Creek) had a slightly larger watershed than site DST-MC3 (Middle Martis Creek) and therefore also had a greater total discharge volume; however, the loads for TSS and total phosphorus were greater at site DST-MC3 due to higher mean concentrations. Pollutant load totals did correlate with each sites total annual discharge for WY 2012.

A comparison of the total pollutant load per acre of watershed (the summation of TSS, total phosphorus, and total nitrogen) for WY 2011 through WY 2012 shows DST-MC5 (65 pounds) and DST-MC6 (72 pounds) both had the lowest values per acre. Sites DST-MC3, DST-MC2, and DST-MC4 had totals of 99, 91, and 91 pounds per acre, respectively.

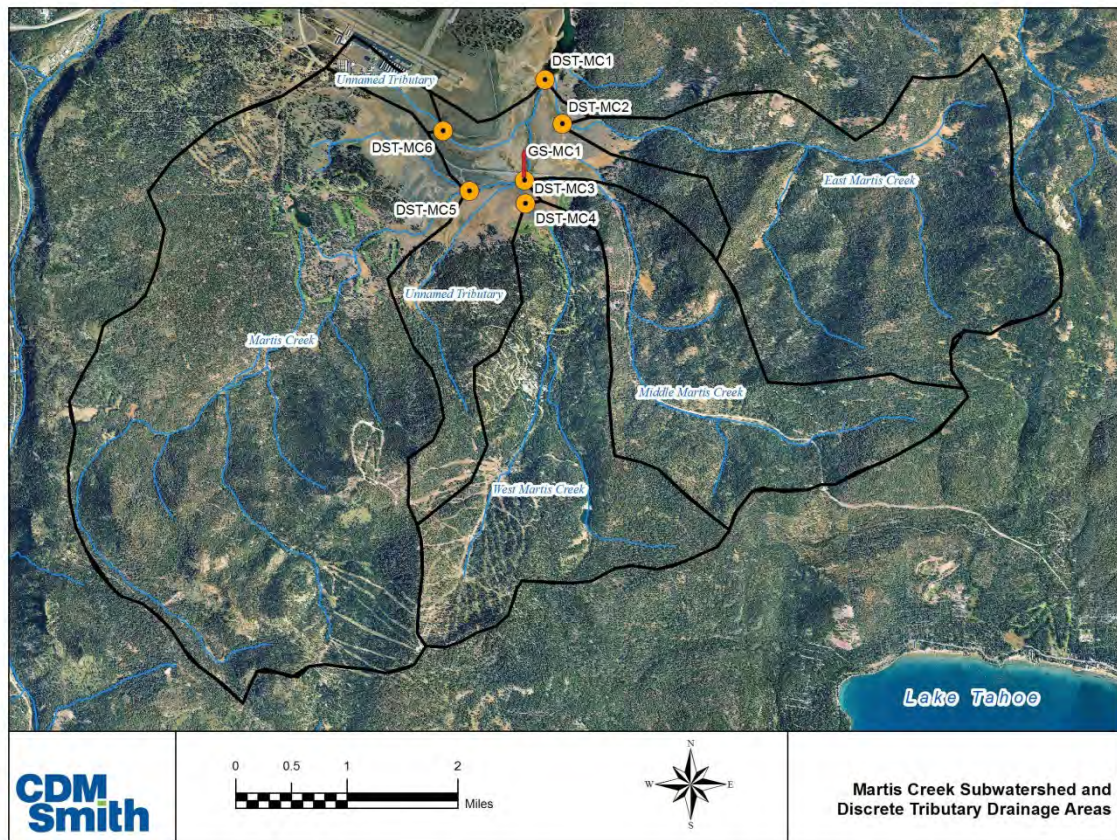


Figure 5-71
Martis Creek Tributary Monitoring Sites and Sub-Watersheds

Table 5-24. Martis Creek Tributary Annual Discharge Volumes

Station ID	Drainage Area (ac)	Percent of Martis Creek Sub-watershed	WY 2011 Total Flow (acre-ft)	WY 2012 Total Flow (acre-ft)
DST-MC1	21,900	100%	31,334	8,370
DST-MC2	4,550	21%	6,510	1,739
DST-MC3	3,000	14%	4,292	1,147
DST-MC4	3,200	15%	4,578	1,223
DST-MC5	8,800	40%	12,591	3,363
DST-MC6	200	1%	286	76
GS-MC1	16,250	74%	23,426	6,211

Table 5-25. Total Tributary Loads

WY 2011						
Station ID	TSS		Total Nitrogen		Total Phosphorus	
	Mean (mg/L)	Load (lb)	Mean (µg/L)	Load (lb)	Mean (µg/L)	Load (lb)
DST-MC1	27	2,271,315	493	42,032	85	7,220
DST-MC2	19	339,236	324	5,732	72	1,270
DST-MC3	22	258,832	407	4,747	85	996
DST-MC4	18	218,995	450	5,599	66	824
DST-MC5	14	467,802	365	12,496	62	2,122
DST-MC6	14	10,706	539	420	64	50
WY 2012						
DST-MC1	15	344,423	679	15,460	92	2,095
DST-MC2	14	64,550	510	2,411	63	300
DST-MC3	10	29,662	529	1,650	90	279
DST-MC4	19	63,729	711	2,364	90	299
DST-MC5	16	145,909	631	5,771	180	1,644
DST-MC6	8	1,574	852	177	65	14

Section 6

Discussion

The following discussion of the WY 2012 monitoring results is based on the integrated results of the assessments performed. Additional information regarding water quality areas of concern, SWMP performance and the prioritization of the existing TRWQMP elements is also included.

6.1 Integration of the Assessment Data

The results of various assessment types conducted during WY 2012 were evaluated from a holistic perspective to determine whether they support, or conflict with, one another and if any additional conclusions or observations can be made. The discussions are organized by watershed including Squaw Creek, Martis Creek, and Town of Truckee.

6.1.1 Squaw Creek

The monitoring assessment types conducted within Squaw Creek include rapid assessments and bioassessments. Rapid assessment surveys were conducted along the downstream one half mile of the creek above the confluence with the Truckee River, while the bioassessments were conducted further upstream where the creek meanders through a large meadow along a golf course and just downstream of Squaw Valley Ski Area and its base area village and parking lots. The results of the RAM surveys indicate that approximately 25 percent of the channel substrate is comprised of fine sediment and that the percentage of fine sediment substrate has increased since the previous surveys conducted in 2010.

Observations made in the field during the Squaw Creek bioassessments also indicate the predominance of DG sand and finer sediments in benthic habitat areas; however, the biological metrics for two of the three bioassessment reaches have improved since the previously conducted surveys in 2010.

6.1.2 Martis Creek

The monitoring assessment types conducted within the Martis Creek watershed include rapid assessments, bioassessments, community water quality sampling, tributary water quality sampling, and stream discharge monitoring.

In Martis Creek, the rapid assessments were generally conducted along stream intervals that either included, or were near, the bioassessment sites and community and tributary level water quality sampling sites. The RAM results for the Martis Creek watershed indicate that West Martis Creek contains the highest percentage of fine substrate with a value of 38 percent.

The results of the community and tributary level water quality monitoring tend to support the rapid assessment results in the Martis Creek watershed. The streams with high percentages of fine substrate identified in the RAM were also observed to contain the highest TSS concentrations at their respective tributary sites and in the stormwater runoff discharging to that channel. Site DST-MC4, which is in West Martis Creek, has the second highest mean concentration of TSS behind only DST-MC1 which is in the main stem of Martis Creek near the Martis Creek Reservoir. Also, while stormwater treatment controls upstream of site DSC-MC3 are providing benefits, moderate TSS concentrations have been

observed at this site. This outfall, and others in the Northstar community that discharge into West Martis Creek, are likely contributing to the higher fine sediment percentages observed in the RAM and elevated TSS levels at site DST-MC4.

Bioassessment results indicate that the surveyed reaches that are located upstream of the developed areas ranked higher than the respective downstream reaches in terms of the biological metrics used to evaluate the streams.

6.1.3 Town of Truckee Corridor

The monitoring assessment types conducted in the Town of Truckee corridor include RAM and community level water quality monitoring. RAM monitoring took place on Donner Creek, Trout Creek, and prioritized locations of the Truckee River. The results of the Truckee River RAM did not indicate high percentages of fine substrate despite a very high percentage in Trout Creek and elevated TSS concentrations at the community level monitoring sites discharging into the Truckee River throughout the downtown corridor. Trout Creek had the highest fine sediment percentages of all stream segments where rapid assessments took place. The results of the Donner Creek RAM did not indicate high percentages of fine substrate despite the turbid flows that were sometimes observed, likely due to the higher energy flows in this segment of Donner Creek. The two photographs in Figures 6-1 and 6-2 below show plumes of sediment entering the Truckee River from Donner Creek and site DSC-TT4 at Bridge Street.

The integrated results indicate that most fine sediment is discharged to the Truckee River from areas of high vehicle traffic where traction sand is used and is then transported downstream where it settles in lower energy reaches downstream and along the channel fringes where flows are slow.



Figure 6-1
Sediment Plume in Truckee River from Donner Creek



Figure 6-2
Sediment Plume in Truckee River at Bridge Street

6.2 Water Quality Areas of Concern

After three years of monitoring, the following areas were identified as areas of the highest concern for water quality:

- **Brickelltown:** Community level water quality sampling indicated that stormwater runoff from this portion of historic downtown Truckee often contains very high concentrations of sediment and nutrients.
- **Donner Creek:** Community level water quality sampling indicated that stormwater runoff entering Donner Creek from West River Street contains high concentrations of suspended solids. Visual observations at the Donner Creek/Truckee River confluence also indicate that Donner Creek discharges large amounts of sediment into the Truckee River during large storm events.
- **West Martis Creek:** Monitoring results show that this site had the greatest pollutant loading of TSS, total phosphorus, and total nitrogen per acre of watershed. RAM monitoring also indicates a relatively high percentage of fine substrate in West Martis Creek.
- **Trout Creek:** Results of the RAM indicate Trout Creek has very high percentages of fine substrate covering the streambed. The newly restored portion in the upper reaches of the RAM survey segment shows improvement over conditions during the previous survey but also indicates a large amount of sediment is being transported from upstream.
- **Squaw Creek:** RAM and bioassessment results indicate a continued impact to this stream by sediment deposition. The area of highest concern identified from 2012 bioassessment monitoring was the upper meadow site in Squaw Creek (site Bio-SC1). This site had the lowest IBI score of all sites sampled in 2012 (IBI score= 46), as well as the smallest median particle size

(D50= 2 mm). The middle meadow (site Bio-SC2) and lower meadow (site Bio-SC3) sites in Squaw Creek also had very small median particle sizes (D50= 3 mm), although these sites scored well in terms of Biological Condition Scores (BCS= 25 and 27 out of a possible 35, respectively) and the Eastern Sierra IBI (93 and 90 out of a possible 100, respectively).

- **Truckee River (Town Corridor):** The results of the Truckee River RAM did not indicate high percentages of fine substrate despite a very high percentage in Trout Creek and elevated TSS concentrations at the community level monitoring sites discharging into the Truckee River throughout the downtown corridor. The integrated results indicate that most fine sediment is discharged to the Truckee River from urban and high impermeable areas with old infrastructure, commercial, and industrial uses where heavy traffic exists and traction sand applications are greatest. Fine sediment in the Truckee River is likely transported downstream where it settles in lower energy reaches downstream and along the channel fringes where flow rates decrease. Water quality within the Town Corridor is also heavily influenced by Union Pacific Railroad and Caltrans.

6.3 Evaluation of SWMP Performance

The effectiveness of the implementation of SWMP related activities can generally be evaluated through the comparisons presented above. Because this is only the third year of implementation and relatively little changes to the watershed have occurred, spatial comparisons are most appropriate at this time. The temporal water quality trends that were identified are likely related to differences in precipitation amounts and are not related to SWMP activities. Temporal analyses will become more valuable with the continued, long-term, implementation of this program. Also, in some cases, a specific project or action may cause an immediate improvement that is recognizable in the data from one year to the next.

The community level discrete sampling continues to provide some demonstration of the effectiveness of SWMP activities. The permanent stormwater treatment BMPs present in some of the drainage systems provide clear benefits as shown in the monitoring results. When compared to other sites, the water quality at the treated sites is clearly improved with respect to all the monitored pollutants in almost every runoff event.

6.4 Prioritization of Existing TRWQMP Elements

The TRWQMP is currently being implemented as planned. Overall, monitoring activities should be continued per the guidance in the TRWQMP and the adaptive management based modifications that have been made to the program over the initial three years of implementation. There is a continued need to develop more comprehensive and robust datasets that will help to identify specific areas of concern and evaluate SWMP performance.

For the WY 2013, monitoring will take on a new focus on continuous turbidity monitoring and sediment load evaluations. Two new automated stations will be operated in the Martis Creek Watershed at the West Martis Creek (DST-MC4) and main stem Martis Creek (DST-MC5) tributary sites. These new stations will be equipped with continuous turbidity probes and pressure transducers to monitoring discharge. Two new continuous turbidity probes will also be installed and operated in the Truckee River upstream and downstream of the Town boundary. The Town's turbidity probes will be installed at existing USGS gauging stations so that stream discharge data will also be available from those locations. The implementation of continuous turbidity probes in the Truckee River and Martis Creek will provide valuable insight on the current sediment loading patterns within these watershed

systems. This data, combined with data collected by other groups and through other TRWQMP elements, will be valuable in identifying watershed areas of concern and developing recommendations for water quality protection and improvement activities.

Section 7

Fiscal Summary

This section provides a summary of costs incurred by Placer County and the Town of Truckee over the initial three years of TRWQMP implementation as described in this report. Costs to complete the Year 1, 2, and 3 activities are presented in Table 7-1.

Table 7-1. Year 1, Year 2, and Year 3 Costs

	Placer County	Town of Truckee
Administrative		
Year 1	\$21,000	\$10,000
Year 2	\$26,000	\$12,000
Year 3	\$25,000	\$11,000
Planning and Permitting		
Year 1	\$100,000	\$13,000
Year 2	\$0	\$0
Year 3	\$6,000	\$7,000
Data Collection		
Year 1	\$65,000	\$26,000
Year 2	\$36,000	\$15,000
Year 3	\$70,000	\$21,000
Laboratory		
Year 1	\$15,000	\$3,000
Year 2	\$10,000	\$3,000
Year 3	\$20,000	\$3,000
Reporting		
Year 1	\$60,000	\$20,000
Year 2	\$50,000	\$15,000
Year 3	\$50,000	\$20,000
Total		
Year 1	\$261,000	\$72,000
Year 2	\$122,000	\$45,000
Year 3	\$171,000	\$62,000

Section 8

Conclusions and Recommendations

This section summarizes the major conclusions that were made based on the 2012 and the combined monitoring results from the first three years of TRWQMP implementation. Information is also presented regarding the monitoring activities planned for WY 2013 and additional adaptive management recommendations for the continued implementation of the TRWQMP. These modifications and recommendations are based on new opportunities for efficient data collection and collaboration with other groups, and on the results of the TRWQMP activities conducted to date. A summary of the conclusions that have been developed to date are also presented.

Overall, monitoring activities should be continued per the guidance in the TRWQMP and the adaptive management based modifications that have been made to the program over the initial three years. There is a continued need to develop more comprehensive and robust datasets that will help to identify specific areas of concern and evaluate SWMP performance. As the monitoring dataset is further developed, recommendations on watershed management activities, such as the location and prioritization of water quality improvement projects, can also be developed based on the monitoring results.

8.1 Continuous Turbidity Monitoring

Both the County and Town will install and operate continuous turbidity monitoring stations in WY 2013. The County stations will be installed adjacent to existing tributary level stations in West Martis Creek and Martis Creek (DST-MC4 and DST-MC5, respectively). The Town's stations will be located in the main stem of the Truckee River near the locations where the river enters and exits the Town boundary. The data collected at these stations will augment similar monitoring being conducted by the Truckee River Watershed Council (TRWC) in Trout, Coldstream and Donner Creeks which are each major tributaries entering the Truckee River within the Town limits. Over time, as results indicate, the location of one or more of these stations may be adjusted to provide an improved understanding of the sources and quantities of sediment entering, and being transported by, the Truckee River and its tributaries within the TRWQMP project area.

The overall goal of these new turbidity stations is to provide a means of estimating suspended sediment loads that are occurring at the monitored locations. The following objectives have been defined for these stations to aid in focusing the data collection, analysis and reporting activities and to provide a means of measuring the progress and effectiveness of the monitoring activities:

1. Collect turbidity and total suspended solids (TSS) data at the sites and develop correlations between these two parameters.



Figure 8-1. Automated Water Quality Monitoring Stations in Placer County.

2. Utilize available stream discharge data together with the turbidity: TSS correlation to calculate suspended sediment loads at the sites.
3. Integrate similar TRWC data into the overall analysis to characterize suspended sediment loads delivered to the Truckee River from Donner and Trout Creeks.
4. Conduct comparisons to suspended sediment load estimates presented in Truckee River TMDL and evaluate loads originating within Town boundary against TMDL defined load allocations.
5. Apply the newly developed turbidity: TSS correlation to available historic turbidity data collected by others to identify and evaluate past and ongoing trends in suspended sediment loads.
6. Where sufficient discharge data is available, develop and apply discharge: TSS relationships to be used as a second method of calculating suspended sediment loading, as well as to evaluate temporal trends in sediment generation and supply.

8.2 Rapid Assessment Methodology

Conclusions

The results of the WY 2012 RAM indicate that Trout Creek, West Martis Creek, and Squaw Creek are of the highest concern based on the relative amount of fine sediment deposited on the bottom of the stream channel. The RAM results indicate that from WY 2010 to WY 2012, the percentage of fine sediment substrate in Squaw Creek and West Martis Creek increased by approximately 7 and 10 percent, respectively. The percentage of fine substrate in Trout Creek remained constant despite completion of a stream restoration project within the upper reaches of monitored stream segment. The restored reaches in Trout Creek were in good condition during the surveys, but large sediment loads are clearly being transported to these areas from upstream sources. The remaining streams showed decreased amounts of fine sediment substrate from WY 2010 to WY 2012 ranging from 2 percent less in the Truckee River to 10 percent less in the main stem of Martis Creek.

Recommendations

The RAM results for the Truckee River do not appear adequate for identifying sources or trends relating to fine substrate. A new approach for analyzing and presenting data should be considered, possibly including a more focused analysis of existing data (i.e. presenting results from each individual transect as opposed to averages for an entire reach). This approach is presented through an initial evaluation in Section 5. With additional refinement, areas with high concentrations of sand and fines could be tracked over time with more localized data collection to determine whether conditions are improving or declining. Areas that do not contain sand or fines may not necessitate further monitoring.

Over time, rapid assessment observations within the tributaries to the Truckee River should also focus on areas of greater concern. The 150m long reaches provide good initial indications of problem areas, but surveying smaller areas with additional and more concentrated measurements would more accurately define specific areas where sediment accumulation is excessive and better enable the tracking of changes to its distribution and movement.

As patterns of fine sediment problem areas within the various stream and river channels emerge, increasing efforts should be made to identify the associated upstream sources of this excess fine sediment. Due to the dynamic nature of sediment transport in these water bodies, this challenging process will require a well developed approach. It is likely that data from the other assessment types will need to be considered, together with the rapid assessment results, to confidently identify source areas. More detailed watershed level field surveys of potential source areas, preferably during large precipitation events, will also provide valuable insight into the identification and prioritization of sediment sources and into the development of alternatives for remedial actions.

8.3 Bioassessment

Conclusions

Eastern Sierra IBI scores can be ranked in tiers (Tiers 5 through 1) or grades (Grades A through F), which are designated as supporting (Tiers 5 and 4; Grades A and B), partially supporting (Tier 3; Grade C), or not supporting (Tiers 2 and 1; Grades D and F) regional water-quality objectives. Table 8-1 lists the thresholds for interpreting IBI scores, including the tier ranks or grades, designations for supporting water-quality objectives, and the rationale (statistical ranges) for these thresholds.

Using the thresholds identified in Table 8-1, two of the three Squaw Creek sites sampled in 2012 (site Bio-SC2 and Bio-SC3) in the middle and lower meadow would be designated as supporting regional water-quality objectives, while the upper meadow site (Bio-SC1) would be designated as not supporting regional water-quality objectives. Using the letter grading analogy, sites Bio-SC2 and Bio-SC3 receive a Grade of 'A' and site Bio-SC1 receives a 'D'. In Martis Creek, sites Bio-MC2, Bio-MC4, Bio-MC5, and Bio-MC6 would be designated as partially supporting regional water-quality objectives with a grade of 'C'. Martis Creek headwater sites Bio-MC1 and Bio-MC2 would be designated as supporting regional water-quality objectives with grades of 'A' and 'B', respectively.

Table 8-1. Thresholds for Interpreting Eastern Sierra IBI scores: IBI Score Tier / Grade Designation Rationale

IBI Score	Tier / Grade	Designation	Rationale
>85.5	5 / A	supporting	>50th percentile (median) reference condition
80.1 - 85.5	4 / B	supporting	25th-50th percentile reference condition
62.2 - 80.1	3 / C	partial supporting	5th-25th percentile reference condition
46 - 62.2	2 / D	not supporting	<5th percentile reference condition (impairment level)

Recommendations

The bioassessment activities being conducted under this program are well developed and follow standardized protocols that are well suited for their purpose. The differences between the Squaw and Martis Creek data collection protocols can be effectively reconciled at the analysis and reporting stage and any significant adjustments to either field protocol are not warranted at this time.

The bioassessments provide a proven indicator of stream health and the results are valuable, especially when evaluated together with results from other assessment types. Bioassessment data collected by other groups, such as the TRWC, should be evaluated for compatibility with this program and appropriately integrated into the analysis and reporting.

8.4 Community Level Discrete Monitoring

The community level monitoring is an effective means of characterizing the water quality of stormwater runoff from various developed portions of the study area. The data also provides:

- a means of prioritizing these areas for water quality improvements,
- an important source of planning and design information, and
- justification for requests of grant funding for such projects.

Conclusions

The data collected to date indicates that outfalls to the Truckee River within the Town Corridor, especially those that receive runoff from the downtown area and nearby high traffic roadways, are discharging the most sediment of all of the community monitoring locations.

Due to the much less intensive land uses in the upstream catchments, the results from the current Placer County community sites do not indicate significant problems. Erosion at the outlet of the Northstar infiltration basin and near the culvert on Skidder Trail has been identified as sediment source to West Martis Creek. It is likely that discharges from outfalls along Highway 89, or other high traffic areas, are more similar to the Town's sites in terms of sediment discharges.

Recommendations

To reduce sediment discharges from the high sediment outfalls, the following recommendations should be considered by the Town and County as funding and other constraints allow.

1. Pave or otherwise stabilize the bare soil areas within the public Right-of-Way to limit pollutant sources.
2. Install curb and gutter or improve the storm drain system to keep concentrated runoff flows separated from the bare soil areas.
3. Install deterrents to prevent parking on dirt shoulders.
4. Install improvements to promote infiltration and reduce storm water runoff volumes.
5. Install treatment controls such as drain inlet inserts or sediment traps to promote settling and provide sediment storage.
6. Regularly clean drain inlets and storm drain pipes and track the amount of material removed.
7. Sweep streets frequently to remove excess traction sand. Given the limited resources for these types of activities, consider prioritizing high traffic areas, especially near the river and its tributaries.
8. The eroding earthen channel upstream of the County's Northstar Community Level site should be stabilized with rip rap or other similar measure.

New community level monitoring locations should be considered, especially when sufficient data has been collected to characterize existing sites.

An approach is also needed to develop pollutant load estimates from the community sites to assess their relative contributions to the total loads being transported by the receiving water bodies. This information could be combined with the load evaluations being conducted for the Truckee River and its tributaries to provide a more complete understanding of sediment generation and transport

processes within the study area. Load based evaluations require flow data which could either be collected by installing flow measurement devices, or flow data could be estimated by means of hydrologic modeling.

8.5 Tributary Level Water Quality Monitoring

The results of the first two years of tributary level water quality monitoring at the six Martis Creek sites are beginning to reveal information regarding the types of pollutants and their relative concentrations and loads at the various locations. Continued monitoring will provide the necessary volume of data for statistical analyses to test the significance of the differences and trends among the sites.

Conclusions

After two years of monitoring, the data indicate that pollutant concentrations within Martis Creek and its tributaries are below the water quality objectives defined for total nitrogen and TKN within Martis Creek at its mouth. All sites had mean total phosphorus concentrations that were above the water quality objective for Martis Creek. This includes East Martis Creek which has a relatively undeveloped watershed, indicating that the phosphorus source may be natural rather than a result of fertilizers use on golf courses and landscaping.

Recommendations

The mean concentrations and the load based evaluations are based on “worst-case” water quality data sampled from events likely to have caused higher than average pollutant mobilizations. The TRWQMP specified approach of sampling worst-case conditions is appropriate in addressing the objective of identifying problem areas in the watershed; however, it also leads to biased mean concentration values that do not consider pollutant concentrations occurring during lower, more typical, flows. This is apparent when comparing results from WY 2011 (wet) and WY 2012 (dry). Larger events were monitored during WY 2011 which resulted in significantly higher concentrations of particulate parameters such as TSS, turbidity, and total phosphorus. It is recommended to consider sampling a number of lower flow events to better represent the range of conditions in the calculated mean concentrations and pollutant loads.

8.6 Martis Creek Stream Gauge

Conclusions

The stream gauge on Martis Creek has been in operation for two years and rating curves have been developed to calculate continuous flows for the majority of the monitored time period. The development and subsequent deterioration of a downstream beaver dam has complicated the discharge calculations, but the stream gauge remains effective in meeting its objectives.

Recommendations

Discharge monitoring should continue at the stream gauge and the condition of the beaver dam should be monitored closely. Two additional stream gauges have been installed in association with the continuous turbidity stations on the West Martis and Martis main stem branches, and will provide additional discharge data for the Martis Creek watershed in WY 2013. These data will be used to refine the current approach used for calculating discharge and pollutant loads.

Section 9

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Appendix A
RAM Assessment Results Table and
Original Field Data Sheets

Appendix A RAM Data Assessment Results						
RAM Interval	Reach No.	Observation Date	Discharge at Tahoe City Dam	Percent < 2 mm	Cobble Percent Embeddedness	D50 (mm)
Squaw Creek	1	8/7/2012	352	24	34	84
	2	8/7/2012	352	25	35	111
	3	8/7/2012	352	24	24	134
	4	8/7/2012	352	35	29	58
	5	8/7/2012	352	18	32	91
	AVERAGE			25	31	96
Bear Creek	1	8/8/2012	350	18	27	74
	2	8/8/2012	350	27	49	55
	3	8/8/2012	350	9	16	98
	4	8/8/2012	350	16	13	83
	5	8/8/2012	350	5	24	74
	6	8/8/2012	350	2	50	54
	7	8/8/2012	350	2	43	90
	8	8/8/2012	350	2	29	137
	9	8/8/2012	350	5	15	96
	10	8/8/2012	350	0	10	133
	11	8/8/2012	350	7	44	85
	AVERAGE			9	29	89
Martis Creek	1	9/14/2012	151	5	23	31
	2	9/14/2012	151	5	15	30
	3	9/14/2012	151	9	24	28
	4	9/13/2012	152	7	22	36
	5	9/13/2012	152	11	22	40
	6	9/13/2012	152	7	26	41
	7	9/13/2012	152	15	16	33
	8	9/13/2012	152	16	27	26
	9	9/13/2012	152	18	33	31
	10	9/13/2012	152	7	23	50
	11	9/13/2012	152	29	30	39
	AVERAGE			12	24	35
West Martis Creek	1	9/18/2012	149	13	21	56
	2	9/18/2012	149	15	24	62
	3	9/18/2012	149	7	23	49
	4	9/18/2012	149	22	19	37
	5	9/18/2012	149	20	16	32
	6	9/18/2012	149	40	NA	11
	7	9/18/2012	149	49	50	10
	8	9/18/2012	149	45	42	9
	9	9/18/2012	149	55	NA	6
	10	9/18/2012	149	73	NA	4
	11	9/18/2012	149	76	NA	3
	AVERAGE			38	28	26
East Martis Creek	1	8/23/2012	345	29	31	37
	2	8/23/2012	345	16	24	49
	3	8/23/2012	345	15	7	63
	4	8/23/2012	345	7	9	80
	5	8/23/2012	345	11	21	54
	6	8/23/2012	345	11	10	44
	7	8/23/2012	345	20	19	32
	8	8/23/2012	345	18	21	19
	9	8/23/2012	345	13	19	20
	10	8/23/2012	345	15	31	19
	11	8/23/2012	345	20	NA	11
	AVERAGE			16	19	39

Appendix A						
RAM Data Assessment Results						
Truckee River @ Donner Creek	1	9/12/2012	154	23	22	88
	2	9/12/2012	154	10	8	194
Truckee River @ Bridge Street	1	9/12/2012	154	13	22	211
	2	9/12/2012	154	10	26	258
Truckee River @ Trout Creek	1	9/12/2012	154	23	31	104
	2	9/12/2012	154	3	25	335
Truckee River @ State Route 267	1	9/12/2012	154	17	25	236
	2	9/12/2012	154	13	42	156
Truckee River @ Martis Creek	1	9/12/2012	154	3	29	157
	2	9/12/2012	154	0	39	245
Truckee River @ Glenshire Drive	1	9/12/2012	154	10	38	138
	2	9/12/2012	154	13	32	216
Trout Creek	1	8/14/2012	354	22	26	67
	2	8/14/2012	354	7	29	81
	3	8/14/2012	354	24	38	71
	4	8/14/2012	354	62	15	23
	5	8/14/2012	354	78	26	21
	6	8/14/2012	354	75	40	14
	7	8/14/2012	354	64	20	93
	8	8/14/2012	354	53	37	57
	9	8/14/2012	354	76	34	44
	10	8/14/2012	354	75	23	43
	11	8/14/2012	354	35	13	65
AVERAGE				52	27	53
Donner Creek	1	8/9/2012	350	18	16	164
	2	8/9/2012	350	7	39	162
	3	8/9/2012	350	24	22	73
	4	8/9/2012	350	11	11	93
	5	8/9/2012	350	16	15	112
	6	8/9/2012	350	15	31	82
	7	8/9/2012	350	11	30	118
	8	8/9/2012	350	13	9	146
	9	8/9/2012	350	13	19	104
	10	8/9/2012	350	9	23	123
	11	8/9/2012	350	7	18	113
AVERAGE				13	21	117

Squaw Creek Original Field Data Sheets

Note: Particle Size in cm

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Last data entered

Stream Name SQUAW Start Time 1122
Date 8.7.12 Start Location CONF. 4 / TRUCKEE RIVER
Field Personnel CN RV Stop Time 1240
Interval ID 40-50 Stop Location 150 m upstream of River
Survey Tape Location Right Bank Left Bank 5 Reach ID

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	49	51	64	68	51
0	Particle Size Class	GF	GF	SA	GC	FN
Width	Particle Size (mm) CM	1.5	0.5	0.1	2.0	FINE
10	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	26	70	81	90	1
15	Particle Size Class	GC	CB	CB	CB	GF
Width	Particle Size (mm) CM	3	9	16	13	1
	% Cobble Embeddedness	30	50	50	25	
Reach Distance (m)	Water Depth (cm)	1	45	71	35	1
30	Particle Size Class	GF	CB	CB	SA	GC
Width	Particle Size (mm) CM	1.5	20	18	.2	2.5
	% Cobble Embeddedness		20	10		
Reach Distance (m)	Water Depth (cm)	9	34	50	60	27
45	Particle Size Class	SA	CB	CB	GF	SA
Width	Particle Size (mm) CM	0.1	7	8	0.4	0.2
	% Cobble Embeddedness		20	0		
Reach Distance (m)	Water Depth (cm)	1	22	18	1	1
60	Particle Size Class	CB	CB	SA	GF	PS
Width	Particle Size (mm) CM	9.5	10	0.2	1	BEDROCK
	% Cobble Embeddedness	30	50			
Reach Distance (m)	Water Depth (cm)	20	33	2	7	1
75	Particle Size Class	GF	CB	SB	GC	SA
Width	Particle Size (mm) CM	0.3	15	35	4	0.1
	% Cobble Embeddedness		50			
Reach Distance (m)	Water Depth (cm)	1	16	13	19	1
90	Particle Size Class	GF	GF	CB	GF	SA
Width	Particle Size (mm) CM	1	0.5	22	1	0.1
	% Cobble Embeddedness			0		
Reach Distance (m)	Water Depth (cm)	2	28	32	0	1
105	Particle Size Class	CB	GC	GF	SB	GF
Width	Particle Size (mm) CM	6.5	2	1	75	0.3
	% Cobble Embeddedness	25				
Reach Distance (m)	Water Depth (cm)	1	1	5	8	1
120	Particle Size Class	GC	CB	GF	CB	SA
Width	Particle Size (mm) CM	2	10	1.5	7	0.2
	% Cobble Embeddedness		50		30	
Reach Distance (m)	Water Depth (cm)	1	2	11	15	2
135	Particle Size Class	CB	CB	CB	CB	GF
Width	Particle Size (mm) CM	6.5	13	15	120	0.4
	% Cobble Embeddedness	40	70	50		
Reach Distance (m)	Water Depth (cm)	1	0	6	4	1
150	Particle Size Class	SA	CB	CB	GC	GF
Width	Particle Size (mm) CM	0.1	17	8	3	1
	% Cobble Embeddedness		30	10		

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Truckee River Water Quality Monitoring Plan
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Stream Name SQUAW
Date 8.7.12
Field Personnel CN, ZV
Interval ID 30-39
Survey Tape Location Right Bank Left Bank

Start Time 1247
Start Location 165m US of River
Stop Time 1320
Stop Location 300m US of River
Reach ID 4

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>165</u>		<u>1</u>	<u>7</u>	<u>14</u>	<u>8</u>	<u>1</u>
	Particle Size Class	<u>SA</u>	<u>SA</u>	<u>CB</u>	<u>CB</u>	<u>GC</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.1</u>	<u>0.1</u>	<u>12</u>	<u>6.5</u>	<u>5</u>
	% Cobble Embeddedness			<u>50</u>		

39

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>180</u>		<u>1</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>1</u>
	Particle Size Class	<u>CB</u>	<u>CB</u>	<u>GF</u>	<u>CB</u>	<u>GF</u>
Width	Particle Size (mm) <u>cm</u>	<u>11</u>	<u>15</u>	<u>1.5</u>	<u>8</u>	<u>0.5</u>
	% Cobble Embeddedness	<u>0</u>	<u>20</u>		<u>25</u>	

38

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>195</u>		<u>1</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>1</u>
	Particle Size Class	<u>CB</u>	<u>GC</u>	<u>GF</u>	<u>GC</u>	<u>SA</u>
Width	Particle Size (mm) <u>cm</u>	<u>6.5</u>	<u>2</u>	<u>0.5</u>	<u>4</u>	<u>0.2</u>
	% Cobble Embeddedness	<u>10</u>				

37

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>210</u>		<u>1</u>	<u>0</u>	<u>1</u>	<u>12</u>	<u>1</u>
	Particle Size Class	<u>SA</u>	<u>CB</u>	<u>GC</u>	<u>SA</u>	<u>SA</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.2</u>	<u>7</u>	<u>5.5</u>	<u>0.2</u>	<u>0.1</u>
	% Cobble Embeddedness		<u>50</u>			

36

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>225</u>		<u>25</u>	<u>24</u>	<u>17</u>	<u>30</u>	<u>1</u>
	Particle Size Class	<u>CB</u>	<u>CB</u>	<u>GF</u>	<u>GF</u>	<u>SA</u>
Width	Particle Size (mm) <u>cm</u>	<u>7</u>	<u>6.5</u>	<u>1</u>	<u>1.5</u>	<u>0.1</u>
	% Cobble Embeddedness	<u>75</u>	<u>0</u>			

35

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>240</u>		<u>1</u>	<u>0</u>	<u>5</u>	<u>9</u>	<u>1</u>
	Particle Size Class	<u>SA</u>	<u>SB</u>	<u>SA</u>	<u>CB</u>	<u>GC</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.1</u>	<u>36</u>	<u>0.2</u>	<u>10</u>	<u>4</u>
	% Cobble Embeddedness				<u>70</u>	

34

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>255</u>		<u>12</u>	<u>0</u>	<u>3</u>	<u>17</u>	<u>1</u>
	Particle Size Class	<u>SA</u>	<u>SB</u>	<u>GF</u>	<u>CB</u>	<u>SA</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.1</u>	<u>30</u>	<u>1</u>	<u>18</u>	<u>0.2</u>
	% Cobble Embeddedness				<u>0</u>	

33

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>270</u>		<u>1</u>	<u>10</u>	<u>17</u>	<u>11</u>	<u>1</u>
	Particle Size Class	<u>SA</u>	<u>SB</u>	<u>SA</u>	<u>SA</u>	<u>SA</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.1</u>	<u>32</u>	<u>0.1</u>	<u>0.2</u>	<u>0.2</u>
	% Cobble Embeddedness					

32

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>285</u>		<u>1</u>	<u>5</u>	<u>7</u>	<u>6</u>	<u>1</u>
	Particle Size Class	<u>GF</u>	<u>CB</u>	<u>GF</u>	<u>CB</u>	<u>CB</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.3</u>	<u>15</u>	<u>0.8</u>	<u>12</u>	<u>20</u>
	% Cobble Embeddedness		<u>60</u>		<u>50</u>	<u>50</u>

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Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>300</u>		<u>1</u>	<u>18</u>	<u>20</u>	<u>29</u>	<u>1</u>
	Particle Size Class	<u>GF</u>	<u>SA</u>	<u>CB</u>	<u>SA</u>	<u>SA</u>
Width	Particle Size (mm) <u>cm</u>	<u>1</u>	<u>0.1</u>	<u>6.5</u>	<u>0.2</u>	<u>0.1</u>
	% Cobble Embeddedness			<u>0</u>		

30

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>300</u>						
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

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Truckee River Water Quality Monitoring Plan
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Stream Name SQUAW
Date 8-7-12
Field Personnel CNRJ
Interval ID 20-29
Survey Tape Location Right Bank Left Bank

Start Time 1321
Start Location 215m US of River
Stop Time 1410
Stop Location 450m US of River
Reach ID 3

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
315		10	6	0	2	1
Width	Particle Size Class	CB	SA	CB	GF	SA
	Particle Size (mm) <u>CM</u>	9	0.2	25	1	0.1
	% Cobble Embeddedness	50		25		

Reach Distance (m)	Water Depth (cm)	1	5	4	5	0
330	Particle Size Class	CB	GF	GF	GC	CB
Width	Particle Size (mm) <u>cm</u>	8	0.5	0.4	4	6.5
	% Cobble Embeddedness	0				50

Reach Distance (m)	Water Depth (cm)	2	4	1	18	1
345	Particle Size Class	GF	CB	CB	GF	SA
Width	Particle Size (mm) <u>CM</u>	0.6	8	8	0.3	0.1
	% Cobble Embeddedness		60	0		

Reach Distance (m)	Water Depth (cm)	1	2	6	9	1
360	Particle Size Class	SA	CB	GC	CB	SA
Width	Particle Size (mm) <u>cm</u>	0.1	8	3.5	12	0.1
	% Cobble Embeddedness		0		20	

Reach Distance (m)	Water Depth (cm)	1	10	0	1	1
375	Particle Size Class	GF	XB	XB	SA	GC
Width	Particle Size (mm) <u>CM</u>	2	200	250	0.2	2
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	0	1	0	1	0
390	Particle Size Class	CB	GC	CB	GC	GC
Width	Particle Size (mm) <u>CM</u>	8	5	12	4	5
	% Cobble Embeddedness	0		50		

Reach Distance (m)	Water Depth (cm)	1	20	22	2	1
405	Particle Size Class	SA	GF	CB	SB	CB
Width	Particle Size (mm) <u>CM</u>	0.2	1.5	11	34	10
	% Cobble Embeddedness			40		70

Reach Distance (m)	Water Depth (cm)	0	1	0	5	2
420	Particle Size Class	CB	CB	CB	CB	GF
Width	Particle Size (mm) <u>CM</u>	7	12	16	12	1.5
	% Cobble Embeddedness	0	50	0	10	

Reach Distance (m)	Water Depth (cm)	1	10	2	0	0
435	Particle Size Class	SA	CB	GC	CB	GC
Width	Particle Size (mm) <u>CM</u>	0.2	6.5	5	11	5
	% Cobble Embeddedness		30		0	

Reach Distance (m)	Water Depth (cm)	1	1	2	41	1
450	Particle Size Class	GF	FN	GC	SA	GC
Width	Particle Size (mm) <u>CM</u>		<0.1	5.5	0.2	5
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Truckee River Water Quality Monitoring Plan
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Stream Name SQUAW
Date 8.7.12
Field Personnel CN RV
Interval ID 10-19
Survey Tape Location Right Bank Left Bank

Start Time 1410
Start Location 465m US of River
Stop Time 1435
Stop Location 600m US of River
Reach ID 2

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)					
<u>465</u>	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)					
<u>480</u>	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	<u>1</u>	<u>10</u>	<u>28</u>	<u>15</u>	<u>1</u>
<u>495</u>	Particle Size Class	<u>FN</u>	<u>GF</u>	<u>GF</u>	<u>GF</u>	<u>GF</u>
Width	Particle Size (mm) <u>cm</u>	<u>FINE</u>	<u>0.3</u>	<u>0.7</u>	<u>0.5</u>	<u>0.5</u>
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	<u>1</u>	<u>4</u>	<u>8</u>	<u>18</u>	<u>1</u>
<u>510</u>	Particle Size Class	<u>GF</u>	<u>GF</u>	<u>SA</u>	<u>GF</u>	<u>SA</u>
Width	Particle Size (mm) <u>cm</u>	<u>1.5</u>	<u>0.6</u>	<u>0.2</u>	<u>1</u>	<u>0.1</u>
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	<u>2</u>	<u>5</u>	<u>6</u>	<u>1</u>	<u>1</u>
<u>525</u>	Particle Size Class	<u>GF</u>	<u>GC</u>	<u>CB</u>	<u>CB</u>	<u>GF</u>
Width	Particle Size (mm) <u>cm</u>	<u>1.5</u>	<u>3.5</u>	<u>7</u>	<u>14</u>	<u>1</u>
	% Cobble Embeddedness			<u>50</u>	<u>40</u>	

Reach Distance (m)	Water Depth (cm)	<u>1</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>1</u>
<u>540</u>	Particle Size Class	<u>CB</u>	<u>GF</u>	<u>SA</u>	<u>SA</u>	<u>FN</u>
Width	Particle Size (mm) <u>cm</u>	<u>7</u>	<u>0.8</u>	<u>0.2</u>	<u>0.2</u>	<u><0.1</u>
	% Cobble Embeddedness	<u>10</u>				

Reach Distance (m)	Water Depth (cm)	<u>1</u>	<u>7</u>	<u>0</u>	<u>1</u>	<u>1</u>
<u>555</u>	Particle Size Class	<u>GC</u>	<u>CB</u>	<u>SB</u>	<u>SA</u>	<u>SA</u>
Width	Particle Size (mm) <u>cm</u>	<u>2</u>	<u>7</u>	<u>30</u>	<u>0.1</u>	<u>0.1</u>
	% Cobble Embeddedness		<u>0</u>			

Reach Distance (m)	Water Depth (cm)	<u>2</u>	<u>8</u>	<u>7</u>	<u>1</u>	<u>0</u>
<u>570</u>	Particle Size Class	<u>GF</u>	<u>CB</u>	<u>CB</u>	<u>GC</u>	<u>CB</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.5</u>	<u>14</u>	<u>12</u>	<u>3</u>	<u>7</u>
	% Cobble Embeddedness		<u>75</u>	<u>25</u>		<u>50</u>

Reach Distance (m)	Water Depth (cm)	<u>3</u>	<u>0</u>	<u>11</u>	<u>0</u>	<u>1</u>
<u>585</u>	Particle Size Class	<u>SA</u>	<u>XB</u>	<u>SA</u>	<u>XB</u>	<u>GF</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.1</u>	<u>150</u>	<u>0.2</u>	<u>125</u>	<u>1</u>
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	<u>2</u>	<u>10</u>	<u>19</u>	<u>0</u>	<u>1</u>
<u>600</u>	Particle Size Class	<u>GF</u>	<u>SA</u>	<u>SB</u>	<u>SB</u>	<u>GC</u>
Width	Particle Size (mm) <u>cm</u>	<u>1.5</u>	<u>0.1</u>	<u>30</u>	<u>60</u>	<u>4</u>
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	<u>5</u>	<u>9</u>	<u>6</u>	<u>12</u>	<u>20</u>
	Particle Size Class	<u>CB</u>	<u>CB</u>	<u>CB</u>	<u>CB</u>	<u>CB</u>
Width	Particle Size (mm) <u>cm</u>	<u>8</u>	<u>12</u>	<u>18</u>	<u>9</u>	<u>10</u>
	% Cobble Embeddedness	<u>50</u>	<u>40</u>	<u>25</u>	<u>50</u>	<u>0</u>

WPT 34
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WPT 40

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Truckee River Water Quality Monitoring Plan
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Stream Name SQUAW
Date 8.7.12
Field Personnel CN RU
Interval ID 0-9
Survey Tape Location _____ Right Bank _____ Left Bank _____

Start Time 1435
Start Location 615M US of River
Stop Time 1507
Stop Location 750M US of River
Reach ID 1

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	13	10	2	0	1
<u>615</u>	Particle Size Class	G-C	CB	CB	SB	G-F
Width	Particle Size (mm) <u>cm</u>	3	15	11	45	0.4
	% Cobble Embeddedness		0	0		

Reach Distance (m)	Water Depth (cm)	1	12	10	10	1
<u>630</u>	Particle Size Class	SA	G-F	G-C	CB	SA
Width	Particle Size (mm) <u>cm</u>	0.1	0.3	2	12	0.1
	% Cobble Embeddedness				30	

Reach Distance (m)	Water Depth (cm)	17	5	0	2	1
<u>645</u>	Particle Size Class	G-F	G-C	SB	G-F	SA
Width	Particle Size (mm) <u>cm</u>	1	3	55	0.8	0.1
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	4	0	4	0
<u>660</u>	Particle Size Class	G-F	CB	G-C	G-C	CB
Width	Particle Size (mm) <u>cm</u>	1	10	2	4	15
	% Cobble Embeddedness		80			10

Reach Distance (m)	Water Depth (cm)	10	15	21	12	1
<u>675</u>	Particle Size Class	G-C	CB	SA	CB	SA
Width	Particle Size (mm) <u>cm</u>	2	12	0.2	13	0.1
	% Cobble Embeddedness		75		10	

Reach Distance (m)	Water Depth (cm)	1	30	42	29	1
<u>690</u>	Particle Size Class	SA	SA	CB	CB	G-C
Width	Particle Size (mm) <u>cm</u>	0.1	0.1	10	20	3
	% Cobble Embeddedness			30	50	

Reach Distance (m)	Water Depth (cm)	6	18	3	2	0
<u>705</u>	Particle Size Class	G-F	G-F	SA	G-F	CB
Width	Particle Size (mm) <u>cm</u>	1	1	0.2	0.3	10
	% Cobble Embeddedness					25

Reach Distance (m)	Water Depth (cm)	2	16	15	20	1
<u>720</u>	Particle Size Class	SA	SA	SA	CB	G-C
Width	Particle Size (mm) <u>cm</u>	0.1	0.1	0.1	11	2
	% Cobble Embeddedness				50	

Reach Distance (m)	Water Depth (cm)	0	5	18	28	19
<u>735</u>	Particle Size Class	CB	G-F	SB	CB	SA
Width	Particle Size (mm) <u>cm</u>	6.5	1	30	12	0.1
	% Cobble Embeddedness	60			60	

Reach Distance (m)	Water Depth (cm)	4	19	10	23	21
<u>750</u>	Particle Size Class	CB	G-F	CB	CB	G-F
Width	Particle Size (mm) <u>cm</u>	6.5	0.5	23	17	0.6
	% Cobble Embeddedness	30		10	0	

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

WPT
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Data entered starting here

Bear Creek Original Field Data Sheets

Note: Particle size in cm

Truckee River Water Quality Monitoring Plan
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Stream Name Bear
Date 8-8-12
Field Personnel AL CN
Interval ID 0-10 110-100
Survey Tape Location Right Bank

Start Time 0915
Start Location Confluence w/ Truckee
Stop Time 0945
Stop Location 150 M US Truckee River
Reach ID X 11

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	48	53	50	38	33
0	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	2	7	30	30	3
12	% Cobble Embeddedness		60			
Reach Distance (m)	Water Depth (cm)	30	56	55	50	14
15	Particle Size Class	fine				
Width	Particle Size (mm) <u>cm</u>		3	7	4	3
10	% Cobble Embeddedness			25		
Reach Distance (m)	Water Depth (cm)	19	42	41	50	1
30	Particle Size Class					fine
Width	Particle Size (mm) <u>cm</u>	3	4	8	1	
7	% Cobble Embeddedness			8		
Reach Distance (m)	Water Depth (cm)	1	55	33	33	24
45	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	2	4	5	2	5
5	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	17	55	50	31	28
60	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	2	8	4	3	1
8	% Cobble Embeddedness		80			
Reach Distance (m)	Water Depth (cm)	1	28	23	3	1
75	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	0.1	8	10	10	4
7	% Cobble Embeddedness		80	80	25	
Reach Distance (m)	Water Depth (cm)	1	8	14	15	1
90	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	4	15	5	1	0.1
3	% Cobble Embeddedness		50			
Reach Distance (m)	Water Depth (cm)	1	0	0	3	1
105	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	2	70	5	4	4
3	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	1	5	2	10	5
120	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	9	3	30	7	1
12	% Cobble Embeddedness	20			10	
Reach Distance (m)	Water Depth (cm)	1	8	0	7	0
135	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	6	7	25	5	0.3
5	% Cobble Embeddedness		80			
Reach Distance (m)	Water Depth (cm)	5	13	30	0	0
150	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	2	5	6	65	2
3	% Cobble Embeddedness					

Note: Particle size in cm

This is the last data to be entered. Start with last page and work forward.

100

107

106

105

104

103

102

101

100

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name Bear
Date 8-8-12
Field Personnel RV, CN
Interval ID H-20 99-90
Survey Tape Location Right Bank Left Bank

Start Time 0745
Start Location 150 m US Bear Crk
Stop Time 1020
Stop Location 300 m US Bear Crk
Reach ID 810

Reach Info

99

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
15		3	10	14	4	1
Width	Particle Size Class					
5	Particle Size (mm) <u>cm</u>	1	6	2	5	3
	% Cobble Embeddedness					

98

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
30		3	0	88	20	1
Width	Particle Size Class					
7	Particle Size (mm) <u>cm</u>	8	70	2	3	4
	% Cobble Embeddedness	20				

97

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
45		18	5	0	30	14
Width	Particle Size Class					
4	Particle Size (mm) <u>cm</u>	5	4	80	2	5
	% Cobble Embeddedness					

96

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
60		4	5	11	0	0
Width	Particle Size Class					
6	Particle Size (mm) <u>cm</u>	3	50	6	22	10
	% Cobble Embeddedness				50	20

95

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
75		0	0	5	2	13
Width	Particle Size Class					
4	Particle Size (mm) <u>cm</u>	12	13	5	10	6
	% Cobble Embeddedness	0	0		20	

94

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
90		1	1	24	30	17
Width	Particle Size Class					
4	Particle Size (mm) <u>cm</u>	2	4	7	Bed	Bed
	% Cobble Embeddedness			10		

93

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
105		10	34	1	28	5
Width	Particle Size Class					
1	Particle Size (mm) <u>cm</u>	BR-R	BR	20	1	5
	% Cobble Embeddedness			0		

92

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
120		1	18	23	15	1
Width	Particle Size Class					
3	Particle Size (mm) <u>cm</u>	3	7	40	2	0.5
	% Cobble Embeddedness		0			

91

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
135		12	45	44	0	8
Width	Particle Size Class					
3	Particle Size (mm) <u>cm</u>	7	4	50	75	3
	% Cobble Embeddedness	0				

90

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
150		3	16	2	5	10
Width	Particle Size Class					
4	Particle Size (mm) <u>cm</u>	5	9	10	60	0.5
	% Cobble Embeddedness		0	0		

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

smooth

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name Bear Start Time 1020
Date 8-8-12 Start Location 300 m US Bear Crk
Field Personnel RV, CN Stop Time 1045
Interval ID 30 89-90 Stop Location 450 m US Bear Crk
Survey Tape Location Right Bank Left Bank Reach ID 39

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	8	2	17	10	16
15	Particle Size Class					
Width	Particle Size (mm) cm	12	4	7	30	5
4	% Cobble Embeddedness	0		0		
Reach Distance (m)	Water Depth (cm)	1	36	49	42	10
30	Particle Size Class					
Width	Particle Size (mm) cm	0.1	4	0.5	1	6
5	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	1	14	1	13	1
45	Particle Size Class		BRS	BRS	BRS	
Width	Particle Size (mm) cm	1				0.8
5	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	1	1	0	0	3
60	Particle Size Class	BRS	BRS	BRS	BRS	BRS
Width	Particle Size (mm) cm					
4	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	1	27	0	10	1
75	Particle Size Class	BRS	BRS			
Width	Particle Size (mm) cm			100	0.5	0.5
5	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	16	24	22	8	1
90	Particle Size Class					
Width	Particle Size (mm) cm	10	11	4	8	1
4	% Cobble Embeddedness	0	50		50	
Reach Distance (m)	Water Depth (cm)	1	21	5	12	1
105	Particle Size Class					
Width	Particle Size (mm) cm	0.1	8	55	8	4
8	% Cobble Embeddedness		50		0	
Reach Distance (m)	Water Depth (cm)	1	22	1	0	1
120	Particle Size Class		BRS	BRS	BRS	BRS
Width	Particle Size (mm) cm	3				
5	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	1	5	5	7	5
135	Particle Size Class		BRS			
Width	Particle Size (mm) cm	0.5		10	13	4
5	% Cobble Embeddedness			0	0	
Reach Distance (m)	Water Depth (cm)	1	63	30	10	3
150	Particle Size Class					
Width	Particle Size (mm) cm	0.1	7	3	7	4
	% Cobble Embeddedness		10		10	
Reach Distance (m)	Water Depth (cm)	9	4			
	Particle Size Class					
Width	Particle Size (mm)	9	8			
	% Cobble Embeddedness	0	50			

450
total

cobble
search

Truckee River Water Quality Monitoring Plan
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Stream Name Bear Start Time 1045
Date 8-8-12 Start Location 450 m US Bear CVL
Field Personnel RJ, CN Stop Time 1115
Interval ID 31-40 71-70 Stop Location 600 m US Bear CVL
Survey Tape Location Right Bank Left Bank 48

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
79	Reach Distance (m)					
	Water Depth (cm)	1	22	21	13	1
	Particle Size Class	BRS			BRS	BRS
	Width		2	3		
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness					
79	Reach Distance (m)					
	Water Depth (cm)	9	8	13	7	1
	Particle Size Class			BRS	BRS	BRS
	Width	7	4			
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness	50				
77	Reach Distance (m)					
	Water Depth (cm)	7	20	5	10	1
	Particle Size Class	BRS				BRS
	Width		10	12	2	
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness		80	0		
76	Reach Distance (m)					
	Water Depth (cm)	1	22	0	12	1
	Particle Size Class	BRS	BRS			
	Width			50	20	15
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness				50	80
75	Reach Distance (m)					
	Water Depth (cm)	1	13	14	33	9
	Particle Size Class	BRS	BRS	BRS	BRS	BRS
	Width		7			
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness		0			
74	Reach Distance (m)					
	Water Depth (cm)	1	28	29	21	1
	Particle Size Class					
	Width	1	1	40	25	2
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness				50	
73	Reach Distance (m)					
	Water Depth (cm)	1	22	0	19	11
	Particle Size Class		BRS			
	Width	3		130	8	1
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness				80	
72	Reach Distance (m)					
	Water Depth (cm)	5	24	0	10	1
	Particle Size Class					
	Width	5	4	40	1	0.5
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness					
71	Reach Distance (m)					
	Water Depth (cm)	1	22	16	0	1
	Particle Size Class					
	Width	1	7	8	70	1
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness		0	0		
70	Reach Distance (m)					
	Water Depth (cm)	1	28	15	15	1
	Particle Size Class					
	Width	6	4	10	3	2
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness			0		
Cobble Search	Reach Distance (m)					
	Water Depth (cm)	3				
	Particle Size Class					
	Width					
	Particle Size (mm)	12				
	% Cobble Embeddedness	0				

70
600
total

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Stream Name Beaver
Date 8-8-12
Field Personnel RV, CN
Interval ID 41-50 69-100
Survey Tape Location (Right Bank) Left Bank

Start Time 1115
Start Location 600 m US Beaver Creek
Stop Time 1150
Stop Location 900 m DS Bridge
Reach ID 57

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	1	4	5	5	3
15	Particle Size Class					
Width	Particle Size (mm) cm	4	12	9	10	4
2	% Cobble Embeddedness		30	0	80	
Reach Distance (m)	Water Depth (cm)	1	15	0	15	1
30	Particle Size Class					
Width	Particle Size (mm) cm	5	6	200	7	2
6	% Cobble Embeddedness				0	
Reach Distance (m)	Water Depth (cm)	18	12	27	45	57
45	Particle Size Class					
Width	Particle Size (mm) cm	5	6	4	9	6
3	% Cobble Embeddedness				100	
Reach Distance (m)	Water Depth (cm)	1	1	3	0	2
60	Particle Size Class					
Width	Particle Size (mm) cm	5	15	1	10	4
1	% Cobble Embeddedness		0		30	
Reach Distance (m)	Water Depth (cm)	5	13	5	6	1
75	Particle Size Class					
Width	Particle Size (mm) cm	5	4	14	5	2
1	% Cobble Embeddedness			0	10	
Reach Distance (m)	Water Depth (cm)	1	5	20	24	1
90	Particle Size Class					
Width	Particle Size (mm) cm	5	1	10	2	1
3	% Cobble Embeddedness			30		
Reach Distance (m)	Water Depth (cm)	1	4	10	5	1
105	Particle Size Class					
Width	Particle Size (mm) cm	1	7	5	2	0.5
1	% Cobble Embeddedness		30			
Reach Distance (m)	Water Depth (cm)	1	5	0	5	4
120	Particle Size Class					
Width	Particle Size (mm) cm	10	6	10	5	2
6	% Cobble Embeddedness	80		100		
Reach Distance (m)	Water Depth (cm)	70	45	24	10	1
135	Particle Size Class					
Width	Particle Size (mm) cm	9	5	5	7	0.5
5	% Cobble Embeddedness	80			0	
Reach Distance (m)	Water Depth (cm)	1	17	12	5	1
150	Particle Size Class					
Width	Particle Size (mm) cm	2	5	10	6	2
4	% Cobble Embeddedness			30		
Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Left
braided

left
braided

left
braided

right
braided

60
750
total

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Stream Name Bear
Date 8-8-12
Field Personnel RV, CN
Interval ID S1-60 5A-50
Survey Tape Location Right Bank Left Bank

Start Time 1150
Start Location 900 m DS bridge
Stop Time 1215
Stop Location 750 m DS bridge
Reach ID 86

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	4	1	5	3	1
15	Particle Size Class					
Width	Particle Size (mm) cm	2	20	8	4	2
3	% Cobble Embeddedness		50	50		
Reach Distance (m)	Water Depth (cm)	12	2	6	19	1
30	Particle Size Class					
Width	Particle Size (mm) cm	3	9	2	4	1
7	% Cobble Embeddedness		0			
Reach Distance (m)	Water Depth (cm)	1	2	19	15	1
45	Particle Size Class					
Width	Particle Size (mm) cm	0.5	2	7	6	5
5 8	% Cobble Embeddedness			50		
Reach Distance (m)	Water Depth (cm)	1	11	0	1	1
60	Particle Size Class					
Width	Particle Size (mm) cm	1	4	8	6	2
3	% Cobble Embeddedness			50		
Reach Distance (m)	Water Depth (cm)	1	1	6	18	1
75	Particle Size Class					
Width	Particle Size (mm) cm	3	0.5	12	5	11
2	% Cobble Embeddedness			90		80
Reach Distance (m)	Water Depth (cm)	2	3	14	7	1
90	Particle Size Class					
Width	Particle Size (mm) cm	3	8	7	4	2
4	% Cobble Embeddedness		50	0		
Reach Distance (m)	Water Depth (cm)	1	10	14	11	1
105	Particle Size Class					
Width	Particle Size (mm) cm	5	15	6	7	4
3	% Cobble Embeddedness		100		0	
Reach Distance (m)	Water Depth (cm)	1	5	25	30	1
120	Particle Size Class					
Width	Particle Size (mm) cm	0.1	18	7	8	3
3	% Cobble Embeddedness		80	50	50	
Reach Distance (m)	Water Depth (cm)	8	16	8	9	3
135	Particle Size Class					
Width	Particle Size (mm) cm	1	5	11	3	6
2	% Cobble Embeddedness			50		
Reach Distance (m)	Water Depth (cm)	2	1	2	1	27
150	Particle Size Class					
Width	Particle Size (mm) cm	1	5	3	5	7
7	% Cobble Embeddedness					50
Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)	0.1	135	0.2	0.1	2
	% Cobble Embeddedness					

2.0 m/s
Depth water
Photos 1/10/12

2.2 28

Truckee River Water Quality Monitoring Plan
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Stream Name BEAR Start Time 1215
Date 8.8.12 Start Location 750 m DS bridge
Field Personnel CN RV Stop Time 1240
Interval ID 6170 49-40 Stop Location 600 m DS bridge
Survey Tape Location Right Bank Left Bank Reach ID

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	1	15	12	10	1
15	Particle Size Class					
Width	Particle Size (mm) <i>cm</i>	3	10	8	4	2
	% Cobble Embeddedness		50	25		
Reach Distance (m)	Water Depth (cm)	1	10	11	7	1
30	Particle Size Class					
Width	Particle Size (mm) <i>cm</i>	0.2	7	3	1	4
	% Cobble Embeddedness		40			
Reach Distance (m)	Water Depth (cm)	1	5	12	4	1
45	Particle Size Class					
Width	Particle Size (mm) <i>cm</i>	2	11	5	20	0.3
	% Cobble Embeddedness		60		25	
Reach Distance (m)	Water Depth (cm)	3	5	10	11	1
60	Particle Size Class					
Width	Particle Size (mm) <i>cm</i>	3	7	11	5	2
	% Cobble Embeddedness		30	30		
Reach Distance (m)	Water Depth (cm)	1	3	0	3	1
75	Particle Size Class					
Width	Particle Size (mm) <i>cm</i>	4	6	20	7	4
	% Cobble Embeddedness			50	20	
Reach Distance (m)	Water Depth (cm)	1	0	4	10	1
90	Particle Size Class					
Width	Particle Size (mm) <i>cm</i>	2	9	2	8	0.1
	% Cobble Embeddedness		25		25	
Reach Distance (m)	Water Depth (cm)	1	8	10	6	1
105	Particle Size Class					
Width	Particle Size (mm) <i>cm</i>	7	11	2	9	1
	% Cobble Embeddedness	0	10		0	
Reach Distance (m)	Water Depth (cm)	1	8	25	16	1
120	Particle Size Class					
Width	Particle Size (mm) <i>cm</i>	6	20	3	7	0.1
	% Cobble Embeddedness		10		0	
Reach Distance (m)	Water Depth (cm)	1	9	11	0	1
135	Particle Size Class					
Width	Particle Size (mm) <i>cm</i>	4	3	13	18	7
	% Cobble Embeddedness			0	0	0
Reach Distance (m)	Water Depth (cm)	1	9	0	4	1
150	Particle Size Class					
Width	Particle Size (mm) <i>cm</i>	1	5	90	6	4
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness					

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Stream Name BEAR
Date 8.8.12
Field Personnel CN, RV
Interval ID 71-80 39-30
Survey Tape Location Right Bank Left Bank

Start Time 1240
Start Location 600 m DS bridge
Stop Time 1300
Stop Location 450 m DS bridge
Reach ID 84

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	1	24	23	25	1
15	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	0.1	9	20	5	10
	% Cobble Embeddedness		0	0		50

Reach Distance (m)	Water Depth (cm)	1	10	2	3	1
30	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	5	3	14	7	2
	% Cobble Embeddedness			0	0	

Reach Distance (m)	Water Depth (cm)	1	15	34	61	1
45	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	0.1	6	19	0.1	BEDROCK
	% Cobble Embeddedness			0		SMOOTH

Reach Distance (m)	Water Depth (cm)	1	2	3	10	0
60	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	2.5	9	15	3	8
	% Cobble Embeddedness		0	25		0

Reach Distance (m)	Water Depth (cm)	1	54	62	39	1
75	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	FINE	28	20	10	5
	% Cobble Embeddedness			40	25	

Reach Distance (m)	Water Depth (cm)	1	15	10	8	1
90	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	0.1	0.1	3	5	0.1
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	10	11	3	1
105	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	2	1	4	8	FINE
	% Cobble Embeddedness				25	

Reach Distance (m)	Water Depth (cm)	0	8	11	0	1
120	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	5	2	4	13	0.1
	% Cobble Embeddedness				0	

Reach Distance (m)	Water Depth (cm)	1	5	6	2	1
135	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	5	16	15	17	2
	% Cobble Embeddedness		30	0	0	

Reach Distance (m)	Water Depth (cm)	1	2	0	0	1
150	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	3	11	13	6	7
	% Cobble Embeddedness		10	50		0

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

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Stream Name BEAR
Date 8.8.12
Field Personnel CN, RU
Interval ID 81-90 29-20
Survey Tape Location Right Bank Left Bank

Start Time 1320
Start Location 450 m PS bridge
Stop Time 1345
Stop Location 300 m PS bridge
Reach ID 23

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
29	Reach Distance (m) <u>15</u>	Water Depth (cm) <u>1</u>	<u>16</u>	<u>17</u>	<u>40</u>	<u>1</u>
	Width	Particle Size Class <u>2</u>	<u>5</u>	<u>0.3</u>	<u>3</u>	<u>8</u>
		Particle Size (mm) <u>cm</u>				<u>50</u>
		% Cobble Embeddedness				
28	Reach Distance (m) <u>30</u>	Water Depth (cm) <u>1</u>	<u>3</u>	<u>3</u>	<u>0</u>	<u>0</u>
	Width	Particle Size Class <u>10</u>	<u>11</u>	<u>16</u>	<u>17</u>	<u>5</u>
		Particle Size (mm) <u>cm</u>				
		% Cobble Embeddedness <u>0</u>	<u>0</u>	<u>50</u>	<u>0</u>	
27	Reach Distance (m) <u>45</u>	Water Depth (cm) <u>1</u>	<u>2</u>	<u>3</u>	<u>0</u>	<u>0</u>
	Width	Particle Size Class <u>2</u>	<u>5</u>	<u>30</u>	<u>14</u>	<u>15</u>
		Particle Size (mm) <u>cm</u>				
		% Cobble Embeddedness <u>0</u>			<u>0</u>	<u>50</u>
26	Reach Distance (m) <u>60</u>	Water Depth (cm) <u>1</u>	<u>10</u>	<u>0</u>	<u>5</u>	<u>1</u>
	Width	Particle Size Class <u>1</u>	<u>3</u>	<u>17</u>	<u>6</u>	<u>FINE</u>
		Particle Size (mm) <u>cm</u>				
		% Cobble Embeddedness				
25	Reach Distance (m) <u>75</u>	Water Depth (cm) <u>1</u>	<u>3</u>	<u>2</u>	<u>6</u>	<u>1</u>
	Width	Particle Size Class <u>4</u>	<u>7</u>	<u>13</u>	<u>6</u>	<u>0.3</u>
		Particle Size (mm) <u>cm</u>				
		% Cobble Embeddedness <u>0</u>	<u>0</u>	<u>20</u>		
24	Reach Distance (m) <u>90</u>	Water Depth (cm) <u>1</u>	<u>3</u>	<u>2</u>	<u>6</u>	<u>1</u>
	Width	Particle Size Class <u>4</u>	<u>7</u>	<u>13</u>	<u>6</u>	<u>0.3</u>
		Particle Size (mm) <u>cm</u>				
		% Cobble Embeddedness <u>0</u>	<u>0</u>	<u>20</u>		
23	Reach Distance (m) <u>105</u>	Water Depth (cm) <u>0</u>	<u>40</u>	<u>58</u>	<u>9</u>	<u>1</u>
	Width	Particle Size Class <u>70</u>	<u>8</u>	<u>25</u>	<u>55</u>	<u>2</u>
		Particle Size (mm) <u>cm</u>				
		% Cobble Embeddedness <u>0</u>	<u>0</u>	<u>0</u>		
22	Reach Distance (m) <u>120</u>	Water Depth (cm) <u>1</u>	<u>0</u>	<u>3</u>	<u>10</u>	<u>5</u>
	Width	Particle Size Class <u>0.2</u>	<u>14</u>	<u>17</u>	<u>8</u>	<u>0.5</u>
		Particle Size (mm) <u>cm</u>				
		% Cobble Embeddedness <u>0</u>	<u>0</u>	<u>25</u>	<u>0</u>	
21	Reach Distance (m) <u>135</u>	Water Depth (cm) <u>1</u>	<u>0</u>	<u>5</u>	<u>10</u>	<u>1</u>
	Width	Particle Size Class <u>2</u>	<u>5</u>	<u>12</u>	<u>6</u>	<u>FINE</u>
		Particle Size (mm) <u>cm</u>				
		% Cobble Embeddedness <u>0</u>				
20	Reach Distance (m) <u>150</u>	Water Depth (cm) <u>1</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>1</u>
	Width	Particle Size Class <u>0.1</u>	<u>13</u>	<u>12</u>	<u>0.2</u>	<u>1</u>
		Particle Size (mm) <u>cm</u>				
		% Cobble Embeddedness <u>50</u>	<u>50</u>	<u>25</u>		
	Reach Distance (m)	Water Depth (cm)				
		Particle Size Class				
	Width	Particle Size (mm) <u>cm</u>				
		% Cobble Embeddedness				

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Stream Name BEAR
Date 8.8.12
Field Personnel CN, RV
Interval ID 91-100 19-10
Survey Tape Location Right Bank Left Bank

Start Time 1345
Start Location 300 m DG bridge
Stop Time 1410
Stop Location 150 m DG bridge
Reach ID 10 2

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	1	13	10	5	0
15	Particle Size Class					
Width	Particle Size (mm) cm	0.1	2	15	5	10
	% Cobble Embeddedness			30		50
Reach Distance (m)	Water Depth (cm)	2	22	15	17	1
30	Particle Size Class					
Width	Particle Size (mm) cm	2	11	18	0.3	5
	% Cobble Embeddedness		50	50		
Reach Distance (m)	Water Depth (cm)	5	0	10	3	1
45	Particle Size Class					
Width	Particle Size (mm) cm	3	32	9	0.5	0.1
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	1	7	18	23	1
60	Particle Size Class					
Width	Particle Size (mm) cm	FINE	5	0.2	0.5	13
	% Cobble Embeddedness					80
Reach Distance (m)	Water Depth (cm)	1	8	3	2	1
75	Particle Size Class					
Width	Particle Size (mm) cm	1	4	0.2	2.5	0.5
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	18	40	39	25	0
90	Particle Size Class					
Width	Particle Size (mm) cm	0.1	6	10	3	7
	% Cobble Embeddedness			100		0
Reach Distance (m)	Water Depth (cm)					
105	Particle Size Class	DRY				
Width	Particle Size (mm) cm					
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	1	0	0	2	1
120	Particle Size Class					
Width	Particle Size (mm) cm	FINE	28	14	8	FINE
	% Cobble Embeddedness			75	50	
Reach Distance (m)	Water Depth (cm)	1	70	80	48	1
135	Particle Size Class					
Width	Particle Size (mm) cm	0.1	FINE	FINE	1	FINE
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	1	58	49	61	1
150	Particle Size Class					
Width	Particle Size (mm) cm	2	11	17	4	0.1
	% Cobble Embeddedness		50	25		
Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

BEAR

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Stream Name Bear Creek Start Time 1410
Date 8.8.12 Start Location 150 m DS bridge
Field Personnel CN, RV Stop Time 1440
Interval ID 101-110 Stop Location A.M. Rd bridge
Survey Tape Location Right Bank Left Bank Reach ID N 1

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	1	60	38	29	1
	Particle Size Class					FN
Width	Particle Size (mm) cm	1	1	14	30	
	% Cobble Embeddedness			10		

Reach Distance (m)	Water Depth (cm)	1	2	2	23	1
	Particle Size Class					
Width	Particle Size (mm) cm	5	12	13	FN	4
	% Cobble Embeddedness		50	10		

Reach Distance (m)	Water Depth (cm)	1	23	31	35	2
	Particle Size Class					
Width	Particle Size (mm) cm	0.1	8	17	7	0.5
	% Cobble Embeddedness		50	75	50	

Reach Distance (m)	Water Depth (cm)	1	17	18	30	1
	Particle Size Class					
Width	Particle Size (mm) cm	1	5	17	2	22
	% Cobble Embeddedness			0		25

Reach Distance (m)	Water Depth (cm)	1	0	1	0	1
	Particle Size Class					
Width	Particle Size (mm) cm	0.2	50	4	13	7
	% Cobble Embeddedness				25	0

Reach Distance (m)	Water Depth (cm)	1	17	18	10	1
	Particle Size Class			PS		
Width	Particle Size (mm) cm	3	4	Bed, 5	1	4
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	15	21	25	1
	Particle Size Class					
Width	Particle Size (mm) cm	3	2	0.3	1	0.1
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	0	16	2	1
	Particle Size Class	PS		PS		
Width	Particle Size (mm) cm	Bed, 5	10	Bed, 5	14	5
	% Cobble Embeddedness		0		10	

Reach Distance (m)	Water Depth (cm)	1	40	80	40	1
	Particle Size Class					
Width	Particle Size (mm) cm	0.1	35	0.2	0.1	2
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	28	23	10	1
	Particle Size Class		PS	PS	PS	PS
Width	Particle Size (mm) cm	0.2	Bed, 5			
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm) cm					
	% Cobble Embeddedness					

Start entering data into spreadsheet here and work back to first page.

Martis Creek Original Field Data Sheets

Note: Particle size in cm

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Last data entered

Stream Name M. MARTIS
Date 9.13.12
Field Personnel CN NB
Interval ID 110-100
Survey Tape Location Right Bank

Start Time _____
Start Location Middle / West MARTIS MOUTH
Stop Time _____
Stop Location 150 m US of middle ML
Reach ID 11

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
0		25	45	40	35	10
Width	Particle Size Class	SAND	SAND	~~20~~	3	FINE
	Particle Size (mm) cm			20		
	% Cobble Embeddedness			10		

15		28	30	35	25	5
Width	Particle Size Class	SAND				
	Particle Size (mm) cm		7	15	2	2
	% Cobble Embeddedness		0	50		

30		10	55	55	50	1
Width	Particle Size Class	FINE				FINE
	Particle Size (mm) cm		2	3	1	
	% Cobble Embeddedness					

45		3	50	60	70	0
Width	Particle Size Class	SAND				
	Particle Size (mm) cm		2	1	7	20
	% Cobble Embeddedness				20	10

60		40	60	60	60	0
Width	Particle Size Class					
	Particle Size (mm) cm	0.1	1	20	15	25
	% Cobble Embeddedness			50	40	10

75		10	35	35	30	10
Width	Particle Size Class	FINE				
	Particle Size (mm) cm		8	9	1	0.1
	% Cobble Embeddedness		40	20		

90		10	15	18	20	5
Width	Particle Size Class					
	Particle Size (mm) cm	FINE	3	2	3	1
	% Cobble Embeddedness					

105		10	20	30	65	70
Width	Particle Size Class	FINE				
	Particle Size (mm) cm		0.1	0.5	2	3
	% Cobble Embeddedness					

120		15	20	10	5	2
Width	Particle Size Class					
	Particle Size (mm) cm	FINE	7	2	1	0.5
	% Cobble Embeddedness		60			

135		10	15	15	15	1
Width	Particle Size Class					
	Particle Size (mm) cm	FINE	4	1	3	2
	% Cobble Embeddedness					

150		1	18	20	22	10
Width	Particle Size Class					
	Particle Size (mm) cm	FINE	2	1	10	1
	% Cobble Embeddedness				50	

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Stream Name RT MARTIS
Date 9.13.12
Field Personnel CN NB
Interval ID 99-90
Survey Tape Location Right Bank

Start Time _____
Start Location 150 m US of middle MC
Stop Time _____
Stop Location 300 m US of middle MC
Reach ID 10

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
165	Particle Size Class	5	10	15	10	1
Width	Particle Size (mm) <u>cm</u>	2	7	3	1	1
	% Cobble Embeddedness		0			

99

180	Particle Size Class	30	40	45	40	40
Width	Particle Size (mm) <u>cm</u>	30	10	15	3	1
	% Cobble Embeddedness		10	10		

99

195	Particle Size Class	20	15	25	30	25
Width	Particle Size (mm) <u>cm</u>	1	2	2	2	50
	% Cobble Embeddedness					

97

210	Particle Size Class	5	5	20	30	20
Width	Particle Size (mm) <u>cm</u>	2	1	3	15	2
	% Cobble Embeddedness				75	

96

225	Particle Size Class	15	15	15	10	0
Width	Particle Size (mm) <u>cm</u>	3	4	5	7	20
	% Cobble Embeddedness				10	50

95

240	Particle Size Class	10	15	15	18	1
Width	Particle Size (mm) <u>cm</u>	fine	3	7	9	3
	% Cobble Embeddedness			10	20	

94

255	Particle Size Class	10	5	5	5	5
Width	Particle Size (mm) <u>cm</u>	3	3	2	5	1
	% Cobble Embeddedness					

93

270	Particle Size Class	1	10	15	15	0
Width	Particle Size (mm) <u>cm</u>	2	2	5	4	3
	% Cobble Embeddedness					

92

285	Particle Size Class	15	55	67	52	20
Width	Particle Size (mm) <u>cm</u>	2	1	3	8	1
	% Cobble Embeddedness				0	

91

300	Particle Size Class	10	50	90	70	30
Width	Particle Size (mm) <u>cm</u>	1	0.1	0.1	0.5	1
	% Cobble Embeddedness					

90

Cobble	Particle Size Class	10	15	70		
Width 300cm	Particle Size (mm) <u>cm</u>	10	8	8		
	% Cobble Embeddedness	10	0	50		

CS

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Stream Name EV. MARPIS
Date 9.13.12
Field Personnel CN NB
Interval ID QA-80
Survey Tape Location Right Bank Left Bank

Start Time _____
Start Location 300 m US of middle MC
Stop Time _____
Stop Location 450 m US of middle MC
Reach ID 1

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>315</u>	Particle Size Class	<u>21</u>	<u>10</u>	<u>5</u>	<u>20</u>	<u>15</u>
Width	Particle Size (mm) <u>cm</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>7</u>	<u>1</u>
	% Cobble Embeddedness				<u>0</u>	

<u>330</u>	Water Depth (cm)	<u>20</u>	<u>25</u>	<u>25</u>	<u>24</u>	<u>10</u>
Width	Particle Size Class	<u>FINE</u>	<u>7</u>	<u>3</u>	<u>2</u>	<u>FINE</u>
	Particle Size (mm) <u>cm</u>		<u>20</u>			
	% Cobble Embeddedness					

<u>345</u>	Water Depth (cm)	<u>55</u>	<u>54</u>	<u>45</u>	<u>30</u>	<u>25</u>
Width	Particle Size Class	<u>2</u>	<u>FINE</u>	<u>7</u>	<u>2</u>	<u>1</u>
	Particle Size (mm) <u>cm</u>			<u>10</u>		
	% Cobble Embeddedness					

<u>360</u>	Water Depth (cm)	<u>15</u>	<u>27</u>	<u>35</u>	<u>35</u>	<u>22</u>
Width	Particle Size Class	<u>FINE</u>	<u>3</u>	<u>7</u>	<u>7</u>	<u>0.1</u>
	Particle Size (mm) <u>cm</u>				<u>10</u>	
	% Cobble Embeddedness					

<u>375</u>	Water Depth (cm)	<u>20</u>	<u>18</u>	<u>20</u>	<u>26</u>	<u>25</u>
Width	Particle Size Class	<u>15</u>	<u>2</u>	<u>5</u>	<u>5</u>	<u>FINE</u>
	Particle Size (mm) <u>cm</u>	<u>50</u>				
	% Cobble Embeddedness					

<u>390</u>	Water Depth (cm)	<u>21</u>	<u>48</u>	<u>40</u>	<u>35</u>	<u>29</u>
Width	Particle Size Class	<u>Bedrock</u>	<u>2</u>	<u>8</u>	<u>8</u>	<u>2</u>
	Particle Size (mm) <u>cm</u>			<u>50</u>	<u>50</u>	
	% Cobble Embeddedness					

<u>405</u>	Water Depth (cm)	<u>37</u>	<u>35</u>	<u>28</u>	<u>25</u>	<u>1</u>
Width	Particle Size Class	<u>1</u>	<u>1</u>	<u>12</u>	<u>1</u>	<u>3</u>
	Particle Size (mm) <u>cm</u>			<u>60</u>		
	% Cobble Embeddedness					

<u>420</u>	Water Depth (cm)	<u>38</u>	<u>30</u>	<u>22</u>	<u>1</u>	<u>1</u>
Width	Particle Size Class	<u>2</u>	<u>20</u>	<u>1</u>	<u>1</u>	<u>2</u>
	Particle Size (mm) <u>cm</u>		<u>60</u>			
	% Cobble Embeddedness					

<u>435</u>	Water Depth (cm)	<u>10</u>	<u>20</u>	<u>30</u>	<u>26</u>	<u>10</u>
Width	Particle Size Class	<u>1</u>	<u>23</u>	<u>1</u>	<u>3</u>	<u>FINE</u>
	Particle Size (mm) <u>cm</u>	<u>20</u>				
	% Cobble Embeddedness					

<u>450</u>	Water Depth (cm)	<u>10</u>	<u>11</u>	<u>6</u>	<u>6</u>	<u>1</u>
Width	Particle Size Class	<u>3</u>	<u>4</u>	<u>2</u>	<u>4</u>	<u>FINE</u>
	Particle Size (mm) <u>cm</u>					
	% Cobble Embeddedness					

<u>COBBLE</u>	Water Depth (cm)	<u>5</u>	<u>11</u>	<u>30</u>		
Width	Particle Size Class	<u>8</u>	<u>12</u>	<u>15</u>		
	Particle Size (mm) <u>cm</u>	<u>50</u>	<u>25</u>	<u>10</u>		
	% Cobble Embeddedness					

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Stream Name MARTIS Start Time _____
Date 9.15.12 Start Location 450 m US of middle mc
Field Personnel CUNB Stop Time _____
Interval ID 7A-7D Stop Location 600 m US of middle mc
Survey Tape Location _____ Reach ID 4
Right Bank _____ Left Bank _____

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>465</u>	Particle Size Class	<u>10</u>	<u>18</u>	<u>10</u>	<u>10</u>	<u>1</u>
Width	Particle Size (mm) <u>cm</u>	<u>FINE</u>	<u>3</u>	<u>4</u>	<u>3</u>	<u>5</u>
	% Cobble Embeddedness					

<u>480</u>	Water Depth (cm)	<u>43</u>	<u>40</u>	<u>33</u>	<u>28</u>	<u>1</u>
Width	Particle Size (mm) <u>cm</u>	<u>1</u>	<u>10</u>	<u>FINE</u>	<u>2</u>	<u>1</u>
	% Cobble Embeddedness		<u>70</u>			

<u>495</u>	Water Depth (cm)	<u>10</u>	<u>35</u>	<u>35</u>	<u>60</u>	<u>50</u>
Width	Particle Size (mm) <u>cm</u>	<u>2</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>
	% Cobble Embeddedness					

<u>510</u>	Water Depth (cm)	<u>15</u>	<u>15</u>	<u>10</u>	<u>10</u>	<u>5</u>
Width	Particle Size (mm) <u>cm</u>	<u>4</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>
	% Cobble Embeddedness					

<u>525</u>	Water Depth (cm)	<u>48</u>	<u>48</u>	<u>45</u>	<u>30</u>	<u>20</u>
Width	Particle Size (mm) <u>cm</u>	<u>15</u>	<u>10</u>	<u>3</u>	<u>2</u>	<u>FINE</u>
	% Cobble Embeddedness	<u>20</u>	<u>10</u>			

<u>540</u>	Water Depth (cm)	<u>20</u>	<u>22</u>	<u>28</u>	<u>35</u>	<u>38</u>
Width	Particle Size (mm) <u>cm</u>	<u>FINE</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>0.5</u>
	% Cobble Embeddedness					

<u>555</u>	Water Depth (cm)	<u>5</u>	<u>10</u>	<u>20</u>	<u>10</u>	<u>1</u>
Width	Particle Size (mm) <u>cm</u>	<u>2</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>2</u>
	% Cobble Embeddedness					

<u>570</u>	Water Depth (cm)	<u>30</u>	<u>34</u>	<u>38</u>	<u>38</u>	<u>20</u>
Width	Particle Size (mm) <u>cm</u>	<u>SAND</u>	<u>1</u>	<u>3</u>	<u>SAND</u>	<u>FINE</u>
	% Cobble Embeddedness					

<u>585</u>	Water Depth (cm)	<u>20</u>	<u>22</u>	<u>25</u>	<u>30</u>	<u>20</u>
Width	Particle Size (mm) <u>cm</u>	<u>1</u>	<u>5</u>	<u>3</u>	<u>3</u>	<u>5</u>
	% Cobble Embeddedness					

<u>600</u>	Water Depth (cm)	<u>10</u>	<u>10</u>	<u>22</u>	<u>35</u>	<u>40</u>
Width	Particle Size (mm) <u>cm</u>	<u>FINE</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>
	% Cobble Embeddedness					

<u>COBBLE</u>	Water Depth (cm)	<u>10</u>	<u>25</u>	<u>12</u>	<u>8</u>	<u>15</u>
Width	Particle Size (mm) <u>cm</u>	<u>8</u>	<u>7</u>	<u>10</u>	<u>8</u>	<u>7</u>
	% Cobble Embeddedness	<u>50</u>	<u>75</u>	<u>50</u>	<u>10</u>	<u>20</u>

40 38 12 20 } CS
12 8 7 12
10 0 10 0

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name SR. MARTIS Start Time _____
Date 9.13.12 Start Location 600 m US of middle MC
Field Personnel CN NB Stop Time _____
Interval ID 104-100 Stop Location 750 m US of middle MC
Survey Tape Location _____ Reach ID 7
Right Bank _____ Left Bank _____

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>615</u>	Particle Size Class	<u>1</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>15</u>
Width	Particle Size (mm) <u>cm</u>	<u>7</u>	<u>5</u>	<u>1</u>	<u>3</u>	<u>1</u>
	% Cobble Embeddedness	<u>0</u>				

b9

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>630</u>	Particle Size Class	<u>1</u>	<u>10</u>	<u>20</u>	<u>18</u>	<u>1</u>
Width	Particle Size (mm) <u>cm</u>	<u>2</u>	<u>5</u>	<u>12</u>	<u>5</u>	<u>9</u>
	% Cobble Embeddedness			<u>30</u>		<u>0</u>

b9

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>645</u>	Particle Size Class	<u>18</u>	<u>20</u>	<u>15</u>	<u>20</u>	<u>20</u>
Width	Particle Size (mm) <u>cm</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>0.5</u>
	% Cobble Embeddedness					

b7

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>660</u>	Particle Size Class	<u>10</u>	<u>10</u>	<u>15</u>	<u>18</u>	<u>10</u>
Width	Particle Size (mm) <u>cm</u>	<u>FINE</u>	<u>7</u>	<u>12</u>	<u>5</u>	<u>1</u>
	% Cobble Embeddedness		<u>20</u>	<u>20</u>		

b6

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>675</u>	Particle Size Class	<u>15</u>	<u>30</u>	<u>70</u>	<u>50</u>	<u>10</u>
Width	Particle Size (mm) <u>cm</u>	<u>FINE</u>	<u>5</u>	<u>20</u>	<u>3</u>	<u>FINE</u>
	% Cobble Embeddedness			<u>10</u>		

b5

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>690</u>	Particle Size Class	<u>37</u>	<u>42</u>	<u>30</u>	<u>20</u>	<u>1</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.1</u>	<u>2</u>	<u>17</u>	<u>2</u>	<u>0.5</u>
	% Cobble Embeddedness			<u>50</u>		

b4

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>705</u>	Particle Size Class	<u>20</u>	<u>26</u>	<u>28</u>	<u>24</u>	<u>10</u>
Width	Particle Size (mm) <u>cm</u>	<u>FINE</u>	<u>3</u>	<u>1</u>	<u>3</u>	<u>0.1</u>
	% Cobble Embeddedness					

b3

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>720</u>	Particle Size Class	<u>1</u>	<u>15</u>	<u>18</u>	<u>22</u>	<u>18</u>
Width	Particle Size (mm) <u>cm</u>	<u>FINE</u>	<u>2</u>	<u>4</u>	<u>4</u>	<u>1</u>
	% Cobble Embeddedness					

b2

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>735</u>	Particle Size Class	<u>1</u>	<u>10</u>	<u>21</u>	<u>35</u>	<u>22</u>
Width	Particle Size (mm) <u>cm</u>	<u>4</u>	<u>2</u>	<u>5</u>	<u>3</u>	<u>1</u>
	% Cobble Embeddedness					

b1

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>750</u>	Particle Size Class	<u>1</u>	<u>10</u>	<u>26</u>	<u>32</u>	<u>32</u>
Width	Particle Size (mm) <u>cm</u>	<u>3</u>	<u>3</u>	<u>5</u>	<u>1</u>	<u>2</u>
	% Cobble Embeddedness					

b0

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>COBBLES</u>	Particle Size Class	<u>15</u>	<u>30</u>	<u>22</u>	<u>10</u>	<u>18</u>
Width	Particle Size (mm) <u>cm</u>	<u>7</u>	<u>10</u>	<u>12</u>	<u>7</u>	<u>9</u>
	% Cobble Embeddedness	<u>10</u>	<u>0</u>	<u>20</u>	<u>10</u>	<u>25</u>

c5

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name RT MARTIS
Date 9-13-12
Field Personnel CN DB
Interval ID 59-50
Survey Tape Location Right Bank

Start Time _____
Start Location 750 m US of middle MC
Stop Time _____
Stop Location 900 m US of middle MC
Reach ID 6

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>765</u>	Particle Size Class	<u>20</u>	<u>20</u>	<u>18</u>	<u>30</u>	<u>10</u>
Width	Particle Size (mm) <u>cm</u>	<u>2</u>	<u>1</u>	<u>7</u>	<u>15</u>	<u>FINE</u>
	% Cobble Embeddedness			<u>10</u>	<u>2</u>	

59

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>780</u>	Particle Size Class	<u>1</u>	<u>18</u>	<u>42</u>	<u>40</u>	<u>1</u>
Width	Particle Size (mm) <u>cm</u>	<u>3</u>	<u>5</u>	<u>8</u>	<u>15</u>	<u>3</u>
	% Cobble Embeddedness			<u>20</u>	<u>75</u>	

59

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>795</u>	Particle Size Class	<u>15</u>	<u>18</u>	<u>20</u>	<u>22</u>	<u>20</u>
Width	Particle Size (mm) <u>cm</u>	<u>2</u>	<u>8</u>	<u>7</u>	<u>3</u>	<u>2</u>
	% Cobble Embeddedness		<u>0</u>	<u>0</u>		

57

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>810</u>	Particle Size Class	<u>1</u>	<u>20</u>	<u>37</u>	<u>46</u>	<u>30</u>
Width	Particle Size (mm) <u>cm</u>	<u>1</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>1</u>
	% Cobble Embeddedness					

56

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>825</u>	Particle Size Class	<u>26</u>	<u>25</u>	<u>26</u>	<u>25</u>	<u>20</u>
Width	Particle Size (mm) <u>cm</u>	<u>SAND</u>	<u>3</u>	<u>5</u>	<u>2</u>	<u>FINE</u>
	% Cobble Embeddedness					

55

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>840</u>	Particle Size Class	<u>1</u>	<u>10</u>	<u>18</u>	<u>10</u>	<u>15</u>
Width	Particle Size (mm) <u>cm</u>	<u>2</u>	<u>3</u>	<u>2</u>	<u>4</u>	<u>7</u>
	% Cobble Embeddedness					<u>20</u>

54

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>855</u>	Particle Size Class	<u>1</u>	<u>7</u>	<u>15</u>	<u>10</u>	<u>10</u>
Width	Particle Size (mm) <u>cm</u>	<u>3</u>	<u>3</u>	<u>7</u>	<u>1</u>	<u>1</u>
	% Cobble Embeddedness			<u>80</u>		

53

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>870</u>	Particle Size Class	<u>30</u>	<u>22</u>	<u>10</u>	<u>5</u>	<u>1</u>
Width	Particle Size (mm) <u>cm</u>	<u>5</u>	<u>7</u>	<u>8</u>	<u>5</u>	<u>0.5</u>
	% Cobble Embeddedness		<u>0</u>	<u>10</u>		

52

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>885</u>	Particle Size Class	<u>15</u>	<u>18</u>	<u>18</u>	<u>17</u>	<u>1</u>
Width	Particle Size (mm) <u>cm</u>	<u>1</u>	<u>5</u>	<u>8</u>	<u>8</u>	<u>FINE</u>
	% Cobble Embeddedness			<u>20</u>	<u>50</u>	

51

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>900</u>	Particle Size Class	<u>32</u>	<u>36</u>	<u>41</u>	<u>40</u>	<u>31</u>
Width	Particle Size (mm) <u>cm</u>	<u>2</u>	<u>8</u>	<u>10</u>	<u>6</u>	<u>5</u>
	% Cobble Embeddedness		<u>50</u>	<u>20</u>		

50

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Truckee River Water Quality Monitoring Plan
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Stream Name TRUCKEE RIVER
Date 9.13.12
Field Personnel CNNB
Interval ID 49-40
Survey Tape Location Right Bank Left Bank

Start Time _____
Start Location 900 m US of middle MC
Stop Time _____
Stop Location 1050 m US of middle MC
Reach ID 5

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>915</u>		<u>36</u>	<u>45</u>	<u>40</u>	<u>31</u>	<u>20</u>
Width	Particle Size Class					
	Particle Size (mm) <u>CM</u>	<u>FINE</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>1</u>
	% Cobble Embeddedness					

<u>930</u>		<u>10</u>	<u>15</u>	<u>20</u>	<u>22</u>	<u>10</u>
Width	Particle Size Class					
	Particle Size (mm) <u>CM</u>	<u>20</u>	<u>12</u>	<u>8</u>	<u>3</u>	<u>FINE</u>
	% Cobble Embeddedness	<u>0</u>	<u>50</u>	<u>20</u>		

<u>945</u>		<u>20</u>	<u>21</u>	<u>22</u>	<u>26</u>	<u>5</u>
Width	Particle Size Class					
	Particle Size (mm) <u>CM</u>	<u>FINE</u>	<u>1</u>	<u>1</u>	<u>4</u>	<u>FINE</u>
	% Cobble Embeddedness					

<u>960</u>		<u>1</u>	<u>15</u>	<u>35</u>	<u>40</u>	<u>18</u>
Width	Particle Size Class					
	Particle Size (mm) <u>CM</u>	<u>1</u>	<u>0.5</u>	<u>3</u>	<u>2</u>	<u>4</u>
	% Cobble Embeddedness					

<u>975</u>		<u>38</u>	<u>26</u>	<u>34</u>	<u>34</u>	<u>15</u>
Width	Particle Size Class					
	Particle Size (mm) <u>CM</u>	<u>1</u>	<u>7</u>	<u>8</u>	<u>5</u>	<u>1</u>
	% Cobble Embeddedness		<u>20</u>	<u>30</u>		

<u>990</u>		<u>19</u>	<u>22</u>	<u>28</u>	<u>32</u>	<u>31</u>
Width	Particle Size Class					
	Particle Size (mm) <u>CM</u>	<u>12</u>	<u>0.5</u>	<u>15</u>	<u>3</u>	<u>1</u>
	% Cobble Embeddedness	<u>20</u>		<u>10</u>		

<u>1005</u>		<u>1</u>	<u>5</u>	<u>10</u>	<u>15</u>	<u>5</u>
Width	Particle Size Class					
	Particle Size (mm) <u>CM</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>FINE</u>
	% Cobble Embeddedness					

<u>1020</u>		<u>33</u>	<u>37</u>	<u>51</u>	<u>69</u>	<u>72</u>
Width	Particle Size Class					
	Particle Size (mm) <u>CM</u>	<u>1</u>	<u>FINE</u>	<u>12</u>	<u>10</u>	<u>3</u>
	% Cobble Embeddedness			<u>10</u>	<u>0</u>	

<u>1035</u>		<u>10</u>	<u>12</u>	<u>19</u>	<u>28</u>	<u>20</u>
Width	Particle Size Class					
	Particle Size (mm) <u>CM</u>	<u>1</u>	<u>4</u>	<u>3</u>	<u>3</u>	<u>3</u>
	% Cobble Embeddedness					

<u>1050</u>		<u>5</u>	<u>15</u>	<u>18</u>	<u>15</u>	<u>1</u>
Width	Particle Size Class					
	Particle Size (mm) <u>CM</u>	<u>1</u>	<u>2</u>	<u>7</u>	<u>12</u>	<u>3</u>
	% Cobble Embeddedness			<u>20</u>	<u>50</u>	

<u>COBBLE</u>		<u>16</u>				
Width	Particle Size Class					
	Particle Size (mm) <u>CM</u>	<u>8</u>				
	% Cobble Embeddedness	<u>10</u>				

49

40

47

46

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39

Truckee River Water Quality Monitoring Plan
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Stream Name W. MARIUS
Date 9.13.12
Field Personnel CNNR
Interval ID 39-30
Survey Tape Location Right Bank Left Bank

Start Time _____
Start Location 1050 m US of middle MC
Stop Time _____
Stop Location 1200 m US of middle MC
Reach ID 4

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1065</u>	Particle Size Class	<u>24</u>	<u>30</u>	<u>25</u>	<u>23</u>	<u>18</u>
Width	Particle Size (mm) <u>cm</u>	<u>4</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>0.5</u>
	% Cobble Embeddedness					

39

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1080</u>	Particle Size Class	<u>1</u>	<u>5</u>	<u>22</u>	<u>28</u>	<u>27</u>
Width	Particle Size (mm) <u>cm</u>	<u>4</u>	<u>2</u>	<u>3</u>	<u>2</u>	<u>1</u>
	% Cobble Embeddedness					

39

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1095</u>	Particle Size Class	<u>40</u>	<u>32</u>	<u>24</u>	<u>10</u>	<u>1</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.5</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>FINE</u>
	% Cobble Embeddedness					

37

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1110</u>	Particle Size Class	<u>38</u>	<u>18</u>	<u>10</u>	<u>5</u>	<u>1</u>
Width	Particle Size (mm) <u>cm</u>	<u>3</u>	<u>1</u>	<u>4</u>	<u>3</u>	<u>3</u>
	% Cobble Embeddedness					

36

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1125</u>	Particle Size Class	<u>5</u>	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>
Width	Particle Size (mm) <u>cm</u>	<u>3</u>	<u>7</u>	<u>5</u>	<u>5</u>	<u>10</u>
	% Cobble Embeddedness		<u>6</u>			<u>40</u>

35

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1140</u>	Particle Size Class	<u>30</u>	<u>30</u>	<u>35</u>	<u>35</u>	<u>20</u>
Width	Particle Size (mm) <u>cm</u>	<u>3</u>	<u>5</u>	<u>2</u>	<u>3</u>	<u>CRAWFISH</u>
	% Cobble Embeddedness					

34

24

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1155</u>	Particle Size Class	<u>23</u>	<u>32</u>	<u>36</u>	<u>37</u>	<u>30</u>
Width	Particle Size (mm) <u>cm</u>	<u>FINE</u>	<u>4</u>	<u>5</u>	<u>3</u>	<u>3</u>
	% Cobble Embeddedness		<u>0</u>			

33

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1170</u>	Particle Size Class	<u>5</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>25</u>
Width	Particle Size (mm) <u>cm</u>	<u>2</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>4</u>
	% Cobble Embeddedness					

32

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1185</u>	Particle Size Class	<u>10</u>	<u>15</u>	<u>18</u>	<u>20</u>	<u>30</u>
Width	Particle Size (mm) <u>cm</u>	<u>FINE</u>	<u>4</u>	<u>27</u>	<u>8</u>	<u>2</u>
	% Cobble Embeddedness			<u>40</u>	<u>20</u>	

31

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1200</u>	Particle Size Class	<u>35</u>	<u>46</u>	<u>38</u>	<u>36</u>	<u>25</u>
Width	Particle Size (mm) <u>cm</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>0.5</u>
	% Cobble Embeddedness					

30

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Truckee River Water Quality Monitoring Plan
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Stream Name McMARTIN
Date 9/15/12
Field Personnel CNNB
Interval ID _____
Survey Tape Location _____ Right Bank _____ Left Bank _____

Start Time _____
Start Location 1200 m US of middle MC
Stop Time _____
Stop Location 1357 m US of middle MC
Reach ID 3

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1215</u>		<u>37</u>	<u>47</u>	<u>32</u>	<u>25</u>	<u>10</u>
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	<u>3</u>	<u>10</u>	<u>0.5</u>	<u>1</u>	<u>FINE</u>
	% Cobble Embeddedness		<u>70</u>			

29

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1230</u>		<u>5</u>	<u>10</u>	<u>20</u>	<u>24</u>	<u>20</u>
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	<u>0.5</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>1</u>
	% Cobble Embeddedness					

29

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1245</u>		<u>15</u>	<u>12</u>	<u>10</u>	<u>10</u>	<u>1</u>
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	<u>2</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>1</u>
	% Cobble Embeddedness					

27

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1260</u>		<u>15</u>	<u>18</u>	<u>22</u>	<u>21</u>	<u>20</u>
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	<u>2</u>	<u>3</u>	<u>5</u>	<u>3</u>	<u>2</u>
	% Cobble Embeddedness					

26

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1275</u>		<u>25</u>	<u>30</u>	<u>31</u>	<u>30</u>	<u>20</u>
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	<u>3</u>	<u>3</u>	<u>7</u>	<u>4</u>	<u>0.1</u>
	% Cobble Embeddedness			<u>10</u>		

25

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1290</u>		<u>1</u>	<u>10</u>	<u>15</u>	<u>10</u>	<u>1</u>
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	<u>4</u>	<u>5</u>	<u>8</u>	<u>3</u>	<u>4</u>
	% Cobble Embeddedness			<u>30</u>		

24

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1305</u>		<u>10</u>	<u>15</u>	<u>15</u>	<u>18</u>	<u>1</u>
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	<u>4</u>	<u>7</u>	<u>7</u>	<u>2</u>	<u>FINE</u>
	% Cobble Embeddedness		<u>10</u>	<u>30</u>		

23

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1320</u>		<u>28</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>31</u>
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	<u>1</u>	<u>9</u>	<u>3</u>	<u>4</u>	<u>0.5</u>
	% Cobble Embeddedness		<u>10</u>			

22

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1335</u>		<u>10</u>	<u>15</u>	<u>15</u>	<u>10</u>	<u>10</u>
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	<u>1</u>	<u>2</u>	<u>8</u>	<u>5</u>	<u>0.1</u>
	% Cobble Embeddedness			<u>10</u>		

21

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
<u>1350</u>		<u>55</u>	<u>56</u>	<u>57</u>	<u>54</u>	<u>15</u>
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	<u>2</u>	<u>0.5</u>	<u>3</u>	<u>0.1</u>	<u>0.5</u>
	% Cobble Embeddedness					

20

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
		<u>50</u>	<u>48</u>	<u>30</u>	<u>18</u>	<u>10</u>
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	<u>10</u>	<u>7</u>	<u>12</u>	<u>7</u>	<u>10</u>
	% Cobble Embeddedness	<u>10</u>	<u>25</u>	<u>10</u>	<u>30</u>	<u>25</u>

CS

Cobble
5

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Stream Name 44. MARTIS
Date 9/15/12
Field Personnel CN NB
Interval ID 19-10
Survey Tape Location _____ Right Bank _____ Left Bank _____

Start Time _____
Start Location 1350 m US of middle MC
Stop Time _____
Stop Location 1500 m US of middle MC
Reach ID 2

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
1365	Particle Size Class	15	12	15	18	1
Width	Particle Size (mm) cm	2	2	2	1	FWS
	% Cobble Embeddedness					

1380	Particle Size Class	10	12	15	10	10
Width	Particle Size (mm) cm	2	3	4	3	2
	% Cobble Embeddedness					

1395	Particle Size Class	10	15	18	25	20
Width	Particle Size (mm) cm	2	3	5	5	3
	% Cobble Embeddedness					

1410	Particle Size Class	5	20	26	15	1
Width	Particle Size (mm) cm	0.1	2	12	2	0.5
	% Cobble Embeddedness			10		

1425	Particle Size Class	30	31	26	21	20
Width	Particle Size (mm) cm	8	7	5	2	1
	% Cobble Embeddedness	10	20			

1440	Particle Size Class	10	10	8	12	5
Width	Particle Size (mm) cm	1	4	3	3	0.5
	% Cobble Embeddedness					

1455	Particle Size Class	12	20	22	21	15
Width	Particle Size (mm) cm	1	5	2	3	1
	% Cobble Embeddedness					

1470	Particle Size Class	50	44	29	25	3
Width	Particle Size (mm) cm	10	1	1	0.5	1
	% Cobble Embeddedness	10				

1485	Particle Size Class	10	10	15	18	10
Width	Particle Size (mm) cm	4	8	5	9	2
	% Cobble Embeddedness		10		20	

1500	Particle Size Class	12	15	16	15	12
Width	Particle Size (mm) cm	1	3	7	2	2
	% Cobble Embeddedness			0		

Cobble Search	Particle Size Class	10	15	28	10	15
Width	Particle Size (mm) cm	7	8	10	12	8
	% Cobble Embeddedness	25	10	25	10	25

19

18

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107 CS
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Stream Name W. MARISS
Date 9.18.12
Field Personnel CNJB
Interval ID 9-0
Survey Tape Location Right Bank Left Bank

Start Time _____
Start Location 1500 m NS of middle MC
Stop Time _____
Stop Location 1 mile upstream
Reach ID 1

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
1515	Particle Size Class	15	21	15	10	10
Width	Particle Size (mm) CM	2	3	4	7	4
	% Cobble Embeddedness				10	

1530	Particle Size Class	26	28	25	21	15
Width	Particle Size (mm) CM	2	3	7	4	1
	% Cobble Embeddedness			10		

1545	Particle Size Class	22	24	26	28	23
Width	Particle Size (mm) CM	3	5	4	5	4
	% Cobble Embeddedness					

1560	Particle Size Class	1	10	10	12	5
Width	Particle Size (mm) CM	1	3	2	2	3
	% Cobble Embeddedness					

1575	Particle Size Class	10	20	21	23	20
Width	Particle Size (mm) CM	3	2	2	4	1
	% Cobble Embeddedness					

1590	Particle Size Class	37	43	45	49	50
Width	Particle Size (mm) CM	0.1	~~2~~ FINE	3	1	0.5
	% Cobble Embeddedness					

1605	Particle Size Class	60	72	85	70	50
Width	Particle Size (mm) CM	1	3	5	4	2
	% Cobble Embeddedness					

1620	Particle Size Class	46	65	75	70	50
Width	Particle Size (mm) CM	0.5	5	12	13	2
	% Cobble Embeddedness			50	60	

1635	Particle Size Class	25	55	58	62	60
Width	Particle Size (mm) CM	1	5	3	1	0.1
	% Cobble Embeddedness					

1650	Particle Size Class	38	38	39	36	33
Width	Particle Size (mm) CM	2	3	3	0.5	3
	% Cobble Embeddedness					

1665	Particle Size Class	60	48	23	38	28
Width	Particle Size (mm) CM	7	10	8	12	15
	% Cobble Embeddedness	10	25	25	10	50

Cobbles Search

CS { 18 28 40
18 20 10
10 25 20

Data entered starting here

West Martis Creek Original Field Data Sheets

Note: Particle Size in cm

Truckee River Water Quality Monitoring Plan
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Last data
entered

Stream Name W. MARTIS CR
Date 9/18/12
Field Personnel NB CN
Interval ID 110-100
Survey Tape Location Right Bank Left Bank

Start Time
Start Location MOUTH Confluence
Stop Time
Stop Location 150 m US of middle MC
Reach ID 11

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
110	18	33	35	30	10	
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	4	3	2	SAND
	% Cobble Embeddedness					

109	1	33	40	40	35	
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	fine	fine	fine	fine
	% Cobble Embeddedness					

108	1	1	1	15	5	
	Particle Size Class					
Width	Particle Size (mm) (cm)	2	fine	fine	1	1
	% Cobble Embeddedness					

107	10	20	20	22	5	
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	SAND	fine	fine	fine
	% Cobble Embeddedness					

106	18	23	24	25	20	
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	fine	fine	fine	fine
	% Cobble Embeddedness					

105	1	15	22	23	15	
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	.5	.5	.1	SAND
	% Cobble Embeddedness					

104	15	21	15	10	2	
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	fine	1	SAND	SAND
	% Cobble Embeddedness					

103	15	20	22	20	20	
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	SAND	SAND	1	fine
	% Cobble Embeddedness					

102	20	22	18	17	10	
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	.5	1	.5	fine
	% Cobble Embeddedness					

101	35	26	23	20	5	
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	fine	fine	fine	fine
	% Cobble Embeddedness					

100	10	28	32	30	25	
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	fine	SAND	fine	fine
	% Cobble Embeddedness					

0 cobbles encountered.

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Stream Name WML
Date 9/18/12
Field Personnel NB, CN
Interval ID 99-890
Survey Tape Location Right Bank

Start Time 12
Start Location 150m US of middle MC
Stop Time
Stop Location 300 m US of middle MC
Reach ID 10

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
	Particle Size Class	11	15	20	20	15
Width	Particle Size (mm) (cm)	Fine	SAND	4	SAND	SAND
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	10	15	16	12	1
	Particle Size Class					
Width	Particle Size (mm) (cm)	Fine	2	1	1	Fine
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	30	38	40	58	30
	Particle Size Class					
Width	Particle Size (mm) (cm)	SAND	SAND	SAND	SAND	Fine
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	17	24	25	24	10
	Particle Size Class					
Width	Particle Size (mm) (cm)	Fine	Fine	1	SAND	Fine
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	17	18	17	17	15
	Particle Size Class					
Width	Particle Size (mm) (cm)	3	1	1	1.5	SAND
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	4	17	18	16	5
	Particle Size Class					
Width	Particle Size (mm) (cm)	Fine	Fine	3	SAND	Fine
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	2	10	15	10	2
	Particle Size Class					
Width	Particle Size (mm) (cm)	SAND	Fine	1	Fine	Fine
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	2	27	38	35	25
	Particle Size Class					
Width	Particle Size (mm) (cm)	Fine	Fine	5	SAND	Fine
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	2	7	12	13	10
	Particle Size Class					
Width	Particle Size (mm) (cm)	Fine	Fine	1.5	SAND	Fine
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	15	20	21	20	10
	Particle Size Class					
Width	Particle Size (mm) (cm)	Fine	1	1.5	1	SAND
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	10	12	17	18	10
	Particle Size Class					
Width	Particle Size (mm) (cm)	Fine	Fine	2	1	Fine
	% Cobble Embeddedness					

→ This should be on page 3.

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Stream Name WMC
Date 9/18/12
Field Personnel NB.CN
Interval ID 8985-80
Survey Tape Location Right Bank Left Bank

Start Time 3:00
Start Location 300 m US of middle WMC
Stop Time 3:15
Stop Location 60 m DS of H. bridge
Reach ID 9

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
88 22		20	21	25	21	10
	Particle Size Class					
Width	Particle Size (mm) (cm)	SAND	1	2	1	fine
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
87 23		12	20	20	17	3
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	1	3	SAND	fine
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
86 24		2	7	10	6	1
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	1	.5	SAND	fine
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
85 25		4	6	6	5	2
	Particle Size Class					
Width	Particle Size (mm) (cm)	.5	SAND	.5	1	fine
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
84 26		3	8	9	4	3
	Particle Size Class					
Width	Particle Size (mm) (cm)	SAND	SAND	fine	SAND	4
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
83 27		10	12	15	16	2
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	fine	.1	1	fine
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
82 28		7	12	15	10	2
	Particle Size Class					
Width	Particle Size (mm) (cm)	.5	fine	fine	fine	fine
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
81 29		8	10	18	18	1
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	1	2	2	fine
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
80 30		10	15	17	15	15
	Particle Size Class					
Width	Particle Size (mm) (cm)	SAND	1	2	2	1
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
79 31						
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

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Stream Name W.M.C Start Time 4
Date 9/18/12 Start Location 60 m D&G of bridge
Field Personnel W.B.CN Stop Time
Interval ID 79-70 Stop Location 90 m US of bridge
Survey Tape Location Right Bank Left Bank Reach ID 8

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
79		7	8	7	7	10
37	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	.5	3	1	fine
	% Cobble Embeddedness					

78	Reach Distance (m)	Water Depth (cm)	27	29	22	33	30
	Particle Size Class						
Width	Particle Size (mm) (cm)	fine	sand	.5	1	fine	
	% Cobble Embeddedness						

77	Reach Distance (m)	Water Depth (cm)	5	10	11	7	5
	Particle Size Class						
Width	Particle Size (mm) (cm)	fine	.5	1	.1	.5	
	% Cobble Embeddedness						

76	Reach Distance (m)	Water Depth (cm)	8	5	5	8	10
	Particle Size Class						
Width	Particle Size (mm) (cm)	fine	sand	.5	sand	sand	
	% Cobble Embeddedness						

75	Reach Distance (m)	Water Depth (cm)	3	10	15	15	15
	Particle Size Class						
Width	Particle Size (mm) (cm)	.5	1	1	.5	fine	
	% Cobble Embeddedness						

74	Reach Distance (m)	Water Depth (cm)	2	5	10	8	5
	Particle Size Class						
Width	Particle Size (mm) (cm)	fine	fine	.1	.5	sand	
	% Cobble Embeddedness						

73	Reach Distance (m)	Water Depth (cm)	18	11	11	6	10
	Particle Size Class						
Width	Particle Size (mm) (cm)	.5	.5	5	12	.5	
	% Cobble Embeddedness				.25		

72	Reach Distance (m)	Water Depth (cm)	10	13	13	12	5
	Particle Size Class						
Width	Particle Size (mm) (cm)	.5	.5	2	fine	fine	
	% Cobble Embeddedness						

71	Reach Distance (m)	Water Depth (cm)	40	45	30	25	10
	Particle Size Class						
Width	Particle Size (mm) (cm)	sand	1	1	sand	1	
	% Cobble Embeddedness						

70	Reach Distance (m)	Water Depth (cm)	10	15	20	20	5
	Particle Size Class						
Width	Particle Size (mm) (cm)	fine	fine	fine	fine	fine	
	% Cobble Embeddedness						

70	Reach Distance (m)	Water Depth (cm)	20	20	22	12	23	26
	Particle Size Class							
Width	Particle Size (mm)	18	15	20	12	18	12	
	% Cobble Embeddedness	90	50	90	25	90	75	

	Reach Distance (m)	Water Depth (cm)	24	19	30	28	22	24
	Particle Size Class							
	Particle Size (mm)	10	12	8	10	12	8	
	% Cobble Embeddedness	0	25	75	75	50	0	

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Stream Name WYR
Date 9/13/12
Field Personnel NB, CN
Interval ID 60-69
Survey Tape Location Right Bank Left Bank

Start Time
Start Location 600 m US of middle mc
Stop Time
Stop Location 750 m US of middle mc
Reach ID 7

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
69	Particle Size Class	15	17	18	15	5
	Particle Size (mm) (cm)	1	7	SAND	4	1
	% Cobble Embeddedness		50			
68	Water Depth (cm)	10	10	8	7	1
	Particle Size Class					
	Particle Size (mm) (cm)	fine	6	2	5	2
	% Cobble Embeddedness					
67	Water Depth (cm)	4	5	7	6	2
	Particle Size Class					
	Particle Size (mm) (cm)	SAND	1	2	7	fine
	% Cobble Embeddedness				50	
66	Water Depth (cm)	1	2	7	5	1
	Particle Size Class					
	Particle Size (mm) (cm)	fine	sand	1	1	fine
	% Cobble Embeddedness					
65	Water Depth (cm)	10	12	15	10	3
	Particle Size Class					
	Particle Size (mm) (cm)	SAND	1	1	1	.5
	% Cobble Embeddedness					
64	Water Depth (cm)	1	3	5	7	8
	Particle Size Class					
	Particle Size (mm) (cm)	fine	fine	.5	.5	1
	% Cobble Embeddedness					
63	Water Depth (cm)	28	22	20	10	1
	Particle Size Class					
	Particle Size (mm) (cm)	.5	.5	SAND	SAND	fine
	% Cobble Embeddedness					
62	Water Depth (cm)	1	3	4	2	1
	Particle Size Class					
	Particle Size (mm) (cm)	SAND	fine	fine	fine	fine
	% Cobble Embeddedness					
61	Water Depth (cm)	5	10	8	5	5
	Particle Size Class					
	Particle Size (mm) (cm)	SAND	2	.5	.5	1
	% Cobble Embeddedness					
60	Water Depth (cm)	5	5	10	5	1
	Particle Size Class					
	Particle Size (mm) (cm)	fine	2	1	3	fine
	% Cobble Embeddedness					
	Water Depth (cm)					
	Particle Size Class					
	Particle Size (mm)					
	% Cobble Embeddedness					

Truckee River Water Quality Monitoring Plan
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Stream Name WML
Date 9/18/12
Field Personnel NB, CN
Interval ID 59-50
Survey Tape Location Right Bank Left Bank

Start Time
Start Location 750 m US middle ml
Stop Time
Stop Location 900 m US middle ml
Reach ID 6

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	5	6	7	5	2
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	1	2	1	.5
	% Cobble Embeddedness					

59

Reach Distance (m)	Water Depth (cm)	5	7	10	8	1
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	.5	2	fine	fine
	% Cobble Embeddedness					

59

Reach Distance (m)	Water Depth (cm)	2	3	2	2	1
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	fine	fine	fine	fine
	% Cobble Embeddedness					

57

Reach Distance (m)	Water Depth (cm)	1	2	5	5	2
	Particle Size Class					
Width	Particle Size (mm) (cm)	fine	fine	fine	fine	fine
	% Cobble Embeddedness					

56

Reach Distance (m)	Water Depth (cm)	15	10	20	18	15
	Particle Size Class					
Width	Particle Size (mm) (cm)	1	2	2	1	1
	% Cobble Embeddedness					

55

Reach Distance (m)	Water Depth (cm)	8	5	8	5	3
	Particle Size Class					
Width	Particle Size (mm) (cm)	2	1	3	1	1
	% Cobble Embeddedness					

54

Reach Distance (m)	Water Depth (cm)	5	8	8	7	5
	Particle Size Class					
Width	Particle Size (mm) (cm)	2	2	2	3	1
	% Cobble Embeddedness					

53

Reach Distance (m)	Water Depth (cm)	15	15	17	13	6
	Particle Size Class					
Width	Particle Size (mm) (cm)	1	3	3	2	1
	% Cobble Embeddedness					

52

Reach Distance (m)	Water Depth (cm)	10	15	20	15	5
	Particle Size Class					
Width	Particle Size (mm) (cm)	.1	fine	fine	fine	fine
	% Cobble Embeddedness					

51

Reach Distance (m)	Water Depth (cm)	3	5	10	10	7
	Particle Size Class					
Width	Particle Size (mm) (cm)	.5	4	6	3	fine
	% Cobble Embeddedness					

50

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name WMC
Date 9/12/12
Field Personnel N.B. CN
Interval ID 44-40
Survey Tape Location Right Bank

Start Time _____
Start Location 100 m US of middle MC
Stop Time _____
Stop Location 1050 m US of middle MC
Reach ID 5

37

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	18	18	17	15	5
	Particle Size Class					
Width	Particle Size (mm) (cm)	5mm	2	1	SAND	SAND
	% Cobble Embeddedness					

49

Reach Distance (m)	Water Depth (cm)	1	2	4	5	1
	Particle Size Class					
Width	Particle Size (mm) (cm)	5	4	3	5	SAND
	% Cobble Embeddedness					

49

Reach Distance (m)	Water Depth (cm)	1	1	5	8	5
	Particle Size Class					
Width	Particle Size (mm) (cm)	1	6	3	2	2
	% Cobble Embeddedness					

47

Reach Distance (m)	Water Depth (cm)	10	10	5	5	5
	Particle Size Class					
Width	Particle Size (mm) (cm)	4	3	1	2	2
	% Cobble Embeddedness					

46

Reach Distance (m)	Water Depth (cm)	5	8	10	5	0
	Particle Size Class					
Width	Particle Size (mm) (cm)	4	3	2	0.1	15
	% Cobble Embeddedness					30

45

Reach Distance (m)	Water Depth (cm)	20	15	15	15	12
	Particle Size Class					
Width	Particle Size (mm) (cm)	10	3	2	3	3
	% Cobble Embeddedness	0				

44

Reach Distance (m)	Water Depth (cm)	15	20	25	15	10
	Particle Size Class					
Width	Particle Size (mm) (cm)	SAND	3	3	1	1
	% Cobble Embeddedness					

43

Reach Distance (m)	Water Depth (cm)	10	10	8	8	5
	Particle Size Class					
Width	Particle Size (mm) (cm)	2	1	3	3	3
	% Cobble Embeddedness					

42

Reach Distance (m)	Water Depth (cm)	10	5	10	8	1
	Particle Size Class					
Width	Particle Size (mm) (cm)	2	FINE	3	1	FINE
	% Cobble Embeddedness					

41

Reach Distance (m)	Water Depth (cm)	10	10	15	15	10
	Particle Size Class					
Width	Particle Size (mm) (cm)	7	20	0.1	18	0.1
	% Cobble Embeddedness	50	10		0	

40

Reach Distance (m)	Water Depth (cm)	5	2	3	8	6
	Particle Size Class					
Width	Particle Size (mm)	20	12	15	22	18
	% Cobble Embeddedness	10	20	20	10	10

cobbles

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Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name WMC
Date 9/19/2012
Field Personnel NB, CN
Interval ID 34-30
Survey Tape Location Right Bank Left Bank

Start Time _____
Start Location 1050 m US of middle MC
Stop Time _____
Stop Location 1200 m US of middle MC
Reach ID 4

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
77	20	25	28	25	18	
39	Particle Size Class					
	Particle Size (mm) (cm)	Fine	F	F	F	F
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	10	5	5	5	5
	Particle Size Class					
38	Particle Size (mm) (cm)	1	1	3	3	0.1
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	20	22	25	28	27
	Particle Size Class					
37	Particle Size (mm) (cm)	0.5	1	F	F	F
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	20	21	20	15	10
	Particle Size Class					
36	Particle Size (mm) (cm)	1	7	3	4	3
	% Cobble Embeddedness		40			

Reach Distance (m)	Water Depth (cm)	10	8	5	5	6
	Particle Size Class					
35	Particle Size (mm) (cm)	2	1	3	3	2
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	10	11	15	15	13
	Particle Size Class					
34	Particle Size (mm) (cm)	12	15	4	10	3
	% Cobble Embeddedness	0	0		20	

Reach Distance (m)	Water Depth (cm)	25	20	26	28	30
	Particle Size Class					
33	Particle Size (mm) (cm)	4	2	3	10	1
	% Cobble Embeddedness				20	

Reach Distance (m)	Water Depth (cm)	10	10	10	10	8
	Particle Size Class					
32	Particle Size (mm) (cm)	3	20	15	3	2
	% Cobble Embeddedness		0	40		

Reach Distance (m)	Water Depth (cm)	5	8	10	8	1
	Particle Size Class					
31	Particle Size (mm) (cm)	1	2	2	1	F
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	18	15	10	8	1
	Particle Size Class					
30	Particle Size (mm) (cm)	2	3	1	2	0.5
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	18	16	8	6	3
	Particle Size Class					
Cobbles Search	Particle Size (mm) (cm)	10	23	15	10	7
	% Cobble Embeddedness	10	10	20	50	10

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Rapid Assessment

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Stream Name WMC
Date 9/19/2012
Field Personnel NB, CN
Interval ID 29-20
Survey Tape Location Right Bank Left Bank

Start Time _____
Start Location 1200 m US of middle MC
Stop Time _____
Stop Location 1750 m US of middle MC
Reach ID 3

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
	Particle Size Class					
Width	Particle Size (mm) (cm)					
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	10	12	10	15	6
	Particle Size Class					
Width	Particle Size (mm) (cm)	2	3	1	6	1
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	4	8	10	10	3
	Particle Size Class					
Width	Particle Size (mm) (cm)	3	4	2	3	Fast
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	2	10	10	6	1
	Particle Size Class					
Width	Particle Size (mm) (cm)	5	12	5	3	3
	% Cobble Embeddedness		50			

Reach Distance (m)	Water Depth (cm)	8	12	10	10	3
	Particle Size Class					
Width	Particle Size (mm) (cm)	2	7	8	3	1
	% Cobble Embeddedness		0	0		

Reach Distance (m)	Water Depth (cm)	6	12	15	19	18
	Particle Size Class					
Width	Particle Size (mm) (cm)	2	4	3	10	0.1
	% Cobble Embeddedness				0	

Reach Distance (m)	Water Depth (cm)	15	22	31	32	31
	Particle Size Class					
Width	Particle Size (mm) (cm)	F	12	2	3	10
	% Cobble Embeddedness		20			40

Reach Distance (m)	Water Depth (cm)	8	10	15	18	2
	Particle Size Class					
Width	Particle Size (mm) (cm)	0.5	20	3	20	4
	% Cobble Embeddedness		70		20	

Reach Distance (m)	Water Depth (cm)	15	18	5	3	0
	Particle Size Class					
Width	Particle Size (mm) (cm)	20	0.5	5	5	10
	% Cobble Embeddedness	10				20

Reach Distance (m)	Water Depth (cm)	30	20	10	8	5
	Particle Size Class					
Width	Particle Size (mm) (cm)	20	12	12	3	1
	% Cobble Embeddedness	40	20	10		

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name WML
Date 9/19/2012
Field Personnel NB, CN
Interval ID 19-10
Survey Tape Location Right Bank Left Bank

Start Time _____
Start Location 1350 m US of middle ML
Stop Time _____
Stop Location 1500 m US of middle ML
Reach ID 7

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	10	15	20	25	18
	Particle Size Class					
Width	Particle Size (mm) (cm)	2	40	2	7	1
	% Cobble Embeddedness				50	
Reach Distance (m)	Water Depth (cm)	10	18	18	15	10
	Particle Size Class					
Width	Particle Size (mm) (cm)	0.1	2	2	1	0.1
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	18	19	19	15	1
	Particle Size Class					
Width	Particle Size (mm) (cm)	F	5	24	F	F
	% Cobble Embeddedness			80		
Reach Distance (m)	Water Depth (cm)	15	21	18	8	6
	Particle Size Class					
Width	Particle Size (mm) (cm)	2	3	20	2	1
	% Cobble Embeddedness			50		
Reach Distance (m)	Water Depth (cm)	18	18	16	21	19
	Particle Size Class					
Width	Particle Size (mm) (cm)	F	6	22	9	2
	% Cobble Embeddedness			10	0	
Reach Distance (m)	Water Depth (cm)	10	15	18	12	5
	Particle Size Class					
Width	Particle Size (mm) (cm)	5	7	3	18	7
	% Cobble Embeddedness		10		10	0
Reach Distance (m)	Water Depth (cm)	12	10	10	18	20
	Particle Size Class					
Width	Particle Size (mm) (cm)	6	8	1	0.1	12
	% Cobble Embeddedness		70			10
Reach Distance (m)	Water Depth (cm)	10	12	10	6	5
	Particle Size Class					
Width	Particle Size (mm) (cm)	4	6	8	15	2
	% Cobble Embeddedness			0	20	
Reach Distance (m)	Water Depth (cm)	10	6	8.5	6	5
	Particle Size Class					
Width	Particle Size (mm) (cm)	10	3	8	2	3
	% Cobble Embeddedness	10		20		
Reach Distance (m)	Water Depth (cm)	18	21	25	27	28
	Particle Size Class					
Width	Particle Size (mm) (cm)	2	0.1	5	4	1
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

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Stream Name WMC
Date 9/18/12
Field Personnel NB, CN
Interval ID 9-0
Survey Tape Location Right Bank Left Bank

Start Time _____
Start Location 1600 m upstream of middle marsh
Stop Time _____
Stop Location Upstream of middle marsh creek
Reach ID 1

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	21	27	21	18	3
	Particle Size Class					
Width	Particle Size (mm) (cm)	2	18	4	1	1
	% Cobble Embeddedness		20			
Reach Distance (m)	Water Depth (cm)	5	12	10	18	5
	Particle Size Class					
Width	Particle Size (mm) (cm)	10	3	10	2	0.5
	% Cobble Embeddedness	10		30		
Reach Distance (m)	Water Depth (cm)	10	15	10	18	5
	Particle Size Class					
Width	Particle Size (mm) (cm)	20	10	22	1	F
	% Cobble Embeddedness	20	20	10		
Reach Distance (m)	Water Depth (cm)	5	3	8	18	18
	Particle Size Class					
Width	Particle Size (mm) (cm)	1	SAND	2	6	2
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	10	10	8	12	18
	Particle Size Class					
Width	Particle Size (mm) (cm)	SAND	40	SAND	30	1
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	1	5	8	7	1
	Particle Size Class					
Width	Particle Size (mm) (cm)	8	1	3	1	3
	% Cobble Embeddedness	20				
Reach Distance (m)	Water Depth (cm)	10	12	8	10	6
	Particle Size Class					
Width	Particle Size (mm) (cm)	1	0.5	1	1	2
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	5	6	3	10	1
	Particle Size Class					
Width	Particle Size (mm) (cm)	5	5	4	20	SAND
	% Cobble Embeddedness				50	
Reach Distance (m)	Water Depth (cm)	5	3	10	3	3
	Particle Size Class					
Width	Particle Size (mm) (cm)	12	10	8	10	3
	% Cobble Embeddedness	50	25	10	10	
Reach Distance (m)	Water Depth (cm)	15	10	8	10	1
	Particle Size Class					
Width	Particle Size (mm) (cm)	0.5	1	9	0.5	SAND
	% Cobble Embeddedness			0		
Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Data entered
Starting here

East Martis Creek Original Field Data Sheets

Starts at
Upstream Extent

Note: Particle Size in cm

Truckee River Water Quality Monitoring Plan
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Stream Name East Martin's

Date 8-23-12

Field Personnel RV, BS

Interval ID 0-10

Survey Tape Location

Right Bank

Left Bank

Start Time 1100

Start Location 1/1000m 1650m upstream of MC

Stop Time 1140

Stop Location 1500 m US MC

Reach ID

Data Entered
Starting
here

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
0	Particle Size Class	20	25	23	16	10
Width	Particle Size (mm) cm	0.1	16	17	14	fine
	% Cobble Embeddedness		0	0	25	

1	Water Depth (cm)	1	7	0	0	9
	Particle Size Class					
Width	Particle Size (mm) cm	2	5	15	20	2
	% Cobble Embeddedness			0	0	

2	Water Depth (cm)	12	17	22	11	1
	Particle Size Class		fine	fine		fine
Width	Particle Size (mm) cm	4			16	
	% Cobble Embeddedness				0	

3	Water Depth (cm)	48	47	43	41	48
	Particle Size Class	fine	fine	fine		fine
Width	Particle Size (mm) cm				3	
	% Cobble Embeddedness					

4	Water Depth (cm)	5	7	8	10	1
	Particle Size Class					grass
Width	Particle Size (mm) cm	1	0.5	3	0.2	
	% Cobble Embeddedness					

5	Water Depth (cm)	14	13	1	7	1
	Particle Size Class			grass	fine	grass
Width	Particle Size (mm) cm	5	0.1			
	% Cobble Embeddedness					

6	Water Depth (cm)	20	13	42	36	33
	Particle Size Class		fine	fine		
Width	Particle Size (mm) cm	1			2	12
	% Cobble Embeddedness					50

7	Water Depth (cm)	5	16	16	15	1
	Particle Size Class				fine	grass
Width	Particle Size (mm) cm	1	3	0.1		
	% Cobble Embeddedness					

8	Water Depth (cm)	1	3	10	9	3
	Particle Size Class	grass	0	grass		grass
Width	Particle Size (mm) cm		1		1	
	% Cobble Embeddedness					

9	Water Depth (cm)	1	9	12	15	5
	Particle Size Class	grass	grass			grass
Width	Particle Size (mm) cm			1	3	
	% Cobble Embeddedness					

10	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm) cm					
	% Cobble Embeddedness					

cobbles { Depth 14 13 33 27 25 22 19 26 23 25
Size (cm) 11 9 15 9 8 13 12 11.5 8 10
% 0 50 75 70 30 70 50 50 60 0

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name East Markis Start Time 1140
Date 8-23-12 Start Location 1500 m US of MC
Field Personnel PV, BS Stop Time 1212
Interval ID 11-20 Stop Location 1350 m US of MC
Survey Tape Location Right Bank Left Bank Reach ID 2

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	3	6	7	5	7
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	2	4	3	4	1
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	7	10	12	13	8
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	4	3	1	fine	1
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	28	28	35	29	25
	Particle Size Class					fine
Width	Particle Size (mm) <u>cm</u>	4	8	0.3	0.1	
	% Cobble Embeddedness		25			

Reach Distance (m)	Water Depth (cm)	15	18	17	17	1
	Particle Size Class					fine
Width	Particle Size (mm) <u>cm</u>	0.5	1.5	6	5	
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	11	10	2	7	4
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	2	3	23	16	7
	% Cobble Embeddedness			0	0	70

Reach Distance (m)	Water Depth (cm)	10	15	20	18	19
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	4	9	8	3	2
	% Cobble Embeddedness		0	0		

Reach Distance (m)	Water Depth (cm)	9	18	23	28	32
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	2	2.5	1	4	0.5
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	5	10	11	25	23
	Particle Size Class		fine			fine
Width	Particle Size (mm) <u>cm</u>	0.1		16	1	
	% Cobble Embeddedness			85		

Reach Distance (m)	Water Depth (cm)	42	43	33	38	30
	Particle Size Class	fine				fine
Width	Particle Size (mm) <u>cm</u>		1	9	8	
	% Cobble Embeddedness			60	56	

Reach Distance (m)	Water Depth (cm)	5	3	10	0	5
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	26	22	9	18	0.5
	% Cobble Embeddedness		0	0	0	

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

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Stream Name East Markis
Date 8-23-12
Field Personnel RV, BS
Interval ID 21-30
Survey Tape Location Right Bank

Start Time 1212
Start Location 1352 m US of MC
Stop Time 1245 m US of MC
Stop Location 1245
Reach ID 3

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	1	5	7	8	9
	Particle Size Class					
Width	Particle Size (mm) cm	1	9	12	9	1
	% Cobble Embeddedness		0	0	0	
Reach Distance (m)	Water Depth (cm)	8	11	1	1	1
	Particle Size Class					grass
Width	Particle Size (mm) cm	0.5	1	22	13	
	% Cobble Embeddedness			0	0	
Reach Distance (m)	Water Depth (cm)	60	62	62	55	50
	Particle Size Class	fine		fine	fine	
Width	Particle Size (mm) cm		0.5			10
	% Cobble Embeddedness					50
Reach Distance (m)	Water Depth (cm)	1	20	28	30	1
	Particle Size Class	grass				grass
Width	Particle Size (mm) cm		6	5	0.1	
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	7	14	16	17	15
	Particle Size Class					
Width	Particle Size (mm) cm	1	0.5	1	3	1
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	33	30	33	28	3
	Particle Size Class					grass
Width	Particle Size (mm) cm	4	14	2	2	
	% Cobble Embeddedness		50			
Reach Distance (m)	Water Depth (cm)	1	0	7	4	3
	Particle Size Class	grass			grass	
Width	Particle Size (mm) cm		14	11		
	% Cobble Embeddedness		0	0		
Reach Distance (m)	Water Depth (cm)	30	39	39	36	12
	Particle Size Class		fine	fine	fine	
Width	Particle Size (mm) cm	0.1				3
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	10	13	8	15	13
	Particle Size Class					
Width	Particle Size (mm) cm	3	1	11	1	8
	% Cobble Embeddedness			0		0
Reach Distance (m)	Water Depth (cm)	5	1	2	1	12
	Particle Size Class					
Width	Particle Size (mm) cm	2	26	16	11	6
	% Cobble Embeddedness		0	0	10	
Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

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MATCHES PREVIOUS STATION 14

Truckee River Water Quality Monitoring Plan
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Stream Name East Markis Start Time 1300
Date 8-23-12 Start Location 1200 m US MC
Field Personnel RV, BS Stop Time 1330
Interval ID 31-40 Stop Location 1050 m US MC
Survey Tape Location Right Bank Left Bank 4 Reach ID 4

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	7	8	2	0	
	Particle Size Class					grass
Width	Particle Size (mm) cm	1	12	17	15	
	% Cobble Embeddedness		0	0	6	

Reach Distance (m)	Water Depth (cm)	10	5	2	9	10
	Particle Size Class					
Width	Particle Size (mm) cm	5	6	19	14	2
	% Cobble Embeddedness			0	0	

Reach Distance (m)	Water Depth (cm)	20	15	15	21	7
	Particle Size Class					grass
Width	Particle Size (mm) cm	2	5	15	9	
	% Cobble Embeddedness	60		0	50	

Reach Distance (m)	Water Depth (cm)	19	15	17	15	1
	Particle Size Class					grass
Width	Particle Size (mm) cm	6.5	17	9	5	
	% Cobble Embeddedness	0	56	10		

Reach Distance (m)	Water Depth (cm)	6	12	11	10	5
	Particle Size Class					
Width	Particle Size (mm) cm	5	10	6	20	0.1
	% Cobble Embeddedness		0		50	

Reach Distance (m)	Water Depth (cm)	16	12	15	19	18
	Particle Size Class					
Width	Particle Size (mm) cm	9	8	9	1	8
	% Cobble Embeddedness	0	0	0		30

Reach Distance (m)	Water Depth (cm)	10	12	14	16	14
	Particle Size Class					
Width	Particle Size (mm) cm	3	7.5	10	3.5	1.5
	% Cobble Embeddedness		0	0	0	

Reach Distance (m)	Water Depth (cm)	16	29	28	29	20
	Particle Size Class	fine	fine			
Width	Particle Size (mm) cm			2	1.5	0.1
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	10	9	2	13	9
	Particle Size Class					
Width	Particle Size (mm) cm	5	9	10	7	6
	% Cobble Embeddedness		0	0	25	

Reach Distance (m)	Water Depth (cm)	5	10	13	10	5
	Particle Size Class	grass	grass			
Width	Particle Size (mm) cm			20	15	3
	% Cobble Embeddedness			0	10	

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

cobbles { Depth
Size
%

Truckee River Water Quality Monitoring Plan
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Stream Name East Martis Start Time 1330
Date 8-23-12 Start Location 1050 M US MC
Field Personnel PV BS Stop Time 1405
Interval ID 41-50 Stop Location 30 US of bridge
Survey Tape Location Right Bank Reach ID 5

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
41	Reach Distance (m)	13	12	18	11	12
	Water Depth (cm)					
	Particle Size Class		grass		grass	
	Width	3		2		1.5
	Particle Size (mm)					
	% Cobble Embeddedness					

42	Reach Distance (m)	10	8	18	17	16
	Water Depth (cm)					
	Particle Size Class					
	Width	1	9.5	2	2	8
	Particle Size (mm)					
	% Cobble Embeddedness		0			0

43	Reach Distance (m)	9	17	18	17	7
	Water Depth (cm)					
	Particle Size Class					grass
	Width	3	4	5	4.5	
	Particle Size (mm)					
	% Cobble Embeddedness					

44	Reach Distance (m)	21	22	27	23	15
	Water Depth (cm)					
	Particle Size Class					grass
	Width	1	17	8	1	
	Particle Size (mm)					
	% Cobble Embeddedness		25	50		

45	Reach Distance (m)	33	39	37	39	36
	Water Depth (cm)					
	Particle Size Class					
	Width	5	0.3	4	1	9
	Particle Size (mm)					
	% Cobble Embeddedness					50

46	Reach Distance (m)	18	25	23	20	18
	Water Depth (cm)					
	Particle Size Class	grass				grass
	Width		1	10	6	
	Particle Size (mm)					
	% Cobble Embeddedness			50		

47	Reach Distance (m)	18	30	27	28	25
	Water Depth (cm)					
	Particle Size Class	grass	grass			grass
	Width			0.1	0.1	
	Particle Size (mm)					
	% Cobble Embeddedness					

48	Reach Distance (m)	2	30	29	28	25
	Water Depth (cm)					
	Particle Size Class	grass	grass			grass
	Width			0.1	0.1	
	Particle Size (mm)					
	% Cobble Embeddedness					

49	Reach Distance (m)	13	17	16	17	8
	Water Depth (cm)					
	Particle Size Class					
	Width	12	6	9	2	0.2
	Particle Size (mm)					
	% Cobble Embeddedness	0		0		

50	Reach Distance (m)	13	29	32	28	25
	Water Depth (cm)					
	Particle Size Class	grass	grass			FN
	Width			12	24	
	Particle Size (mm)					
	% Cobble Embeddedness			50	30	

Cobble Search	Reach Distance (m)	8	9			
	Water Depth (cm)					
	Particle Size Class					
	Width	22	19			
	Particle Size (mm)					
	% Cobble Embeddedness	25	10			

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Stream Name East Marb's Start Time 1405
Date 8-23-12 Start Location 30 m US of bridge
Field Personnel RV, DS Stop Time 1430
Interval ID S1-60 Stop Location 700 m US of MC
Survey Tape Location Right Bank Left Bank 6 Reach ID 6

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	3	13	15	16	14
	Particle Size Class					
Width	Particle Size (mm) cm	0.5	1	2	2	3
	% Cobble Embeddedness					

S1

Reach Distance (m)	Water Depth (cm)	2	10	10	14	15
	Particle Size Class					
Width	Particle Size (mm) cm	1	2	4	6	5
	% Cobble Embeddedness					

S2

Reach Distance (m)	Water Depth (cm)	2	28	27	28	12
	Particle Size Class	grass				grass
Width	Particle Size (mm) cm		7	2	1	
	% Cobble Embeddedness		0			

S3

Reach Distance (m)	Water Depth (cm)	10	21	17	17	10
	Particle Size Class	grass				grass
Width	Particle Size (mm) cm		1	4	3	
	% Cobble Embeddedness					

S4

Reach Distance (m)	Water Depth (cm)	28	36	38	36	30
	Particle Size Class	fine	fine	fine	fine	fine
Width	Particle Size (mm) cm					
	% Cobble Embeddedness					

S5

Reach Distance (m)	Water Depth (cm)	12	28	34	35	34
	Particle Size Class	grass				
Width	Particle Size (mm) cm		0.5	2	4	2
	% Cobble Embeddedness					

S6

Reach Distance (m)	Water Depth (cm)	5	13	7	22	10
	Particle Size Class	grass	grass			grass
Width	Particle Size (mm) cm			15	8	
	% Cobble Embeddedness			20	0	

S7

Reach Distance (m)	Water Depth (cm)	1	28	2	9	8
	Particle Size Class	grass				grass
Width	Particle Size (mm) cm		5	13	14	8
	% Cobble Embeddedness			0	0	0

S8

Reach Distance (m)	Water Depth (cm)	15	19	26	22	10
	Particle Size Class	grass	grass			grass
Width	Particle Size (mm) cm			5	3	
	% Cobble Embeddedness					

S9

Reach Distance (m)	Water Depth (cm)	2	14	15	18	2
	Particle Size Class					grass
Width	Particle Size (mm) cm	5	7	9	0.5	
	% Cobble Embeddedness		0	0		

60

Reach Distance (m)	Water Depth (cm)	2	14	15	18	12
	Particle Size Class					grass
Width	Particle Size (mm)	5	7	9	0.5	
	% Cobble Embeddedness					

cobbles

Depth 35 30 32 30
Size 10 12 9 16
% 0 30 0 0

Truckee River Water Quality Monitoring Plan
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Stream Name East Martis Start Time 0430
Date 8-23-12 Start Location 750 m USMC
Field Personnel RV, BS Stop Time 1455
Interval ID 61-70 Stop Location 600 m US of MC
Survey Tape Location Right Bank Left Bank 7 Reach ID

		Reach Info				
		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
61	Reach Distance (m)					
	Water Depth (cm)		35	41	36	39
	Particle Size Class	fine	fine			fine
	Width			1	4	
	Particle Size (mm) CM					
	% Cobble Embeddedness					
62	Reach Distance (m)					
	Water Depth (cm)	17	42	48	42	43
	Particle Size Class	grass				
	Width		2	16	2	4
	Particle Size (mm) CM					
	% Cobble Embeddedness					
63	Reach Distance (m)					
	Water Depth (cm)	7	12	20	21	25
	Particle Size Class	grass	grass	grass		
	Width				3	4
	Particle Size (mm) CM					
	% Cobble Embeddedness					
64	Reach Distance (m)					
	Water Depth (cm)	7	26	22	28	28
	Particle Size Class	grass				fine
	Width		6	9	5	
	Particle Size (mm) CM			20		
	% Cobble Embeddedness					
65	Reach Distance (m)					
	Water Depth (cm)	33	33	42	43	38
	Particle Size Class	fine		fine	fine	fine
	Width		7			
	Particle Size (mm) CM		30			
	% Cobble Embeddedness					
66	Reach Distance (m)					
	Water Depth (cm)	17	18	25	18	
	Particle Size Class					grass
	Width	1	7	5	0.5	
	Particle Size (mm) CM					
	% Cobble Embeddedness		0			
67	Reach Distance (m)					
	Water Depth (cm)	1	30	30	30	
	Particle Size Class	grass				fine
	Width		8	4	7	
	Particle Size (mm) CM				50	
	% Cobble Embeddedness		0			
68	Reach Distance (m)					
	Water Depth (cm)	32	31	31	17	
	Particle Size Class					grass
	Width	5	6	2	5	
	Particle Size (mm) CM					
	% Cobble Embeddedness					
69	Reach Distance (m)					
	Water Depth (cm)	5	15	13	15	8
	Particle Size Class	grass				
	Width		4	5	1	2
	Particle Size (mm) CM					
	% Cobble Embeddedness					
70	Reach Distance (m)					
	Water Depth (cm)	1	27	30	20	15
	Particle Size Class				fine	
	Width	0.1	3	0.3		3
	Particle Size (mm) CM					
	% Cobble Embeddedness					
	Reach Distance (m)					
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm)					
	% Cobble Embeddedness					

Cobbles { Depth 28 29 23 20 18 34 35
Size 10 11 16 10 10 14 7
% 0 50 10 50 0 50 0

Truckee River Water Quality Monitoring Plan
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Stream Name East Martin Start Time 1455
Date 8-23-12 Start Location 600 m US MC
Field Personnel PV, BS Stop Time 1530
Interval ID 71-80 Stop Location 450 m US MC
Survey Tape Location Right Bank Reach ID 8

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					
71	Reach Distance (m)	29	38	32	31	17
	Water Depth (cm)					
	Particle Size Class					
72	Width	0.3	3	5	2	1
71	Particle Size (mm)					
	% Cobble Embeddedness					
73	Reach Distance (m)	11	12	11	10	5
	Water Depth (cm)					
	Particle Size Class	fine				
72	Width		2	3	4	0.1
	Particle Size (mm)					
	% Cobble Embeddedness					
74	Reach Distance (m)	1	25	36	34	25
	Water Depth (cm)					
	Particle Size Class					
73	Width	0.1	8	3	2.5	grass
	Particle Size (mm)					
	% Cobble Embeddedness		80			
75	Reach Distance (m)	1	15	13	13	1
	Water Depth (cm)					
	Particle Size Class	grass				
74	Width		2	2	5	grass
	Particle Size (mm)					
	% Cobble Embeddedness					
76	Reach Distance (m)	1	30	35	35	35
	Water Depth (cm)					
	Particle Size Class	grass				
75	Width		0.1	3	1	2
	Particle Size (mm)					
	% Cobble Embeddedness					
77	Reach Distance (m)	27	43	42	45	30
	Water Depth (cm)					
	Particle Size Class	grass				
76	Width		4	3	4	grass
	Particle Size (mm)					
	% Cobble Embeddedness					
78	Reach Distance (m)	19	21	23	26	22
	Water Depth (cm)					
	Particle Size Class					
77	Width	0.1	1	3	5	fine
	Particle Size (mm)					
	% Cobble Embeddedness					
79	Reach Distance (m)	1	12	15	14	2
	Water Depth (cm)					
	Particle Size Class	grass	grass			
78	Width			3	0.1	fine
	Particle Size (mm)					
	% Cobble Embeddedness					
79	Reach Distance (m)	10	15	13	12	3
	Water Depth (cm)					
	Particle Size Class					
80	Width	1	0.5	0.3	1	grass
	Particle Size (mm)					
	% Cobble Embeddedness					
80	Reach Distance (m)	5	13	15	13	10
	Water Depth (cm)					
	Particle Size Class	grass				
	Width		1	1.5	1	grass
	Particle Size (mm)					
	% Cobble Embeddedness					

cobbles { Depth 48 40 35 33 38 35 34 29 32 27 28 25
size 7 7 8 8.5 6.5 10 6.5 11 9 10 7 8
% 20 0 25 10 0 40 0 50 30 20 0 0

Truckee River Water Quality Monitoring Plan
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Stream Name East Markis Start Time 1530
Date 8-23-12 Start Location 450 m US ML
Field Personnel RV, BS Stop Time 1600
Interval ID 81-90 Stop Location 300 m US ML
Survey Tape Location Right Bank Reach ID 9

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	5	18	19	15	10
	Particle Size Class	grass				grass
Width	Particle Size (mm)		0.1	0.5	0.1	
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	10	12	8	10	3
	Particle Size Class		grass	grass		grass
Width	Particle Size (mm)	0.5			0.3	
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	23	43	36	35	10
	Particle Size Class	~~grass~~		fine	grass	grass
Width	Particle Size (mm)	0.5	4		4	
	% Cobble Embeddedness	0				

Reach Distance (m)	Water Depth (cm)	10	17	14	13	3
	Particle Size Class	grass		grass	grass	grass
Width	Particle Size (mm)		4			
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	5	17	15	16	10
	Particle Size Class	grass	grass			grass
Width	Particle Size (mm)			5	4	
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	5	15	17	18	10
	Particle Size Class	grass				grass
Width	Particle Size (mm)		1	4	1	
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	24	28	24	1
	Particle Size Class	fine	fine			fine
Width	Particle Size (mm)			1	0.1	
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	2	11	12	10	5
	Particle Size Class	grass	grass	grass	grass	grass
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	13	23	22	10
	Particle Size Class	grass	grass			grass
Width	Particle Size (mm)			3	4	
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	5	14	28	17	5
	Particle Size Class	grass	grass			grass
Width	Particle Size (mm)			2	3	
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	27	35	33	34	28
	Particle Size Class					
Width	Particle Size (mm)	20	7	13	9	7
	% Cobble Embeddedness	0	0	10	25	50

Cobbles

Depth
Size
%

20 33
22 11
0 70

Truckee River Water Quality Monitoring Plan
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Stream Name East Martis Start Time 1600
Date 8-23-12 Start Location 300 m US M.C.
Field Personnel RV, AS Stop Time 1625
Interval ID 91-100 Stop Location 150 m US M.C.
Survey Tape Location Right Bank Reach ID 10

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	13	17	20	19	8
	Particle Size Class	grass				grass
Width	Particle Size (mm)		1	2	1	
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	10	22	21	20	10
	Particle Size Class	grass				grass
Width	Particle Size (mm)		2	2	3	
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)		23	28	29	10
	Particle Size Class	fine				grass
Width	Particle Size (mm)		3	2	1	
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	16	29	30	28	13
	Particle Size Class	grass				grass
Width	Particle Size (mm)		0.1	1	0.1	
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	21	22	20	20
	Particle Size Class	grass	grass	grass		
Width	Particle Size (mm)				4	2
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	2	12	15	14	1
	Particle Size Class	grass		grass		grass
Width	Particle Size (mm)		1		10	
	% Cobble Embeddedness				80	

Reach Distance (m)	Water Depth (cm)	20	24	24	21	1
	Particle Size Class					grass
Width	Particle Size (mm)	1	1.5	2	1	
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	9	12	8	2
	Particle Size Class					fine
Width	Particle Size (mm)	2	4	3	2	
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	2	11	15	14	7
	Particle Size Class	fine	fine	3	0.1	fine
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	4	8	12	13	8
	Particle Size Class	grass	1	1	4	grass
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	10		7	6	0
	Particle Size Class					
Width	Particle Size (mm)	10	4	26.5	7	8
	% Cobble Embeddedness	0	0	75	50	0

Cobbles

Depth
Size
%

0	1	2	28	15	23
8	0	7	10	7	8
25	0	0	20	50	70

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Stream Name East Martis
Date 8-23-12
Field Personnel RV, BS
Interval ID 101-110
Survey Tape Location Right Bank

Start Time 1625
Start Location 157 m US MC
Stop Time 1650
Stop Location Martis Creek confluence
Reach ID 11

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	1	14	26	23	1
	Particle Size Class	grass	1	4	1	grass
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	10	14	23	1
	Particle Size Class	grass	fine	fine	2	grass
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	12	19	20	17	10
	Particle Size Class				grass	* grass
Width	Particle Size (mm)	2	0.5	1		
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	13	25	25	23
	Particle Size Class	grass	grass	fine	grass	grass
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	25	32	32	21	1
	Particle Size Class				grass	grass
Width	Particle Size (mm)	0.1	2	0.5		
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	10	13	15	14	10
	Particle Size Class	grass	grass	grass	grass	grass
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	24	23	18	10	1
	Particle Size Class	grass	fine	0.1	grass	grass
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	10	12	13	14	12
	Particle Size Class	grass	grass	grass	grass	grass
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	15	13	10	10
	Particle Size Class				fine	fine
Width	Particle Size (mm)	6	2	1		
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	29	31	35	1
	Particle Size Class	grass			fine	grass fine
Width	Particle Size (mm)		1469	0.5		
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

No cobbles found

Truckee River Original Field Data Sheets

Note: Particle Size in cm
There are 2 reaches per page

Truckee River Water Quality Monitoring Plan
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Data entered
starting
here

Stream Name Truckee River
Date 9/12/12
Field Personnel 27 cm
Interval ID U5-0 0-5
Survey Tape Location Right Bank Left Bank

Start Time
Start Location 1 Reach upstream Donner Creek
Stop Time
Stop Location 1 Reach downstream Donner Creek
Reach ID 1, 2

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
	Particle Size Class	SA	CB	CB	CB	SA
Width	Particle Size (mm)	1	10	16	3	1
	% Cobble Embeddedness		0	25	50	1

Reach Distance (m)	Water Depth (cm)	1	70	55	70	1
	Particle Size Class	SA	CB	SB	CB	SA
Width	Particle Size (mm)	1	20	30	10	1
	% Cobble Embeddedness		50	30	0	1

Reach Distance (m)	Water Depth (cm)	1	40	42	45	1
	Particle Size Class	SA	GC	CB	CB	GC
Width	Particle Size (mm)	1	5	12	15	3
	% Cobble Embeddedness			70	50	

Reach Distance (m)	Water Depth (cm)	1	5	35	50	1
	Particle Size Class	CB	GC	CB	CB	GC
Width	Particle Size (mm)	5	5	10	10	5
	% Cobble Embeddedness			0	50	

Reach Distance (m)	Water Depth (cm)	1	30	35	50	1
	Particle Size Class	SA	CB	CB	CB	GC
Width	Particle Size (mm)	1	20	10	20	2
	% Cobble Embeddedness		10	0	50	

Reach Distance (m)	Water Depth (cm)	0	70	75	63	1
	Particle Size Class					
Width	Particle Size (mm)	15	10	20	7	1
	% Cobble Embeddedness	0	0	25	0	1

Reach Distance (m)	Water Depth (cm)	1	0	70	70	1
	Particle Size Class					
Width	Particle Size (mm)	3	200	10	20	1
	% Cobble Embeddedness			0	0	

Reach Distance (m)	Water Depth (cm)	1	1	40	60	1
	Particle Size Class					
Width	Particle Size (mm)	1	5	10	20	3
	% Cobble Embeddedness			0	0	

Reach Distance (m)	Water Depth (cm)	1	70	45	60	20
	Particle Size Class					
Width	Particle Size (mm)	1	12	15	50	5
	% Cobble Embeddedness		0	0		

Reach Distance (m)	Water Depth (cm)	1	55	40	70	1
	Particle Size Class					
Width	Particle Size (mm)	5	10	90	20	10
	% Cobble Embeddedness		50	0	0	

Reach Distance (m)	Water Depth (cm)	1	72	48	50	1
	Particle Size Class					
Width	Particle Size (mm)	5	20	3	10	2
	% Cobble Embeddedness		50		0	

Truckee River Water Quality Monitoring Plan
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Stream Name TR
Date 9/12/15
Field Personnel NB/KW
Interval ID 63-68, 68-73
Survey Tape Location Right Bank Left Bank

Start Time
Start Location 1 Reach up Bridge St.
Stop Time
Stop Location 1 Reach down Bridge St.
Reach ID 3, 4

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
63	Reach Distance (m)	0	85	95	98	1
	Water Depth (cm)					
	Particle Size Class					
	Width	SAND	1	12	20	1
	Particle Size (mm) (cm)					
	% Cobble Embeddedness			0	0	
64	Reach Distance (m)	0	30	110	80	0
	Water Depth (cm)					
	Particle Size Class					
	Width	50	4	12	15	40
	Particle Size (mm) (cm)			25	50	
	% Cobble Embeddedness					
65	Reach Distance (m)	0	43	50	60	0
	Water Depth (cm)					
	Particle Size Class					
	Width	20	10	15	20	60
	Particle Size (mm) (cm)	50	0	0	0	
	% Cobble Embeddedness					
66	Reach Distance (m)	0	50	75	65	0
	Water Depth (cm)					
	Particle Size Class					
	Width	20	25	10	30	17
	Particle Size (mm) (cm)	0	0	50		0
	% Cobble Embeddedness					
67	Reach Distance (m)	0	60	102	80	1
	Water Depth (cm)					
	Particle Size Class					
	Width	45	12	20	50	1
	Particle Size (mm) (cm)	50	50			
	% Cobble Embeddedness					
68	Reach Distance (m)	0	85	90	85	0
	Water Depth (cm)					
	Particle Size Class					
	Width	20	5	50	20	30
	Particle Size (mm) (cm)	0			75	
	% Cobble Embeddedness					
69	Reach Distance (m)	0	50	80	100	0
	Water Depth (cm)					
	Particle Size Class					
	Width	20	4	20	20	300
	Particle Size (mm) (cm)	25		10	0	
	% Cobble Embeddedness					
70	Reach Distance (m)	0	87	90	68	0
	Water Depth (cm)					
	Particle Size Class					
	Width	5	10	15	5	40
	Particle Size (mm) (cm)	25	50			
	% Cobble Embeddedness					
71	Reach Distance (m)	10	45	48	42	0
	Water Depth (cm)					
	Particle Size Class					
	Width	SAND	5	18	12	100
	Particle Size (mm) (cm)			0	50	
	% Cobble Embeddedness					
72	Reach Distance (m)	0	90	62	30	0
	Water Depth (cm)					
	Particle Size Class					
	Width	SAND	5	8	10	15
	Particle Size (mm) (cm)			80	0	0
	% Cobble Embeddedness					
73	Reach Distance (m)	0	30	40	58	0
	Water Depth (cm)					
	Particle Size Class					
	Width	1	3	12	8	12
	Particle Size (mm) (cm)			0	50	50
	% Cobble Embeddedness					

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Stream Name TR
Date 9/12/11
Field Personnel NB CW
Interval ID 121-126, 126-131
Survey Tape Location Right Bank Left Bank

Start Time _____
Start Location 1 Reach up Trout cr
Stop Time _____
Stop Location 1 Reach DN Trout cr
Reach ID 5, 6

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
121		0	48	62	65	1
	Particle Size Class					
Width	Particle Size (mm) (cm)	SAND	12	10	22	SAND
	% Cobble Embeddedness		50	25	50	

122	Reach Distance (m)	Water Depth (cm)	20	40	55	44	0
	Particle Size Class						
Width	Particle Size (mm) (cm)	1	8	10	9		SAND
	% Cobble Embeddedness		0	50			

123	Reach Distance (m)	Water Depth (cm)	5	33	35	36	0
	Particle Size Class						
Width	Particle Size (mm) (cm)	SAND	5	10	8		SAND
	% Cobble Embeddedness			0	50		

124	Reach Distance (m)	Water Depth (cm)	0	32	45	33	0
	Particle Size Class						
Width	Particle Size (mm) (cm)	SAND	1	6	8		2
	% Cobble Embeddedness				50		

125	Reach Distance (m)	Water Depth (cm)	0	50	60	40	0
	Particle Size Class						
Width	Particle Size (mm) (cm)	SAND	5	70	15		5
	% Cobble Embeddedness				0		

126	Reach Distance (m)	Water Depth (cm)	0	60	65	50	0
	Particle Size Class						
Width	Particle Size (mm) (cm)	5	10	10	15		70
	% Cobble Embeddedness		50	0	50		

127	Reach Distance (m)	Water Depth (cm)	0	90	45	60	0
	Particle Size Class						
Width	Particle Size (mm) (cm)	7	50	12	50		30
	% Cobble Embeddedness	0		50			

128	Reach Distance (m)	Water Depth (cm)	0	65	63	55	0
	Particle Size Class						
Width	Particle Size (mm) (cm)	60	10	70	10		70
	% Cobble Embeddedness		50	0	0		

129	Reach Distance (m)	Water Depth (cm)	0	60	70	45	0
	Particle Size Class						
Width	Particle Size (mm) (cm)	100	10	15	50		30
	% Cobble Embeddedness		25	50			

130	Reach Distance (m)	Water Depth (cm)	0	70	28	30	0
	Particle Size Class						
Width	Particle Size (mm) (cm)	10	20	10	15		30
	% Cobble Embeddedness	0	50	0	0		

131	Reach Distance (m)	Water Depth (cm)	0	80	60	70	0
	Particle Size Class						
Width	Particle Size (mm) (cm)	SAND	30	8	20		2.50
	% Cobble Embeddedness			25	50		

Truckee River Water Quality Monitoring Plan
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Stream Name TR
Date 9/12/12
Field Personnel NB, CN
Interval ID 131-136, 136-141
Survey Tape Location Right Bank Left Bank

Start Time
Start Location 1 reach up 267
Stop Time
Stop Location 1 reach down 267
Reach ID 6, 7, 8

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
	Particle Size Class					
Width	Particle Size (mm) CM	SAND	30	0	20	2.50
	% Cobble Embeddedness			25	50	

Reach Distance (m)	Water Depth (cm)	0	85	80	48	0
	Particle Size Class					
Width	Particle Size (mm) CM	1	12	10	.1	SAND
	% Cobble Embeddedness		0	25		

Reach Distance (m)	Water Depth (cm)	0	65	70	50	0
	Particle Size Class					
Width	Particle Size (mm) CM	60	20	15	5	10
	% Cobble Embeddedness		25	75		0

Reach Distance (m)	Water Depth (cm)	0	0	75	30	0
	Particle Size Class					
Width	Particle Size (mm) CM	50	80	30	12	20
	% Cobble Embeddedness				50	0

Reach Distance (m)	Water Depth (cm)	0	0	80	89	0
	Particle Size Class					
Width	Particle Size (mm) CM	1	80	15	20	10
	% Cobble Embeddedness		25	0	0	50

Reach Distance (m)	Water Depth (cm)	0	60	78	80	0
	Particle Size Class					
Width	Particle Size (mm) CM	SAND	8	8	2	SAND
	% Cobble Embeddedness		0	50		

Reach Distance (m)	Water Depth (cm)	0	21	60	61	0
	Particle Size Class					
Width	Particle Size (mm) CM	SAND	6	5	12	12
	% Cobble Embeddedness				50	50

Reach Distance (m)	Water Depth (cm)	0	55	45	30	0
	Particle Size Class					
Width	Particle Size (mm) CM	1	4	10	20	5
	% Cobble Embeddedness			30	75	

Reach Distance (m)	Water Depth (cm)	0	50	40	20	0
	Particle Size Class					
Width	Particle Size (mm) CM	SAND	12	40	3	6
	% Cobble Embeddedness		75			

Reach Distance (m)	Water Depth (cm)	0	90	80	65	0
	Particle Size Class					
Width	Particle Size (mm) CM	100	3	5	10	60
	% Cobble Embeddedness				25	

Reach Distance (m)	Water Depth (cm)	0	80	62	60	0
	Particle Size Class					
Width	Particle Size (mm) CM	24	15	10	12	18
	% Cobble Embeddedness	80	50	25	50	0

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Stream Name TR
Date 9/12/08
Field Personnel _____
Interval ID 287-292, 292-293
Survey Tape Location _____
Right Bank _____
Left Bank _____

Start Time _____
Start Location 1 reach up Martins Cr
Stop Time _____
Stop Location 1 reach on Martins Cr
Reach ID 8, 9, 10

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
287	Particle Size Class	0	85	130	130	0
Width	Particle Size (mm) <u>cm</u>	2	4	30	20	30
	% Cobble Embeddedness				50	
288	Water Depth (cm)	0	60	80	70	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	10	5	20	12	20
	% Cobble Embeddedness	0		25	50	25
289	Water Depth (cm)	0	55	75	65	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	45	10	20	5	SAND
	% Cobble Embeddedness		0	50		
290	Water Depth (cm)	0	40	70	100	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	20	8	1	20	15
	% Cobble Embeddedness	50	50		50	0
291	Water Depth (cm)	0	60	55	65	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	20	10	3	12	30
	% Cobble Embeddedness	0	50		50	
292	Water Depth (cm)	0	60	60	60	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	10	5	20	15	50
	% Cobble Embeddedness	0		50	0	
293	Water Depth (cm)	0	75	55	57	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	2	30	5	10	7
	% Cobble Embeddedness				75	50
294	Water Depth (cm)	0	75	75	60	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	120	90	1	7	15
	% Cobble Embeddedness				50	50
295	Water Depth (cm)	0	70	65	80	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	10	15	40	5	20
	% Cobble Embeddedness	10	75			25
296	Water Depth (cm)	0	75	42	50	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	15	10	100	0	1
	% Cobble Embeddedness	0	75		50	
297	Water Depth (cm)	1	20	45	70	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	5	50	8	25	35
	% Cobble Embeddedness			25	50	

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Stream Name TR
Date 9/12/12
Field Personnel _____
Interval ID 313-318 318-323
Survey Tape Location Right Bank Left Bank

Start Time _____
Start Location 1 reach up Glenbrook Br.
Stop Time _____
Stop Location 1 reach on Glenbrook Br.
Reach ID 11, 12

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
312		0	5	45	47	0
	Particle Size Class					
Width	Particle Size (mm) <u>CM</u>	<u>SAND</u>	6	2	5	<u>BLACK SAND</u>
	% Cobble Embeddedness					

313	Reach Distance (m)	Water Depth (cm)	1	30	110	60	1
	Particle Size Class						
Width	Particle Size (mm) <u>CM</u>	15	20	30	8	12	
	% Cobble Embeddedness	50	50	30	25	0	

314	Reach Distance (m)	Water Depth (cm)	0	98	80	60	0
	Particle Size Class						
Width	Particle Size (mm) <u>CM</u>	<u>SAND</u>	15	12	5	<u>SAND</u>	
	% Cobble Embeddedness		50	50			

315	Reach Distance (m)	Water Depth (cm)	0	85	92	60	0
	Particle Size Class						
Width	Particle Size (mm) <u>CM</u>	15	9	4	4	40	
	% Cobble Embeddedness	50	50				

316	Reach Distance (m)	Water Depth (cm)	0	80	55	65	20
	Particle Size Class						
Width	Particle Size (mm) <u>CM</u>	12	7	10	1	1	
	% Cobble Embeddedness	50	75	0			

317	Reach Distance (m)	Water Depth (cm)	0	42	50	32	7
	Particle Size Class						
Width	Particle Size (mm) <u>CM</u>	15	4	7	1	8	
	% Cobble Embeddedness	0		50		50	

318	Reach Distance (m)	Water Depth (cm)	0	80	90	52	0
	Particle Size Class						
Width	Particle Size (mm) <u>CM</u>	50	70	20	5	15	
	% Cobble Embeddedness		50			0	

319	Reach Distance (m)	Water Depth (cm)	0	90	60	80	0
	Particle Size Class						
Width	Particle Size (mm) <u>CM</u>	80	100	3	12	<u>SAND</u>	
	% Cobble Embeddedness				50		

320	Reach Distance (m)	Water Depth (cm)	1	73	60	65	0
	Particle Size Class						
Width	Particle Size (mm) <u>CM</u>	<u>SAND</u>	7	1	10	20	
	% Cobble Embeddedness		50		50	10	

321	Reach Distance (m)	Water Depth (cm)	0	34	22	45	10
	Particle Size Class						
Width	Particle Size (mm) <u>CM</u>	10	8	25	15	15	1
	% Cobble Embeddedness	0	0	75	50	42	

322	Reach Distance (m)	Water Depth (cm)	1	40	55	50	1
	Particle Size Class						
Width	Particle Size (mm) <u>CM</u>	<u>SAND</u>	15	150	3	<u>SAND</u>	
	% Cobble Embeddedness		50				

→ Last data entered
323
Depth
Particle Size
670

1 46 62 40 1
3 10 4 8 4
20 10

Trout Creek Original Field Data Sheets

Starts at
Upstream Extent

Note: Particle Size in cm
FN = FINES = 0.05 mm

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Stream Name Trout Creek

Date 8-14-12

Field Personnel PN, CN

Interval ID 0-10

Survey Tape Location Right Bank

Start Time 1520

Start Location 1 mile upstream of Truckee River

Stop Time 1540

Stop Location 15 m DS Donner Pass Rd

Reach ID 1

Data entered
Starting here

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
	Particle Size Class	GF	FN	2	4	3
Width	Particle Size (mm) cm	1	~~0.05~~	~~0.05~~	~~0.05~~	SA
	% Cobble Embeddedness					0.1

Reach Distance (m)	Water Depth (cm)	3	0	1	6	8
	Particle Size Class	GF	CB	GF	GC	CB
Width	Particle Size (mm) cm	1	10	1	3	10
	% Cobble Embeddedness		50			50

Reach Distance (m)	Water Depth (cm)	10	8	7	0	8
	Particle Size Class					
Width	Particle Size (mm) cm	8	5	3	15	1
	% Cobble Embeddedness	0			0	

Reach Distance (m)	Water Depth (cm)	17	15	15	17	17
	Particle Size Class				FN	FN
Width	Particle Size (mm) cm	0.1	0.1	20	~~0.05~~	~~0.05~~
	% Cobble Embeddedness			20		

Reach Distance (m)	Water Depth (cm)	0	10	10	10	1
	Particle Size Class					
Width	Particle Size (mm) cm	18	3	12	10	3
	% Cobble Embeddedness	0		0	50	

Reach Distance (m)	Water Depth (cm)	0	0	12	3	1
	Particle Size Class					
Width	Particle Size (mm) cm	15	20	2	15	3
	% Cobble Embeddedness	80	0		50	

Reach Distance (m)	Water Depth (cm)	1	5	0	0	1
	Particle Size Class					
Width	Particle Size (mm) cm	4	3	10	22	2
	% Cobble Embeddedness			0	0	

Reach Distance (m)	Water Depth (cm)	0	5	5	0	1
	Particle Size Class					
Width	Particle Size (mm) cm	4	5	3	20	3
	% Cobble Embeddedness				20	

Reach Distance (m)	Water Depth (cm)	0	10	12	8	1
	Particle Size Class					
Width	Particle Size (mm) cm	25	5	3	4	3
	% Cobble Embeddedness	0				

Reach Distance (m)	Water Depth (cm)	0	10	13	8	0
	Particle Size Class				FN	
Width	Particle Size (mm) cm	5	15	3	~~0.05~~	5
	% Cobble Embeddedness		50			

Reach Distance (m)	Water Depth (cm)	0	15	18	22	0
	Particle Size Class		FN	FN		
Width	Particle Size (mm) cm	20	~~0.05~~	~~0.05~~	0.05	25
	% Cobble Embeddedness	50				50

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Truckee River Water Quality Monitoring Plan
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Stream Name Trout
Date 8-14-12
Field Personnel PV, CW
Interval ID 11-20
Survey Tape Location Right Bank Left Bank

Start Time 1505
Start Location 15 m DS Donner Pass
Stop Time 1520
Stop Location 165 m DS Donner Pass
Reach ID 2

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	8	7	5	3	4
	% Cobble Embeddedness	0	0			

Reach Distance (m)	Water Depth (cm)	0	20	24	24	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	20	5	4	8	20
	% Cobble Embeddedness	50			50	20

Reach Distance (m)	Water Depth (cm)	0	10	16	8	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	15	4	4	8	10
	% Cobble Embeddedness	30			0	50

Reach Distance (m)	Water Depth (cm)	1	10	10	12	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	4	8	3	5	15
	% Cobble Embeddedness		0			50

Reach Distance (m)	Water Depth (cm)	1	10	0	16	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	4	3	22	12	2
	% Cobble Embeddedness			0	50	

Reach Distance (m)	Water Depth (cm)	1	10	16	17	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	6	3	2	10	15
	% Cobble Embeddedness				0	50

Reach Distance (m)	Water Depth (cm)	0	21	23	24	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	15	5	20	2	3
	% Cobble Embeddedness	0		20		

Reach Distance (m)	Water Depth (cm)	0	21	26	4	1
	Particle Size Class		FN			
Width	Particle Size (mm) <u>cm</u>	20	~~20.5~~	6	4	5
	% Cobble Embeddedness	50				

Reach Distance (m)	Water Depth (cm)	0	10	17	20	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	8	6	14	3	3
	% Cobble Embeddedness	50		0		

Reach Distance (m)	Water Depth (cm)	0	18	18	16	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	3	20	6	4	15
	% Cobble Embeddedness		0			80

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

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Stream Name Trout Start Time 1442
Date 8-24-12 Start Location 165 m DS Donner Pass
Field Personnel RV, CN Stop Time 1605
Interval ID 21-30 Stop Location 315 m DS Donner Pass
Survey Tape Location Right Bank Left Bank Reach ID 3

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
21		1	22	27	19	1
	Particle Size Class		FN			
Width	Particle Size (mm) <u>cm</u>	2	0.05	5	7	12
	% Cobble Embeddedness				50	80

22	Reach Distance (m)	Water Depth (cm)	0	15	21	18	1
	Particle Size Class				FN		
Width	Particle Size (mm) <u>cm</u>	8	3	5	~~0.05~~		1
	% Cobble Embeddedness	50					

23	Reach Distance (m)	Water Depth (cm)	0	17	20	14	0
	Particle Size Class						
Width	Particle Size (mm) <u>cm</u>	12	15	5	6	17	
	% Cobble Embeddedness	0	50				0

End Restored section 24	Reach Distance (m)	Water Depth (cm)	10	12	17	8	0
	Particle Size Class				5		
Width	Particle Size (mm) <u>cm</u>	5	10	5 ~~20~~	20	6	
	% Cobble Embeddedness		50		50		

25	Reach Distance (m)	Water Depth (cm)	8	12	8	0	0
	Particle Size Class						
Width	Particle Size (mm) <u>cm</u>	4	6	8	18	12	
	% Cobble Embeddedness			0	0	50	

26	Reach Distance (m)	Water Depth (cm)	30	35	30	20	1
	Particle Size Class	FN					FN
Width	Particle Size (mm) <u>cm</u>	~~0.05~~	1	0.1	0.1	~~0.05~~	
	% Cobble Embeddedness						

27	Reach Distance (m)	Water Depth (cm)	1	16	16	12	0
	Particle Size Class	FN					
Width	Particle Size (mm) <u>cm</u>	~~0.05~~	15	10	12	35	
	% Cobble Embeddedness		50	50	0		

28	Reach Distance (m)	Water Depth (cm)	8	6	5	2	1
	Particle Size Class						
Width	Particle Size (mm) <u>cm</u>	5	10	8	15	20	
	% Cobble Embeddedness		80	80	50	20	

29	Reach Distance (m)	Water Depth (cm)	10	20	15	10	1
	Particle Size Class	FN	FN				FN
Width	Particle Size (mm) <u>cm</u>	~~0.05~~	~~0.05~~	10	5	~~0.05~~	
	% Cobble Embeddedness			0			

30	Reach Distance (m)	Water Depth (cm)	1	35	25	20	1
	Particle Size Class	FN				FN	FN
Width	Particle Size (mm) <u>cm</u>	~~0.05~~	2	1	~~0.05~~	~~0.05~~	
	% Cobble Embeddedness						

	Reach Distance (m)	Water Depth (cm)					
	Particle Size Class						
Width	Particle Size (mm)						
	% Cobble Embeddedness						

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Stream Name Trout Start Time 1425
Date 8-14-12 Start Location 315 m DS Donner Pass
Field Personnel PN, CN Stop Time 1442
Interval ID 31-40 Stop Location 465 m DS Donner Pass
Survey Tape Location (Right Bank) Left Bank Reach ID 4

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
	Particle Size Class	<u>40</u>	<u>30</u>	<u>70</u>	<u>30</u>	<u>25</u>
Width	Particle Size (mm) <u>cm</u>	<u>2</u>	<u>3</u>	<u>15</u>	<u>20</u>	<u>5</u>
	% Cobble Embeddedness			<u>20</u>	<u>0</u>	

Reach Distance (m)	Water Depth (cm)	<u>20</u>	<u>90</u>	<u>60</u>	<u>28</u>	<u>36</u>
	Particle Size Class	<u>FN</u>				<u>FN</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.05</u>	<u>10</u>	<u>20</u>	<u>15</u>	<u>0.05</u>
	% Cobble Embeddedness		<u>50</u>	<u>0</u>	<u>20</u>	

Reach Distance (m)	Water Depth (cm)	<u>20</u>	<u>34</u>	<u>37</u>	<u>25</u>	
	Particle Size Class	<u>FN</u>		<u>FN</u>		<u>FN</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>	<u>0.1</u>	<u>0.05</u>
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	<u>10</u>	<u>10</u>	<u>7</u>	<u>3</u>	<u>1</u>
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	<u>5</u>	<u>10</u>	<u>8</u>	<u>3</u>	<u>2</u>
	% Cobble Embeddedness		<u>90</u>	<u>0</u>		

Reach Distance (m)	Water Depth (cm)	<u>10</u>	<u>50</u>	<u>70</u>	<u>80</u>	<u>1</u>
	Particle Size Class	<u>FN</u>	<u>FN</u>			
Width	Particle Size (mm) <u>cm</u>	<u>0.05</u>	<u>0.05</u>	<u>1</u>	<u>1</u>	<u>0.05</u>
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	<u>30</u>	<u>45</u>	<u>40</u>	<u>48</u>	<u>10</u>
	Particle Size Class	<u>FN</u>		<u>FN</u>		<u>FN</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.05</u>	<u>1</u>	<u>0.05</u>	<u>1</u>	<u>0.05</u>
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	<u>1</u>	<u>50</u>	<u>50</u>	<u>55</u>	<u>1</u>
	Particle Size Class	<u>FN</u>	<u>FN</u>			
Width	Particle Size (mm) <u>cm</u>	<u>0.05</u>	<u>0.05</u>	<u>0.1</u>	<u>0.1</u>	<u>1</u>
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	<u>1</u>	<u>60</u>	<u>5</u>	<u>40</u>	<u>1</u>
	Particle Size Class	<u>FN</u>	<u>FN</u>		<u>FN</u>	<u>FN</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.05</u>	<u>0.05</u>	<u>1</u>	<u>0.05</u>	<u>0.05</u>
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	<u>1</u>	<u>55</u>	<u>70</u>	<u>25</u>	<u>1</u>
	Particle Size Class	<u>FN</u>	<u>FN</u>	<u>FN</u>	<u>FN</u>	<u>FN</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	<u>15</u>	<u>60</u>	<u>3</u>	<u>45</u>	<u>20</u>
	Particle Size Class	<u>FN</u>	<u>FN</u>	<u>FN</u>	<u>FN</u>	<u>FN</u>
Width	Particle Size (mm) <u>cm</u>	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	<u>1</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>5</u>	<u>10</u>	<u>2</u>
	Particle Size Class								
Width	Particle Size (mm) <u>cm</u>	<u>8</u>	<u>10</u>	<u>12</u>	<u>20</u>	<u>10</u>	<u>12</u>	<u>7</u>	<u>8</u>
	% Cobble Embeddedness	<u>0</u>	<u>0</u>	<u>10</u>	<u>25</u>	<u>0</u>	<u>10</u>	<u>0</u>	<u>0</u>

34
Garbage
all over

Cobbles

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name Trout
Date 8-14-12
Field Personnel PV, CN
Interval ID 41-50
Survey Tape Location Right Bank

Start Time 1400
Start Location 465 m DS Donner Pass
Stop Time 1425
Stop Location 155 m US of PV Culvert
Reach ID 5

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
	Particle Size Class	FN	22	45	47	5
Width	Particle Size (mm) CM	~~0.05~~	50	4	FN	FN
	% Cobble Embeddedness				~~0.05~~	~~0.05~~

Reach Distance (m)	Water Depth (cm)	65	70	75	35	10
	Particle Size Class			FN		
Width	Particle Size (mm) CM	8	1	~~0.05~~	10	15
	% Cobble Embeddedness	0			0	0

Reach Distance (m)	Water Depth (cm)	60	80	90	35	35
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) CM	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	35	45	48	55	1
	Particle Size Class		FN	FN	FN	FN
Width	Particle Size (mm) CM	10	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness	50				

Reach Distance (m)	Water Depth (cm)	0	50	50	40	1
	Particle Size Class		FN	FN	FN	FN
Width	Particle Size (mm) CM	12	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness	50				

Reach Distance (m)	Water Depth (cm)	20	50	100	70	5
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) CM	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	23	39	40	39	10
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) CM	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	20	35	25	40	10
	Particle Size Class	FN				FN
Width	Particle Size (mm) CM	~~0.05~~	1	1	1	~~0.05~~
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	30	48	40	10
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) CM	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	0	50	0	5	5
	Particle Size Class	FN		FN	FN	FN
Width	Particle Size (mm) CM	~~0.05~~	2	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	0	12	18	10	20	18	20
	Particle Size Class							
Width	Particle Size (mm)	8	12	8	12	7	10	12
	% Cobble Embeddedness	0	50	70	20	0	50	20

cobbles

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name Trout Start Time 1335
Date 8-14-12 Start Location 150 m US DW culvert
Field Personnel PV, CN Stop Time 1400
Interval ID S1-60 Stop Location 5 m US of DW culvert
Survey Tape Location Right Bank Left Bank 6 Reach ID 6

Reach Info

S1

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) <u>CM</u>	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

S2

Reach Distance (m)	Water Depth (cm)	FN	30	50	35	10
	Particle Size Class	FN	FN	FN	FN	
Width	Particle Size (mm) <u>CM</u>	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	8
	% Cobble Embeddedness					0

S3

Reach Distance (m)	Water Depth (cm)	FN	40	70	30	1
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) <u>CM</u>	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

S4

Reach Distance (m)	Water Depth (cm)	FN	110	36	16	1
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) <u>CM</u>	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

S5

Reach Distance (m)	Water Depth (cm)	5	45	22	17	0
	Particle Size Class	FN	FN		FN	
Width	Particle Size (mm) <u>CM</u>	~~0.05~~	~~0.05~~	5	~~0.05~~	12
	% Cobble Embeddedness					80

S6

Reach Distance (m)	Water Depth (cm)	30	80	30	65	5
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) <u>CM</u>	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

S7

Reach Distance (m)	Water Depth (cm)	0	30	120	24	5
	Particle Size Class	FN	FN	FN		
Width	Particle Size (mm) <u>CM</u>	~~0.05~~	~~0.05~~	~~0.05~~	8	1
	% Cobble Embeddedness				0	

S8

Reach Distance (m)	Water Depth (cm)	1	100	60	26	1
	Particle Size Class	FN	FN		FN	
Width	Particle Size (mm) <u>CM</u>	~~0.05~~	~~0.05~~	5	~~0.05~~	20
	% Cobble Embeddedness					50

S9

Reach Distance (m)	Water Depth (cm)	20	35	32	38	15
	Particle Size Class	FN	FN	FN	FN	
Width	Particle Size (mm) <u>CM</u>	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	10
	% Cobble Embeddedness					50

Not 60
Wadable

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)	NA				
	% Cobble Embeddedness					

Cobbles

Reach Distance (m)	Water Depth (cm)	0	0	0	0	1	5
	Particle Size Class						
Width	Particle Size (mm)	12	20	8	15	8	10
	% Cobble Embeddedness	50	10	50	80	50	50

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Rapid Assessment

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Stream Name Trout Creek
Date 8-14-12
Field Personnel EV, CN
Interval ID 61-70
Survey Tape Location Right Bank

Start Time 1305
Start Location 5 m US of DW culvert
Stop Time 1335
Stop Location 139 m DS of DW culvert
Reach ID

Reach Info

61

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
		50	70	80	50	60
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) cm	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

62

Reach Distance (m)	Water Depth (cm)	50	85	31	25	15
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) cm	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

63

Reach Distance (m)	Water Depth (cm)	0	50	76	40	1
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) cm	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

64

Reach Distance (m)	Water Depth (cm)	0	20	90	70	45
	Particle Size Class		FN	FN	FN	FN
Width	Particle Size (mm) cm	60	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

65

Reach Distance (m)	Water Depth (cm)	0	10	40	50	0
	Particle Size Class		FN	FN	FN	
Width	Particle Size (mm) cm	20	~~0.05~~	~~0.05~~	~~0.05~~	60
	% Cobble Embeddedness	50				

66

Reach Distance (m)	Water Depth (cm)	0	40	50	85	1
	Particle Size Class		FN	FN	FN	
Width	Particle Size (mm) cm	30	~~0.05~~	~~0.05~~	~~0.05~~	2
	% Cobble Embeddedness					

67

Reach Distance (m)	Water Depth (cm)	95	110	89	70	45
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) cm	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

68

Reach Distance (m)	Water Depth (cm)	0	32	30	24	0
	Particle Size Class		FN		FN	
Width	Particle Size (mm) cm	90	~~0.05~~	0.1	~~0.05~~	80
	% Cobble Embeddedness					

69

Reach Distance (m)	Water Depth (cm)	17	58	75	45	1
	Particle Size Class					
Width	Particle Size (mm) cm	1	20	5	10	3
	% Cobble Embeddedness		50		0	

70

Reach Distance (m)	Water Depth (cm)	20	40	50	50	15
	Particle Size Class					FN
Width	Particle Size (mm) cm	0.1	50	15	20	~~0.05~~
	% Cobble Embeddedness			0	0	

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name Trout
Date 8-14-12
Field Personnel PN - CN
Interval ID 71-80
Survey Tape Location Right Bank

Start Time 1225
Start Location 600 m US River
Stop Time 1305
Stop Location 450 m US Truckee River
Reach ID 8

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
71		5	19	20	31	10
	Particle Size Class					
Width	Particle Size (mm) <u>1m</u>	1	10	0.5	15	0.1
	% Cobble Embeddedness		80		90	

72	Reach Distance (m)	Water Depth (cm)	7	10	18	3	0
	Particle Size Class						
Width	Particle Size (mm) <u>cm</u>	1	2	15	7	8	
	% Cobble Embeddedness			0	0	50	

73	Reach Distance (m)	Water Depth (cm)	10	12	24	0	0
	Particle Size Class			FN			
Width	Particle Size (mm) <u>cm</u>	2	~~0.05~~	15	80	40	
	% Cobble Embeddedness			70			

74	Reach Distance (m)	Water Depth (cm)	22	55	50	48	47
	Particle Size Class		FN				FN
Width	Particle Size (mm) <u>cm</u>	~~0.05~~	10	1	2	~~0.05~~	
	% Cobble Embeddedness		50				

75	Reach Distance (m)	Water Depth (cm)	5	25	34	28	27
	Particle Size Class		FN	FN	FN	FN	FN
Width	Particle Size (mm) <u>cm</u>	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness						

76	Reach Distance (m)	Water Depth (cm)	1	1	3	1	1
	Particle Size Class		FN				
Width	Particle Size (mm) <u>cm</u>	~~0.05~~	1	1	0.5	2	
	% Cobble Embeddedness						

77	Reach Distance (m)	Water Depth (cm)	1	19	46	8	1
	Particle Size Class		FN	FN			
Width	Particle Size (mm) <u>cm</u>	~~0.05~~	~~0.05~~	10	2	0.1	
	% Cobble Embeddedness			0			

78	Reach Distance (m)	Water Depth (cm)	18	43	41	25	12
	Particle Size Class		FN	FN	FN	FN	FN
Width	Particle Size (mm) <u>cm</u>	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness						

79	Reach Distance (m)	Water Depth (cm)	20	24	23	23	2
	Particle Size Class				FN	FN	FN
Width	Particle Size (mm) <u>cm</u>	0.1	2	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness						

80	Reach Distance (m)	Water Depth (cm)	1	20	10	10	1
	Particle Size Class			FN	FN	FN	FN
Width	Particle Size (mm) <u>cm</u>	0.1	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness						

cobbles	Reach Distance (m)	Water Depth (cm)	15	20	28	12	11
	Particle Size Class						
Width <u>CS</u>	Particle Size (mm) <u>cm</u>	12	17	10	22	18	
	% Cobble Embeddedness	50	50	80	20	20	

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name Trout
Date 8-M-12
Field Personnel RV, CN
Interval ID 81-90
Survey Tape Location Right Bank Left Bank

Start Time 1200
Start Location 450 m US Truckee River
Stop Time 1225
Stop Location 300 m US River
Reach ID 9

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
81		07	14	13	1	0
	Particle Size Class					
Width	Particle Size (mm) <u>CM</u>	9 22	1	2	15	80
	% Cobble Embeddedness	10			0	

82	Reach Distance (m)	Water Depth (cm)	0	50	5	10	1
	Particle Size Class	FN		FN	FN	FN	FN
Width	Particle Size (mm) <u>CM</u>	~~0.05~~	0.1	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness						

83	Reach Distance (m)	Water Depth (cm)	60	65	63	43	15
	Particle Size Class			FN	FN	FN	FN
Width	Particle Size (mm) <u>CM</u>	0.1	0.1	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness						

84	Reach Distance (m)	Water Depth (cm)	1	33	35	29	20
	Particle Size Class		FN		FN	FN	FN
Width	Particle Size (mm) <u>CM</u>	0.1	~~0.05~~	0.1	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness						

85	Reach Distance (m)	Water Depth (cm)	17	23	29	26	5
	Particle Size Class	FN	FN	FN	FN	FN	FN
Width	Particle Size (mm) <u>CM</u>	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness						

86	Reach Distance (m)	Water Depth (cm)	1	1	0	4	1
	Particle Size Class						
Width	Particle Size (mm) <u>CM</u>	2	1	3	2	6	
	% Cobble Embeddedness						

87	Reach Distance (m)	Water Depth (cm)	1	15	14	5	1
	Particle Size Class	FN		FN	FN	FN	FN
Width	Particle Size (mm) <u>CM</u>	~~0.05~~	0.1	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness						

88	Reach Distance (m)	Water Depth (cm)	1	38	40	60	1
	Particle Size Class		FN	FN	FN	FN	FN
Width	Particle Size (mm) <u>CM</u>	0.1	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness						

89	Reach Distance (m)	Water Depth (cm)	1	35	45	2	1
	Particle Size Class		FN	FN	FN	FN	FN
Width	Particle Size (mm) <u>CM</u>	0.1	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness						

90	Reach Distance (m)	Water Depth (cm)	0	1	5	1	1
	Particle Size Class			FN			
Width	Particle Size (mm) <u>CM</u>	80	15	~~0.05~~	10	0.1	
	% Cobble Embeddedness		50		20		

Cobbles	Reach Distance (m)	Water Depth (cm)	80 0 0	0	5	0	1	2
	Particle Size Class							
Width	Particle Size (mm) <u>CM</u>	8 7 8	15	18	17	13	16	
	% Cobble Embeddedness	50 80 0	50	70	70	0	10	

Truckee River Water Quality Monitoring Plan
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Stream Name Troy Start Time 1140
Date 8/14/12 Start Location 700 m US River
Field Personnel PN, CN Stop Time 1225
Interval ID 91-100 Stop Location 150 m US River
Survey Tape Location Right Bank Reach ID 10

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	1	2	3	2	1
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) CM	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	2	2	1	1
	Particle Size Class					
Width	Particle Size (mm) CM	0.1	2	1	0.5	1
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	13	20	18	10	3
	Particle Size Class	FN			FN	FN
Width	Particle Size (mm) CM	~~0.05~~	0.5	1	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	0	5	3	3	1
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) CM	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	0	15	15	8	1
	Particle Size Class		FN	FN	FN	FN
Width	Particle Size (mm) CM	100	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	6	0	4	1
	Particle Size Class		FN		FN	
Width	Particle Size (mm) CM	0.1	~~0.05~~	15	~~0.05~~	0.5
	% Cobble Embeddedness			50		

Reach Distance (m)	Water Depth (cm)	1	3	3	1	1
	Particle Size Class	FN				FN
Width	Particle Size (mm) CM	~~0.05~~	5	2	0.1	~~0.05~~
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	25	23	13	1
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) CM	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	1	35	36	37	37
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) CM	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	0	0	0	0	0
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) CM	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~	~~0.05~~
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	0	0	13	0	0
	Particle Size Class					
Width	Particle Size (mm) CM	22	10	13	12	8
	% Cobble Embeddedness	0	0	0	50	25

CS depth class size (cm)
0 CS 10 0
0 CS 25 0
0 CS 18 0
0 CS 15 0
1 CS 20 50
0 CS 10 75

100 Dry
Cobbles

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name Trout Creek Start Time 1115
Date 8/14/12 Start Location 50 m US of Truckee
Field Personnel PN, CN Stop Time 1140
Interval ID ~~101-110~~ 101-110 Stop Location Truckee River
Survey Tape Location Right Bank Reach ID 11

Reach Info

Reach Distance (m)	Water Depth (cm)	Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
	Particle Size Class	0	0	0	0	0
Width	Particle Size (mm) <u>CM</u>	<u>FN</u>	<u>20</u>	<u>FN</u>	<u>FN</u>	<u>6</u>
	% Cobble Embeddedness	<u>0.05</u>	<u>60</u>	<u>0.05</u>	<u>0.05</u>	

101
Dry
101

Reach Distance (m)	Water Depth (cm)	0	0	0	0	0
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) <u>CM</u>	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>
	% Cobble Embeddedness					

102
Dry
102

Reach Distance (m)	Water Depth (cm)	0	0	0	0	0
	Particle Size Class	FN	FN	FN	FN	FN
Width	Particle Size (mm) <u>CM</u>	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>
	% Cobble Embeddedness					

103
Dry
103

Reach Distance (m)	Water Depth (cm)	0	0	0	0	0
	Particle Size Class					
Width	Particle Size (mm) <u>CM</u>	<u>2</u>	<u>15</u>	<u>4</u>	<u>6</u>	<u>4</u>
	% Cobble Embeddedness		<u>50</u>			

104
Dry
104

Reach Distance (m)	Water Depth (cm)	0	0	0	0	0
	Particle Size Class					
Width	Particle Size (mm) <u>CM</u>	<u>4</u>	<u>2</u>	<u>15</u>	<u>3</u>	<u>1</u>
	% Cobble Embeddedness			<u>50</u>		

105
Dry
105

Reach Distance (m)	Water Depth (cm)	0	0	0	0	0
	Particle Size Class	FN				
Width	Particle Size (mm) <u>CM</u>	<u>0.05</u>	<u>5</u>	<u>3</u>	<u>15</u>	<u>1</u>
	% Cobble Embeddedness				<u>0</u>	

106
Dry
106

Reach Distance (m)	Water Depth (cm)	0	0	0	0	0
	Particle Size Class					
Width	Particle Size (mm) <u>CM</u>	<u>1</u>	<u>1</u>	<u>30</u>	<u>6</u>	<u>15</u>
	% Cobble Embeddedness					<u>0</u>

107
Dry
107

Reach Distance (m)	Water Depth (cm)	0	0	0	0	0
	Particle Size Class					
Width	Particle Size (mm) <u>CM</u>	<u>5</u>	<u>8</u>	<u>15</u>	<u>15</u>	<u>2</u>
	% Cobble Embeddedness		<u>0</u>	<u>0</u>	<u>50</u>	

108
Dry
108

Reach Distance (m)	Water Depth (cm)	0	0	5	0	0
	Particle Size Class					
Width	Particle Size (mm) <u>CM</u>	<u>40</u>	<u>20</u>	<u>10</u>	<u>20</u>	<u>10</u>
	% Cobble Embeddedness		<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

109
109

Reach Distance (m)	Water Depth (cm)	1	10	8	0	1
	Particle Size Class					
Width	Particle Size (mm) <u>CM</u>	<u>5</u>	<u>12</u>	<u>8</u>	<u>20</u>	<u>10</u>
	% Cobble Embeddedness		<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

110
110

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

PS is in CM

→ Last data entered

Donner Creek Original Field Data Sheets

Note: Particle size in cm

Truckee River Water Quality Monitoring Plan
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Stream Name Dogger Cr.
Date 8/9/12
Field Personnel EN AB
Interval ID 110-100
Survey Tape Location Right Bank Left Bank

Start Time mouth of Truckee River Confluence
Start Location mouth of Truckee River
Stop Time
Stop Location 150 m US of TR
Reach ID 11

Last data entered

110

109

108

107

106

105

104

103

102

101

100

		Reach Info				
		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	5	35	33	23	1
	Particle Size Class					
Width	Particle Size (mm) cm	4	11	6	8	7
	% Cobble Embeddedness		0		0	20
Reach Distance (m)	Water Depth (cm)	1	26	46	28	1
	Particle Size Class					
Width	Particle Size (mm) cm	3	10	11	12	6
	% Cobble Embeddedness		0	0	10	
Reach Distance (m)	Water Depth (cm)	25	43	11	29	20
	Particle Size Class					
Width	Particle Size (mm) cm	3	10	5	5	3
	% Cobble Embeddedness		80			
Reach Distance (m)	Water Depth (cm)	1	31	10	0	1
	Particle Size Class					
Width	Particle Size (mm) cm	1	5	11	45	4
	% Cobble Embeddedness			50		
Reach Distance (m)	Water Depth (cm)	1	25	0	32	1
	Particle Size Class					
Width	Particle Size (mm) cm	.1	4	50	3	.1
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	12	10	16	22	1
	Particle Size Class					
Width	Particle Size (mm) cm	10	8	10	15	4
	% Cobble Embeddedness	0	0	20	0	
Reach Distance (m)	Water Depth (cm)	1	10	20	24	5
	Particle Size Class					
Width	Particle Size (mm) cm	3	1	4	7	5
	% Cobble Embeddedness				20	
Reach Distance (m)	Water Depth (cm)	1	60	75	50	1
	Particle Size Class					
Width	Particle Size (mm) cm	30	40	3	70	5
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	1	35	37	25	1
	Particle Size Class					
Width	Particle Size (mm) cm	.1	70	10	1	4
	% Cobble Embeddedness		50	50		
Reach Distance (m)	Water Depth (cm)	1	0	20	33	1
	Particle Size Class					
Width	Particle Size (mm) cm	4	3	50	13	.1
	% Cobble Embeddedness				0	
Reach Distance (m)	Water Depth (cm)	11	6	30	7	1
	Particle Size Class					
Width	Particle Size (mm)	1	5	80	20	8
	% Cobble Embeddedness					0

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name Panther Cr Start Time _____
Date 8/9/12 Start Location 190 m US of TR
Field Personnel NB CM Stop Time _____
Interval ID 99-90 Stop Location 190 m DS of RR tunnel
Survey Tape Location Right Bank Left Bank Reach ID 10

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
99	Reach Distance (m)					
	Water Depth (cm)	1	13	10	12	1
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	4	3	6	10	Fines
	% Cobble Embeddedness				0	
98	Reach Distance (m)					
	Water Depth (cm)	1	40	20	24	17
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	8	40	1	18	4
	% Cobble Embeddedness	50			0	
97	Reach Distance (m)					
	Water Depth (cm)	10	12	0	29	1
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	5	40	50	30	2
	% Cobble Embeddedness					
96	Reach Distance (m)					
	Water Depth (cm)	1	30	40	28	1
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	1	12	8	1	.1
	% Cobble Embeddedness		0	50		
95	Reach Distance (m)					
	Water Depth (cm)	1	14	15	16	5
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	6	3	12	10	3
	% Cobble Embeddedness			0	0	
94	Reach Distance (m)					
	Water Depth (cm)	1	30	25	8	1
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	5	30	7	8	.1
	% Cobble Embeddedness			50	50	
93	Reach Distance (m)					
	Water Depth (cm)	0	15	23	21	1
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	200	4	5	22	5
	% Cobble Embeddedness				80	
92	Reach Distance (m)					
	Water Depth (cm)	5	5	24	55	0
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	4	12	6	10	22
	% Cobble Embeddedness		50			10
91	Reach Distance (m)					
	Water Depth (cm)	3	4	5	12	1
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	5	4	6	10	.1
	% Cobble Embeddedness				0	
90	Reach Distance (m)					
	Water Depth (cm)	6	12	13	5	1
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	3	5	10	2	.1
	% Cobble Embeddedness			20		
	Reach Distance (m)					
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm)					
	% Cobble Embeddedness					

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Stream Name Douglas Cr.
Date 8/9/12
Field Personnel CR 03
Interval ID 74-80
Survey Tape Location Right Bank Left Bank

Start Time _____
Start Location 150 m DS of RR tunnel
Stop Time _____
Stop Location DS end of RR tunnel
Reach ID 9

Reach Info

89

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	1	18	4	14	4
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	.1	12	4	20	6
	% Cobble Embeddedness		0		20	

88

Reach Distance (m)	Water Depth (cm)	1	1	14	18	3
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	8	4	15	6	4
	% Cobble Embeddedness	80		50		

87

Reach Distance (m)	Water Depth (cm)	1	20	50	0	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	<u>Finest</u>	1	6	100	.1
	% Cobble Embeddedness					

86

Reach Distance (m)	Water Depth (cm)	1	40	10	10	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	3	10	8	8	.1
	% Cobble Embeddedness		50	0	50	

85

Reach Distance (m)	Water Depth (cm)	5	12	5	10	5
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	5	8	4	20	4
	% Cobble Embeddedness		0		0	

84

Reach Distance (m)	Water Depth (cm)	1	18	22	16	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	5	10	6	10	50
	% Cobble Embeddedness		0		0	

83

Reach Distance (m)	Water Depth (cm)	1	5	33	34	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	10	20	6	18	2
	% Cobble Embeddedness	0	50		0	

82

Reach Distance (m)	Water Depth (cm)	30	19	0	40	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	6	20	2	13	10
	% Cobble Embeddedness		80		0	0

81

Reach Distance (m)	Water Depth (cm)	18	26	22	18	5
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	.1	10	15	5	1
	% Cobble Embeddedness		0	0		

80

Reach Distance (m)	Water Depth (cm)	3	12	89	22	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	.1	5	10	60	.5
	% Cobble Embeddedness			0		

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

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Stream Name Donner Cr.
Date 8/9/12
Field Personnel WJW
Interval ID 74-70
Survey Tape Location Right Bank Left Bank

Start Time _____
Start Location DS end of RR tunnel
Stop Time _____
Stop Location 70m US of RR tunnel
Reach ID _____

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
79	Reach Distance (m)	27	29	34	35	33
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	<u>1/2</u>	3	4	2	1
	% Cobble Embeddedness					
79	Reach Distance (m)	10	12	24	35	34
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	2	5	4	3	5
	% Cobble Embeddedness					
77	Reach Distance (m)	13	5	10	5	15
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	<u>Bedrock</u>	<u>Bedrock</u>	<u>Bedrock</u>	<u>Bedrock</u>	<u>Bedrock</u>
	% Cobble Embeddedness	<u>Rough</u>	<u>Rough</u>	<u>Rough</u>	<u>Rough</u>	<u>Rough</u>
76	Reach Distance (m)	3	17	20	5	3
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	20	30	28	50	50
	% Cobble Embeddedness					
75	Reach Distance (m)	1	10	25	15	1
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	<u>Fine</u>	<u>Bedrock</u>	<u>Bedrock</u>	30	<u>Fine</u>
	% Cobble Embeddedness		<u>Rough</u>	<u>Rough</u>		
74	Reach Distance (m)	0	26	25	18	10
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	25	25	10	5	8
	% Cobble Embeddedness		0	0		0
73	Reach Distance (m)	8	26	30	27	2
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	<u>Fine</u>	4	30	0	4
	% Cobble Embeddedness				0	
72	Reach Distance (m)	1	22	19	16	1
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	1	20	0	10	<u>Fine</u>
	% Cobble Embeddedness		10	0	0	
71	Reach Distance (m)	1	43	0	25	5
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	5	8	80	20	6
	% Cobble Embeddedness		50		8	
70	Reach Distance (m)	3	12	17	25	1
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>	10	5	12	15	<u>Fine</u>
	% Cobble Embeddedness	0		0	50	
	Reach Distance (m)					
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm) <u>cm</u>					
	% Cobble Embeddedness					

Truckee River Water Quality Monitoring Plan
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Stream Name Dwyer Cr.
Date 6/9/12
Field Personnel WBC
Interval ID 104-100
Survey Tape Location Right Bank Left Bank

Start Time
Start Location 70 m US of RR tunnel
Stop Time
Stop Location 100 m DS of SR 89 bridge
Reach ID 7

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
69	Reach Distance (m)	1	20	21	42	0
	Water Depth (cm)					
	Particle Size Class					
	Width	2	1	15	12	180
	Particle Size (mm)			10	20	
	% Cobble Embeddedness					
68	Reach Distance (m)	2	12	25	10	1
	Water Depth (cm)					
	Particle Size Class					
	Width	7	7	8	5	1
	Particle Size (mm)	0	20	40		
	% Cobble Embeddedness					
67	Reach Distance (m)	1	15	0	15	5
	Water Depth (cm)					
	Particle Size Class					
	Width	7	11	12	4	4
	Particle Size (mm)	60	50	30		
	% Cobble Embeddedness					
66	Reach Distance (m)	0	30	15	15	1
	Water Depth (cm)					
	Particle Size Class					
	Width	150	4	2	8	3
	Particle Size (mm)				10	
	% Cobble Embeddedness					
65	Reach Distance (m)	1	50	21	10	1
	Water Depth (cm)					
	Particle Size Class					
	Width	FINE	5	7	5	3
	Particle Size (mm)			10		
	% Cobble Embeddedness					
64	Reach Distance (m)	1	20	20	11	1
	Water Depth (cm)					
	Particle Size Class					
	Width	0.1	10	10	3	2
	Particle Size (mm)		80	50		
	% Cobble Embeddedness					
63	Reach Distance (m)	2	18	17	15	1
	Water Depth (cm)					
	Particle Size Class					
	Width	2	15	8	5	2
	Particle Size (mm)		50	70		
	% Cobble Embeddedness					
32 62	Reach Distance (m)	1	5	20	22	1
	Water Depth (cm)					
	Particle Size Class					
	Width	2	3	7	8	FINE
	Particle Size (mm)			10	30	
	% Cobble Embeddedness					
61	Reach Distance (m)	2	28	17	21	2
	Water Depth (cm)					
	Particle Size Class					
	Width	3	7	5	6	3
	Particle Size (mm)		50			
	% Cobble Embeddedness					
60	Reach Distance (m)	1	20	38	32	1
	Water Depth (cm)					
	Particle Size Class					
	Width	0.1	15	18	5	0.1
	Particle Size (mm)		20	10		
	% Cobble Embeddedness					
58	Reach Distance (m)					
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm)					
	% Cobble Embeddedness					

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Stream Name Douglas
Date 8.9.12
Field Personnel CN, NB
Interval ID 54-50
Survey Tape Location Right Bank

Start Time _____
Start Location 160 m DS of SR 89 Bridge
Stop Time _____
Stop Location 10 m DS of SR 89 Bridge
Reach ID 6

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	1	15	37	20	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	3	1	7	4	1
	% Cobble Embeddedness			40		

Reach Distance (m)	Water Depth (cm)	2	18	20	17	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	1	5	7	8	FINE
	% Cobble Embeddedness			40	50	

Reach Distance (m)	Water Depth (cm)	2	10	25	18	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	4	5	4	3	1
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	2	15	32	35	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	3	2	7	3	0.1
	% Cobble Embeddedness			50		

Reach Distance (m)	Water Depth (cm)	1	18	40	50	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	2	30	9	3	FINE
	% Cobble Embeddedness			0		

Reach Distance (m)	Water Depth (cm)	1	22	35	20	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	10	8	7	3	2
	% Cobble Embeddedness	50	50	50	50	

Reach Distance (m)	Water Depth (cm)	1	5	5	10	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	FINE	70	5	7	3
	% Cobble Embeddedness		50		10	

Reach Distance (m)	Water Depth (cm)	1	0	0	25	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	4	16	5	6	0.1
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)	20	28	0	0	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	FINE	12	5	8	5
	% Cobble Embeddedness		70		0	

Reach Distance (m)	Water Depth (cm)	0	20	75	34	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	100	100	5	11	2
	% Cobble Embeddedness				10	

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

PHOTO 50
20
OPPOSITE
BANK

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name DONNER

Date 8.9.12

Field Personnel EN, NB

Interval ID 49-40

Survey Tape Location

Right Bank

Left Bank

Reach Info

Start Time

Start Location 10 m DS of SR 89 Bridge

Stop Time

Stop Location 110 m US of SR 89 Bridge

Reach ID 5

Photo on photos bank

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	0	40	80	47	1
	Particle Size Class					
Width	Particle Size (mm) cm	20	80	4	5	6
	% Cobble Embeddedness					

48

Reach Distance (m)	Water Depth (cm)	15	19	24	30	30
	Particle Size Class					
Width	Particle Size (mm) cm	5	8	6	1	7
	% Cobble Embeddedness		40			20

47

Reach Distance (m)	Water Depth (cm)	15	22	26	49	27
	Particle Size Class					
Width	Particle Size (mm) cm	4	4	5	1	5
	% Cobble Embeddedness					

46

Reach Distance (m)	Water Depth (cm)	1	10	15	10	1
	Particle Size Class					
Width	Particle Size (mm) cm	FINE	7	8	5	5
	% Cobble Embeddedness		20	30		

45

Reach Distance (m)	Water Depth (cm)	1	35	39	80	1
	Particle Size Class					
Width	Particle Size (mm) cm	FINE	1	15	5	0.1
	% Cobble Embeddedness			50		

44

Reach Distance (m)	Water Depth (cm)	0	13	17	12	0
	Particle Size Class					
Width	Particle Size (mm) cm	5	4	5	3	10
	% Cobble Embeddedness					0

43

Reach Distance (m)	Water Depth (cm)	1	17	21	45	1
	Particle Size Class					
Width	Particle Size (mm) cm	0.1	6	11	7	FINE
	% Cobble Embeddedness			0	10	

Photo on photos bank

42

Reach Distance (m)	Water Depth (cm)	1	2	10	12	0
	Particle Size Class					
Width	Particle Size (mm) cm	0.1	10	5	7	9
	% Cobble Embeddedness		0		10	0

41

Reach Distance (m)	Water Depth (cm)	0	10	42	90	1
	Particle Size Class					
Width	Particle Size (mm) cm	12	2	4	5	FINES
	% Cobble Embeddedness	10				

40

Reach Distance (m)	Water Depth (cm)	1	36	60	80	1
	Particle Size Class					
Width	Particle Size (mm) cm	0.1	5	2	30	FINE
	% Cobble Embeddedness					

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Truckee River Water Quality Monitoring Plan
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Stream Name Donner
Date 8.9.12
Field Personnel CWNB
Interval ID 39-30
Survey Tape Location Right Bank

Start Time _____
Start Location 110 m US of SR84 Bridge
Stop Time _____
Stop Location 1200 m US of TR
Reach ID 4

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
39	Reach Distance (m)	0	15	19	11	0
	Water Depth (cm)					
	Particle Size Class					
	Width	12	8	5	7	5
	Particle Size (mm) <u>cm</u>					
	% Cobble Embeddedness	0	20		10	
38	Reach Distance (m)	10	16	15	18	0
	Water Depth (cm)					
	Particle Size Class					
	Width	9	5	3	6	5
	Particle Size (mm) <u>cm</u>					
	% Cobble Embeddedness	0				
37	Reach Distance (m)	0	15	10	15	0
	Water Depth (cm)					
	Particle Size Class					
	Width	11	6	3	5	4
	Particle Size (mm) <u>cm</u>					
	% Cobble Embeddedness	0				
36	Reach Distance (m)	1	20	11	30	1
	Water Depth (cm)					
	Particle Size Class					
	Width	0.1	2	7	4	FINE
	Particle Size (mm) <u>cm</u>					
	% Cobble Embeddedness			20		
35	Reach Distance (m)	0	22	35	5	1
	Water Depth (cm)					
	Particle Size Class					
	Width	8	2	11	3	FINE
	Particle Size (mm) <u>cm</u>					
	% Cobble Embeddedness	0		10		
PHOTO 34 OPPOSITE BANK	Reach Distance (m)	0	20	51	32	0
	Water Depth (cm)					
	Particle Size Class					
	Width	10	60	5	5	12
	Particle Size (mm) <u>cm</u>					
	% Cobble Embeddedness	20				0
PHOTO 33 OP. BANK	Reach Distance (m)	0	0	50	50	0
	Water Depth (cm)					
	Particle Size Class					
	Width	60	70	50	5	4
	Particle Size (mm) <u>cm</u>					
	% Cobble Embeddedness					
32	Reach Distance (m)	0	20	25	24	0
	Water Depth (cm)					
	Particle Size Class					
	Width	7	10	2	5	4
	Particle Size (mm) <u>cm</u>					
	% Cobble Embeddedness	10	50			
31	Reach Distance (m)	0	32	34	25	1
	Water Depth (cm)					
	Particle Size Class					
	Width	11	2	1	3	2
	Particle Size (mm) <u>cm</u>					
	% Cobble Embeddedness	0				
30	Reach Distance (m)	10	30	40	30	1
	Water Depth (cm)					
	Particle Size Class					
	Width	FINE	5	4	5	2
	Particle Size (mm) <u>cm</u>					
	% Cobble Embeddedness					
	Reach Distance (m)					
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm)					
	% Cobble Embeddedness					

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name DONNOR
Date 8.9.12
Field Personnel CN, NB
Interval ID 29-20
Survey Tape Location Right Bank

Start Time _____
Start Location 1200 m US TR
Stop Time _____
Stop Location 1350 m US TR
Reach ID 3

Left Bank
Reach Info

29

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	0	15	35	22	1
	Particle Size Class					
Width	Particle Size (mm) cm	4	8	10	6	2
	% Cobble Embeddedness		10	0		

28

Reach Distance (m)	Water Depth (cm)	1	26	30	38	1
	Particle Size Class					
Width	Particle Size (mm) cm	FINE	2	9	56	4
	% Cobble Embeddedness			50		

27

Reach Distance (m)	Water Depth (cm)	1	10	21	17	1
	Particle Size Class					
Width	Particle Size (mm) cm	10	6	7	8	2
	% Cobble Embeddedness	0		30	10	

26

Reach Distance (m)	Water Depth (cm)	0	18	20	15	0
	Particle Size Class					
Width	Particle Size (mm) cm	12	4	5	7	6
	% Cobble Embeddedness	0			10	

25

Reach Distance (m)	Water Depth (cm)	0	10	15	16	1
	Particle Size Class					
Width	Particle Size (mm) cm	5	3	2	7	3
	% Cobble Embeddedness				10	

24

Reach Distance (m)	Water Depth (cm)	0	8	7	2	1
	Particle Size Class					
Width	Particle Size (mm) cm	8	4	3	5	FINE
	% Cobble Embeddedness	10				

23

Reach Distance (m)	Water Depth (cm)	0	9	15	24	1
	Particle Size Class					
Width	Particle Size (mm) cm	7	8	4	3	FINE
	% Cobble Embeddedness	20	50			

22

Reach Distance (m)	Water Depth (cm)	0	29	25	20	1
	Particle Size Class					
Width	Particle Size (mm) cm	50	3	4	3	FINE
	% Cobble Embeddedness					

21

Reach Distance (m)	Water Depth (cm)	1	15	18	18	1
	Particle Size Class					
Width	Particle Size (mm) cm	FINE	3	5	6	FINE
	% Cobble Embeddedness					

20

Reach Distance (m)	Water Depth (cm)	1	5	18	5	0
	Particle Size Class					
Width	Particle Size (mm) cm	FINE	100	20	10	12
	% Cobble Embeddedness			10	50	50

Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Truckee River Water Quality Monitoring Plan
Rapid Assessment

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Stream Name DONNER Start Time _____
Date 8.9.12 Start Location 1350 m US of TR
Field Personnel CN NB Stop Time _____
Interval ID 19-10 Stop Location 1500 m US of TR
Survey Tape Location _____ Reach ID 2

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
19	Reach Distance (m)	0	18	15	10	0
	Water Depth (cm)					
	Particle Size Class					
	Width	80	2	12	7	5
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness			10	50	

18	Reach Distance (m)	1	10	15	10	0
	Water Depth (cm)					
	Particle Size Class					
	Width	Finer	1	1	2	2
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness					

17	Reach Distance (m)	0	15	15	10	0
	Water Depth (cm)					
	Particle Size Class					
	Width	80	3	4	8	2
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness				50	

16	Reach Distance (m)	0	25	15	15	0
	Water Depth (cm)					
	Particle Size Class					
	Width	120	7	9	5	4
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness		50	50		

15	Reach Distance (m)	0	15	15	15	0
	Water Depth (cm)					
	Particle Size Class					
	Width	80	7	5	12	3
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness		50		70	

14	Reach Distance (m)	0	15	16	14	1
	Water Depth (cm)					
	Particle Size Class					
	Width	7	10	7	8	Finer
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness	20	40	10	40	

13	Reach Distance (m)	1	10	10	12	1
	Water Depth (cm)					
	Particle Size Class					
	Width	3	7	9	15	5
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness		30	50	50	

12	Reach Distance (m)	1	10	16	12	0
	Water Depth (cm)					
	Particle Size Class					
	Width	0.1	7	9	3	9
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness		0	30		40

11	Reach Distance (m)	0	17	18	20	0
	Water Depth (cm)					
	Particle Size Class					
	Width	3	2	3	5	150
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness					

10	Reach Distance (m)	1	10	18	15	1
	Water Depth (cm)					
	Particle Size Class					
	Width	3	4	10	2	4
	Particle Size (mm) <i>cm</i>					
	% Cobble Embeddedness			50		

	Reach Distance (m)					
	Water Depth (cm)					
	Particle Size Class					
	Width					
	Particle Size (mm)					
	% Cobble Embeddedness					

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Stream Name DONNER
Date 8.9.12
Field Personnel CJNB
Interval ID 10140 9-0
Survey Tape Location Right Bank

Start Time _____
Start Location 1500 m upstream TR
Stop Time _____
Stop Location 1 mile upstream
Reach ID 1 (1650 m upstream)

Reach Info

		Left Edge of Water	Left Center	Center	Right Center	Right Edge of Water
Reach Distance (m)	Water Depth (cm)	0	22	9	8	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	120	4	3	12	10
	% Cobble Embeddedness				0	0
Reach Distance (m)	Water Depth (cm)	1	10	15	12	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	0.1	2	10	9	5
	% Cobble Embeddedness			0	30	
Reach Distance (m)	Water Depth (cm)	1	15	10	9	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	FINE	5	12	7	FINE
	% Cobble Embeddedness			10	0	
Reach Distance (m)	Water Depth (cm)	0	35	20	14	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	300	3	3	4	0.1
	% Cobble Embeddedness					
Reach Distance (m)	Water Depth (cm)	0	14	15	16	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	12	3	0.1	8	FINE
	% Cobble Embeddedness	0			10	
Reach Distance (m)	Water Depth (cm)	1	5	18	17	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	5	8	4	8	150
	% Cobble Embeddedness		50		0	
Reach Distance (m)	Water Depth (cm)	1	12	18	21	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	FINE	5	3	11	FINE
	% Cobble Embeddedness				10	
Reach Distance (m)	Water Depth (cm)	1	13	10	15	0
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	0.1	5	6	8	5
	% Cobble Embeddedness				50	
Reach Distance (m)	Water Depth (cm)	15	21	18	12	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	FINE	2	9	12	3
	% Cobble Embeddedness			50	10	
Reach Distance (m)	Water Depth (cm)	0	15	14	0	1
	Particle Size Class					
Width	Particle Size (mm) <u>cm</u>	80	6	3	10	5
	% Cobble Embeddedness				0	
Reach Distance (m)	Water Depth (cm)					
	Particle Size Class					
Width	Particle Size (mm)					
	% Cobble Embeddedness					

Data entered starting here

Appendix B
Bioassessment Laboratory Results and
Original Field Data Sheets

SQUAW CREEK BIOASSESSMENT 2012		Upper Meadow					Middle Meadow					Lower Meadow				
		BIO-SC1					BIO-SC2					BIO-SC3				
Replicate	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
LAB FINAL ID																
NON-INSECT TAXA																
undetermined oligochaete spp.	104	119	125	47	150	24	48	13	32	41	62	10	20	33	33	
Dugesia tigrina					1											
Hydra						2				4	1					
undetermined ostracod spp.	4	7	10	1		1	5		2		2	1	1	3		
Ferrissia sp.																
Fossaria sp.		1														
Gyraulus sp.					1											
Physa sp.				1							1					
undetermined hydrobiid genus-species																
Pisidium sp.																
Atractides sp.					25	3	2	2	7	6	7	9	18	11	1	
Hygrobates sp.		2	2		2		2		1	1				4	3	
Albaxona sp.		1														
Aturus sp.						1			1		1					
Feltria sp.					1				5	7	1		1	1		
Frontipoda sp.																
Lebertia sp.		2			3	6	3	3		1	6		5	4	3	
Protzia sp.												1		1		
Sperchon sp.						1					1			1	1	
Testudacarus sp.																
Torrenticola sp.							1	2	2	2	3	1	2	3	3	
Wandesia sp.																
Stygothrombium sp.																
Hydrozetes sp.																
Trimalaconothrus sp.			3		4	1	3	2	12	7		8	21	2	2	
Epidamaeus sp.																
undetermined mite sp.																
INSECT TAXA																
Ophiogomphus sp.																
Cordulegaster dorsalis																
Coenagrion-Enallagma sp.																
Baetis sp.					15	3		3	3	1		5	2	2		
Acentrella sp.					1			1	1		1					
Callibaetis sp.																
Centroptilum sp.		5	1				1					1				
Diphetor hageni						4		2		3		2	5	2		
Ameletus sp.		2	2		1		1	4	1	4	5	6	1	7		
Siphonurus sp.	1	1	4		1											
Tricorythodes sp.																
Paraleptophlebia sp.	5	14	23	1	3	48	22	9	53	21	54	51	35	38	2	
Paraleptophlebia bicornuta																
Serratella spp. (teresa, tibialis, levis)					5	11	7	7	8	1	13	6	21	14	8	
Attenella delantala							2									
Attenella soquele																
Caudatella hystrix																
Drunella doddsi									1				1			
Drunella flavilinea-coloradensis					4	1	1	1	1			1	3	1		
Drunella grandis					4	20	6	2	6	6	5	2	14	9	3	
Drunella spinifera																
Ephemerella (aurivillii)																
Timpanoga hecuba														1		
Cinygma sp.																
Cinygmula sp.					11	14		9	11	9		12	7	6		
Ecdyonurus sp.						3	1	1	2	3	2	1	3	7		
Epeorus sp.																
Ironodes sp.																
Leucrocuta sp.																
Rhithrogena sp.					8	13		1	26	19	3	7	4	6		
Malenka sp.						8		4	2	6	9	4	15	5	1	
Prostoia besametsa													1			

Visoka cataractae						32	131	7	53	95	30	164	73	148	53	9
Zapada sp.						18	9	35		4	2	10	5	4	8	4
Capnia /Paracapnia +mixed spp.	1	4	3	1	18					2						
Eucapnopsis brevicauda																
Despaxia augusta																
Sweltsa sp.		1			30	4	2	21	23	11		7	16	5	10	1
Suwallia sp.			1				1	2								
Haploperla sp.																
Yoraperla sp.																
Cultus sp.																
Frisonia picticeps									1							
Isoperla sp.			1					4					1	1		
Megarcys sp.																
Kogotus/Rickera sp.					5	3	1	2	1	2			1	4		
Oroperla barbara																
Perlinodes aureus																
Skwala sp.					6	6	4	11	11	6			8	9	2	
Pteronarcys sp.																
Pteronarcella sp.																
Calineuria californica																
Doroneuria baumanni								1	2	1			2			
Hesperoperla pacifica																
Rhyacophila acropedes/brunnea grp.																
Rhyacophila alberta grp.																
Rhyacophila angelita grp.														1		
Rhyacophila arnaudi grp.																
Rhyacophila betteni grp.						1										
Rhyacophila hyalinata grp.																
Rhyacophila nevadensis grp.																
Rhyacophila sibirica grp.																
Rhyacophila rotunda grp.																
Rhyacophila vagrita grp.																
Rhyacophila verrula grp.																
Yphria californica																
Agraylea sp.																
Hydroptila sp.		1		3	1	4	5	2	7	1		8	2	3	3	4
Ochrotrichia sp.		1														
Amiocentrus sp.								1					1	2		
Brachycentrus americanus																
Micrasema sp.																
Agapetus sp.																
Anagapetus sp.															1	
Glossosoma sp.									2			1		1		
Arctopsyche grandis																
Parapsyche elsis																
Ceratopsyche spp.					8	6		24	28	29		12	4	23	10	2
Cheumatopsyche								1				1				
Lepidostoma sp.							4	2	6	7		9	2	1	2	3
Cryptochia sp.																
Desmona sp.																
Dicosmoecus sp.	1					1				1		1		1		
Ecclisomyia sp.																
Homophylax sp.																
Onocosmoecus sp.	1	1	2	1	1	1	1		1	1			1		1	1
Psychoglypha sp.																
Gumaga sp.																
Polycentropus sp.																
Dolophilodes sp.																
Wormaldia sp.						1			2	2						
Apatania sp.		3	1		2	1	2	1	5	1		1	7		4	2
Neophylax sp.																
Sialis sp.			1	1												
Orohermes crepusculus																
Sigara washingtonensis																
Gerris sp.																
Eubrianax edwardsi																

Halipilus sp.															
Cleptelmis addenda															
Heterolimnius sp.															
Lara avara															
Narpus concolor															
Optioservus quadrimaculatus				3				4				2			
Zaitzevia parvula															
Hydraena sp.															
Ametor scabrosus															
Hydrobius sp.															
Laccobius sp.															
Agabus sp.					1										
Hydroporus sp.															
Oreodytes picturatus															
Oreodytes rivalis obesus															
Oreodytes scitulus scitulus	2	1				2		3						2	
Stictotarsus striatellus			5											1	
undetermined sp.															
Cryptolabis sp.															
Hexatoma sp.															
Hesperoconopa sp.															
Rhabdomastix sp.															
Antocha monticola															
Dicranota sp.										1					
Limonia sp.															
Limnophila sp.															
Molophilus sp.															
Pedicia sp.															
Culex sp.															
Thaumalea sp.															
Pericoma sp.															
Glutops sp.															
Caloparyphus sp.															
Chrysops sp.															
Silvius sp.		1													
Tabanus sp.															
Simulium spp.				67	3		16	9	4	1	1	1		1	
Prosimulium sp.															
Dixa sp.															
Meringodixa sp.															
Bezzia-Palpomyia sp.					2	3		6	25	2		1	1	4	
Ceratopogon sp.															
Culicoides sp.															
Dasyhelea sp.									4						
Stilobezzia sp.									1						
Limnophora sp.			1	1	1		1	2		1					
undetermined sp.							2								
Chelifera/Metachela sp.															
Clinocera (Hydrodromia) sp.															
Neoplasta sp.															
Oreogeton sp.															
Wiedemannia sp.															
Scatella sp.															
Diamesa sp.								1							
Pagastia sp.				1	3			2	1			2	1		
Potthastia gaedii grp.			1							4				2	
Pseudodiamesa sp.															
Parochlus kiefferi															
Monodiamesa			1												
Ablabesmyia sp.															
Apsectrotanypus sp.															
Conchapelopia sp.			1	6	3		13	1	5		8		1	5	18
Larsia sp.														1	
Nilotanypus sp.															
Paramerina sp.															
Pentaneura sp.			1	1	11	26	7	9	32	12	26	22	19	13	5

Psectrotanypus		1													
Rheopelopia						1			1	1	1			1	
Thienemannimyia grp.	20	21	24	29											
Trissopelopia sp.															
Zavrelimyia sp.	5	1		1											
Brillia sp.															
Cardiocladius sp.															
Chaetocladius sp.															
Cricotopus-Orthocladius spp.		14	16	65	75	47	47	8	45	38	21	7	13	18	121
Cricotopus (Nostococladius) sp.															
Corynoneura		6	4	1	12	3	2	1	4	2	4				1
Corynoneura cf. scutellata															
Eukiefferiella brehmi grp.															
Eukiefferiella gracei grp.															
Eukiefferiella claripennis grp.					10	1		2		1	2				
Eukiefferiella pseudomontana grp.															
Eukiefferiella devonica grp.									1						
Eukiefferiella similis grp.															
Euryhapsis sp.															
Heleniella sp.															
Heterotrissocladius marcidus grp.	3	3	8	1	1										6
Hydrobaenus sp.															
Krenosmittia sp.															
Limnophyes sp.															1
Lopescladius sp.															
Metriocnemus sp.															2
Nanocladius balticus grp.															
Nanocladius parvulus grp.						1			3				1		
Parakiefferiella sp.				1											14
Parametriocnemus sp.				4			8	1	8	1	7		1		4
Paraphaenocladius sp.															
Parorthocladius sp.															
Psectrocladius psilopterus grp.	33	8	5	11	3	2	9	1	5	2				1	4
Psectrocladius sordidellus grp.															
Pseudosmittia sp.															
Rheocricotopus sp.			1	3	3	4	9		13	2	3	1	1	1	
Symposiocladius sp.															
Synorthocladius sp.							1				1				
Thienemanniella cf. xena					1	1	1		1	2	1				
Thienemanniella fusca															
Tvetenia bavarica grp.				21				12	16	16	7		8	1	9
Apedilum sp.															
Chironomus sp.															
Cladotanytarsus vanderwulpi grp.							1							1	1
Constempellina sp.															
Cryptochironomus sp.															
Demicryptochironomus sp.															
Dicretendipes sp.															
Micropsectra sp.	6	23	68	46	27	46	68	14	79	27	29	30	42	51	62
Microtendipes pedellus grp.	3	1	1	3			2		3	3	5		1	5	5
Microtendipes rydalensis grp.															
Paracladopelma doris grp.				1											
Paratanytarsus sp.															
Paratendipes sp.															
Phaenopsectra sp.	4	1		1										1	
Polypedilum aviceps															
Polypedilum cf. convictum					3			1	5	5		4	6	2	
Polypedilum cf. laetum															
Polypedilum scalaenum															
Polypedilum cf. tritum														1	
Pseudochironomus sp.		1		2	3				1		1			1	4
Rheotanytarsus sp.			1		2	4		4	12	4	4	1	9		11
Stempellinella sp.															
Stictochironomus	75	105	73	35				1						1	2
Tanytarsus sp.	2	2	4			3	4		1		4	4	4	3	4
TOTAL	162	222	253	215	407	442	280	244	566	318	439	291	427	301	324

MARTIS CREEK BIOASSESSMENT 2012	BIO-MC1	BIO-MC1	BIO-MC2	BIO-MC2	BIO-MC3	BIO-MC3	BIO-MC4	BIO-MC4	BIO-MC5	BIO-MC5	BIO-MC6	BIO-MC6
Sample Type	TRC	RWB	TRC	RWB	TRC	RWB	TRC	RWB	TRC	RWB	TRC	RWB
LAB FINAL ID												
NON-INSECT TAXA												
Turbellaria	41	20	16	3	31	30	71	88			2	
Oligochaeta	11	24	7	10	33	22	115	83	39	68	39	65
Helobdella stagnalis										3		
Candona sp.	5	4		6	4	1	1	6		13		1
Herpetocypris sp.								4				
Hyalella sp.											117	113
Pacifastacus leniusculus				1					1	1	1	1
Protzia sp.	29	22	3		12	5			4			
Wandesia sp.	1	2						1				
uid species	1	1										
Hygrobates sp.								3		3		
Lebertia sp.	2	6	10	6		1	13	10	4	9		
Sperchon sp. A			1				3	4				
Sperchon sp. B	2											
Testudacarus sp.								2				
Pisidium casertanum	1	3		2	6	2	13	25		2	2	2
INSECT TAXA												
Ameletus validus									2	1		
Ameletus sp.		3			3	6	1					
Baetis tricaudatus	64	51	31	16	15	5	37	15	3	1	13	6
Diphetor hageni		1		2	1	3			3	1	13	9
Pseudocloeon sp.												4
Caudatella heterocaudata	8	1										
Drunella doddsi	37	25	2	1								
D. flavilinea	2	4										
D. grandis	6	27			6	2	1				1	1
Ephemerella dorothea			8	6					152	63	2	
Serratella teresa			1									
Serratella tibialis	1	1	2	2	1	1					1	
Cinygma sp.					3	8			1		7	9
Cinygmula sp.	32	50	3	2	26	15	5	9	3	1	13	13
Ecdyonurus criddlei										2		
Epeorus grandis		1										
Ironodes californica	19	4	1		32	20					8	10
Paraleptophlebia bicornuta										1		
P. debilis										10	16	18
P. memorialis/temporalis	11	6	6	8	13	31	4	2	38	38	73	102
uid species										6		
Paraperla sp.		1			1							
Sweltsa sp.	11	20	76	54	40	78	21	15	36	21		
Suwallia sp.		2										
Moselia sp.					1	2						
uid species	2	5			1	3	3	2				
Malenka sp.		1		1	6	10		3	9	3	14	19
Soyedina sp.					1							
Visoka cataractae	1	2				6						
Zapada cinctipes	9	2	7	1	32	20	23	22	13	3	23	19
Zapada sp. A	3	3			1	1						
Yoraperla nigrisoma	95	90	2	1	10	7	1				4	1
Calineuria californica				1	9			1				
Doroneuria baumanni	15	7			7	8						

Isoperla pinta		9					3	3				
Perlinodes aurea			1									
Skwala americana			9	18					28	16	2	1
uid species					3							
Pteronarcys princeps	5	2			3	4						
Sialis occidens				1			1					1
Apatania sp.		2				1						
Brachycentrus americanus	1	4	1				39	10				
Micrasema sp.		2	35	16			23	37				
Anagapetus sp.	6	2			12	11	1	1				
Glossosoma sp.			1									
Ceratopsyche osleri			17	3		1	1		23	1	10	4
Parapsyche almota	11	10							1			
Hydroptila sp.									1	2	2	
Lepidostoma sp.									2			
Cryptochia sp.					1							
Dicosmoecus sp.									1			
Ecclisomyia sp.		8			1							
Dolophilodes sp.	3	1										
Rhyacophila arnaudi	1	2				2						
R. vaccua	11	6	3	2	18	9	5	2			1	
Rhyacophila sp. (brunnea grp)	3	3	1	1	4	2		1				
Neophylax rickerti		2	1	1								
Amphizoa sp.		1										
Agabus sp.							1					
Ochthebius sp. A			1					2				
Eubrianax edwardsii										2	2	3
Cleptelmis addenda							36	15			22	13
Heterolimnius corpulentus	29	48			107	90	1	1				
Lara avara	6	3			8	9						
Narpus sp.					4	9						
Optioservus quadrimaculatus			64	45			34	3	50	54		1
Rhizelmis nigra					1							
Zaitzevia parvula			14	6			25	8	5	1	1	
Atrichopogon sp.	1											
Bezzia sp.			1	1		1	1	2		2		1
Boreochlus sp.					1							
Tanypus sp.				2								
Conchapelopia sp				17	1				2	33	1	1
Paramerina sp.											1	
Pentaneura sp.				1								1
Reomyia sp.		1										
Zavreliomyia sp.								1				
Diamesa sp.			3								1	
Pagastia sp.			2	1					2	1		
Potthastia sp. (gaedii grp)			2	3						3		
Monodiamesa sp.				2								
Odontomesa sp.				2								
Brillia sp.	1	2		1	1	1	1					
Cardiocladius sp.												1
Chaetocladius sp.					8	8		1				
Corynoneura sp.					2			1				
Cricotopus annulator									7	12	2	7
Cricotopus. (bicinctus grp)			9	12			6	16				1
C. (tremulus grp)			19	24		1			12	4	3	
C. (Isocladius) sp. A									1			
Cricotopus (Nostococladius)			2	1					1		1	1
Eukiefferiella (claripennis)								1				1
Eukiefferiells (devonica)			1		1				5		8	2

Eukiefferiella (gracei)			2	1					7		9	1
Georthocladius sp.					1	1						
Heterotrissocladius sp.		1										
Krenosmittia sp.						1						
Nanocladius sp.				18						4		
Orthocladius cf. doreus								4	4			
Orthocladius cf. obumbratus			1									
Orthocladius sp. B			3									
O. (Euorthocladius) sp. B								1				
Parametrioctenemus sp.	2	1				1	1	1	1			
Rheocricotopus sp.		1		13	2	3	2	23		1		
Synorthocladius sp.							1		1	2		
Thienemanniella sp.												5
Tvetenia sp. A	5	2	39	22	1	3	6	5	18	1	29	23
Tvetenia sp. B								1				
Apedilum sp.				1								
Cryptochironomus sp.				1								
Endochironomus sp.				4								
Microtendipes sp.				3	1				1	11		
Polypedilum sp.				15								
Pseudochironomus richardsoni				7	1				1	1		
Micropsectra sp. A	15	7	66	89	2		2	4	41	18	49	36
Micropsectra sp. B		2		20				1		40	1	
Paratanytarsus sp.			1									
Rheotanytarsus sp.			2						5			
Stempellina sp. A		8										
Stempellinella sp.				2								
Dixa sp.								1				3
Prosimulium sp.	1											
Simulium arcticum	4	2			2	1	6	5			6	5
S. aureum			2	4				8	2	2	16	28
S. piperi							39	29	2		11	17
S. tuberosum			12				2		10		4	
Pericoma sp. A	2	8	36	17	2		2	2	13	11		
Pericoma sp. C					1							
Antocha monticola		2	20	19	1				6	2		1
Cryptolabis sp.			1									
Dicranota sp. A			4	3		1	3		1	2	1	
Dicranota sp. B						3	1		2		2	
Hexatoma sp. A	1	4	1	1								
Hexatoma sp. B			2	1		2	1	4		1		
Tipula sp.	1				1	2		1	1	1		
Neoplasia sp.	2			4				2			1	
Triclinocera sp.				1								
Glutops sp.	3	11	1	2	2	2						
Chrysops sp.				1						3		1
uid tabanid species										1		
TOTAL	525	554	556	532	489	460	560	498	569	488	536	552

STREAM: SQUAW Creek SITE: Upper Meadow DATE: 7-25-2001 1200

RIFFLE SERIES: 131-391 178-101 139-143

Run 0-15 139-143 102-116 116-143 143-150 meters

Transects at 10 meter intervals along 150 meter reach

T	Stream Width	Bank Cover L	Bank Cover R	Angle Left	Angle Right	Densio. Left	Densio. Up	Densio. Down	Densio. Right	Rndm No.
1	6.8	VgE	VgE	M	M	0	0	0	0	
2	4.9	VgE	VgE	M	M	0	0	0	0	35
3	6.7	VgE	VgE	M	M	0	0	0	0	88
4	4.1	ArE	O ^{Grass} BAR	M	S	0	0	0	0	92
5	6.5	VgE	VgE	S	M	0	0	0	0	139
6	8.2	VgE	O ^{Grass} BAR	U	S/M	0	0	0	0	142
7	7.4	VgE	O ^{Grass} BAR	M	S/M	0	0	0	0	
8	8.3	VgE	VgE	M	M	0	0	0	0	
9	5.1	VgE	VgE	M	M	0	0	0	0	
10	2.0	VgE	O ^{Grass} BAR	M	S	0	0	0	0	
11	4.9	VgE	VgE/O ^{Grass}	M	M/S	0	0	0	0	
12	3.7	VgE/O ^{Grass}	VgE	M/S	U	0	0	0	0	
13	5.6	VgE	VgE	M	M	0	0	0	3	
14	4.4	O ^{Grass} BAR	ArE	S	M	0	0	0	0	
15	5.7	VgE	ArE	M	M	0	0	0	0	
GPS:	42	VgE	VgE	M	U	0	0	0	0	

SLOPE(s):

stream length(s)

upper level reading(s)

2.81

lower level reading(s)

2.79

Site Backwatered

LINEAR DISTANCE ALONG 150 METER REACH LENGTH: 80.4

WATER CHEM. SAMPLED? @ 1200

TEMPERATURE 17.54 pH 7.48

CONDUCTIVITY 153

D.O. 9.34

ALKALINITY 179

Surrounding RIPARIAN VEGETATION Cover (w/in 2 m of channel)

[descriptions of species present if known and sparse/common/ or dense]

[Sparse=<25%, Common=50%, Dense=>75%; S-C=25-50%, C-D=50-75%]

Herbaceous Cover Dense

Woody Bushes SPARSE

Deciduous Trees

Evergreen Trees Very SPARSE

ALGAE TYPE(s) Present:

☒ Diatom Film (olive green)

☒ Filamentous Form (green)

☒ Mat / Slime (blue-green)

PHOTOS:

U5 05
178 179 0
176 177 50
174 175 100
172 173 150

Pic 581 Algae

Riffle @ 139-142 very sandy

Site backwatered from Beaverdam 70m D.S.

DATE: 7-25-14 2001

T	D-1	V-1	ST-1	D-2	V-2	ST-2	D-3	V-3	ST-3	D-4	V-4	ST-4	D-5	V-5	ST-5
1	14		A 71 26	39		3 A 50			12 A 60			25 A 20			71 A
2	10		71 A 26			71 A 48			23 A 44			4 A 45			9 A
3	56		9 A 99			20 A 75			3 A 26			1 A 17			71 A
4	81		71 A 99			9 A 87			6 A 60			3 A 19			1 A
5	19		71 A 18			29 A 15			31 A 24			10 A 09			2 A
6	28		71 A 55			5 A 59			11 A 52			15 A 29			1 A
7	42		71 A 36			38 A 27			12 A 22			15 A 10			9 A
8	54		71 A 54			1 A 77			4 A 66			6 A 19			14 A
9	9		71 A 29			0 A 45			50 A 44			12 A 10			16 A
10	4		6 A 7			16 A 13			39 A 15			12 A 8			3 A
11	7		71 A 10			1 A 15			2 A 9			2 A 7			39 A
12	16		35 A 29			1 A 35			15 A 42			18 A 48			71 A
13	16		71 A 47			1 A 46			60 A 73			7 A 35			71 A
14	9		15 A 28			3 A 51			7 A 52			11 A 8			71 A
15	3		20 A 0			20 5			16 A 8			10 A 15			5 A
	10		15 A 50			17 A 53			21 A 74			15 A 81			71 A

CORRIE EMBEDDEDNESS MEASURES (n=25)

Current Meter used and units:

[illegible]

STREAM: SQUAN Creek SITE: middle meadow DATE: 7-24-12 2001

RIFFLE SERIES: 0-4 114-251 152-68 125-132 145-156 1
RUN 114-141 125-36 144-50 188-104 1132-142 1 meters
 POOL SERIES: 4-141 1 136-44 152-52 168-88 1104-125 142-145 1 meters

Transects at 10 meter intervals along 150 meter reach

T	Stream Width	Bank Cover L	Bank Cover R	Angle Left	Angle Right	Densio. Left	Densio. Up	Densio. Down	Densio. Right	Rndm No.
1	2.6	~~GRV~~ <u>GRV</u>	~~GRV~~ <u>GRV</u>	<u>S/M</u>	<u>S</u>	0	0	0	0	
2	3.7	<u>VgE</u>	<u>OS</u> <u>VgE</u>	<u>M</u>	<u>S/M</u>	0	0	0	3	2
3	3.8	<u>VgE</u>	<u>OS</u> <u>VgE</u>	<u>M</u>	<u>S/M</u>	0	0	0	0	22
4	4.2	<u>VgE</u>	<u>VgE</u>	<u>M</u>	<u>M</u>	0	0	0	0	63
5	4.9	<u>VgE</u>	<u>VgU</u>	<u>M</u>	<u>M</u>	0	0	0	0	127
6	4.6	<u>VgE</u>	<u>VgE</u>	<u>M</u>	<u>U</u>	0	0	0	0	146
7	5.9	<u>VgE</u>	<u>VgE</u>	<u>M</u>	<u>U</u>	0	0	0	0	
8	3.7	<u>VgE</u>	<u>VgE</u>	<u>M</u>	<u>M</u>	3	0	0	0	
9	3.1	<u>VgE</u>	<u>GRV</u> <u>VgE</u>	<u>U</u>	<u>S/m</u>	0	0	0	0	
10	5.5	<u>VgE</u>	<u>VgE</u>	<u>M</u>	<u>U</u>	0	0	0	0	
11	5.1	<u>VgE</u>	<u>VgE</u>	<u>U</u>	<u>M</u>	0	0	0	0	
12	5.3	<u>VgE</u>	<u>VgE</u>	<u>M</u>	<u>U</u>	0	0	0	0	
13	4.7	<u>VgE</u>	<u>VgE</u>	<u>M</u>	<u>U</u>	0	0	0	0	
14	4.6	<u>VgE</u>	<u>VgE</u>	<u>S/M</u>	<u>U</u>	0	0	0	0	
15	5.7	<u>VgE</u>	<u>VgE</u>	<u>M</u>	<u>U</u>	0	0	0	0	
GPS	11.3	<u>VgE</u>	<u>VgE</u>	<u>M</u>	<u>U</u>	0	0	0	0	

ELEVATION: _____

SLOPE(s):

stream length(s)

0.35%

upper level reading(s)

2.12 m

lower level reading(s)

2.65 m

LINEAR DISTANCE ALONG 150 METER REACH LENGTH: 137m

WATER CHEM. SAMPLED? C 1200

TEMPERATURE 22.47 pH _____

CONDUCTIVITY 161

D.O. 10.70

ALKALINITY 193.6

Surrounding RIPARIAN VEGETATION Cover (w/in 2 m of channel)

[descriptions of species present if known and sparse/common/ or dense]

[Sparse=<25%, Common=50%, Dense=>75%; S-C=25-50%, C-D=50-75%]

Herbaceous Cover Dense

Woody Bushes SPARSE

Deciduous Trees -

Evergreen Trees -

ALGAE TYPE(s) Present:

☒ Diatom Film (olive green)

☒ Filamentous Form (green)

☒ Mat / Slime (blue-green)

PHOTOS: 13 135

557, 558 @ 0
 559, 560 @ 50
 561, 562 @ 100
 563, 564 @ 150

PIE 565-566 Riffle @ 125-132

567-568 Drumella GRANDIS

SCATTERED clumps RANUNCULUS

568-570 Algae Red Rock BREA ing off

STREAM: SQUAW CREEK SITE: Middle Meadow

DATE: 7-24-12 2001

T	D-1	V-1	ST-1	D-2	V-2	ST-2	D-3	V-3	ST-3	D-4	V-4	ST-4	D-5	V-5	ST-5
1	8		5A	6		31A	8		9A	4		4A	5		10A
2	11		1A	29		71A	43		25A	32		21A	15		4A
3	4		1A	3		24A	5		31A	10		15A	16		71A
4	4		3A	9		71A	15		16A	16		8A	12		71A
5	11		71A	12		1A	40		3A	54		71A	20		71A
6	26		71A	31		3A	14		5A	29		20A	46		71A
7	12		11A	4		3A	0		34	5		29A	16		1A
8	44		71A	52		30A	42		6A	27		14A	13		3A
9	45		6A	58		6A	52		13A	31		20A	15		1A
10	31		71A	44		18A	15		6A	18		6A	21		71A
11	46		16A	50		3A	38		71A	37		25A	22		2A
12	18		71A	16		7A	35		15A	26		13A	11		71A
13	20		71A	39		2A	50		16A	42		21A	35		38A
14	6		71A	5		37A	1		2A	2		10A	5		28A
15	6		1A	9		4A	6		21A	12		19A	20		71A
16	10		65A	4		13A	0		3-	0		5	4		71A

Current Meter used and units:

COBBLE EMBEDDEDNESS MEASURES (n=25)				
35	50	60	15	25
5	25	30	10	15
50	30	5	20	0
15	10	25	30	10
80	70	15	60	45

STREAM: SQUAW Creek SITE: LOWER MEADOW DATE: 7-23-17 2001 12:00

RIFFLE SERIES: 2-4 / 129-38 / / / / / 1106-1111 /

POOL SERIES: 6-2 / / / 138-36 / / / / / 189-106 / 111-131 meters

RUN 8-63 82-89 131-150+ meters

Transects at 10 meter intervals along 150 meter reach

T	Stream Width	Bank Cover L	Bank Cover R	Angle Left	Angle Right	Densio. Left	Densio. Up	Densio. Down	Densio. Right	Rndm No.
100 ¹	3.3m	0 GRAVEL BAR	V ₆ E	S	M	0	0	0	8	
100 ²	7.5m	0 GRAVEL BAR	V ₆ E	S	M	0	0	0	0	3
300 ³	2.3	0 GRAVEL BAR	V ₆ E	S	M	0	0	0	0	3529
400 ⁴	4.8	V ₆ E	0 GRAVEL BAR	U	S	0	0	0	0	35
600 ⁵	5.3	V ₆ E	V ₆ B	U	M	0	0	0	0	38
800 ⁶	4.9	V ₆ E	V ₆ B	U	M	0	0	0	5	109
900 ⁷	7.9	V ₆ B	V ₆ E	M	M	0	0	0	0	
1100 ⁸	6.0	V ₆ E	0 GRAVEL BAR	U	S	0	0	0	0	
1200 ⁹	6.1	V ₆ E	0 GRAVEL BAR	M	S	0	0	0	0	
1400 ¹⁰	3.7	V ₆ E	0 GRAVEL BAR	U	S	0	0	0	0	
1300 ¹¹	3.2	V ₆ E	0 GRAVEL	M	S	0	0	0	0	
1000 ¹²	10.3	0 GRAVEL BAR	V ₆ E	S	U	0	0	0	0	
700 ¹³	4.2	V ₆ E	V ₆ E	M	M	0	0	0	0	
500 ¹⁴	5.1	V ₆ E	V ₆ B	M	M	0	0	0	0	
150 ¹⁵	5.4	V ₆ E	V ₆ B	U	M	0	0	0	0	
160 ¹⁶	3.5	V ₆ E	0 GRAVEL BAR	M	S	0	0	0	0	
10	4.1	0 GRAVEL BAR	V ₆ E	S	U	0	0	0	0	

SLOPE(s) stream length(s)

upper level reading(s)

ELEVATION:

lower level reading(s)

0.20%

2.71m

2.96m

LINEAR DISTANCE ALONG 150 METER REACH LENGTH: 123m

WATER CHEM. SAMPLED? ☒

TEMPERATURE 20.82 pH 8.03 CONDUCTIVITY 158

D.O. 4.30 ALKALINITY 47.8%

Surrounding RIPARIAN VEGETATION Cover (w/in 2 m of channel)

TDS 0.111 SAL 0.008

[descriptions of species present if known and sparse/common/ or dense]

ALGAE TYPE(s) Present:

[Sparse=<25%, Common=50%, Dense=>75%; S-C=25-50%, C-D=50-75%]

☒ Diatom Film (olive green)

Herbaceous Cover DENSE

* ☒ Filamentous Form (green)

Woody Bushes SPARSE

☐ Mat / Slime (blue-green)

Deciduous Trees -

Evergreen Trees SPARSE - NONE

PHOTOS: 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

PIC 554-554 DG BAR @ 105 CONGR POOL

543 544 4505 100
45 46 4505 50
47 48 4505 0

STREAM: SQUAW CREEK

SITE: LOWER MEADOW

DATE: 7-23-17

2001

T	D-1	V-1	ST-1	D-2	V-2	ST-2	D-3	V-3	ST-3	D-4	V-4	ST-4	D-5	V-5	ST-5
1	20		60 ^A	70		80 ^A	45		14 ^A	27		71 ^A	15		71 ^A
2	2		40 ^A	14		10 ^A	26		71 ^A	36		90 ^A	29		19 ^A
3	41		37 ^A	6		12 ^A	6		21 ^A	10		31 ^A	16		71 ^A
4	18		27 ^A	22		24 ^A	21		11 ^A	13		7 ^A	6		4 ^A
5	28		22 ^A	18		24 ^A	8		10 ^A	5		5 ^A	29		3 ^A
6	53		71 ^A	66		18 ^A	56		3 ^A	30		90 ^A	5		7 ^A
7	2		10 ^A	0		1	4		40 ^A	40		90 ^A	8		71 ^A
8	32		14 ^A	59		47 ^A	20		30 ^A	59		10 ^A	19		71 ^A
9	10		20 ^A	50		71 ^A	59		26 ^A	35		14 ^A	19		21 ^A
10	15		22 ^A	20		40 ^A	20		23 ^A	15		22 ^A	8		10 ^A
11	29		71 ^A	22		46 ^A	20		4 ^A	15		34 ^A	9		9 ^A
12	18		40 ^A	38		13 ^A	59		10 ^A	50		71 ^A	68		71 ^A
13	70		71 ^A	72		13 ^A	92		4 ^A	58		10 ^A	25		71 ^A
14	70		50 ^A	51		14 ^A	22		14 ^A	9		41 ^A	9		6 ^A
15	40		71 ^A	54		14 ^A	35		10 ^A	25		34 ^A	16		14 ^A
16	11		71 ^A	15		12 ^A	19		52 ^A	18		25 ^A	16		3 ^A

Current Meter used and units:

COBBLE EMBEDDEDNESS MEASURES (n=25)			
5	35	0	
50	10	30	15
35	45	25	
	10		

10 10 10 20 60 45 40 55 71^A

REACH DOCUMENTATION		Standard Reach Length (wetted width ≤ 10 m) = 150 m Distance between transects = 15 m Alternate Reach Length (wetted width > 10 m) = 250 m Distance between transects = 25 m	
Project Name: <u>TRUCKEE RIVER WQ MON. PRG</u>	Date: <u>8 / 21 / 2012</u>	Sample Collection Time: <u>1130</u>	
Stream Name: <u>MARTIN CREEK SCHOFFER BRANCH</u>	Site Name/ Description: <u>1MM. BELOW FOOTBRIDGE & MARTIN CREEK UPPER LWS SITE</u>		
Site Code: <u>MC-1</u>	Crew Members: <u>FOL / BJIC</u>		
Latitude (actual - decimal degrees): °N	datum: <u>NAD83</u>	GPS Device: <u></u>	
Longitude (actual - decimal degrees): °W	other: <u></u>		

AMBIENT WATER QUALITY MEASUREMENTS					* Turbidity, silica, oxygen saturation, and air temp are optional; calibration date required on page 24		Actual Reach Length (m) (see reach length guidelines at top of form)
Water Temp (Deg C)	pH	Turbidity (mg/L)	Turbidity (ntu)*	Oxygen Sat. (%)*			
<u>9.23</u>	<u>7.03</u>	<u>0.029</u>	<u>41.6</u>	<u>94.8</u>		<u>150</u>	
Dissolved O ₂ (mg/L)	Specific Conduct (uS/cm)	Salinity (ppt)	ORP (mg/L)*	Air Temp (Deg C)*	Explanation:		
<u>10.92/94.8</u>	<u>121/84</u>	<u>0.06</u>	<u>82.8</u>	<u>23°C</u>			

DISCHARGE MEASUREMENTS								check if discharge measurements not possible ☐			
1 st measurement = left bank (looking downstream)								(explain in field notes section)			
VELOCITY AREA METHOD (preferred)				cal. date		Transect Width (m): <u>1.8</u>		BUOYANT OBJECT METHOD (use ONLY if velocity area method not possible)			
	Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)		Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)		Float 1	Float 2	Float 3
1	84.5	2	60%	11	174.5	11	0.478	Distance (m)			
2	93.5	4	85%	12	183.5	12	0.295	Float Time (sec)			
3	102.5	5	90%	13	192.5	12	0.353	Float Reach Cross Section			
4	111.5	5	90%	14	201.5	14	0.236	width (m)	Upper Section	Middle Section	Lower Section
5	120.5	6	0.241	15	210.5	16	0.251	Depth 1			
6	129.5	8	0.368	16	219.5	14	0.302	Depth 2			
7	138.5	10	0.361	17	228.5	14	0.249	Depth 3			
8	147.5	10	0.346	18	237.5	13	0.244	Depth 4			
9	156.5	10	0.440	19	246.5	12	0.278	Depth 5			
10	165.5	11	0.476	20	255.5	10	80%				

NOTABLE FIELD CONDITIONS (check one box per topic)			
Evidence of recent rainfall (enough to increase surface runoff)	<u>NO</u>	minimal	>10% flow increase
Evidence of fires in reach or immediately upstream (<500 m)	<u>NO</u>	< 1 year	< 5 years
Dominant landuse/ landcover in area surrounding reach	Agriculture	<u>Forest</u>	Rangeland
	Urban/Industrial	<u>Suburb/Town</u>	Other

ADDITIONAL COBBLE EMBEDDEDNESS MEASURES (carry over from transect forms if needed to attain target count of 25 measure in %)	1	2	3	4	5	6	7	8	9	10	11	12	13
	14	15	16	17	18	19	20	21	22	23	24	25	

STREAM GAUGE STAFF PLATE 0.50

Site Code:

MC-1

Date: 08/21/2012

SLOPE and BEARING FORM (transect based - for Full PHAB only)

 AUTOLEVEL
 CLINOMETER
 HANDLEVEL
 OTHER

Starting Transect	MAIN SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)					SUPPLEMENTAL SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)				
	Stadia rod measurements	Slope (%) or Elevation Difference	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)	Stadia rod measurements	Slope or Elevation Difference	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)
	POS 1 POS 2	cm ☐ % ☐					cm ☐ % ☐			
K	3,255	POS 2								
J										
I	1,890 0,265									
H										
G										
F	2,428 1,035									
E										
D										
C										
B										
A		4,875								

additional
calculation
area

ADDITIONAL HABITAT CHARACTERIZATION

High Gradient ☒Low Gradient ☐

Parameter	Optimal	Suboptimal	Marginal	Poor
Epifaunal Substrate/ Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover (50% for low- gradient streams); mix of submerged logs, undercut banks, cobble or other stable habitat	40-70% mix of stable habitat (30- 50% for low-gradient streams); well-suited for full colonization potential	20-40% mix of stable habitat (10- 30% in low-gradient streams); substrate frequently disturbed or removed	Less than 20% stable habitat (10% in low-gradient streams); lack of habitat is obvious; substrate unstable or lacking
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition (<20% in low-gradient streams)	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 5-30% of the bottom affected (20-50% in low-gradient streams)	Moderate deposition of new gravel, sand, or fine sediment on bars; 30- 50% of the bottom affected (50- 80% in low-gradient streams)	Heavy deposits of fine material; increased bar development; more than 50% of the bottom changing frequently (>80% in low-gradient streams)
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern	Some channelization present, (e.g., bridge abutments); evidence of past channelization (> 20yrs) may be present but recent channelization not present	Channelization may be extensive; embankments or shoring structures present on both banks; 40 to 80% of stream reach disrupted	Banks shored with gabion or concrete; Over 80% of the stream reach channelized and disrupted; instream habitat greatly altered or removed entirely
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Site Code: MC-1	Site Name:	Date: 08/21/2012
Wetted Width (m): 2.0	Bankfull Width (m): 3.12	Bankfull Height (m): 42cm
Transect A		

Transect Substrates									
Position	Dist from L.B. (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	1	71		(P)A	0	P(A)D	P(A)D	(P)A D
Left Center	0.5	7	9		(P)A	1	P(A)D	P(A)D	P(A)D
Center	1.1	19	5		(P)A	0	P(A)D	P(A)D	P(A)D
Right Center	1.5	16	200	35	(P)A	1	P(A)D	P(A)D	(P)A D
Right Bank	2.0	15	71		(P)A	0	P(A)D	P(A)D	(P)A D

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

Microalgae Thickness Codes
 0 = No microalgae present. Feels rough, not slimy.
 1 = Present but not visible. Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail.
 3 = 1-5mm.
 4 = 5-20mm.
 5 = >20mm.
 UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z-code).
 D = Dry, not assessed.

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Filamentous Algae	0 1 2 3 4		
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4		
Boulders -	0 1 2 3 4		
Woody Debris >0.3 m	0 1 2 3 4		
Woody Debris <0.3 m	0 1 2 3 4		
Undercut Banks	0 1 2 3 4		
Overhang, Vegetation	0 1 2 3 4		
Live Tree Roots	0 1 2 3 4		
Artificial Structures	0 1 2 3 4		

DENSIOMETER READINGS (0-17) count covered dots	
Center	14
Left	17
Center Upstream	17
Center Right	16
Center Downstream	16
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m <50m from Channel Channel (record Yes or No)	
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0	Y N	0 B C P
Row Crop	P C B 0	Y N	0 B C P
Pasture/ Range	P C B 0	Y N	0 B C P
Logging Operations	P C B 0	Y N	0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0	Y N	0 B C P

BANK STABILITY			
Left Bank	eroded	stable	stable
Right Bank	eroded	stable	stable

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (optional)	☐
893	
Upstream (required)	☐
894	

new tree fall upstream of A
 Rec TRAIL whole stretch

Inter-Transect: AB

Wetted Width (m):

2.3

Inter-Transect Substrates

Position	Dist from L.B. (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	9	71		P A	0	P A D	P A D	P A D	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt. (formerly Z code) D = Dry, not assessed
Left Center	0.6	8	17		P A	1	P A D	P A D	P A D	
Center	1.2	10	15		P A	1	P A D	P A D	P A D	
Right Center	1.7	12	125	30	P A	1	P A D	P A D	P A D	
Right Bank	2.3	14	23		P A	1	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

Substrate Size Class	
Channel Type	
Gravel Type	
Gravel	70
Sand	10
Silt	
Clay	
UD	
D	

Site Code: <u>MC-1</u>	Site Name:	Date: <u>08/21/2012</u>
Wetted Width (m): <u>2.00</u>	Bankfull Width (m): <u>2.80</u>	Bankfull Height (m): <u>43cm</u>

Transect B

Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0.0	8	27		P	1	P	P	P	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-6mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code) D = Dry, not assessed
Left Center	0.5	13	129	10	P	1	P	P	P	
Center	4.0	11	24		P	1	P	P	P	
Right Center	1.5	10	99	5	P	1	P	P	P	
Right Bank	2.0	1	39		P	1	P	P	P	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

MACRO
Phytes
on cobble
= moss

RIPARIAN VEGETATION (facing downstream)			INSTREAM HABITAT COMPLEXITY			DENSIMETER READINGS (0-17) <i>count covered dots</i>		
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)					
Vegetation Class	Left Bank	Right Bank						
Upper Canopy (>5 m high)								
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4						
Lower Canopy (0.5 m-5 m high)								
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4						
Ground Cover (<0.5 m high)								
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4						
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4						
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4						

INSTREAM HABITAT COMPLEXITY			DENSIMETER READINGS (0-17) <i>count covered dots</i>		
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		
Filamentous Algae	0 1 2 3 4		Center Left	8	
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4		Center Upstream	10	
Boulders	0 1 2 3 4		Center Right	17	
Woody Debris >0.3 m	0 1 2 3 4		Center Downstream	17	
Woody Debris <0.3 m	0 1 2 3 4		Optional		
Undercut Banks	0 1 2 3 4		Left Bank		
Overhang. Vegetation	0 1 2 3 4		Right Bank		
Live Tree Roots	0 1 2 3 4				
Artificial Structures	0 1 2 3 4				

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m - <50m from Channel Channel (record Yes or No)											
		Left Bank				Channel		Right Bank					
Walls/ Rip-rap/ Dams		P	C	B	0	Y	N	0	B	C	P		
Buildings		P	C	B	0	Y	N	0	B	C	P		
Pavement/ Cleared Lot		R	C	B	0			0	B	C	P		
Road/ Railroad	TRAIL	P	C	B	0	Y	N	0	B	C	P		
Pipes (Inlet/ Outlet)		P	C	B	0	Y	N	0	B	C	P		
Landfill/ Trash		P	C	B	0	Y	N	0	B	C	P		
Park/ Lawn		P	C	B	0			0	B	C	P		
Row Crop		P	C	B	0			0	B	C	P		
Pasture/ Range		P	C	B	0			0	B	C	P		
Logging Operations		P	C	B	0			0	B	C	P		
Mining Activity		P	C	B	0	Y	N	0	B	C	P		
Vegetation Management		P	C	B	0			0	B	C	P		
Bridges/ Abutments		P	C	B	0	Y	N	0	B	C	P		
Orchards/ Vineyards		P	C	B	0			0	B	C	P		

BANK STABILITY			
Left Bank	eroded	stable	stable
Right Bank	eroded	stable	stable

Inter-Transect: BC

Wetted Width (m): 2.1

Inter-Transect Substrates

Position	Dist. from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	10	121	10	P A	0	P A D	P A D	P A D	0 = No microalgae present. Feels rough, not slimy.
Left Center	0.5	18	165	0	P A	2	P A D	P A D	P A D	1 = Present but not visible. Feels slimy.
Center	1.1	14	161	0	P A	1	P A D	P A D	P A D	2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail.
Right Center	1.6	0.4	250		P A	1	P A D	P A D	P A D	3 = 1-5mm.
Right Bank	2.1	5	32		P A	1	P A D	P A D	P A D	4 = 5-20mm.
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										5 = >20mm.
										UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed.

FLORA HABITATS	
Channel Type	%
Channel Type	
Channel Type	
Channel Type	45
Channel Type	5
Channel Type	
Channel Type	
Channel Type	

Site Code: <u>MC-1</u>	Site Name:		Date: <u>8/21/2012</u>
Wetted Width (m): <u>1.6</u>	Bankfull Width (m): <u>2.9</u>	Bankfull Height (m): <u>45cm</u>	Transect C

Transect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	2	129	50	PA	0	PA D	PA D	PA D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present; substrate too small or covered with silt. (formerly Z code) D = Dry, not assessed.
Left Center	0.4	13	10		PA	0	PA D	PA D	PA D	
Center	0.8	17	18		PA	0	PA D	PA D	PA D	
Right Center	1.2	13	23		PA	1	PA D	PA D	PA D	
Right Bank	1.6	2	1		PA	0	PA D	PA D	PA D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

RIPARIAN VEGETATION (facing downstream)			INSTREAM HABITAT COMPLEXITY		DENSIMETER READINGS (0-17) count covered dots	
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			
Vegetation Class	Left Bank	Right Bank				
Upper Canopy (>5 m high)						
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Filamentous Algae	0 1 2 3 4	Center Left	17
Lower Canopy (0.5 m-5 m high)						
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	Center Upstream	16
Ground Cover (<0.5 m high)						
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Right	17
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Woody Debris >0.3 m	0 1 2 3 4	Center Downstream	17
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Optional:	
			Undercut Banks	0 1 2 3 4	Left Bank	
			Overhang, Vegetation	0 1 2 3 4	Right Bank	
			Live Tree Roots	0 1 2 3 4		
			Artificial Structures	0 1 2 3 4		

HUMAN INFLUENCE (circle only the closest to wetted channel)		Left Bank		Channel	Right Bank	
0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m - <50m from Channel Channel (record Yes or No)						
Wells/ Rip-rap/ Dams		P C B 0		Y N	0 B C P	
Buildings		P C B 0		Y N	0 B C P	
Pavement/ Cleared Lot		P C B 0		Y N	0 B C P	
Road/ Railroad <u>TRAIL</u>		P C B 0		Y N	0 B C P	
Pipes (Inlet/ Outlet)		P C B 0		Y N	0 B C P	
Landfill/ Trash		P C B 0		Y N	0 B C P	
Park/ Lawn		P C B 0		Y N	0 B C P	
Row Crop		P C B 0		Y N	0 B C P	
Pasture/ Range		P C B 0		Y N	0 B C P	
Logging Operations		P C B 0		Y N	0 B C P	
Mining Activity		P C B 0		Y N	0 B C P	
Vegetation Management		P C B 0		Y N	0 B C P	
Bridges/ Abutments		P C B 0		Y N	0 B C P	
Orchards/ Vineyards		P C B 0		Y N	0 B C P	

Bank Stability			
Left Bank	eroded	stable	0 1 2 3 4
Right Bank	eroded	stable	0 1 2 3 4

Inter-Transect: CD										Wetted Width (m): 1.15
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	8	11		(P)A	1	P (A) D	P (A) D	(P)A D	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.3	12	18		P (A)	1	P (A) D	P (A) D	P (A) D	
Center	0.6	15	37		(P)A	1	P (A) D	P (A) D	P (A) D	
Right Center	0.9	10	12		(P)A	1	P A D	P A D	P A D	
Right Bank	1.2	2	19		(P)A	0	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

Channel Type	%
Channel Type	
Channel Type	
Channel Type	
Channel Type	
Channel Type	
Channel Type	
Channel Type	
Channel Type	
Channel Type	

Site Code: MC-1	Site Name:	Date: 8/31/2012
Wetted Width (m): 1.9	Bankfull Width (m): 3.1	Bankfull Height (m): 4.1

Transect D

Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	2	24		(P) A	1	P (A) D	P (A) D	(P) A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.5	3	12		(P) A	1	P (A) D	P (A) D	(P) A D	
Center	1.0	8	26		(P) A	1	P (A) D	P (A) D	(P) A D	
Right Center	1.4	13	18		(P) A	1	P (A) D	P (A) D	(P) A D	
Right Bank	1.9	11	3		(P) A	1	P (A) D	P (A) D	(P) A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 (3) 4	0 1 (2) 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 (2) 3 4	0 1 (2) 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 (2) 3 4	0 (1) 2 3 4	
Herbs/ grasses	0 (1) 2 3 4	0 1 (2) 3 4	
Barren, bare soil/ duff	0 1 (2) 3 4	0 1 (2) 3 4	

INSTREAM HABITAT COMPLEXITY		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Filamentous Algae	0 1 2 3 4	(0) 1 2 3 4	
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	0 (1) 2 3 4	
Boulders	0 1 2 3 4	(0) 1 2 3 4	
Woody Debris >0.3 m	0 1 2 3 4	(0) 1 2 3 4	
Woody Debris <0.3 m	0 1 2 3 4	0 1 (2) 3 4	
Undercut Banks	0 1 2 3 4	0 (1) 2 3 4	
Overhang, Vegetation	0 1 2 3 4	0 1 2 (3) 4	
Live Tree Roots	0 1 2 3 4	0 (1) 2 3 4	
Artificial Structures	0 1 2 3 4	(0) 1 2 3 4	

DENSIMETER READINGS (0-17) count covered dots	
Center	14
Left	2
Center Upstream	16
Center Right	17
Center Downstream	
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m >50m from Channel Channel (record Yes or No)	
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B (0)	Y (N)	(0) B C P
Buildings	P C B (0)	Y (N)	(0) B C P
Pavement/ Cleared Lot	P C B (0)		(0) B C P
Road/ Railroad TRAIL	(P) C B (0)	Y (N)	0 B C (P)
Pipes (Inlet/ Outlet)	P C B (0)	Y (N)	(0) B C P
Landfill/ Trash	P C B (0)	Y (N)	(0) B C P
Park/ Lawn	P C B (0)		(0) B C P
Row Crop	P C B (0)		(0) B C P
Pasture/ Range	P C B (0)		(0) B C P
Logging Operations	(P) C B (0)		0 B C (P)
Mining Activity	P C B (0)	Y (N)	(0) B C P
Vegetation Management	P C B (0)	Y (N)	(0) B C P
Bridges/ Abutments	P C B (0)	Y (N)	(0) B C P
Orchards/ Vineyards	P C B (0)		(0) B C P

BANK STABILITY			
Left Bank	eroded	vegetated	(0) 1 2 3 4
Right Bank	eroded	vegetated	(0) 1 2 3 4

Inter-Transect: DE										Wetted Width (m): 2.3
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	16	71		(P)A	0	P(A)D	P(A)D	(P)A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present; substrate too small or covered with silt. (formerly Z code). D = Dry, not assessed.
Left Center	0.6	8	11		(P)A	0	P(A)D	P(A)D	(P)A D	
Center	1.2	4	1		(P)A	1	P(A)D	P(A)D	(P)A D	
Right Center	1.7	14	56		(P)A	1	P(A)D	P(A)D	P(A)D	
Right Bank	2.3	7	4		(P)A	0	P(A)D	P(A)D	(P)A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

FLOW HABITATS	
Channel Type	
Channel Form	
Flow	
Flow	
Flow	
Flow	
Flow	
Flow	
Flow	

Site Code: MC-1	Site Name:	Date: 8-12-1 / 2012
Wetted Width (m): 1.5	Bankfull Width (m): 3.9	Bankfull Height (m):
		Transect E

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	2	71		P A	0	P A D	P A D	P A D
Left Center	0.4	8	12		P A	0	P A D	P A D	P A D
Center	0.8	12	71	20	P A	2	P A D	P A D	P A D
Right Center	1.1	20	1		P A	2	P A D	P A D	P A D
Right Bank	1.5	29	60		P A	2	P A D	P A D	P A D

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

Microalgae Thickness Codes
 0 = No microalgae present. Feels rough, not slimy.
 1 = Present but not visible. Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them. scraping leaves visible trail.
 3 = 1-5mm.
 4 = 5-20mm.
 5 = >20mm.
 UD = Cannot determine if microalgae present. substrate too small or covered with silt (formerly Z code)
 D = Dry, not assessed

RIPARIAN VEGETATION (facing downstream)			INSTREAM HABITAT COMPLEXITY			DENSIMETER READINGS (0-17) <i>count covered dots</i>		
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)					
Vegetation Class	Left Bank	Right Bank	Filamentous Algae			Center Left		
Upper Canopy (>5 m high)						17		
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Aquatic Macrophytes/ Emergent Vegetation			Center Upstream		
Lower Canopy (0.5 m-5 m high)						16		
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Boulders			Center Right		
Ground Cover (<0.5 m high)						10		
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Woody Debris >0.3 m			Center Downstream		
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m			11		
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Undercut Banks			Optional		
			Overhang. Vegetation			Left Bank		
			Live Tree Roots			Right Bank		
			Artificial Structures					

HUMAN INFLUENCE (circle only the closest to wetted channel)		Left Bank		Channel	Right Bank	
0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m - <50m from Channel Channel (record Yes or No)						
Walls/ Rip-rap/ Dams		P C B 0		Y N	0 B C P	
Buildings		P C B 0		Y N	0 B C P	
Pavement/ Cleared Lot		P C B 0		Y N	0 B C P	
Road/ Railroad TRAIL		P C B 0		Y N	0 B C P	
Pipes (Inlet/ Outlet)		P C B 0		Y N	0 B C P	
Landfill/ Trash		P C B 0		Y N	0 B C P	
Park/ Lawn		P C B 0		Y N	0 B C P	
Row Crop		P C B 0		Y N	0 B C P	
Pasture/ Range		P C B 0		Y N	0 B C P	
Logging Operations		P C B 0		Y N	0 B C P	
Mining Activity		P C B 0		Y N	0 B C P	
Vegetation Management		P C B 0		Y N	0 B C P	
Bridges/ Abutments		P C B 0		Y N	0 B C P	
Orchards/ Vineyards		P C B 0		Y N	0 B C P	

Bank Stability			
Left Bank	eroded	stable	eroded
Right Bank	eroded	stable	eroded

Inter-Transect: EF										Wetted Width (m): 1.85
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	3	1		P A	0	P A D	P A D	P A D	0 = No microalgae present. Feels rough, not slimy.
Left Center	0.5	10	41		P A	0	P A D	P A D	P A D	1 = Present but not visible. Feels slimy.
Center	0.9	12	149	20	P A	1	P A D	P A D	P A D	2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center	1.4	22	18		P A	1	P A D	P A D	P A D	3 = 1-5mm.
Right Bank	1.9	2	71		P A	0	P A D	P A D	P A D	4 = 5-20mm.
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										5 = >20mm.
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly 2 code)
										D = Dry, not assessed

Flow Habitat	
Channel Type	1
Channel Form	
Flow	
Depth	30
Width	15
Area	
Flow	5
Depth	

Site Code: MC-1	Site Name:	Date: 8/21/2012
Wetted Width (m): 1.5	Bankfull Width (m): 5.5	Bankfull Height (m): 45cm
Transect F		

Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	9	25		0 A		P 0 D	P 0 D	0 P A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them. Scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present. Substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.4	40	79	0	P 0 A	2	P 0 D	P 0 D	0 P A D	
Center	0.8	10	161	50	P 0 A	2	P 0 D	P 0 D	0 P A D	
Right Center	1.1	12	145	45	P 0 A	1	P 0 D	P 0 D	0 P A D	
Right Bank	1.5	2	59	1	P 0 A		P 0 D	P 0 D	0 P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurement's preferred).										

RIPARIAN VEGETATION (facing downstream)			INSTREAM HABITAT COMPLEXITY		DENSIOMETER READINGS (0-17) count covered dots	
Vegetation Class	Left Bank	Right Bank				
0 = Absent (0%) 3 = Heavy (40-75%) 1 = Sparse (<10%) 4 = Very Heavy (>75%) 2 = Moderate (10-40%)						
Upper Canopy (>5 m high)						
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Filamentous Algae	0 1 2 3 4	Center Left	17
Lower Canopy (0.5 m-5 m high)						
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	Center Upstream	16
Ground Cover (<0.5 m high)						
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Right	10
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Woody Debris >0.3 m	0 1 2 3 4	Center Downstream	12
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Optional	
			Undercut Banks	0 1 2 3 4	Left Bank	
			Overhang, Vegetation	0 1 2 3 4	Right Bank	
			Live Tree Roots	0 1 2 3 4		
			Artificial Structures	0 1 2 3 4		

HUMAN INFLUENCE (circle only the closest to wetted channel)	Left Bank			Channel	Right Bank		
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P				
Buildings	P C B 0	Y N	0 B C P				
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P				
Road/ Railroad XRAIL	P C B 0	Y N	0 B C P				
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P				
Landfill/ Trash	P C B 0	Y N	0 B C P				
Park/ Lawn	P C B 0	Y N	0 B C P				
Row Crop	P C B 0	Y N	0 B C P				
Pasture/ Range	P C B 0	Y N	0 B C P				
Logging Operations	P C B 0	Y N	0 B C P				
Mining Activity	P C B 0	Y N	0 B C P				
Vegetation Management	P C B 0	Y N	0 B C P				
Bridges/ Abutments	P C B 0	Y N	0 B C P				
Orchards/ Vineyards	P C B 0	Y N	0 B C P				

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (required)	☐
896	
Upstream (required)	☐
895	

Inter-Transect: FG										Wetted Width (m): 1.5
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	27	1		P	0	P A D	P A D	P A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but < 1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.4	20	16		P A	1	P A D	P A D	P A D	
Center	0.8	20	300		P A	2	P A D	P A D	P A D	
Right Center	1.1	10	46		P A	2	P A D	P A D	P A D	
Right Bank	1.5	3	900		P A	2	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/Falls	
Rapid	
Riffle	90
Run	5
Glide	
Pool	5
Dry	

Site Code: MC-1	Site Name:	Date: 8/2/2012
Wetted Width (m): 1.9	Bankfull Width (m): 3.0	Bankfull Height (m): 49cm
Transect G		

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present; Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail; 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code); D = Dry, not assessed
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	6	65		P A	1	P A D	P A D	P A D	
Left Center	0.5	14	9		P A	1	P A D	P A D	P A D	
Center	1.0	16	64		P A	1	P A D	P A D	P A D	
Right Center	1.4	18	40		P A	1	P A D	P A D	P A D	
Right Bank	1.9	1	4		P A	0	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang, Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIMETER READINGS (0-17) count covered dots	
Center Left	16
Center Upstream	16
Center Right	16
Center Downstream	17
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m <50m from Channel Channel (record Yes or No)		
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad TRAIL	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0	Y N	0 B C P
Row Crop	P C B 0	Y N	0 B C P
Pasture/ Range	P C B 0	Y N	0 B C P
Logging Operations	P C B 0	Y N	0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0	Y N	0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: GH										Wetted Width (m): 1.65
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	2	15		(P)A	0	P (A) D	P (A) D	P (A) D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.4	9	32		(P)A	0	P (A) D	P (A) D	P (A) D	
Center	1.8	22	220	30	(P)A	2	P (A) D	P (A) D	P (A) D	
Right Center	1.2	15	130	20	(P)A	2	P (A) D	P (A) D	P (A) D	
Right Bank	1.7	5	8		(P)A	0	P (A) D	P (A) D	P (A) D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

Substrate	
Channel Type	
Channel Size	
Flow	65
Depth	10
Width	25
Flow	
Depth	

Site Code: MC-1	Site Name:	Date: 8/21/2012
Wetted Width (m): 2.0	Bankfull Width (m): 2.9	Bankfull Height (m): 48 cm
Transect H		

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	2	26		(P)A	1	(P)A D	(P)A D	(P)A D
Left Center	0.5	8	119	50	(P)A	1	(P)A D	(P)A D	(P)A D
Center	1.0	17	105	40	(P)A	1	(P)A D	(P)A D	(P)A D
Right Center	1.5	13	26		(P)A	2	(P)A D	(P)A D	(P)A D
Right Bank	2.0	10	91	15	(P)A	1	(P)A D	(P)A D	(P)A D

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

Microalgae Thickness Codes
 0 = No microalgae present. Feels rough, not slimy.
 1 = Present but not visible. Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm.
 4 = 5-20mm.
 5 = >20mm.
 UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code)
 D = Dry, not assessed

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIOMETER READINGS (0-17) count covered dots	
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			
Vegetation Class	Left Bank	Right Bank	Filamentous Algae	0 1 2 3 4	Center Left
Upper Canopy (>5 m high)			Aquatic Macrophytes/Emergent Vegetation	0 1 2 3 4	Center Left 17
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Upstream 17
Lower Canopy (0.5 m-5 m high)			Woody Debris >0.3 m	0 1 2 3 4	Center Right 16
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Center Downstream 17
Ground Cover (<0.5 m high)			Undercut Banks	0 1 2 3 4	Optional
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Overhang, Vegetation	0 1 2 3 4	Left Bank
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Live Tree Roots	0 1 2 3 4	Right Bank
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Artificial Structures	0 1 2 3 4	

HUMAN INFLUENCE (circle only the closest to wetted channel)		BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)	
0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m - <50m from Channel Channel (record Yes or No)			
	Left Bank	Channel	Right Bank
Walls/Rip-rap/Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/Cleared Lot	P C B 0	Y N	0 B C P
Road/Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/Outlet)	P C B 0	Y N	0 B C P
Landfill/Trash	P C B 0	Y N	0 B C P
Park/Lawn	P C B 0	Y N	0 B C P
Row Crop	P C B 0	Y N	0 B C P
Pasture/Range	P C B 0	Y N	0 B C P
Logging Operations	P C B 0	Y N	0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/Abutments	P C B 0	Y N	0 B C P
Orchards/Vineyards	P C B 0	Y N	0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)	
Left Bank	eroded vulnerable stable
Right Bank	eroded vulnerable stable

New tree fall Right @ transect

Inter-Transect: HI										Wetted Width (m): 1.6
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	12	18		P A	0	P A D	P A D	P A D	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them. scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present. substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.4	10	81	0	P A	2	P A D	P A D	P A D	
Center	0.8	9	23		P A	1	P A D	P A D	P A D	
Right Center	1.2	2	132	0	P A	1	P A D	P A D	P A D	
Right Bank	1.4	4	10		P A	0	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/Falls	
Rapid	
Riffle	80
Run	20
Glide	
Pool	
Dry	

Site Code: MC-1	Site Name:	Date: 8/21/2012
Wetted Width (m): 1.5	Bankfull Width (m): 3.35	Bankfull Height (m): 46 cm
Transect 1		

Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	1	13		(P)A	0	(P)A D	(P)A D	(P)A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.4	5	88	0	(P)A	01	(P)A D	(P)A D	(P)A D	
Center	0.8	10	69	0	(P)A	1	(P)A D	(P)A D	(P)A D	
Right Center	1.1	8	95	5	(P)A	2	(P)A D	(P)A D	(P)A D	
Right Bank	1.5	2	5		(P)A	0	(P)A D	(P)A D	(P)A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIOMETER READINGS (0-17) count covered dots	
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			
Vegetation Class	Left Bank	Right Bank			
Upper Canopy (>5 m high)					
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Filamentous Algae	0 1 2 3 4	Center Left 17
Lower Canopy (0.5 m-5 m high)					
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	Center Upstream 17
Ground Cover (<0.5 m high)					
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Right 17
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Woody Debris >0.3 m	0 1 2 3 4	Center Downstream 17
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Optional
			Undercut Banks	0 1 2 3 4	Left Bank
			Overhang, Vegetation	0 1 2 3 4	Right Bank
			Live Tree Roots	0 1 2 3 4	
			Artificial Structures	0 1 2 3 4	

HUMAN INFLUENCE (circle only the closest to wetted channel)		BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)	
0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m+ <50m from Channel Channel (record Yes or No)			
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad TRAIL	0 C B 0	Y N	0 B C 0
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0	Y N	0 B C P
Row Crop	P C B 0	Y N	0 B C P
Pasture/ Range	P C B 0	Y N	0 B C P
Logging Operations	0 C B 0	Y N	0 B C 0
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0	Y N	0 B C P

Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: IJ						Wetted Width (m): 1.85				
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	3	1		0 A	0	P A D	P A D	P A D	0 = No microalgae present. Feels rough, not slimy.
Left Center	0.5	9	40		0 A	1	P A D	P A D	P A D	1 = Present but not visible. Feels slimy.
Center	0.9	10	200	45	0 A	2	P A D	P A D	P A D	2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center	1.4	6	20		0 A	1	P A D	P A D	P A D	3 = 1-5mm.
Right Bank	1.9	3	57		0 A	1	P A D	P A D	P A D	4 = 5-20mm.
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										5 = >20mm.
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	100
Run	
Glide	
Pool	
Dry	

Site Code: <u>MC1</u>	Site Name:	Date: <u>8-12-12</u> / 2012
Wetted Width (m): <u>2.1</u>	Bankfull Width (m): <u>3.05</u>	Bankfull Height (m): <u>40 cm</u>

Transect J

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	3	15		(P)A	0	P(A)D	P(A)D	(P)A D
Left Center	0.5	3	60		(P)A	2	P(A)D	P(A)D	P(A)D
Center	1.1	11	80	0	(P)A	2	P(A)D	P(A)D	P(A)D
Right Center	1.6	9	28		(P)A	1	P(A)D	P(A)D	P(A)D
Right Bank	2.1	8	16		(P)A	0	P(A)D	P(A)D	P(A)D

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

Microalgae Thickness Codes
 0 = No microalgae present. Feels rough, not slimy.
 1 = Present but not visible. Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail.
 3 = 1-5mm.
 4 = 5-20mm.
 5 = >20mm.
 UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code).
 D = Dry, not assessed.

RIPARIAN VEGETATION (facing downstream)			INSTREAM HABITAT COMPLEXITY			DENSIOMETER READINGS (0-17) count covered dots				
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)							
Vegetation Class	Left Bank		Right Bank							
Upper Canopy (>5 m high)										
Trees and saplings >5 m high	0	1	2	3	4	0	1	2	3	4
Lower Canopy (0.5 m-5 m high)										
All vegetation 0.5 m to 5 m	0	1	2	3	4	0	1	2	3	4
Ground Cover (<0.5 m high)										
Woody shrubs & saplings <0.5 m	0	1	2	3	4	0	1	2	3	4
Herbs/ grasses	0	1	2	3	4	0	1	2	3	4
Barren, bare soil/ duff	0	1	2	3	4	0	1	2	3	4
			Filamentous Algae			0 1 2 3 4			Center Left 17	
			Aquatic Macrophytes/ Emergent Vegetation			0 1 2 3 4			Center Upstream 16	
			Boulders			0 1 2 3 4			Center Right 17	
			Woody Debris >0.3 m			0 1 2 3 4			Center Downstream 17	
			Woody Debris <0.3 m			0 1 2 3 4			Optional	
			Undercut Banks			0 1 2 3 4			Left Bank	
			Overhang. Vegetation			0 1 2 3 4			Right Bank	
			Live Tree Roots			0 1 2 3 4				
			Artificial Structures			0 1 2 3 4				

HUMAN INFLUENCE (circle only the closest to wetted channel)		Left Bank		Channel	Right Bank	
0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m < 50m from Channel Channel (record Yes or No)						
Walls/ Rip-rap/ Dams		P C B 0		Y N	0 B C P	
Buildings		P C B 0		Y N	0 B C P	
Pavement/ Cleared Lot		P C B 0		Y N	0 B C P	
Road/ Railroad <u>TRAIL</u>		(P) C B 0		Y N	0 B C (P)	
Pipes (Inlet/ Outlet)		P C B 0		Y N	0 B C P	
Landfill/ Trash		P C B 0		Y N	0 B C P	
Park/ Lawn		P C B 0		Y N	0 B C P	
Row Crop		P C B 0		Y N	0 B C P	
Pasture/ Range		P C B 0		Y N	0 B C P	
Logging Operations		(P) C B 0		Y N	0 B C (P)	
Mining Activity		P C B 0		Y N	0 B C P	
Vegetation Management		P C B 0		Y N	0 B C P	
Bridges/ Abutments		P C B 0		Y N	0 B C P	
Orchards/ Vineyards		P C B 0		Y N	0 B C P	

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: JK										Wetted Width (m): 1.7
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	2	40		(P) A	1	P (A) D	P (A) D	(P) A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 6-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.4	4	22		(P) A	2	P (A) D	P (A) D	(P) A D	
Center	0.9	9	41		(P) A	1	P (A) D	P (A) D	P (A) D	
Right Center	1.3	10	36		(P) A	1	P (A) D	P (A) D	P (A) D	
Right Bank	1.7	7	11		(P) A	0	P (A) D	P (A) D	(P) A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

FLOW HABITATS	
(% between transects, total = 100%)	
Channel Type	%
Cascade/Falls	
Rapid	
Riffle	95
Run	
Glide	
Pool	5
Dry	

Site Code: <u>MC-1</u>	Site Name:	Date: <u>8-21</u> / 2012
Wetted Width (m): <u>2.0</u>	Bankfull Width (m): <u>3.5</u>	Bankfull Height (m): <u>30cm</u>
Transect K		

Transect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	<u>0</u>	<u>1</u>	<u>11</u>		<u>PA</u>	<u>0</u>	<u>PA</u> <u>D</u>	<u>PA</u> <u>D</u>	<u>PA</u> <u>D</u>	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. U = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	<u>0.5</u>	<u>10</u>	<u>55</u>		<u>PA</u>	<u>2</u>	<u>PA</u> <u>D</u>	<u>PA</u> <u>D</u>	<u>PA</u> <u>D</u>	
Center	<u>1.0</u>	<u>11</u>	<u>86</u>	<u>0</u>	<u>PA</u>	<u>2</u>	<u>PA</u> <u>D</u>	<u>PA</u> <u>D</u>	<u>PA</u> <u>D</u>	
Right Center	<u>1.5</u>	<u>11</u>	<u>105</u>	<u>20</u>	<u>PA</u>	<u>2</u>	<u>PA</u> <u>D</u>	<u>PA</u> <u>D</u>	<u>PA</u> <u>D</u>	
Right Bank	<u>2.0</u>	<u>2</u>	<u>29</u>		<u>PA</u>	<u>1</u>	<u>PA</u> <u>D</u>	<u>PA</u> <u>D</u>	<u>PA</u> <u>D</u>	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 <u>2</u> 3 4	0 1 2 <u>3</u> 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 <u>3</u> 4	0 1 <u>2</u> 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 <u>3</u> 4	0 <u>1</u> 2 3 4	
Herbs/ grasses	0 1 <u>2</u> 3 4	0 1 <u>2</u> 3 4	
Barren, bare soil/ duff	0 <u>1</u> 2 3 4	0 <u>1</u> 2 3 4	

INSTREAM HABITAT COMPLEXITY		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Filamentous Algae	0 <u>1</u> 2 3 4		
Aquatic Macrophytes/ Emergent Vegetation	0 <u>1</u> 2 3 4		
Boulders	0 <u>1</u> 2 3 4		
Woody Debris >0.3 m	0 <u>1</u> 2 3 4		
Woody Debris <0.3 m	0 1 <u>2</u> 3 4		
Undercut Banks	0 <u>1</u> 2 3 4		
Overhang, Vegetation	0 1 2 <u>3</u> 4		
Live Tree Roots	0 <u>1</u> 2 3 4		
Artificial Structures	0 <u>1</u> 2 3 4		

DENSIOMETER READINGS (0-17) count covered dbts	
Center	<u>17</u>
Left	<u>16</u>
Upstream	<u>17</u>
Right	<u>17</u>
Center Downstream	<u>17</u>
Optional:	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m < 50m from Channel Channel (record Yes or No)	
	Left Bank	Channel	Right Bank
Walls/Rip-rap/ Dams	P C B <u>0</u>	Y <u>N</u>	<u>0</u> B C P
Buildings	P C B <u>0</u>	Y <u>N</u>	<u>0</u> B C P
Pavement/ Cleared Lot	P C B <u>0</u>		<u>0</u> B C P
Road/Railroad <u>TRAIL</u>	<u>P</u> <u>C</u> B <u>0</u>	Y <u>N</u>	<u>0</u> B <u>C</u> <u>P</u>
Pipes (Inlet/ Outlet)	P C B <u>0</u>	Y <u>N</u>	<u>0</u> B C P
Landfill/ Trash	P C B <u>0</u>	Y <u>N</u>	<u>0</u> B C P
Park/ Lawn	P C B <u>0</u>		<u>0</u> B C P
Row Crop	P C B <u>0</u>		<u>0</u> B C P
Pasture/ Range	P C B <u>0</u>		<u>0</u> B C P
Logging Operations	<u>P</u> C B <u>0</u>		<u>0</u> B C <u>P</u>
Mining Activity	P C B <u>0</u>	Y <u>N</u>	<u>0</u> B C P
Vegetation Management	P C B <u>0</u>		<u>0</u> B C P
Bridges/ Abutments	<u>P</u> <u>C</u> <u>B</u> <u>0</u>	Y <u>N</u>	<u>0</u> <u>B</u> <u>C</u> <u>P</u>
Orchards/ Vineyards	P C B <u>0</u>		<u>0</u> B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	<u>stable</u>
Right Bank	eroded	vulnerable	<u>stable</u>

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (required)	☐
<u>897</u>	
Upstream (optional)	☐
<u>898</u>	

REACH DOCUMENTATION		Standard Reach Length (wetted width ≤ 10 m) = 150 m Distance between transects = 15 m Alternate Reach Length (wetted width > 10 m) = 250 m Distance between transects = 25 m	
Project Name: <u>TUCKER RIVER WQ MONITORING</u>	Date: <u>08 / 24 / 2012</u>	Sample Collection Time: <u>1145</u>	
Stream Name: <u>MARTIN CRK</u>	Site Name/ Description: <u>MARTIN CRK BELOW LAMMAN BEVERLY MT</u>		
Site Code: <u>MC2</u>	Crew Members: <u>JAC/BJK</u>		
Latitude (actual - decimal degrees): °N	datum: <u>NAD83</u> other: <u>NAD27</u>		
Longitude (actual - decimal degrees): °W	GPS Device: <u>GARMIN 62</u>		

AMBIENT WATER QUALITY MEASUREMENTS					Turbidity, silica, oxygen saturation, and air temp are optional; calibration date required on page 24		Actual Reach Length (m) (see reach length guidelines at top of form)
Water Temp (Deg C)	pH	Dissolved O ₂ (mg/L)	Turbidity (ntu)	Oxygen Sat. (%)			
<u>11.92</u>	<u>7.18</u>	<u>52.0 - 47.7</u>	<u>0.092</u>	<u>106.9%</u>		<u>150</u>	
Dissolved O ₂ (mg/L)	Specific Conduct (uS/cm)	Salinity (ppt)	Silica (mg/L)*	Air Temp (Deg C)		Explanation:	
<u>11.54</u>	<u>142/06</u>	<u>0.07</u>	<u>0.07</u>	<u>26°C</u>			

DISCHARGE MEASUREMENTS							check if discharge measurements not possible ☐				
1 st measurement = left bank (looking downstream)							(explain in field notes section)				
VELOCITY AREA METHOD (preferred)				cal. date	Transect Width (m): <u>1.6 m</u>			BUOYANT OBJECT METHOD (use ONLY if velocity area method not possible)			
	Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)		Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)		Float 1	Float 2	Float 3
1	<u>0.74</u>	<u>10</u>	<u>10%</u>	11	<u>1.54</u>	<u>26</u>	<u>0.427</u>	Distance (m)			
2	<u>0.82</u>	<u>19</u>	<u>40%</u>	12	<u>1.62</u>	<u>26</u>	<u>0.379</u>	Float Time (sec)			
3	<u>0.90</u>	<u>20</u>	<u>80%</u>	13	<u>1.70</u>	<u>26</u>	<u>0.372</u>	Float Reach Cross Section			
4	<u>0.98</u>	<u>22</u>	<u>0.251</u>	14	<u>1.78</u>	<u>25</u>	<u>0.351</u>	width (m)	Upper Section	Middle Section	Lower Section
5	<u>1.06</u>	<u>24</u>	<u>0.374</u>	15	<u>1.86</u>	<u>24</u>	<u>0.373</u>	depth (cm)			
6	<u>1.14</u>	<u>26</u>	<u>0.353</u>	16	<u>1.94</u>	<u>24</u>	<u>0.368</u>	Width			
7	<u>1.22</u>	<u>28</u>	<u>0.404</u>	17	<u>2.02</u>	<u>24</u>	<u>0.390</u>	Depth 1			
8	<u>1.30</u>	<u>28</u>	<u>0.389</u>	18	<u>2.10</u>	<u>23</u>	<u>0.266</u>	Depth 2			
9	<u>1.38</u>	<u>28</u>	<u>0.405</u>	19	<u>2.18</u>	<u>22</u>	<u>0.148</u>	Depth 3			
10	<u>1.46</u>	<u>28</u>	<u>0.418</u>	20	<u>2.26</u>	<u>18</u>	<u>60%</u>	Depth 4			
								Depth 5			

NOTABLE FIELD CONDITIONS (check one box per topic)			
Evidence of recent rainfall (enough to increase surface runoff)	<u>NO</u>	minimal	>10% flow increase
Evidence of fires in reach or immediately upstream (<500 m)	<u>NO</u>	<1 year	<5 years
Dominant landuse/ landcover in area surrounding reach	Agriculture Urban/ Industrial	<u>Forest</u> Suburb/Town	<u>Rangeland</u> Other

ADDITIONAL COBBLE EMBEDDEDNESS MEASURES (carry over from transect forms if needed to attain target count of 25; measure in %)	1	2	3	4	5	6	7	8	9	10	11	12	13
	<u>5</u>	<u>10</u>	<u>0</u>	<u>15</u>	<u>25</u>	<u>0</u>	<u>35</u>	<u>0</u>	<u>5</u>	<u>15</u>	<u>10</u>	<u>0</u>	
	14	15	16	17	18	19	20	21	22	23	24	25	

Site Code: ML-2Date: 8/24/2012

SLOPE and BEARING FORM (transect based - for Full PHAB only)

 AUTOLEVEL
 CLINOMETER
 HANDLEVEL
 OTHER

Starting Transect	MAIN SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)					SUPPLEMENTAL SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)				
	Stadia rod measurements	Slope (%) or Elevation Difference	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)	Stadia rod measurements	Slope or Elevation Difference	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)
		cm ☐ % ☐					cm ☐ % ☐			
K	3,025 (1,720)									
J				118						
I				78	50				354	50
H	2,841 (1,150)			70	50				128	50
G				77						
F				130						
E				127						
D				126	50				81	50
C				75						
B				127						
A	2,655			129						
additional calculation area	1.2 = 925cm → 0.61% 126m									

ADDITIONAL HABITAT CHARACTERIZATION					High Gradient ☐	Low Gradient ☒
Parameter	Optimal	Suboptimal	Marginal	Poor		
Epifaunal Substrate/Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover (50% for low-gradient streams); mix of submerged logs, undercut banks, cobble or other stable habitat	40-70% mix of stable habitat (30-50% for low-gradient streams); well-suited for full colonization potential	20-40% mix of stable habitat (10-30% in low-gradient streams); substrate frequently disturbed or removed	Less than 20% stable habitat (10% in low-gradient streams); lack of habitat is obvious; substrate unstable or lacking		
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition (<20% in low-gradient streams)	Some new increase in bar formation; mostly from gravel, sand, or fine sediment; 5-30% of the bottom affected (20-50% in low-gradient streams)	Moderate deposition of new gravel, sand, or fine sediment on bars; 30-50% of the bottom affected (50-80% in low-gradient streams)	Heavy deposits of fine material; increased bar development; more than 50% of the bottom changing frequently (>80% in low-gradient streams)		
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern	Some channelization present, (e.g., bridge abutments); evidence of past channelization (> 20yrs) may be present but recent channelization not present	Channelization may be extensive; embankments or shoring structures present on both banks; 40 to 80% of stream reach disrupted	Banks shored with gabion or cement; Over 80% of the stream reach channelized and disrupted; instream habitat greatly altered or removed entirely		
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		

Site Code: MC-2	Site Name:	Date: 8-12-2012
Wetted Width (m): 2.0	Bankfull Width (m): 3.2	Bankfull Height (m): 3.4
Transect A		

Transect Substrates									
Position	Dist from L.B. (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	40	11		PA	1	PA D	PA D	PA D
Left Center	0.5	56	40		PA	0	PA D	PA D	PA D
Center	1.0	55	52		PA	0	PA D	PA D	PA D
Right Center	1.5	52	29		PA	0	PA D	PA D	PA D
Right Bank	2.0	42	>1		PA	0	PA D	PA D	PA D
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).									

Microalgae Thickness Codes

0 = No microalgae present. Feels rough, not slimy.
 1 = Present but not visible. Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm.
 4 = 5-20mm.
 5 = >20mm.
 UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
 D = Dry, not assessed.

RIPARIAN VEGETATION (facing downstream)	0 = Absent (0%) 3 = Heavy (40-75%) 1 = Sparse (<10%) 4 = Very Heavy (>75%) 2 = Moderate (10-40%)									
	Vegetation Class		Left Bank					Right Bank		
Upper Canopy (>5 m high)										
Trees and saplings >5 m high	0	1	2	3	4	0	1	2	3	4
Lower Canopy (0.5 m-5 m high)										
All vegetation 0.5 m to 5 m	0	1	2	3	4	0	1	2	3	4
Ground Cover (<0.5 m high)										
Woody shrubs & saplings <0.5 m	0	1	2	3	4	0	1	2	3	4
Herbs/ grasses	0	1	2	3	4	0	1	2	3	4
Barren, bare soil/ duff	0	1	2	3	4	0	1	2	3	4

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang, Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots

Center	
Left	17
Center Upstream	16
Center Right	10
Center Downstream	11
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = > 10m < 50m from Channel; Channel (record Yes or No)											
	Left Bank				Channel	Right Bank						
Walls/ Rip-rap/ Dams	P	C	B	0	Y	N	0	B	C	P		
Buildings	P	C	B	0	Y	N	0	B	C	P		
Pavement/ Cleared Lot	P	C	B	0		N	0	B	C	P		
Road/ Railroad	P	C	B	0	Y	N	0	B	C	P		
Pipes (Inlet/ Outlet)	P	C	B	0	Y	N	0	B	C	P		
Landfill/ Trash	P	C	B	0	Y	N	0	B	C	P		
Park/ Lawn	P	C	B	0			0	B	C	P		
Row Crop	P	C	B	0			0	B	C	P		
Pasture/ Range	P	C	B	0			0	B	C	P		
Logging Operations	P	C	B	0			0	B	C	P		
Mining Activity	P	C	B	0	Y	N	0	B	C	P		
Vegetation Management	P	C	B	0			0	B	C	P		
Bridges/ Abutments	P	C	B	0	Y	N	0	B	C	P		
Orchards/ Vineyards	P	C	B	0			0	B	C	P		

Bank Stability			
Left Bank	eroded	stable	stable
Right Bank	eroded	stable	stable

TAKE PHOTOGRAPHS

(check box if taken & record photo code)

Downstream (optional) ☐

907

Upstream (required) ☐

905 906

TRAIL on LB

Inter-Transect: AB

Wetted Width (m):

1.65

Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	11	40		(P)A	0	P (A) D	P (A) D	(P) A D	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt. (formerly Z code) D = Dry, not assessed.
Left Center	0.4	25	31		(P)A	1	P (A) D	P (A) D	(P) A D	
Center	0.8	24	48		(P)A	1	P (A) D	P (A) D	P (A) D	
Right Center	1.2	20	12		(P)A	1	P (A) D	P (A) D	P (A) D	
Right Bank	1.7	18	17		(P)A	1	P (A) D	P (A) D	(P) A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

FLOW HABITATS	
Channel Type	
Channel	
Bank	
Flow	60
Flow	20
Flow	10
Flow	10
Flow	

Site Code: <u>MC-2</u>	Site Name:	Date: <u>8/24/2012</u>
Wetted Width (m): <u>1.5</u>	Bankfull Width (m): <u>3.2</u>	Bankfull Height (m): <u>4.2</u>
Transect B		

Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	2	71		P A	0	P A D	P A D	P A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm 4 = 5-20mm 5 = >20mm UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.4	10	39		P A	3	P A D	P A D	P A D	
Center	0.8	11	14		P A	1	P A D	P A D	P A D	
Right Center	1.1	15	76	10	P A	3	P A D	P A D	P A D	
Right Bank	1.5	11	27		P A	2	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

RIPARIAN VEGETATION (facing downstream)			INSTREAM HABITAT COMPLEXITY		DENSIOMETER READINGS (0-17) count covered dots	
Vegetation Class	Left Bank	Right Bank				
Upper Canopy (>5 m high)						
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Filamentous Algae	0 1 2 3 4	Center	7
Lower Canopy (0.5 m-5 m high)						
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	Center Upstream	0
Ground Cover (<0.5 m high)						
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Right	0
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Woody Debris >0.3 m	0 1 2 3 4	Center Downstream	0
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Optional	
			Undercut Banks	0 1 2 3 4	Left Bank	
			Overhang, Vegetation	0 1 2 3 4	Right Bank	
			Live Tree Roots	0 1 2 3 4		
			Artificial Structures	0 1 2 3 4		

HUMAN INFLUENCE (circle only the closest to wetted channel)	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0	Y N	0 B C P
Row Crop	P C B 0	Y N	0 B C P
Pasture/ Range	P C B 0	Y N	0 B C P
Logging Operations	P C B 0	Y N	0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0	Y N	0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: BC

Wetted Width (m):

2.1

Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	5	71		P A	0	P A D	P A D	P A D	0 = No microalgae present Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code) D = Dry, not assessed
Left Center	0.5	14	12		P A	1	P A D	P A D	P A D	
Center	1.1	19	71	5	P A	2	P A D	P A D	P A D	
Right Center	1.6	20	14		P A	2	P A D	P A D	P A D	
Right Bank	2.1	10	71		P A	0	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

FLOW HABITATS	
Channel Type	Flow
Channel Type	
Channel Type	
Channel Type	75
Channel Type	
Channel Type	
Channel Type	25
Channel Type	

Site Code: <u>MC-2</u>	Site Name:	Date: <u>8/24/2012</u>
Wetted Width (m): <u>3.4</u>	Bankfull Width (m): <u>47</u>	Bankfull Height (m): <u>44</u>
Transect C		

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	8	71		(P)A	0	P (A) D	P (A) D	(P) (A) D
Left Center	0.9	58	71		(P)A	0	P (A) D	P (A) D	(P)A D
Center	1.7	76	50		(P)A	1	P (A) D	P (A) D	(P)A D
Right Center	2.6	39	71		(P)A	1	P (A) D	P (A) D	P (A) D
Right Bank	3.4	5	71		(P)A	0	P (A) D	P (A) D	(P)A D

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

Microalgae Thickness Codes
 0 = No microalgae present.
 Feels rough, not slimy.
 1 = Present but not visible.
 Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm.
 4 = 5-20mm.
 5 = >20mm.
 UP = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z-code).
 D = Dry, not assessed.

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Filamentous Algae	0 1 2 3 4		
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4		
Boulders	0 1 2 3 4		
Woody Debris >0.3 m	0 1 2 3 4		
Woody Debris <0.3 m	0 1 2 3 4		
Undercut Banks	0 1 2 3 4		
Overhang, Vegetation	0 1 2 3 4		
Live Tree Roots	0 1 2 3 4		
Artificial Structures	0 1 2 3 4		

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	0
Center Upstream	0
Center Right	8
Center Downstream	2
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m & 60m from Channel Channel (record Yes or No)	
	Left Bank	Channel	Right Bank
Walls/Rip-rap/Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/Cleared Lot	P C B 0	Y N	0 B C P
Road/Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/Outlet)	P C B 0	Y N	0 B C P
Landfill/Trash	P C B 0	Y N	0 B C P
Park/Lawn	P C B 0	Y N	0 B C P
Row Crop	P C B 0	Y N	0 B C P
Pasture/Range	P C B 0	Y N	0 B C P
Logging Operations	P C B 0	Y N	0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/Abutments	P C B 0	Y N	0 B C P
Orchards/Vineyards	P C B 0	Y N	0 B C P

BANK STABILITY			
Left Bank	eroded	stable	stable
Right Bank	eroded	stable	stable

Inter-Transect: CD						Wetted Width (m): 1.9				
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	10	17		P A	1	P A D	P A D	P A D	0 = No microalgae present Feels rough, not slimy 1 = Present but not visible Feels slimy 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail 3 = 1-5mm 4 = 5-20mm 5 = >20mm UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code) D = Dry, not assessed
Left Center	0.5	14	13		P A	2	P A D	P A D	P A D	
Center	1.0	5	29		P A	2	P A D	P A D	P A D	
Right Center	1.4	6	33		P A	1	P A D	P A D	P A D	
Right Bank	1.9	4	71		P A	0	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

FLOW HABITATE	
Channel Type	5
Channel Size	
Flow	
WPA	50
WPA	40
WPA	
WPA	10
WPA	

Site Code: <u>MC-2</u>	Site Name:	Date: <u>8/24/2012</u>
Wetted Width (m): <u>2.1</u>	Bankfull Width (m): <u>3.8</u>	Bankfull Height (m): <u>46</u>
Transect D		

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code). D = Dry; not assessed.
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	11	71		P A	0	P A D	P A D	P A D	
Left Center	0.5	24	3		P A	0	P 0 D	P A D	P A D	
Center	1.1	35	15		P A	0	P A D	P A D	P A D	
Right Center	1.6	44	20		P A	2	P A D	P A D	P A D	
Right Bank	2.1	12	71		P A	0	P A D	P 0 D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Filamentous Algae	0 1 2 3 4		
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4		
Boulders	0 1 2 3 4		
Woody Debris >0.3 m	0 1 2 3 4		
Woody Debris <0.3 m	0 1 2 3 4		
Undercut Banks	0 1 2 3 4		
Overhang, Vegetation	0 1 2 3 4		
Live Tree Roots	0 1 2 3 4		
Artificial Structures	0 1 2 3 4		

DENSIMETER READINGS (0-17) count covered dots	
Center	0
Left	16
Center Upstream	17
Center Right	17
Center Downstream	17
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m+ >50m from Channel Channel (record Yes or No)	
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0		0 B C P
Row Crop	P C B 0		0 B C P
Pasture/ Range	P C B 0		0 B C P
Logging Operations	P C B 0		0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0		0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0		0 B C P

Bank Stability			
Left Bank	eroded	stable	eroded
Right Bank	eroded	stable	eroded

Inter-Transect: DE										Wetted Width (m): 2.25
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	8	71		P A	0	P A D	P A D	P A D	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.6	16	18		P A	1	P A D	P A D	P A D	
Center	1.1	21	22		P A	2	P A D	P A D	P A D	
Right Center	1.7	20	82	0	P A	1	P A D	P A D	P A D	
Right Bank	2.3	4	71		P A	0	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLUVAHABSTATS	
Channel Type	%
Channel Head	
Head	
Mid	15
Mid	60
Mid	10
Mid	15
Mid	

Site Code: MC-2	Site Name:	Date: 8-12-2012
Wetted Width (m): 1.9	Bankfull Width (m): 4.2	Bankfull Height (m): 4.9
Transect E		

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm-size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	4	11		P A	0	P A D	P A D	P A D
Left Center	0.5	10	41		P A	2	P A D	P A D	P A D
Center	1.0	11	48		P A	1	P A D	P A D	P A D
Right Center	1.4	10	39		P A	2	P A D	P A D	P A D
Right Bank	1.9	8	16		P A	1	P A D	P A D	P A D
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred). Microalgae Thickness Codes: 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.									

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIMETER READINGS (0-17) count covered dots	
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			
Vegetation Class		Left Bank	Right Bank		
Upper Canopy (>5 m high)					
Trees and saplings >5 m high		0 1 2 3 4	0 1 2 3 4	Center Left	0
Lower Canopy (0.5 m-5 m high)					
All vegetation 0.5 m to 5 m		0 1 2 3 4	0 1 2 3 4	Center Upstream	0
Ground Cover (<0.5 m high)					
Woody shrubs & saplings <0.5 m		0 1 2 3 4	0 1 2 3 4	Center Right	10
Herbs/ grasses		0 1 2 3 4	0 1 2 3 4	Center Downstream	0
Barren, bare soil/ duff		0 1 2 3 4	0 1 2 3 4	Optional	
				Left Bank	
				Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		Left Bank		Channel	Right Bank	
0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m < 50m from Channel N = Channel (record Yes or No)						
Walls/ Rip-rap/ Dams		P	C	B	0	Y N
Buildings		P	C	B	0	Y N
Pavement/ Cleared Lot		P	C	B	0	Y N
Road/ Railroad		P	C	B	0	Y N
Pipes (Inlet/ Outlet)		P	C	B	0	Y N
Landfill/ Trash		P	C	B	0	Y N
Park/ Lawn		P	C	B	0	Y N
Row Crop		P	C	B	0	Y N
Pasture/ Range		P	C	B	0	Y N
Logging Operations		P	C	B	0	Y N
Mining Activity		P	C	B	0	Y N
Vegetation Management		P	C	B	0	Y N
Bridges/ Abutments		P	C	B	0	Y N
Orchards/ Vineyards		P	C	B	0	Y N

Bank Stability			
Left Bank	Stable	Unstable	Stable
Right Bank	Stable	Unstable	Stable

Inter-Transect: EF						Wetted Width (m): 2.2				
Inter-Transect Substrates										
Position	Dist. from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	17	27		PA	0	PA D	PA D	PA D	0 = No microalgae present. Feels rough, not slimy.
Left Center	0.6	38	30		PA	1	PA D	PA D	PA D	1 = Present but not visible. Feels slimy.
Center	1.1	32	30		PA	1	PA D	PA D	PA D	2 = Present and visible but < 1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center	1.7	25	71		PA	0	PA D	PA D	PA D	3 = 1-5mm.
Right Bank	2.2	15	71		PA		PA D	PA D	PA D	4 = 5-20mm.
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										5 = > 20mm.
										UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code)
										D = Dry, not assessed

FLEX HABITATS	
Grass Type	1
Grass Type	
Grass	
Grass	5
Grass	40
Grass	50
Grass	5
Grass	

Site Code: MC-2	Site Name:	Date: 8-12-12 / 2012
Wetted Width (m): 2.5	Bankfull Width (m): 3.1	Bankfull Height (m): 50
		Transect F

Transect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	2	30	CLAY	(P)A	0	PAD	PAD	PAD	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.6	9	60		(P)A	0	PAD	PAD	PAD	
Center	1.3	25	45		(P)A	2	PAD	PAD	PAD	
Right Center	1.9	20	71		(P)A	0	PAD	PAD	PAD	
Right Bank	2.5	10	71		(P)A	0	PAD	PAD	PAD	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Filamentous Algae	0 1 2 3 4		
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4		
Boulders	0 1 2 3 4		
Woody Debris >0.3 m	0 1 2 3 4		
Woody Debris <0.3 m	0 1 2 3 4		
Undercut Banks	0 1 2 3 4		
Overhang, Vegetation	0 1 2 3 4		
Live Tree Roots	0 1 2 3 4		
Artificial Structures	0 1 2 3 4		

DENSIMETER READINGS (0-17) count covered dots	
Center Left	17
Center Upstream	15
Center Right	17
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m+ <50m from Channel Channel (record Yes or No)	
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0		0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0		0 B C P
Row Crop	P C B 0		0 B C P
Pasture/ Range	P C B 0		0 B C P
Logging Operations	P C B 0		0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0		0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0		0 B C P

BANK STABILITY	
Left Bank	moderate
Right Bank	moderate

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (required)	☐
910	
Upstream (required)	☐
908909	

Inter-Transect: FG										Wetted Width (m): 1.75
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	8	71		0A	0	PAD	PAD	PAD	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them. Scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt. (formerly Z code) D = Dry, not assessed
Left Center	0.4	14	22		PA	1	PAD	PAD	PAD	
Center	0.9	14	bed		PA		PAD	PAD	PAD	
Right Center	1.3	6	bed		PA		PAD	PAD	PAD	
Right Bank	1.8	8	71		0A	0	PAD	PAD	PAD	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/Falls	
Rapid	
Riffle	70
Run	30
Glide	
Pool	
Dry	

Site Code: <u>MC-2</u>	Site Name:	Date: <u>8-12-2012</u>
Wetted Width (m): <u>1.75</u>	Bankfull Width (m): <u>5.2</u>	Bankfull Height (m): <u>50</u>
Transect G		

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	9	71		PA	0	PAD	PAD	PAD
Left Center	0.4	10	22		PA	2	PAD	PAD	PAD
Center	0.9	11	44		PA	3	PAD	PAD	PAD
Right Center	1.3	10	30		PA	3	PAD	PAD	PAD
Right Bank	1.8	4	36		PA	2	PAD	PAD	PAD
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)									

Microalgae Thickness Codes

0 = No microalgae present. Feels rough, not slimy.

1 = Present but not visible. Feels slimy.

2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.

3 = 1-5mm.

4 = 5-20mm.

5 = >20mm.

UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code).

D = Dry, not assessed

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Filamentous Algae	0 1 2 3 4		
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4		
Boulders	0 1 2 3 4		
Woody Debris >0.3 m	0 1 2 3 4		
Woody Debris <0.3 m	0 1 2 3 4		
Undercut Banks	0 1 2 3 4		
Overhang, Vegetation	0 1 2 3 4		
Live Tree Roots	0 1 2 3 4		
Artificial Structures	0 1 2 3 4		

DENSIMETER READINGS (0-17) count covered dots	
Center Left	0
Center Upstream	0
Center Right	0
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m-50m from Channel Channel (record Yes or No)	
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0	Y N	0 B C P
Row Crop	P C B 0	Y N	0 B C P
Pasture/ Range	P C B 0	Y N	0 B C P
Logging Operations	P C B 0	Y N	0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0	Y N	0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: GH										Wetted Width (m): 1.7
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	1	14		PA	0	P A D	P A D	P A D	0 = No microalgae present. Feels rough, not slimy.
Left Center	0.4	8	13		PA	1	P A D	P A D	P A D	1 = Present but not visible. Feels slimy.
Center	0.9	18	40		PA	2	P A D	P A D	P A D	2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center	1.3	25	11		PA	1	P A D	P A D	P A D	3 = 1-5mm.
Right Bank	1.7	2	6		PA	0	P A D	P A D	PA D	4 = 5-20mm.
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										5 = >20mm.
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code)
										D = Dry, not assessed

Flow Habitat	
Channel Type	
Channel Size	
Flow	
Flow	40
Flow	30
Flow	30
Flow	
Flow	

Site Code: <u>ME-2</u>	Site Name:	Date: <u>8/24/2012</u>
Wetted Width (m): <u>3.1</u>	Bankfull Width (m): <u>4.0</u>	Bankfull Height (m): <u>3.9</u>
Transect H		

Transect Substrates										
Position	Dist from EB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	6	71		PA	0	PA D	PA D	PA D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.8	12	10		PA	1	PA D	PA D	PA D	
Center	1.6	15	42		PA	2	PA D	PA D	PA D	
Right Center	7.3	16	6		PA	1	PA D	PA D	PA D	
Right Bank	3.1	14	71		PA	0	PA D	PA D	PA D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIOMETER READINGS (0-17) count covered dots	
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			
Vegetation Class	Left Bank	Right Bank	Filamentous Algae	0 1 2 3 4	Center Left 11
Upper Canopy (>5 m high)			Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	Center Upstream 7
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Right 2
Lower Canopy (0.5 m-5 m high)			Woody Debris >0.3 m	0 1 2 3 4	Center Downstream 0
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Optional
Ground Cover (<0.5 m high)			Undercut Banks	0 1 2 3 4	Left Bank
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Overhang Vegetation	0 1 2 3 4	Right Bank
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Live Tree Roots	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Artificial Structures	0 1 2 3 4	

HUMAN INFLUENCE (circle only the closest to wetted channel)	Left Bank		Channel	Right Bank		
	P	C	B	Y	N	P
Walls/Rip-rap/Dams	P	C	B	Y	N	P
Buildings	P	C	B	Y	N	P
Pavement/Cleared Lot	P	C	B	Y	N	P
Road/Railroad	P	C	B	Y	N	P
Pipes (Inlet/Outlet)	P	C	B	Y	N	P
Landfill/Trash	P	C	B	Y	N	P
Park/Lawn	P	C	B	Y	N	P
Row Crop	P	C	B	Y	N	P
Pasture/Range	P	C	B	Y	N	P
Logging Operations	P	C	B	Y	N	P
Mining Activity	P	C	B	Y	N	P
Vegetation Management	P	C	B	Y	N	P
Bridges/Abutments	P	C	B	Y	N	P
Orchards/Vineyards	P	C	B	Y	N	P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: HI										Wetted Width (m): 1.5
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	11	71		PA	0	PA D	PA D	PA D	0 = No microalgae present. Feels rough, not slimy.
Left Center	0.4	16	60		PA	0	PA D	PA D	PA D	1 = Present but not visible. Feels slimy.
Center	0.8	31	60		PA	3	PA D	PA D	PA D	2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them. Scraping leaves visible trail.
Right Center	1.1	30	24		PA	2	PA D	PA D	PA D	3 = 1-5mm.
Right Bank	1.5	8	>1		PA	0	PA D	PA D	PA D	4 = 5-20mm.
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										5 = >20mm.
										UD = Cannot determine if microalgae present. Substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed.

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/Falls	
Rapid	
Rifle	10
Run	50
Glide	
Pool	40
Dry	

Site Code: <u>MC-2</u>	Site Name:	Date: <u>8-12-12</u> / 2012
Wetted Width (m): <u>3.8</u>	Bankfull Width (m): <u>4.9</u>	Bankfull Height (m): <u>40</u>
Transect I		

Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	10	71		PA	0	PA D	PA D	PA D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	1.0	21	15		PA	0	PA D	PA D	PA D	
Center	1.9	38	58		PA	3	PA D	PA D	PA D	
Right Center	2.9	30	40		PA	1	PA D	PA D	PA D	
Right Bank	3.8	10	71		PA	0	PA D	PA D	PA D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Filamentous Algae	0 1 2 3 4		
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4		
Boulders	0 1 2 3 4		
Woody Debris >0.3 m	0 1 2 3 4		
Woody Debris <0.3 m	0 1 2 3 4		
Undercut Banks	0 1 2 3 4		
Overhang. Vegetation	0 1 2 3 4		
Live Tree Roots	0 1 2 3 4		
Artificial Structures	0 1 2 3 4		

DENSIOMETER READINGS (0-17) count covered dots	
Center	0
Left	0
Center Upstream	0
Center Right	0
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m - 50m from Channel Channel (record Yes or No)	
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0	Y N	0 B C P
Row Crop	P C B 0	Y N	0 B C P
Pasture/ Range	P C B 0	Y N	0 B C P
Logging Operations	P C B 0	Y N	0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0	Y N	0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: IJ

Wetted Width (m):

2.3

Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	20	27		PA	1	PAD	PAD	PA D	0 = No microalgae present. Feels rough, not slimy.
Left Center	0.6	39	45		PA	1	PAD	PAD	PAD	1 = Present but not visible. Feels slimy.
Center	1.2	20	25		PA	1	PAD	PAD	PAD	2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center	1.7	14	13		PA	1	PAD	PAD	PAD	3 = 1-5mm.
Right Bank	2.3	7	71		PA	0	PAD	PAD	PA D	4 = 5-20mm.
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										5 = >20mm.
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code)
										D = Dry, not assessed

FLOW HABITATS

(% between transects, total = 100%)

Channel Type	%
Cascade/Falls	
Rapid	
Riffle	65
Run	
Glide	
Pool	35
Dry	

Site Code: MC-2	Site Name:	Date: 8-14-2012
Wetted Width (m): 3.0	Bankfull Width (m): 6.5	Bankfull Height (m): 4.2
Transect J		

Transect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	39	1		0A	0	P A D	P A D	P A D	Microalgae Thickness Codes: 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.8	72	37		0A	0	P A D	P A D	P A D	
Center	1.5	80	84	0	0A	1	P A D	P A D	P A D	
Right Center	2.3	72	55		0A	1	P A D	P A D	P A D	
Right Bank	3.0	8	61		P A	0	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Filamentous Algae	0 1 2 3 4		
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4		
Boulders	0 1 2 3 4		
Woody Debris >0.3 m	0 1 2 3 4		
Woody Debris <0.3 m	0 1 2 3 4		
Undercut Banks	0 1 2 3 4		
Overhang, Vegetation	0 1 2 3 4		
Live Tree Roots	0 1 2 3 4		
Artificial Structures	0 1 2 3 4		

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	0
Center Upstream	0
Center Right	0
Center Downstream	0
Optional:	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m - >50m from Channel Channel (record Yes or No)		
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0		0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0		0 B C P
Row Crop	P C B 0		0 B C P
Pasture/ Range	P C B 0		0 B C P
Logging Operations	P C B 0		0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0		0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0		0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: JK										Wetted Width (m): 2.5
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	10	71		0 ^A	0	P A D	P A D	0 ^A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z-code). D = Dry; not assessed.
Left Center	0.6	25	20		0 ^A	2	P A D	P A D	P A D	
Center	1.3	19	54		0 ^A	3	P A D	P A D	P A D	
Right Center	1.5	16	15		0 ^A	2	P A D	P A D	P A D	
Right Bank	2.5	16	50		0 ^A	1	P A D	P A D	0 ^A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	45
Run	
Glide	
Pool	55
Dry	

Site Code: MC-2	Site Name:	Date: 8-124 / 2012
Wetted Width (m): 5.2	Bankfull Width (m): 5.3	Bankfull Height (m): 5.0
		Transect K

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. U = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z-code). D = Dry, not assessed.
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	20	71		PA	0	PAD	PAD	PAD	
Left Center	1.3	21	34		PA	1	PAD	PAD	PA D	
Center	2.6	42	33		PA	3	PAD	PAD	PAD	
Right Center	3.9	30	14		PA	0	PAD	PAD	PA D	
Right Bank	5.2	8	71		PA		PAD	PAD	PA D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

RIPARIAN VEGETATION (facing downstream)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)				3 = Heavy (40-75%) 4 = Very Heavy (>75%)					
	Left Bank				Right Bank					
Vegetation Class										
Upper Canopy (>5 m high)										
Trees and saplings >5 m high	0	1	2	3	4	0	1	2	3	4
Lower Canopy (0.5 m-5 m high)										
All vegetation 0.5 m to 5 m	0	1	2	3	4	0	1	2	3	4
Ground Cover (<0.5 m high)										
Woody shrubs & saplings <0.5 m	0	1	2	3	4	0	1	2	3	4
Herbs/ grasses	0	1	2	3	4	0	1	2	3	4
Barren, bare soil/ duff	0	1	2	3	4	0	1	2	3	4

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)				
	Filamentous Algae	0	1	2	3
Aquatic Macrophytes/ Emergent Vegetation	0	1	2	3	4
Boulders	0	1	2	3	4
Woody Debris >0.3 m	0	1	2	3	4
Woody Debris <0.3 m	0	1	2	3	4
Undercut Banks	0	1	2	3	4
Overhang, Vegetation	0	1	2	3	4
Live Tree Roots	0	1	2	3	4
Artificial Structures	0	1	2	3	4

DENSIMETER READINGS (0-17) count covered dots	
Center	8
Left	
Center Upstream	3
Center Right	4
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m - >50m from Channel Channel (record Yes or No)									
	Left Bank				Channel	Right Bank				
Walls/ Rip-rap/ Dams	P	C	B	0	Y	N	0	B	C	P
Buildings	P	C	B	0	Y	N	0	B	C	P
Pavement/ Cleared Lot	P	C	B	0	Y	N	0	B	C	P
Road/ Railroad	P	C	B	0	Y	N	0	B	C	P
Pipes (Inlet/ Outlet)	P	C	B	0	Y	N	0	B	C	P
Landfill/ Trash	P	C	B	0	Y	N	0	B	C	P
Park/ Lawn	P	C	B	0			0	B	C	P
Row Crop	P	C	B	0			0	B	C	P
Pasture/ Range	P	C	B	0			0	B	C	P
Logging Operations	P	C	B	0			0	B	C	P
Mining Activity	P	C	B	0	Y	N	0	B	C	P
Vegetation Management	P	C	B	0			0	B	C	P
Bridges/ Abutments	P	C	B	0	Y	N	0	B	C	P
Orchards/ Vineyards	P	C	B	0			0	B	C	P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (required)	☐
Upstream (optional)	☐

912
911

REACH DOCUMENTATION		Standard Reach Length (wetted width ≤ 10 m) = 150 m Distance between transects = 15 m Alternate Reach Length (wetted width > 10 m) = 250 m Distance between transects = 25 m	
Project Name: TEWAMP	Date: 9/6/2012	Sample Collection Time: 1200	
Stream Name: UPPER W.B. MARTIN	Site Name/Description: UPPER WEST BRANCH (ABOVE NSTAR RD)		
Site Code: MC-3	Crew Members: JAC, BJK		
Latitude (actual - decimal degrees): °N	datum: NAD83	GPS Device:	
Longitude (actual - decimal degrees): °W	other:		

AMBIENT WATER QUALITY MEASUREMENTS					* Turbidity, silica, oxygen saturation, and air temp are optional; calibration date required on page 24	Actual Reach Length (m) (see reach length guidelines at top of form)
Water Temp (Deg C)	pH	Alkalinity (mg/L)	Turbidity (ntu)*	Oxygen Sat. (%)*		
11.3	7.64			95.7		Explanation:
Dissolved O ₂ (mg/L)	Specific Conduct (uS/cm)	Salinity (ppt)	Silica (mg/L)*	Air Temp (Deg C)*		
10.44	189/190	0.05				

DISCHARGE MEASUREMENTS							check if discharge measurements not possible ☐				
1 st measurement = left bank (looking downstream)							(explain in field notes section)				
VELOCITY AREA METHOD (preferred)				cal. date	Transect Width (m): 0.8		BUOYANT OBJECT METHOD (use ONLY if velocity area method not possible)				
	Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)		Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)		Float 1	Float 2	Float 3
1	0.22	24	0.149	11	62	28	0.374	Distance (m)			
2	.26	24	0.149	12	66	28	0.427	Float Time (sec)			
3	.30	32	0.178	13	70	28	0.390	Float Reach Cross Section			
4	34	34	0.178	14	74	27	0.407	width (m)	Upper Section	Middle Section	Lower Section
5	38	34	0.171	15	78	28	0.272	depth (cm)			
6	42	32	0.148	16	82	28	0.302	Width			
7	46	32	0.159	17	86	26	0.241	Depth 1			
8	50	30	0.163	18	90	26	0.217	Depth 2			
9	54	30	0.247	19	94	22	0.207	Depth 3			
10	58	28	0.287	20	98	22	0.200	Depth 4			
								Depth 5			

NOTABLE FIELD CONDITIONS (check one box per topic)			
Evidence of recent rainfall (enough to increase surface runoff)	NO	minimal	$\geq 10\%$ flow increase
Evidence of fires in reach or immediately upstream (< 500 m)	NO	< 1 year	< 5 years
Dominant landuse/ landcover in area surrounding reach	Agriculture	Forest	Rangeland
	Urban/Industrial	Suburb/Town	Other

ADDITIONAL COBBLE EMBEDDEDNESS MEASURES (carry over from transect forms if needed to attain target count of 25; measure in %)	1	2	3	4	5	6	7	8	9	10	11	12	13
	14	15	16	17	18	19	20	21	22	23	24	25	

Site Code: <u>MC-3</u>		Date: <u>9/1/2012</u>																			
SLOPE and BEARING FORM (transect based - for Full PHAB only)				AUTOLEVEL CLINOMETER HANDLEVEL OTHER																	
Starting Transect	MAIN SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)					SUPPLEMENTAL SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)															
	Stadia rod measurements	Slope (%) or Elevation Difference	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)	Stadia rod measurements	Slope or Elevation Difference	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)											
		cm ☐ % ☐					cm ☐ % ☐														
K		4.82																			
J		5.20		324																	
I		6.20		340																	
H		6.50		336																	
G	4.40	7.60		342																	
F	5.00			4																	
E	6.40			12																	
D	7.00			4																	
C	5.90	7.00		356																	
B	6.70			348																	
A	7.20	(8.75) (12.5)		23																	
additional calculation area	$7.20 / 150 \rightarrow 4.86\%$																				
ADDITIONAL HABITAT CHARACTERIZATION						High Gradient ☒		Low Gradient ☐													
Parameter	Optimal					Suboptimal					Marginal					Poor					
Epifaunal Substrate/ Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover (50% for low-gradient streams); mix of submerged logs, undercut banks, cobble or other stable habitat					40-70% mix of stable habitat (30-50% for low-gradient streams); well-suited for full colonization potential					20-40% mix of stable habitat (10-30% in low-gradient streams); substrate frequently disturbed or removed					Less than 20% stable habitat (10% in low-gradient streams); lack of habitat is obvious; substrate unstable or lacking					
Score:	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition (<20% in low-gradient streams)					Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 5-30% of the bottom affected (20-50% in low-gradient streams)					Moderate deposition of new gravel, sand, or fine sediment on bars; 30-50% of the bottom affected (50-80% in low-gradient streams)					Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently (>80% in low-gradient streams)					
Score:	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern					Some channelization present; (e.g., bridge abutments); evidence of past channelization (> 20yrs) may be present but recent channelization not present					Channelization may be extensive; embankments or shoring structures present on both banks; 40 to 80% of stream reach disrupted					Banks shored with gabion or cement; Over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely					
Score:	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Site Code: MC-3	Site Name:	Date: 9-16-2012
Wetted Width (m): 2.2	Bankfull Width (m): 3.05	Bankfull Height (m): 34
Transect A		

Transect Substrates									
Position	Dist from L.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	1	24		PA	1	PA D	PA D	PA D
Left Center	0.6	4	44		PA	0	PA D	PA D	PA D
Center	1.1	10	300		PA	2	PA D	PA D	PA D
Right Center	1.7	16	20		PA	0	PA D	PA D	PA D
Right Bank	2.2	10	2		PA	0	PA D	PA D	PA D

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

Microalgae Thickness Codes
 0 = No microalgae present, Feels rough, not slimy;
 1 = Present but not visible, Feels slimy;
 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm;
 4 = 5-20mm;
 5 = >20mm;
 UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code);
 D = Dry, not assessed

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 2 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 2 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang, Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIMETER READINGS (0-17) count covered dots	
Center Left	17
Center Upstream	16
Center Right	13
Center Downstream	14
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+ <50m from Channel; Channel (record Yes or No)			
	Left Bank	Channel	Right Bank	
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P	
Buildings	P C B 0	Y N	0 B C P	
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P	
Road/ Railroad	P C B 0	Y N	0 B C P	
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P	
Landfill/ Trash	P C B 0	Y N	0 B C P	
Park/ Lawn	P C B 0	Y N	0 B C P	
Row Crop	P C B 0	Y N	0 B C P	
Pasture/ Range	P C B 0	Y N	0 B C P	
Logging Operations	P C B 0	Y N	0 B C P	
Mining Activity	P C B 0	Y N	0 B C P	
Vegetation Management	P C B 0	Y N	0 B C P	
Bridges/ Abutments	P C B 0	Y N	0 B C P	
Orchards/ Vineyards	P C B 0	Y N	0 B C P	

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (optional)	☐
Upstream (required)	☐

929
930

Inter-Transect: AB

Wetted Width (m):

1.3

Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	14	69	30	(P) A	1	P A D	P A D	P A D	Microalgae Thickness Codes: 0 = No microalgae present. Feels rough, not slimy; 1 = Present but not visible. Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.3	18	55		(P) A	1	P A D	P A D	P A D	
Center	0.2	20	89	0	(P) A	1	P A D	P A D	P A D	
Right Center	1.0	14	56		(P) X	1	P A D	P A D	P A D	
Right Bank	1.3	1	5		(P) A	0	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS

(% between transects, total=100%)

Channel Type	%
Cascade/ Falls	5
Rapid	
Riffle	80
Run	5
Glide	
Pool	10
Dry	

Site Code: <u>MC-3</u>	Site Name:	Date: <u>9/6/2012</u>
Wetted Width (m): <u>1.8</u>	Bankfull Width (m): <u>3.3</u>	Bankfull Height (m): <u>36</u>
Transect B		

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	6	>1		(P)A	0	P A D	P A D	P A D	
Left Center	0.5	9	101	0	(P)A	1	P A D	P A D	P A D	
Center	0.9	15	68	0	(P)A	1	P A D	P A D	P A D	
Right Center	1.4	8	40		(P)A	1	P A D	P A D	P A D	
Right Bank	1.8	1	14		(P)A	0	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIMETER READINGS (0-17) count covered dots	
Vegetation Class		Left Bank		Right Bank	
Upper Canopy (>5 m high)					
Trees and saplings >5 m high	0 1 (2) 3 4	0 1 (2) 3 4	0 1 (2) 3 4	0 1 (2) 3 4	Center Left 5
Lower Canopy (0.5 m-5 m high)					
All vegetation 0.5 m to 5 m	0 1 (2) 3 4	0 1 (2) 3 4	0 1 (2) 3 4	0 1 (2) 3 4	Center Upstream 15
Ground Cover (<0.5 m high)					
Woody shrubs & saplings <0.5 m	0 (1) 2 3 4	0 (1) 2 3 4	0 (1) 2 3 4	0 (1) 2 3 4	Center Right 17
Herbs/ grasses	0 1 2 (3) 4	0 1 (2) 3 4	0 1 (2) 3 4	0 1 (2) 3 4	Center Downstream 15
Barren, bare soil/ duff	0 (1) 2 3 4	0 1 (2) 3 4	0 1 (2) 3 4	0 1 (2) 3 4	Optional
				Left Bank	
				Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	Left Bank		Channel	Right Bank	
	Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P	
Buildings	P C B 0	Y N	0 B C P		
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P		
Road/ Railroad	P C B 0	Y N	0 B C P		
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P		
Landfill/ Trash	P C B 0	Y N	0 B C P		
Park/ Lawn	P C B 0	Y N	0 B C P		
Row Crop	P C B 0	Y N	0 B C P		
Pasture/ Range	P C B 0	Y N	0 B C P		
Logging Operations	P C B 0	Y N	0 B C P		
Mining Activity	P C B 0	Y N	0 B C P		
Vegetation Management	P C B 0	Y N	0 B C P		
Bridges/ Abutments	P C B 0	Y N	0 B C P		
Orchards/ Vineyards	P C B 0	Y N	0 B C P		

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: BC

Wetted Width (m):

2.3

Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size-class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	3	40		PA	0	P A D	P A D	P A D	0 = No microalgae present. Feels rough, not slimy;
Left Center	0.6	5	39		PA	0	P A D	P A D	P A D	1 = Present but not visible. Feels slimy;
Center	1.2	8	60		PA	1	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center	1.7	7	55		PA	0	P A D	P A D	P A D	3 = 1-5mm;
Right Bank	2.3	10	11		PA	0	P A D	P A D	P A D	4 = 5-20mm;
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										5 = >20mm;
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

FLOW HABITATS

(% between transects, total=100%)

Channel Type	%
Cascade/ Falls	5
Rapid	
Riffle	40
Run	15
Glide	
Pool	40
Dry	

Site Code: MC-3	Site Name:	Date: 9-16-2012
Wetted Width (m): 1.8	Bankfull Width (m): 4.2	Bankfull Height (m): 2.4
Transect C		

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	1	26		(P)A	0	P A D	P A D	P A D
Left Center	0.5	10	70	0	(P)A	1	P A D	P A D	P A D
Center	0.9	11	77	0	(P)A	1	P A D	P A D	P A D
Right Center	1.4	5	121	0	(P)A	1	P A D	P A D	P A D
Right Bank	1.8	2	49	0	(P)A	0	P A D	P A D	P A D

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

Microalgae Thickness Codes

0 = No microalgae present, Feels rough, not slimy;
1 = Present but not visible, Feels slimy;
2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
3 = 1-5mm;
4 = 5-20mm;
5 = >20mm;
UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
D = Dry, not assessed.

RIPARIAN VEGETATION (facing downstream)		Left Bank		Right Bank		INSTREAM HABITAT COMPLEXITY	DENSIMETER READINGS (0-17) count covered dots
	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)						
Vegetation Class		Upper Canopy (>5 m high)		Lower Canopy (0.5 m-5 m high)		Ground Cover (<0.5 m high)	
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	Filamentous Algae	Center Left 17
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	Aquatic Macrophytes/ Emergent Vegetation	Center Upstream 17
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	Boulders	Center Right 17
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	Woody Debris >0.3 m	Center Downstream 17
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	Optional
						Undercut Banks	Left Bank
						Overhang. Vegetation	Right Bank
						Live Tree Roots	
						Artificial Structures	

HUMAN INFLUENCE (circle only the closest to wetted channel)	Left Bank		Channel		Right Bank	
	Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P		
Buildings	P C B 0	Y N	0 B C P			
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P			
Road/ Railroad	P C B 0	Y N	0 B C P			
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P			
Landfill/ Trash	P C B 0	Y N	0 B C P			
Park/ Lawn	P C B 0	Y N	0 B C P			
Row Crop	P C B 0	Y N	0 B C P			
Pasture/ Range	P C B 0	Y N	0 B C P			
Logging Operations	P C B 0	Y N	0 B C P			
Mining Activity	P C B 0	Y N	0 B C P			
Vegetation Management	P C B 0	Y N	0 B C P			
Bridges/ Abutments	P C B 0	Y N	0 B C P			
Orchards/ Vineyards	P C B 0	Y N	0 B C P			

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: CD										Wetted Width (m): 3.5
Inter-Transect Substrates										
Position	Dist from I.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy; 1 = Present but not visible. Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Bank	0	10	9		(P) A	0	P A D	P A D	P A D	
Left Center	0.9	9	21		(P) A	0	P A D	P A D	P A D	
Center	1.8	12	30		(P) A	1	P A D	P A D	P A D	
Right Center	2.6	11	55		(P) A	1	P A D	P A D	P A D	
Right Bank	3.5	11	4		(P) A	0	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	40
Run	10
Glide	
Pool	50
Dry	

Site Code: ML-3	Site Name:	Date: 9/6/2012
Wetted Width (m): 2.1	Bankfull Width (m): 30	Bankfull Height (m): 36
Transect D		

Transect Substrates										
Position	Dist from L.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Bank	0	1	21		PA	1	PA D	PA D	PA D	
Left Center	0.5	24	36		PA	0	PA D	PA D	PA D	
Center	1.1	26	300		PA	2	PA D	PA D	PA D	
Right Center	1.6	22	39		PA	1	PA D	PA D	PA D	
Right Bank	3.1	15	11		PA	0	PA D	PA D	PA D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIMETER READINGS (0-17) count covered dots	
Vegetation Class	Left Bank	Right Bank			
0 = Absent (0%) 3 = Heavy (40-75%) 1 = Sparse (<10%) 4 = Very Heavy (>75%) 2 = Moderate (10-40%)					
Upper Canopy (>5 m high)					
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Filamentous Algae	0 1 2 3 4	Center Left
Lower Canopy (0.5 m-5 m high)					
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	Center Upstream
Ground Cover (<0.5 m high)					
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Right
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Woody Debris >0.3 m	0 1 2 3 4	Center Downstream
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Optional
			Undercut Banks	0 1 2 3 4	Left Bank
			Overhang. Vegetation	0 1 2 3 4	Right Bank
			Live Tree Roots	0 1 2 3 4	
			Artificial Structures	0 1 2 3 4	

HUMAN INFLUENCE (circle only the closest to wetted channel)	Left Bank				Channel	Right Bank				
	P	C	B	0	Y	N	0	B	C	P
Walls/ Rip-rap/ Dams				0	Y	N	0	B	C	P
Buildings				0	Y	N	0	B	C	P
Pavement/ Cleared Lot				0	Y	N	0	B	C	P
Road/ Railroad				0	Y	N	0	B	C	P
Pipes (Inlet/ Outlet)				0	Y	N	0	B	C	P
Landfill/ Trash				0	Y	N	0	B	C	P
Park/ Lawn				0			0	B	C	P
Row Crop				0			0	B	C	P
Pasture/ Range				0			0	B	C	P
Logging Operations				0			0	B	C	P
Mining Activity				0	Y	N	0	B	C	P
Vegetation Management				0	Y	N	0	B	C	P
Bridges/ Abutments				0	Y	N	0	B	C	P
Orchards/ Vineyards				0			0	B	C	P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: DE										Wetted Width (m): 1.7
Inter-Transect Substrates										
Position	Dist from I.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	10	71		(P) A	0	P A D	P A D	P A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy; 1 = Present but not visible. Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code); D = Dry, not assessed
Left Center	0.4	16	11		(P) A	0	P A D	P A D	P A D	
Center	0.9	20	3		(P) A	0	P A D	P A D	P A D	
Right Center	1.3	25	150	35	(P) A	1	P A D	P A D	P A D	
Right Bank	1.7	10	>1		(P) A	0	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	55
Run	25
Glide	
Pool	20
Dry	

Site Code: MC-3	Site Name:	Date: 9/6/2012
Wetted Width (m): 1.7	Bankfull Width (m): 3.9	Bankfull Height (m): 40
		Transect E

Transect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	5	1		(P) A	0	P A D	P A D	(P) A D	
Left Center	0.4	12	20		(P) A	0	P A D	P A D	P A D	
Center	0.9	5	195	50	(P) A	1	P A D	P A D	P A D	
Right Center	1.3	7	91	0	(P) A	2	P A D	P A D	P A D	
Right Bank	1.7	15	4		(P) A	0	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

Microalgae Thickness Codes:
 0 = No microalgae present, Feels rough, not slimy;
 1 = Present but not visible, Feels slimy;
 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm;
 4 = 5-20mm;
 5 = >20mm;
 UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
 D = Dry, not assessed

RIPARIAN VEGETATION (facing downstream)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank
Upper Canopy (>5 m high)		
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4
Lower Canopy (0.5 m-5 m high)		
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4
Ground Cover (<0.5 m high)		
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	6
Center Upstream	17
Center Right	17
Center Downstream	2
Optional:	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No)		
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0		0 B C P
Row Crop	P C B 0		0 B C P
Pasture/ Range	P C B 0		0 B C P
Logging Operations	P C B 0		0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0		0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: EF										Wetted Width (m): 3.1
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	2	4		(P) A	0	P A D	P A D	P A D	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.8	1	27		(P) A	0	P A D	P A D	P A D	
Center	1.6	8	30		(P) A	0	P A D	P A D	P A D	
Right Center	2.3	11	48		(P) A	0	P A D	P A D	P A D	
Right Bank	3.1	12	5		A A	0	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	10
Rapid	
Riffle	60
Run	10
Glide	
Pool	20
Dry	

Site Code: MC-3	Site Name:	Date: 9/16/2012
Wetted Width (m): 2.0	Bankfull Width (m): 5.0	Bankfull Height (m): 2.5

Transect F

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	4	7	1	(P) A	0	P A D	P A D	P A D
Left Center	0.5	5	1		(P) A	0	P A D	P A D	(P) A D
Center	1.0	11	4	2	(P) A	0	P A D	P A D	P A D
Right Center	1.5	10	10		(P) A	0	P A D	P A D	P A D
Right Bank	2.0	2	7		(P) A	0	P A D	P A D	P A D

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

Microalgae Thickness Codes

0 = No microalgae present, Feels rough, not slimy;
 1 = Present but not visible, Feels slimy;
 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm;
 4 = 5-20mm;
 5 = >20mm;
 UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
 D = Dry, not assessed

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIOMETER READINGS (0-17) count covered dots	
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			
Vegetation Class	Left Bank	Right Bank			
Upper Canopy (>5 m high)					
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4			
Lower Canopy (0.5 m-5 m high)					
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4			
Ground Cover (<0.5 m high)					
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4			
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4			
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4			
		INSTREAM HABITAT COMPLEXITY Filamentous Algae 0 1 2 3 4 Aquatic Macrophytes/ Emergent Vegetation 0 1 2 3 4 Boulders 0 1 2 3 4 Woody Debris >0.3 m 0 1 2 3 4 Woody Debris <0.3 m 0 1 2 3 4 Undercut Banks 0 1 2 3 4 Overhang, Vegetation 0 1 2 3 4 Live Tree Roots 0 1 2 3 4 Artificial Structures 0 1 2 3 4		DENSIOMETER READINGS (0-17) count covered dots Center Left 17 Center Upstream 17 Center Right 17 Center Downstream 15 Optional Left Bank Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		Left Bank		Channel	Right Bank	
Walls/ Rip-rap/ Dams	P C B 0	Y N	0	Y N	0	B C P
Buildings	P C B 0	Y N	0	Y N	0	B C P
Pavement/ Cleared Lot	P C B 0	Y N	0	Y N	0	B C P
Road/ Railroad	P C B 0	Y N	0	Y N	0	B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0	Y N	0	B C P
Landfill/ Trash	P C B 0	Y N	0	Y N	0	B C P
Park/ Lawn	P C B 0	Y N	0	Y N	0	B C P
Row Crop	P C B 0	Y N	0	Y N	0	B C P
Pasture/ Range	P C B 0	Y N	0	Y N	0	B C P
Logging Operations	P C B 0	Y N	0	Y N	0	B C P
Mining Activity	P C B 0	Y N	0	Y N	0	B C P
Vegetation Management	P C B 0	Y N	0	Y N	0	B C P
Bridges/ Abutments	P C B 0	Y N	0	Y N	0	B C P
Orchards/ Vineyards	P C B 0	Y N	0	Y N	0	B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect, between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (required)	☐
Upstream (required)	☐

Inter-Transect: FG										Wetted Width (m): 1.5
Inter-Transect Substrates										
Position	Dist from L.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	30	>1		P A	0	P A D	P A D	P A D	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.4	29	109	10	P A	1	P A D	P A D	P A D	
Center	0.8	31	7		P A	0	P A D	P A D	P A D	
Right Center	1.1	29	52		P A	1	P A D	P A D	P A D	
Right Bank	1.5	28	5		P A	0	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	10
Rapid	
Riffle	20
Run	20
Glide	
Pool	50
Dry	

Site Code: <u>MC-3</u>	Site Name:	Date: <u>9-16</u> / 2012
Wetted Width (m): <u>1.8</u>	Bankfull Width (m): <u>3.0</u>	Bankfull Height (m): <u>41</u>
Transect G		

Transect Substrates									
Position	Dist from L.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	50	3		(P)	0	P A D	P A D	P A D
Left Center	0.5	45	4		(P) A	0	P A D	P A D	P A D
Center	0.9	35	120	0	(P) A	1	P A D	P A D	P A D
Right Center	1.4	19	1		(P) A	0	P A D	P A D	P A D
Right Bank	1.8	2	1		(P) A	0	P A D	P A D	P A D

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

Microalgae Thickness Codes
 0 = No microalgae present, Feels rough, not slimy;
 1 = Present but not visible, Feels slimy;
 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm;
 4 = 5-20mm;
 5 = >20mm;
 UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
 D = Dry, not assessed

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIMETER READINGS (0-17) count covered dots	
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			
Vegetation Class	Left Bank	Right Bank	Filamentous Algae	0 1 2 3 4	Center Left
Upper Canopy (>5 m high)			Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	Center Upstream
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Right
Lower Canopy (0.5 m-5 m high)			Woody Debris >0.3 m	0 1 2 3 4	Center Downstream
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Optional
Ground Cover (<0.5 m high)			Undercut Banks	0 1 2 3 4	Left Bank
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Overhang. Vegetation	0 1 2 3 4	Right Bank
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Live Tree Roots	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Artificial Structures	0 1 2 3 4	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No)			
	Left Bank	Channel	Right Bank	
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P	
Buildings	P C B 0	Y N	0 B C P	
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P	
Road/ Railroad	P C B 0	Y N	0 B C P	
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P	
Landfill/ Trash	P C B 0	Y N	0 B C P	
Park/ Lawn	P C B 0	Y N	0 B C P	
Row Crop	P C B 0	Y N	0 B C P	
Pasture/ Range	P C B 0	Y N	0 B C P	
Logging Operations	P C B 0	Y N	0 B C P	
Mining Activity	P C B 0	Y N	0 B C P	
Vegetation Management	P C B 0	Y N	0 B C P	
Bridges/ Abutments	P C B 0	Y N	0 B C P	
Orchards/ Vineyards	P C B 0	Y N	0 B C P	

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: GH										Wetted Width (m): 1.9
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	7	1		PA	0	PA D	PA D	PA D	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.5	5	51		PA	0	PA D	PA D	PA D	
Center	1.0	10	86	20	PA	0	PA D	PA D	PA D	
Right Center	1.4	15	11		PA	0	PA D	PA D	PA D	
Right Bank	1.9	11	71		PA	0	PA D	PA D	PA D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	10
Rapid	
Riffle	30
Run	10
Glide	
Pool	50
Dry	

Site Code: MC-3	Site Name:	Date: 9-10-12 2012
Wetted Width (m): 1.3	Bankfull Width (m): 23	Bankfull Height (m): 40

Transect H

Transect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	1	71		(P)A	0	P A D	P A D	P A D	
Left Center	0.3	11	1		(P)A	0	P A D	P A D	P A D	
Center	0.7	22	50		(P)A	0	P A D	P A D	P A D	
Right Center	1.0	28	78		(P)A	0	P A D	P A D	P A D	
Right Bank	1.3	9	1		(P)A	0	P A D	P A D	(P)A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

Microalgae Thickness Codes:
 0 = No microalgae present, Feels rough, not slimy;
 1 = Present but not visible, Feels slimy;
 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm;
 4 = 5-20mm;
 5 = >20mm;
 UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
 D = Dry, not assessed.

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIOMETER READINGS (0-17) count covered dots	
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			
Vegetation Class	Left Bank	Right Bank	Filamentous Algae	Center Left	
Upper Canopy (>5 m high)			Aquatic Macrophytes/ Emergent Vegetation	Center	17
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	Center Upstream	16
Lower Canopy (0.5 m to 5 m high)			Boulders	Center Right	3
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Woody Debris >0.3 m	Center Downstream	13
Ground Cover (<0.5 m high)			Woody Debris <0.3 m	Optional	
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Undercut Banks	Left Bank	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Overhang, Vegetation	Right Bank	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Live Tree Roots		
			Artificial Structures		

HUMAN INFLUENCE (circle only the closest to wetted channel)	Left Bank			Channel	Right Bank		
	Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P			
Buildings	P C B 0	Y N	0 B C P				
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P				
Road/ Railroad	P C B 0	Y N	0 B C P				
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P				
Landfill/ Trash	P C B 0	Y N	0 B C P				
Park/ Lawn	P C B 0	Y N	0 B C P				
Row Crop	P C B 0	Y N	0 B C P				
Pasture/ Range	P C B 0	Y N	0 B C P				
Logging Operations	P C B 0	Y N	0 B C P				
Mining Activity	P C B 0	Y N	0 B C P				
Vegetation Management	P C B 0	Y N	0 B C P				
Bridges/ Abutments	P C B 0	Y N	0 B C P				
Orchards/ Vineyards	P C B 0	Y N	0 B C P				

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: HI						Wetted Width (m): 1.5				
Inter-Transect Substrates										
Position	Dist from L.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	9	71		PA	0	P A D	P A D	P A D	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt. (formerly Z code). D = Dry, not assessed.
Left Center	0.4	16	9		PA	0	P A D	P A D	P A D	
Center	0.8	11	61		PA	0	P A D	P A D	P A D	
Right Center	1.1	11	110	5	PA	1	P A D	P A D	P A D	
Right Bank	1.5	14	59		PA	1	P A D	P A D	PA D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	85
Run	15
Glide	
Pool	20
Dry	

Site Code: <u>MC-3</u>	Site Name:	Date: <u>2/16/2012</u>
Wetted Width (m): <u>1.1</u>	Bankfull Width (m): <u>1.7</u>	Bankfull Height (m): <u>5.2</u>

Transect I

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	8	22		P A	1	P A D	P A D	P A D	
Left Center	0.3	15	115		P A	0	P A D	P A D	P A D	
Center	0.6	24	790		P A	2	P A D	P A D	P A D	
Right Center	0.8	2	20		P A	0	P A D	P A D	P A D	
Right Bank	1.1	1	208	10	P A	1	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

RIPARIAN VEGETATION (facing downstream)			INSTREAM HABITAT COMPLEXITY		DENSIMETER READINGS (0-17) count covered dots	
Vegetation Class	Left Bank	Right Bank				
Upper Canopy (>5 m high)						
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Filamentous Algae	0 1 2 3 4	Center Left	5
Lower Canopy (0.5 m-5 m high)			Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	Center Upstream	17
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Right	17
Ground Cover (<0.5 m high)			Woody Debris >0.3 m	0 1 2 3 4	Center Downstream	17
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Optional	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Undercut Banks	0 1 2 3 4	Left Bank	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Overhang. Vegetation	0 1 2 3 4	Right Bank	
			Live Tree Roots	0 1 2 3 4		
			Artificial Structures	0 1 2 3 4		

HUMAN INFLUENCE (circle only the closest to wetted channel)	Left Bank			Channel	Right Bank					
	P	C	B	Y	N	P	C	B		
Walls/ Rip-rap/ Dams	P	C	B	0	Y	N	0	B	C	P
Buildings	P	C	B	0	Y	N	0	B	C	P
Pavement/ Cleared Lot	P	C	B	0	Y	N	0	B	C	P
Road/ Railroad	P	C	B	0	Y	N	0	B	C	P
Pipes (Inlet/ Outlet)	P	C	B	0	Y	N	0	B	C	P
Landfill/ Trash	P	C	B	0	Y	N	0	B	C	P
Park/ Lawn	P	C	B	0	Y	N	0	B	C	P
Row Crop	P	C	B	0	Y	N	0	B	C	P
Pasture/ Range	P	C	B	0	Y	N	0	B	C	P
Logging Operations	P	C	B	0	Y	N	0	B	C	P
Mining Activity	P	C	B	0	Y	N	0	B	C	P
Vegetation Management	P	C	B	0	Y	N	0	B	C	P
Bridges/ Abutments	P	C	B	0	Y	N	0	B	C	P
Orchards/ Vineyards	P	C	B	0	Y	N	0	B	C	P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: IJ						Wetted Width (m): 1.8				
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	5	19		PA	0	P X D	P X D	P X D	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code); D = Dry, not assessed
Left Center	0.5	3	42		PA	0	P X D	P X D	P X D	
Center	0.9	10	79	25	PA	1	P X D	P X D	P X D	
Right Center	1.4	6	80	30	PA	1	P X D	P X D	P X D	
Right Bank	1.8	5	24		PA	0	P X D	P X D	P X D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	85
Run	10
Glide	
Pool	5
Dry	

Site Code: <u>26-3</u>	Site Name:	Date: <u> </u> / <u> </u> / 2012
Wetted Width (m): <u>1.8</u>	Bankfull Width (m): <u>3.0</u>	Bankfull Height (m): <u>3.2</u>

Transect J

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Position	Dist from L.B. (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	5	21		(P) A	0	P A D	P A D	P A D	
Left Center	0.5	0.9	600		(P) A	1	P A D	P A D	(P) A D	
Center	0.9	28	165	0	(P) A	1	P A D	P A D	P A D	
Right Center	1.4	19	179	0	(P) A	1	P A D	P A D	P A D	
Right Bank	1.8	1	14		(P) A	0	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

RIPARIAN VEGETATION (facing downstream)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)		3 = Heavy (40-75%) 4 = Very Heavy (>75%)							
Vegetation Class	Left Bank				Right Bank					
Upper Canopy (>5 m high)										
Trees and saplings >5 m high	0	1	2	3	4	0	1	2	3	4
Lower Canopy (0.5 m-5 m high)										
All vegetation 0.5 m to 5 m	0	1	2	3	4	0	1	2	3	4
Ground Cover (<0.5 m high)										
Woody shrubs & saplings <0.5 m	0	1	2	3	4	0	1	2	3	4
Herbs/ grasses	0	1	2	3	4	0	1	2	3	4
Barren, bare soil/ duff	0	1	2	3	4	0	1	2	3	4

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)				
Filamentous Algae	0	1	2	3	4
Aquatic Macrophytes/ Emergent Vegetation	0	1	2	3	4
Boulders	0	1	2	3	4
Woody Debris >0.3 m	0	1	2	3	4
Woody Debris <0.3 m	0	1	2	3	4
Undercut Banks	0	1	2	3	4
Overhang. Vegetation	0	1	2	3	4
Live Tree Roots	0	1	2	3	4
Artificial Structures	0	1	2	3	4

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	17
Center Upstream	17
Center Right	17
Center Downstream	17
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No)		
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0		0 B C P
Row Crop	P C B 0		0 B C P
Pasture/ Range	P C B 0		0 B C P
Logging Operations	P C B 0		0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0		0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0		0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: JK										Wetted Width (m): 2.2
Inter-Transect Substrates										
Position	Dist from L.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	10	430		(P)	2	P A D	P A D	P A D	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.6	18	140	0	(P) A	1	P A D	P A D	P A D	
Center	1.1	5	109	0	(P) A	1	P A D	P A D	P A D	
Right Center	1.7	0.4	190	0	(P) A	1	P A D	P A D	P A D	
Right Bank	2.2	7	60		(P) A	0	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	100
Run	10
Glide	
Pool	
Dry	

Site Code: MC-3	Site Name:	Date: 9-16-2012
Wetted Width (m): 2.4	Bankfull Width (m): 3.0	Bankfull Height (m): 3.2

Transect K

Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	4	1		(P) A	0	P A D	P A D	P A D	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; U = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.6	8	21		(P) A	0	P A D	P A D	P A D	
Center	1.2	11	61		(P) A	1	P A D	P A D	P A D	
Right Center	1.8	10	205	70	(P) A	1	P A D	P A D	P A D	
Right Bank	2.4	15	74	10	(P) A	1	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots	
Center	16
Left	
Center Upstream	17
Center Right	17
Center Downstream	17
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No)		
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0		0 B C P
Row Crop	P C B 0		0 B C P
Pasture/ Range	P C B 0		0 B C P
Logging Operations	P C B 0		0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0		0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0		0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (required)	☐
Upstream (optional)	☐

934
933

REACH DOCUMENTATION		Standard Reach Length (wetted width ≤ 10 m) = 150 m Distance between transects = 15 m Alternate Reach Length (wetted width > 10 m) = 250 m Distance between transects = 25 m	
Project Name: TRWQMP	Date: 9 / 17 / 2012	Sample Collection Time: 1030	
Stream Name: MARTIS Creek	Site Name/ Description: Lower WS MARTIS BELOW GOLF course		
Site Code: MC-4	Crew Members: IAC BJK		
Latitude (actual – decimal degrees): °N	datum: NAD83	GPS Device:	
Longitude (actual – decimal degrees): °W	other:		

AMBIENT WATER QUALITY MEASUREMENTS					*Turbidity, silica, oxygen saturation, and air temp are optional; calibration date required on page 24	Actual Reach Length (m) (see reach length guidelines at top of form)
Water Temp (Deg C)	pH	Alkalinity (mg/L)	Turbidity (ntu)*	Oxygen Sat. (%)*		150
8.83	6.89			88.9		
Dissolved O ₂ (mg/L)	Specific Conduct (uS/cm)	Salinity (ppt)	Silica (mg/L)*	Air Temp (Deg C)*		Explanation:
10.31	1941134	0.09				

DISCHARGE MEASUREMENTS							check if discharge measurements not possible ☐			
1 st measurement = left bank (looking downstream)							(explain in field notes section)			
VELOCITY AREA METHOD (preferred)				cal. date	Transect Width (m): 8		BUOYANT OBJECT METHOD (use ONLY if velocity area method not possible)			
	Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)		Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)	Float 1	Float 2	Float 3
1	22	4	10%	11	62	20	0.141			
2	26	10	50%	12	66	20	0.145			
3	30	11	80%	13	70	20	0.134			
4	34	12	0.181	14	74	18	0.163			
5	38	15	0.177	15	78	17	0.185			
6	42	18	0.200	16	82	18	0.220			
7	46	18	0.200	17	86	17	0.235			
8	50	20	0.146	18	90	15	0.183			
9	54	20	0.118	19	94	16	80%			
10	58	20	0.149	20	98	16	40%			
Float Reach Cross Section										
	width (m)	Upper Section	Middle Section	Lower Section						
	depth (cm)									
	Width									
	Depth 1									
	Depth 2									
	Depth 3									
	Depth 4									
	Depth 5									

NOTABLE FIELD CONDITIONS (check one box per topic)			
Evidence of recent rainfall (enough to increase surface runoff)	☒ NO	minimal	>10% flow increase
Evidence of fires in reach or immediately upstream (<500 m)	☒ NO	<1 year	<5 years
Dominant landuse/ landcover in area surrounding reach	Agriculture	Forest	Rangeland
	Urban/Industrial	Suburb/Town	Other

ADDITIONAL COBBLE EMBEDDEDNESS MEASURES	1	2	3	4	5	6	7	8	9	10	11	12	13
(carry over from transect forms if needed to attain target count of 25; measure in %)	0	5	10	25	10	35	60	50	25	40	50	40	35
	14	15	16	17	18	19	20	21	22	23	24	25	
	10	25	0	5									

Site Code: MC-4

Date: 9/12/2012

SLOPE and BEARING FORM (transect based - for Full PHAB only)

 AUTOLEVEL
 CLINOMETER
 HANDLEVEL
 OTHER

Starting Transect	MAIN SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)					SUPPLEMENTAL SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)				
	Stadia rod measurements	Slope (%) or Elevation Difference cm ☐ % ☐	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)	Stadia rod measurements	Slope or Elevation Difference cm ☐ % ☐	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)
K	1.600									
J				290						
I				308						
H				321						
G				309						
F				352						
E				261						
D				340						
C				317						
B				310						
A	4.025			287						

additional calculation area

→ 7.425/150 → 1.65%

ADDITIONAL HABITAT CHARACTERIZATION											High Gradient ☐					Low Gradient ☒					
Parameter	Optimal					Suboptimal					Marginal					Poor					
Epifaunal Substrate/ Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover (50% for low-gradient streams); mix of submerged logs, undercut banks, cobble or other stable habitat					40-70% mix of stable habitat (30-50% for low-gradient streams); well-suited for full colonization potential					20-40% mix of stable habitat (10-30% in low-gradient streams); substrate frequently disturbed or removed					Less than 20% stable habitat (10% in low gradient streams); lack of habitat is obvious; substrate unstable or lacking					
Score:	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition (<20% in low-gradient streams)					Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 5-30% of the bottom affected (20-50% in low-gradient streams)					Moderate deposition of new gravel, sand, or fine sediment on bars; 30-50% of the bottom affected (50-80% in low-gradient streams)					Heavy deposits of fine material; increased bar development; more than 50% of the bottom changing frequently (>80% in low-gradient streams)					
Score:	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern					Some channelization present (e.g., bridge abutments); evidence of past channelization (> 20yrs) may be present but recent channelization not present					Channelization may be extensive; embankments or shoring structures present on both banks; 40 to 80% of stream reach disrupted					Banks shored with gabion or cement; Over 80% of the stream reach channelized and disrupted; instream habitat greatly altered or removed entirely					
Score:	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Site Code: <u>ML-4</u>	Site Name:	Date: <u>9/17/2012</u>
Wetted Width (m): <u>58</u>	Bankfull Width (m): <u>10</u>	Bankfull Height (m): <u>40</u>
Transect A		

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	8	16		(P)A	0	PAD	PAD	PAD
Left Center	0.1	20	11		(P)A	0	PAD	PAD	PAD
Center	0.3	21	4		(P)A	0	PAD	PAD	PAD
Right Center	0.4	26	27		(P)A	0	PAD	PAD	PAD
Right Bank	0.6	20	17		(P)A	0	PAD	PAD	PAD
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)									

Microalgae Thickness Codes

0 = No microalgae present. Feels rough, not slimy.
 1 = Present but not visible. Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm.
 4 = 5-20mm.
 5 = >20mm.
 UD = Can not determine if microalgae present, substrate too small or covered with silt (formerly Z code)
 D = Dry, not assessed

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Filamentous Algae	0 1 2 3 4		
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4		
Boulders	0 1 2 3 4		
Woody Debris >0.3 m	0 1 2 3 4		
Woody Debris <0.3 m	0 1 2 3 4		
Undercut Banks	0 1 2 3 4		
Overhang. Vegetation	0 1 2 3 4		
Live Tree Roots	0 1 2 3 4		
Artificial Structures	0 1 2 3 4		

DENSIOMETER READINGS (0-17) count covered dots	
Center	0
Left	0
Center Upstream	0
Center Right	9
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m <50m from Channel Channel (record Yes or No)	
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y (N)	0 B C P
Buildings	P C B 0	Y (N)	0 B C P
Pavement/ Cleared Lot	P C B 0	Y (N)	0 B C P
Road/ Railroad	P C B 0	Y (N)	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y (N)	0 B C P
Landfill/ Trash	P C B 0	Y (N)	0 B C P
Park/ Lawn	P C B 0	Y (N)	0 B C P
Row Crop	P C B 0	Y (N)	0 B C P
Pasture/ Range	P C B 0	Y (N)	0 B C P
Logging Operations	P C B 0	Y (N)	0 B C P
Mining Activity	P C B 0	Y (N)	0 B C P
Vegetation Management	P C B 0	Y (N)	0 B C P
Bridges/ Abutments	P C B 0	Y (N)	0 B C P
Orchards/ Vineyards	P C B 0	Y (N)	0 B C P

BANK STABILITY			
Left Bank	eroded	stable	0
Right Bank	eroded	stable	0

TAKE PHOTOGRAPHS

(check box if taken & record photo code)

Downstream (optional) ☐

27

Upstream (required) ☐

26

Inter-Transect: AB

Wetted Width (m):

52

Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	10	11	1		PA	0	PAD	PAD	PAD	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present. Substrate too small or covered with silt. (formerly 2 code) D = Dry, not assessed
Left Center	13.01	13	3		PA	0	PAD	PAD	PAD	
Center	43	15	13		PA	0	PAD	PAD	PAD	
Right Center	45	17	1		PA	1	PAD	PAD	PAD	
Right Bank	45	12	22		PA	1	PAD	PAD	PAD	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

Flow Characteristics	
Channel Type	1
Channel Form	
Flow	
Flow	30
Flow	35
Flow	5
Flow	

Site Code: <u>MC-4</u>	Site Name:	Date: <u>9/17/2012</u>
Wetted Width (m): <u>1.75</u>	Bankfull Width (m): <u>1.3</u>	Bankfull Height (m): <u>5.2</u>

Transect B

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	9	21		PA	0	PAD	PAD	PAD
Left Center	0.2	10	13		PA	0	PAD	PAD	PAD
Center	0.4	10	20		PA	0	PAD	PAD	PAD
Right Center	0.6	10	4		PA	0	PAD	PAD	PAD
Right Bank	0.8	8	1		PA	0	PAD	PAD	PAD

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

Microalgae Thickness Codes
 0 = No microalgae present. Feels rough, not slimy.
 1 = Present but not visible. Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm.
 4 = 5-20mm.
 5 = >20mm.
 UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
 D = Dry, not assessed

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Filamentous Algae	0 1 2 3 4		
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4		
Boulders	0 1 2 3 4		
Woody Debris >0.3 m	0 1 2 3 4		
Woody Debris <0.3 m	0 1 2 3 4		
Undercut Banks	0 1 2 3 4		
Overhang. Vegetation	0 1 2 3 4		
Live Tree Roots	0 1 2 3 4		
Artificial Structures	0 1 2 3 4		

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	0
Center Upstream	0
Center Right	0
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m <50m from Channel Channel (record Yes or No)	
	Left Bank	Channel	Right Bank
Walls/Rip-rap/Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/Cleared Lot	P C B 0		0 B C P
Road/Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/Outlet)	P C B 0	Y N	0 B C P
Landfill/Trash	P C B 0	Y N	0 B C P
Park/Lawn	P C B 0		0 B C P
Row Crop	P C B 0		0 B C P
Pasture/Range	P C B 0		0 B C P
Logging Operations	P C B 0		0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0		0 B C P
Bridges/Abutments	P C B 0	Y N	0 B C P
Orchards/Vineyards	P C B 0		0 B C P

BANK STABILITY			
Left Bank	eroded	stable	0
Right Bank	eroded	stable	0

Inter-Transect: BC

Wetted Width (m):

66

Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	8	1		(P)A	0	P A D	P A D	P A D	0 = No microalgae present. Feels rough, not slimy.
Left Center	0.2	3	56		(P)A	1	P A D	P A D	P A D	1 = Present but not visible. Feels slimy.
Center	0.3	4	190	70	(P)A	2	P A D	P A D	P A D	2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center	0.5	8	37		(P)A	1	P A D	P A D	P A D	3 = 1-6mm.
Right Bank	0.7	6	34		(P)A	1	P A D	P A D	P A D	4 = 5-20mm.
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										5 = >20mm.
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed.

Flow Habitat	
Channel Type	3
Channel Form	
Bank	
Flow	30
Flow	30
Flow	
Flow	40
Flow	

Site Code: <u>MC-4</u>	Site Name:	Date: <u>9/17/2012</u>
Wetted Width (m): <u>77</u>	Bankfull Width (m): <u>130</u>	Bankfull Height (m): <u>49</u>
Transect C		

Transect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	2	71		PA	0	PA D	PA D	PA D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.2	10	31		PA	0	PA D	PA D	PA D	
Center	0.4	18	12		PA	1	PA D	PA D	PA D	
Right Center	0.6	18	12		PA	0	PA D	PA D	PA D	
Right Bank	0.8	3	71		PA	0	PA D	PA D	PA D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	0
Center Upstream	0
Center Right	0
Center Downstream	0
Optional:	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m <50m from Channel Channel (record Yes or No)		
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0	Y N	0 B C P
Row Crop	P C B 0	Y N	0 B C P
Pasture/ Range	P C B 0	Y N	0 B C P
Logging Operations	P C B 0	Y N	0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0	Y N	0 B C P

Bank Stability			
Left Bank	eroded	stable	0
Right Bank	eroded	stable	0

Inter-Transect: CD										Wetted Width (m): 1.1
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	4	4		PA	0	P A D	P A D	P A D	0 = No microalgae present. Feels rough, not slimy.
Left Center	0.3	6	25		PA	1	P A D	P A D	P A D	1 = Present but not visible. Feels slimy.
Center	0.6	8	37		PA	1	P A D	P A D	P A D	2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center	0.8	8	31		PA	1	P A D	P A D	P A D	3 = 1-5mm.
Right Bank	1.1	6	14		PA	1	P A D	P A D	P A D	4 = 5-20mm.
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										5 = >20mm.
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly 2 code).
										D = Dry, not assessed.

At Fence Line

FLOW HABITATS (% between transects, total = 100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	40
Run	45
Glide	
Pool	15
Dry	

Site Code: MC-4	Site Name:	Date: 9/17/2012
Wetted Width (m): 1.1	Bankfull Width (m): 1.40	Bankfull Height (m): 48
Transect D		

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt. (formerly Z code) D = Dry, not assessed
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	11	3a		(P)A	0	P ~~A~~ D	P ~~A~~ D	P ~~A~~ D	
Left Center	0.3	12	5b		(P)A	2	P ~~A~~ D	P ~~A~~ D	P ~~A~~ D	
Center	0.6	6	33		(P)A	1	P ~~A~~ D	P ~~A~~ D	P ~~A~~ D	
Right Center	0.8	4	10		(P)A	0	P ~~A~~ D	P ~~A~~ D	P ~~A~~ D	
Right Bank	1.1	1	3		(P)A	0	P ~~A~~ D	P ~~A~~ D	P ~~A~~ D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

RIPARIAN VEGETATION (facing downstream)	0 = Absent (0%) 3 = Heavy (40-75%) 1 = Sparse (<10%) 4 = Very Heavy (>75%) 2 = Moderate (10-40%)																
	Vegetation Class						Left Bank						Right Bank				
Upper Canopy (>5 m high)																	
Trees and saplings >5 m high	0	1	2	3	4		0	1	2	3	4						
Lower Canopy (0.5 m-5 m high)																	
All vegetation 0.5 m to 5 m	0	1	2	3	4		0	1	2	3	4						
Ground Cover (<0.5 m high)																	
Woody shrubs & saplings <0.5 m	0	1	2	3	4		0	1	2	3	4						
Herbs/ grasses	0	1	2	3	4		0	1	2	3	4						
Barren, bare soil/ duff	0	1	2	3	4		0	1	2	3	4						

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)				
	0	1	2	3	4
Filamentous Algae	0	1	2	3	4
Aquatic Macrophytes/ Emergent Vegetation	0	1	2	3	4
Boulders	0	1	2	3	4
Woody Debris >0.3 m	0	1	2	3	4
Woody Debris <0.3 m	0	1	2	3	4
Undercut Banks	0	1	2	3	4
Overhang, Vegetation	0	1	2	3	4
Live Tree Roots	0	1	2	3	4
Artificial Structures	0	1	2	3	4

DENSIOMETER READINGS (0-17) count covered dots	
Center	0
Left	
Center Upstream	0
Center Right	0
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m+ >50m from Channel Channel (record Yes or No)											
	Left Bank				Channel				Right Bank			
Walls/Rip rap/ Dams	P	C	B	0	Y				0	B	C	P
Buildings	P	C	B	0	Y				0	B	C	P
Pavement/ Cleared Lot	P	C	B	0					0	B	C	P
Road/Railroad	P	C	B	0	Y				0	B	C	P
Pipes (Inlet/ Outlet)	P	C	B	0	Y				0	B	C	P
Landfill/ Trash	P	C	B	0	Y				0	B	C	P
Park/ Lawn	P	C	B	0					0	B	C	P
Row Crop	P	C	B	0					0	B	C	P
Pasture/ Range	P	C	B	0					0	B	C	P
Logging Operations	P	C	B	0					0	B	C	P
Mining Activity	P	C	B	0	Y				0	B	C	P
Vegetation Management	P	C	B	0					0	B	C	P
Bridges/ Abutments	P	C	B	0	Y				0	B	C	P
Orchards/ Vineyards	P	C	B	0					0	B	C	P

BANK STABILITY			
Left Bank	eroded	stable	2
Right Bank	eroded	stable	2

Inter-Transect: DE										Wetted Width (m): 78cm
Inter-Transect Substrates										
Position	Dist. from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOV	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	1	215	30	PA	2	PA D	PA D	PA D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish unit on them; scraping leaves visible trail. 3 = 1-5mm 4 = 5-20mm 5 = >20mm UD = Cannot determine if microalgae present; substrate too small or covered with silt. (formerly Z code) D = Dry - not assessed
Left Center	0.2	8	110	60	PA	1	PA D	PA D	PA D	
Center	0.4	8	73	70	PA	1	PA D	PA D	PA D	
Right Center	0.6	10	28		PA	1	PA D	PA D	PA D	
Right Bank	0.8	8	26		PA	1	PA D	PA D	PA D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS (% between transects, total = 100%)	
Channel Type	%
Cascade/Falls	
Rapid	
Rifle	70
Run	10
Glide	
Pool	20
Dry	

Site Code: <u>MC-4</u>	Site Name:	Date: <u>9/1/17</u> 2012
Wetted Width (m): <u>12</u>	Bankfull Width (m): <u>1.5</u>	Bankfull Height (m): <u>48</u>
		Transect E

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code) D = Dry, not assessed
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	4	30		PA	0	P A D	P A D	P A D	
Left Center	0.3	6	42		PA	1	P A D	P A D	P A D	
Center	0.6	8	60		PA	1	P A D	P A D	P A D	
Right Center	0.9	7	40		PA	1	P A D	P A D	P A D	
Right Bank	1.2	5	1		PA	0	P A D	P A D	P A D	
	Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)									

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Filamentous Algae	0 1 2 3 4		
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4		
Boulders	0 1 2 3 4		
Woody Debris >0.3 m	0 1 2 3 4		
Woody Debris <0.3 m	0 1 2 3 4		
Undercut Banks	0 1 2 3 4		
Overhang, Vegetation	0 1 2 3 4		
Live Tree Roots	0 1 2 3 4		
Artificial Structures	0 1 2 3 4		

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	0
Center Upstream	2
Center Right	2
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m <50m from Channel Channel (record Yes or No)	
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P 0 B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0		0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0		0 B C P
Row Crop	P C B 0		0 B C P
Pasture/ Range	P C B 0		0 B C P
Logging Operations	P C B 0		0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0		0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0		0 B C P

Human Influence			
Left Bank	0	0	0
Right Bank	0	0	0

Inter-Transect: EF										Wetted Width (m): 80
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	10	420		(P) A	2	P A D	P A D	(P) A D	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.2	16	4		(P) A	0	P A D	P A D	P A D	
Center	0.4	18	13		(P) A	0	P A D	P A D	P A D	
Right Center	0.6	16	150	35	0 A	1	P A D	P A D	P A D	
Right Bank	0.8	8	13		0 A	0	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/Falls	
Rapid	
Riffle	60
Run	20
Glide	
Pool	20
Dry	

Site Code: <u>MC-4</u>	Site Name:	Date: <u>1/17/2012</u>
Wetted Width (m): <u>90</u>	Bankfull Width (m): <u>1.4</u>	Bankfull Height (m): <u>.48</u>

Transect F

Transect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	3	6		(P)A	0	PAD	PAD	(P)AD	
Left Center	0.2	5	28		(P)A	1	PAD	PAD	PAD	
Center	0.5	10	18		(P)A	1	PAD	PAD	PAD	
Right Center	0.7	8	25	70	(P)A	2	PAD	PAD	PAD	
Right Bank	0.9	18	16		(P)A	0	PAD	PAD	PAD	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

Microalgae Thickness Codes:
 0 = No microalgae present. Feels rough, not slimy.
 1 = Present but not visible. Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail.
 3 = 1-5mm.
 4 = 5-20mm.
 5 = >20mm.
 UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
 D = Dry, not assessed.

RIPARIAN VEGETATION (facing downstream)		Vegetation Class		Left Bank		Right Bank		INSTREAM HABITAT COMPLEXITY		DENSIMETER READINGS (0-17) count covered dots	
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		Upper Canopy (>5 m high)		Trees and saplings >5 m high		0 1 2 3 4		Filamentous Algae		0 1 2 3 4	
		Lower Canopy (0.5 m-5 m high)		All vegetation 0.5 m to 5 m		0 1 2 3 4		Aquatic Macrophytes/ Emergent Vegetation		0 1 2 3 4	
		Ground Cover (<0.5 m high)		Woody shrubs & saplings <0.5 m		0 1 2 3 4		Boulders		0 1 2 3 4	
				Herbs/ grasses		0 1 2 3 4		Woody Debris >0.3 m		0 1 2 3 4	
				Barren, bare soil/ duff		0 1 2 3 4		Woody Debris <0.3 m		0 1 2 3 4	
								Undercut Banks		0 1 2 3 4	
								Overhang, Vegetation		0 1 2 3 4	
								Live Tree Roots		0 1 2 3 4	
								Artificial Structures		0 1 2 3 4	
										Optional	
										Left Bank	
										Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		Left Bank		Channel		Right Bank	
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P				
Buildings	P C B 0	Y N	0 B C P				
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P				
Road/ Railroad	P C B 0	Y N	0 B C P				
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P				
Landfill/ Trash	P C B 0	Y N	0 B C P				
Park/ Lawn	P C B 0	Y N	0 B C P				
Row Crop	P C B 0	Y N	0 B C P				
Pasture/ Range	P C B 0	Y N	0 B C P				
Logging Operations	P C B 0	Y N	0 B C P				
Mining Activity	P C B 0	Y N	0 B C P				
Vegetation Management	P C B 0	Y N	0 B C P				
Bridges/ Abutments	P C B 0	Y N	0 B C P				
Orchards/ Vineyards	P C B 0	Y N	0 B C P				

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (required)	☐
Upstream (required)	☐

3 meter upstream of CART PATH Bridge

Inter-Transect: FG										Wetted Width (m): 70
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	5	22		PA	1	PA D	PA D	PA D	0 = No microalgae present. Feels rough, not slimy.
Left Center	0.2	9	9		PA	0	PA D	PA D	PA D	1 = Present but not visible. Feels slimy.
Center	0.4	22	24		PA	1	PA D	PA D	PA D	2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail.
Right Center	0.5	13	17		PA	1	PA D	PA D	PA D	3 = 1-5mm.
Right Bank	0.7	3	20		PA	0	PA D	PA D	PA D	4 = 5-20mm.
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										5 = >20mm.
										UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/Falls	
Rapid	
Rifle	55
Run	10
Glide	
Pool	35
Dry	

Site Code: <u>M44</u>	Site Name:	Date: <u>9/1/2012</u>
Wetted Width (m): <u>50</u>	Bankfull Width (m): <u>1.5</u>	Bankfull Height (m): <u>60</u>

Transect G

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	2	1		PA	0	PAD	PAD	PAD
Left Center	0.1	5	4		PA	1	PAD	PAD	PAD
Center	0.3	4	41		PA	1	PAD	PAD	PAD
Right Center	0.4	9	32		PA	1	PAD	PAD	PAD
Right Bank	0.5	4	15		PA	1	PAD	PAD	PAD

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

Microalgae Thickness Codes
 0 = No microalgae present. Feels rough, not slimy.
 1 = Present but not visible. Feels slimy.
 2 = Present and visible but <1 mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail.
 3 = 1-5mm.
 4 = 6-20mm.
 5 = >20mm.
 UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code)
 D = Dry, not assessed

RIPARIAN VEGETATION (facing downstream)		Vegetation Class		Left Bank	Right Bank
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		Upper Canopy (>5 m high)			
		Trees and saplings >5 m high		0 1 2 3 4	0 1 2 3 4
		Lower Canopy (0.5 m-5 m high)			
		All vegetation 0.5 m to 5 m		0 1 2 3 4	0 1 2 3 4
		Ground Cover (<0.5 m high)			
		Woody shrubs & saplings <0.5 m		0 1 2 3 4	0 1 2 3 4
		Herbs/ grasses		0 1 2 3 4	0 1 2 3 4
		Barren, bare soil/ duff		0 1 2 3 4	0 1 2 3 4

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	0
Center Upstream	0
Center Right	0
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		Left Bank		Channel	Right Bank	
0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m - 50m from Channel Channel (record Yes or No)						
Walls/Rip-rap/ Dams		P C B 0		Y N	0 B C P	
Buildings		P C B 0		Y N	0 B C P	
Pavement/ Cleared Lot		P C B 0		Y N	0 B C P	
Road/ Railroad		P C B 0		Y N	0 B C P	
Pipes (Inlet/ Outlet)		P C B 0		Y N	0 B C P	
Landfill/ Trash		P C B 0		Y N	0 B C P	
Park/ Lawn		P C B 0		Y N	0 B C P	
Row Crop		P C B 0		Y N	0 B C P	
Pasture/ Range		P C B 0		Y N	0 B C P	
Logging Operations		P C B 0		Y N	0 B C P	
Mining Activity		P C B 0		Y N	0 B C P	
Vegetation Management		P C B 0		Y N	0 B C P	
Bridges/ Abutments		P C B 0		Y N	0 B C P	
Orchards/ Vineyards		P C B 0		Y N	0 B C P	

BANK STABILITY			
Left Bank	eroded	stable	0
Right Bank	eroded	stable	0

Inter-Transect: GH										Wetted Width (m): 55
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	4	36		PA	0	PA D	PA D	PA D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.1	7	30		PA	1	PA D	PA D	PA D	
Center	0.3	9	20		PA	1	PA D	PA D	PA D	
Right Center	0.4	8	39		PA	1	PA D	PA D	PA D	
Right Bank	0.6	6	3		PA	0	PA D	PA D	PA D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/Falls	
Rapid	
Riffle	55
Run	20
Glide	10
Pool	15
Dry	

Site Code: <u>MC-4</u>	Site Name:	Date: <u>9/1/12</u> 2012
Wetted Width (m): <u>90</u>	Bankfull Width (m): <u>1.6</u>	Bankfull Height (m): <u>41</u>

Transect H

Transect Substrates										Microalgae Thickness Codes
Position	Dist from EB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	6	1		P	0	P A D	P A D	P A D	
Left Center	0.2	10	20		P A	1	P A D	P A D	P A D	
Center	0.5	11	30		P A	1	P A D	P A D	P A D	
Right Center	0.7	10	16		P A	1	P A D	P A D	P A D	
Right Bank	0.9	9	17		P A	0	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

Microalgae Thickness Codes:
 0 = No microalgae present. Feels rough, not slimy.
 1 = Present but not visible. Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm.
 4 = 5-20mm.
 5 = >20mm.
 UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
 D = Dry, not assessed.

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIOMETER READINGS (0-17) count covered dots	
Vegetation Class	Left Bank	Right Bank	Filamentous Algae	0 1 2 3 4	Center
Upper Canopy (>5 m high)			Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	Left
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Upstream
Lower Canopy (0.5 m-5 m high)			Woody Debris >0.3 m	0 1 2 3 4	Center Right
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Center Downstream
Ground Cover (<0.5 m high)			Undercut Banks	0 1 2 3 4	Optional
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Overhang. Vegetation	0 1 2 3 4	Left Bank
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Live Tree Roots	0 1 2 3 4	Right Bank
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Artificial Structures	0 1 2 3 4	

HUMAN INFLUENCE (circle only the closest to wetted channel)	Left Bank			Channel	Right Bank		
	Walls/Rip-rap/Dams	P C B 0	Y N	0 B C P			
Buildings	P C B 0	Y N	0 B C P				
Pavement/Cleared Lot	P C B 0	Y N	0 B C P				
Road/Railroad <u>CAR</u>	P C B 0	Y N	0 B C P				
Pipes (Inlet/Outlet)	P C B 0	Y N	0 B C P				
Landfill/Trash	P C B 0	Y N	0 B C P				
Park/Lawn	P C B 0	Y N	0 B C P				
Row Crop	P C B 0	Y N	0 B C P				
Pasture/Range	P C B 0	Y N	0 B C P				
Logging Operations	P C B 0	Y N	0 B C P				
Mining Activity	P C B 0	Y N	0 B C P				
Vegetation Management	P C B 0	Y N	0 B C P				
Bridges/Abutments	P C B 0	Y N	0 B C P				
Orchards/Vineyards	P C B 0	Y N	0 B C P				

BANK STABILITY (score zone 5m upstream and 5m downstream of transect, between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: HI										Wetted Width (m): 80
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	4	71		(P)A	0	P A D	P A D	P A D	Microalgae Thickness Codes 0 = No microalgae present Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.2	26	21		(P)A	1	P A D	P A D	P A D	
Center	0.4	9	74	0	(P)A	2	P A D	P A D	P A D	
Right Center	0.6	9	24		(P)A	1	P A D	P A D	P A D	
Right Bank	0.8	6	1		(P)A	0	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/Falls	
Rapid	
Riffle	70
Run	15
Glide	
Pool	15
Dry	

Site Code: MC-4	Site Name:	Date: 9/17/2012
Wetted Width (m): 72	Bankfull Width (m): 18	Bankfull Height (m): 1.50

Transect I

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	9	71		(P)A	0	P A D	P A D	(P)A D
Left Center	0.2	10	11		(P)A	1	P A D	P A D	P A D
Center	0.4	11	34		(P)A	1	P A D	P A D	(P)A D
Right Center	0.5	11	53		(P)A	1	P A D	P A D	P A D
Right Bank	0.7	10	30		(P)A	1	P A D	P A D	(P)A D

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

Microalgae Thickness Codes
 0 = No microalgae present
 Feels rough, not slimy.
 1 = Present but not visible, Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm.
 4 = 5-20mm.
 6 = >20mm.
 UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code)
 D = Dry, not assessed

RIPARIAN VEGETATION (facing downstream)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Vegetation Class	Left Bank Right Bank
Upper Canopy (>5 m high)	
Trees and saplings >5 m high	0 1 2 3 4 0 1 2 3 4
Lower Canopy (0.5 m-5 m high)	
All vegetation 0.5 m to 5 m	0 1 2 3 4 0 1 2 3 4
Ground Cover (<0.5 m high)	
Woody shrubs & saplings <0.5 m	0 1 2 3 4 0 1 2 3 4
Herbs/ grasses	0 1 2 3 4 0 1 2 3 4
Barren, bare soil/ duff	0 1 2 3 4 0 1 2 3 4

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIMETER READINGS (0-17) count covered dots.	
Center Left	0
Center Upstream	0
Center Right	9
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present. B = On Bank. C = Between Bank & 10m from Channel. P = >10m+ <50m from Channel. Channel (record Yes or No)
	Left Bank Channel Right Bank
Walls/ Rip-rap/ Dams	P C B 0 Y N 0 B C P
Buildings	P C B 0 Y N 0 B C P
Pavement/ Cleared Lot	P C B 0 Y N 0 B C P
Road/ Railroad	P C B 0 Y N 0 B C P
Pipes (Inlet/ Outlet)	P C B 0 Y N 0 B C P
Landfill/ Trash	P C B 0 Y N 0 B C P
Park/ Lawn	P C B 0 Y N 0 B C P
Row Crop	P C B 0 Y N 0 B C P
Pasture/ Range	P C B 0 Y N 0 B C P
Logging Operations	P C B 0 Y N 0 B C P
Mining Activity	P C B 0 Y N 0 B C P
Vegetation Management	P C B 0 Y N 0 B C P
Bridges/ Abutments	P C B 0 Y N 0 B C P
Orchards/ Vineyards	P C B 0 Y N 0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)
Left Bank eroded vulnerable stable
Right Bank eroded vulnerable stable

Inter-Transect: IJ						Wetted Width (m): 78				
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	11	14		PA	1	PA D	PA D	PA D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	02	18	30		PA	1	PA D	PA D	PA D	
Center	04	15	>1		PA	0	PA D	PA D	PA D	
Right Center	06	12	>1		PA	0	PA D	PA D	PA D	
Right Bank	08	8	>1		PA	0	PA D	PA D	PA D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/Falls	
Rapid	
Riffle	35
Run	30
Glide	10
Pool	25
Dry	

Site Code: MC-4	Site Name:	Date: 9-17-2012
Wetted Width (m): 1.5	Bankfull Width (m): 1.9	Bankfull Height (m): 30
Transect J		

Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	25	12		P A	0	P A D	P A D	P A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code) D = Dry, not assessed
Left Center	0.4	11	13		P A	0	P A D	P A D	P A D	
Center	0.8	5	17		P A	1	P A D	P A D	P A D	
Right Center	1.1	8	11		P A	0	P A D	P A D	P A D	
Right Bank	1.5	4	71		P A	0	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

RIPARIAN VEGETATION (facing downstream)	0 = Absent (0%)				3 = Heavy (40-75%)					
	1 = Sparse (<10%)				4 = Very Heavy (>75%)					
	2 = Moderate (10-40%)									
Vegetation Class	Left Bank				Right Bank					
Upper Canopy (>5 m high)										
Trees and saplings >5 m high	0	1	2	3	4	0	1	2	3	4
Lower Canopy (0.5 m-5 m high)										
All vegetation 0.5 m to 5 m	0	1	2	3	4	0	1	2	3	4
Ground Cover (<0.5 m high)										
Woody shrubs & saplings <0.5 m	0	1	2	3	4	0	1	2	3	4
Herbs/ grasses	0	1	2	3	4	0	1	2	3	4
Barren, bare soil/ duff	0	1	2	3	4	0	1	2	3	4

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%)				1 = Sparse (<10%)				2 = Moderate (10-40%)				3 = Heavy (40-75%)				4 = Very Heavy (>75%)			
	Filamentous Algae	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3
Aquatic Macrophytes/ Emergent Vegetation	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
Boulders	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
Woody Debris >0.3 m	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
Woody Debris <0.3 m	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
Undercut Banks	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
Overhang, Vegetation	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
Live Tree Roots	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
Artificial Structures	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4

DENSIMETER READINGS (0-17) count covered dots	
Center	11
Left	
Center Upstream	3
Center Right	17
Center Downstream	17
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present				B = On Bank				C = Between Bank & 10m from Channel				P = >10m < 50m from Channel				Channel (record Yes or No)			
	Left Bank				Channel				Right Bank											
Walls/ Rip-rap/ Dams	P	C	B	0	Y	N	0	B	C	P										
Buildings	P	C	B	0	Y	N	0	B	C	P										
Pavement/ Cleared Lot	P	C	B	0	Y	N	0	B	C	P										
Road/ Railroad	P	C	B	0	Y	N	0	B	C	P										
Pipes (Inlet/ Outlet)	P	C	B	0	Y	N	0	B	C	P										
Landfill/ Trash	P	C	B	0	Y	N	0	B	C	P										
Park/ Lawn	P	C	B	0			0	B	C	P										
Row Crop	P	C	B	0			0	B	C	P										
Pasture/ Range	P	C	B	0			0	B	C	P										
Logging Operations	P	C	B	0			0	B	C	P										
Mining Activity	P	C	B	0	Y	N	0	B	C	P										
Vegetation Management	P	C	B	0			0	B	C	P										
Bridges/ Abutments	P	C	B	0	Y	N	0	B	C	P										
Orchards/ Vineyards	P	C	B	0			0	B	C	P										

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: JK										Wetted Width (m): 1.5
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	4	71		PA	0	PA D	PA D	PA D	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.4	8	3		PA	0	PA D	PA D	PA D	
Center	0.8	10	8		PA	1	PA D	PA D	PA D	
Right Center	1.1	10	7		PA	0	PA D	PA D	PA D	
Right Bank	1.5	5	71		PA	0	PA D	PA D	PA D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/Falls	
Rapid	
Riffle	
Run	
Glide	20
Pool	80
Dry	

Site Code:	Site Name:	Date: ____ / ____ / 2012
Wetted Width (m): 50	Bankfull Width (m): 1.2	Bankfull Height (m): 4.5

Transect K

Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	11	1		0 A	0	P A D	P A D	P A D	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. U = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.1	12	4		0 A	0	P A D	P A D	P A D	
Center	0.3	8	105	0	0 A	2	P A D	P A D	P A D	
Right Center	0.4	10	120	0	0 A	1	P A D	P A D	P A D	
Right Bank	0.5	15	205	0	0 A	2	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Filamentous Algae	0 1 2 3 4		
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4		
Boulders	0 1 2 3 4		
Woody Debris >0.3 m	0 1 2 3 4		
Woody Debris <0.3 m	0 1 2 3 4		
Undercut Banks	0 1 2 3 4		
Overhang, Vegetation	0 1 2 3 4		
Live Tree Roots	0 1 2 3 4		
Artificial Structures	0 1 2 3 4		

DENSIOMETER READINGS (0-17) count covered dots	
Center	7
Left	0
Center Upstream	0
Center Right	0
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m < 50m from Channel Channel (record Yes or No)	
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0	Y N	0 B C P
Row Crop	P C B 0	Y N	0 B C P
Pasture/ Range	P C B 0	Y N	0 B C P
Logging Operations	P C B 0	Y N	0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0	Y N	0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (required)	☐
31	
Upstream (optional)	☐
30	

REACH DOCUMENTATION		Standard Reach Length (wetted width ≤ 10 m) = 150 m Distance between transects = 15 m Alternate Reach Length (wetted width > 10 m) = 250 m Distance between transects = 25 m	
Project Name: <u>T2WAMP</u>	Date: <u>8/27/2012</u>	Sample Collection Time: <u>1100</u>	
Stream Name: <u>MADON CREEK</u>	Site Name/ Description: <u>MADON CREEK (LAKE) ABOVE WBCOAT</u>		
Site Code: <u>MCS</u>	Crew Members: <u>JAC, BJC</u>		
Latitude (actual – decimal degrees): °N	datum: <u>NAD83</u> other: <u>NAD27</u>		
Longitude (actual – decimal degrees): °W	GPS Device: <u>CARMIN 62</u>		

AMBIENT WATER QUALITY MEASUREMENTS					* Turbidity, silica, oxygen saturation, and air temp are optional; calibration date required on page 24	Actual Reach Length (m) (see reach length guidelines at top of form)
Water Temp (Deg. C)	pH	Alkalinity (mg/L)	Turbidity (ntu)*	Oxygen Sat. (%)		
<u>8.83</u>	<u>7.52</u>	<u>-62.7</u>	<u>100.0</u>	<u>94.8</u>		<u>150</u>
Dissolved O ₂ (mg/L)	Specific Conduct (uS/cm)	Salinity (ppt)	Silica (mg/L)*	Air Temp (Deg. C)*		Explanation:
<u>10.99</u>	<u>143/99</u>	<u>0.07</u>	<u>99</u>			

DISCHARGE MEASUREMENTS							check if discharge measurements not possible ☐			
1 st measurement – left bank (looking downstream)							(explain in field notes section)			
VELOCITY AREA METHOD (preferred)				cal. date	Transect Width (m): <u>2.2m</u>		BUOYANT OBJECT METHOD (use ONLY if velocity area method not possible)			
	Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)		Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)	Float 1	Float 2	Float 3
1	<u>75.5</u>	<u>34</u>	<u>50%</u>	11	<u>185.5</u>	<u>40</u>	<u>0.258</u>			
2	<u>86.5</u>	<u>36</u>	<u>0.119</u>	12	<u>196.5</u>	<u>38</u>	<u>0.167</u>			
3	<u>97.5</u>	<u>42</u>	<u>0.258</u>	13	<u>207.5</u>	<u>36</u>	<u>0.110</u>			
4	<u>108.5</u>	<u>44</u>	<u>0.323</u>	14	<u>218.5</u>	<u>36</u>	<u>85%</u>			
5	<u>119.5</u>	<u>46</u>	<u>0.331</u>	15	<u>229.5</u>	<u>33</u>	<u>80%</u>			
6	<u>130.5</u>	<u>46</u>	<u>0.456</u>	16	<u>240.5</u>	<u>32</u>	<u>50%</u>			
7	<u>141.5</u>	<u>46</u>	<u>0.419</u>	17	<u>251.5</u>	<u>30</u>	<u>20%</u>			
8	<u>152.5</u>	<u>46</u>	<u>0.361</u>	18	<u>262.5</u>	<u>30</u>	<u>5%</u>			
9	<u>163.5</u>	<u>42</u>	<u>0.324</u>	19	<u>273.5</u>	<u>30</u>	<u>0</u>			
10	<u>174.5</u>	<u>42</u>	<u>0.267</u>	20	<u>284.5</u>	<u>30</u>	<u>0</u>			
Float Reach Cross Section										
width (m)	Upper Section	Middle Section	Lower Section							
Depth 1										
Depth 2										
Depth 3										
Depth 4										
Depth 5										

NOTABLE FIELD CONDITIONS (check one box per topic)			
Evidence of recent rainfall (enough to increase surface runoff)	<u>NO</u>	minimal	>10% flow increase
Evidence of fires in reach or immediately upstream (<500 m)	<u>NO</u>	< 1 year	< 5 years
Dominant landuse/ landcover in area surrounding reach	Agriculture	Forest	<u>Rangeland</u>
	Urban/Industrial	Suburb/Town	Other

ADDITIONAL COBBLE EMBEDDEDNESS MEASURES (carry over from transect forms if needed to attain target count of 25 measure in %)	1	2	3	4	5	6	7	8	9	10	11	12	13
	14	15	16	17	18	19	20	21	22	23	24	25	

Site Code: ML-fDate: 8/22 2012

SLOPE and BEARING FORM (transect based - for Full PHAB only)

 AUTOLEVEL
 CLINOMETER
 HANDLEVEL
 OTHER

☒
☐
☐
☐

Starting Transect	MAIN SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)					SUPPLEMENTAL SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)				
	Stadia rod measurements	Slope (%) or Elevation Difference cm ☐ % ☐	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)	Stadia rod measurements	Slope or Elevation Difference cm ☐ % ☐	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)
K	3.05									
J										
I										
H										
G	↓									
F	0.61									
E	9									
D										
C										
B										
A	3.86									
additional calculation area	$= 0.61/150 \rightarrow 0.0041 \quad 0.41\%$									

ADDITIONAL HABITAT CHARACTERIZATION

High Gradient ☐Low Gradient ☒

Parameter	Optimal	Suboptimal	Marginal	Poor
Epifaunal Substrate/ Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover (50% for low-gradient streams); mix of submerged logs, undercut banks, cobble or other stable habitat	40-70% mix of stable habitat (30-50% for low-gradient streams); well-suited for full colonization potential	20-40% mix of stable habitat (10-30% in low-gradient streams); substrate frequently disturbed or removed	Less than 20% stable habitat (10% in low-gradient streams); lack of habitat is obvious; substrate unstable or lacking
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition (<20% in low-gradient streams)	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 5-30% of the bottom affected (20-50% in low-gradient streams)	Moderate deposition of new gravel, sand, or fine sediment on bars; 30-50% of the bottom affected (50-80% in low-gradient streams)	Heavy deposits of fine material; increased bar development; more than 50% of the bottom changing frequently (>80% in low-gradient streams)
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern	Some channelization present (e.g., bridge abutments); evidence of past channelization (> 20yrs) may be present but recent channelization not present	Channelization may be extensive; embankments or shoring structures present on both banks; 40 to 80% of stream reach disrupted	Banks shored with gabion or cement; Over 80% of the stream reach channelized and disrupted; instream habitat greatly altered or removed entirely
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Site Code: MC-3	Site Name:	Date: 8-127-2012
Wetted Width (m): 2.3	Bankfull Width (m): 6.0	Bankfull Height (m): 48
Transect A		

Transect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	8	93	0	PA	1	PA-D	PA-D	PA-D	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail. 3 = 1-5mm 4 = 5-20mm 5 = >20mm UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code) D = Dry, not assessed
Left Center	0.6	18	144	10	PA	2	PA-D	PA-D	PA-D	
Center	1.2	14	520		PA	3	PA-D	PA-D	PA-D	
Right Center	1.7	40	24		PA	1	PA-D	PA-D	PA-D	
Right Bank	2.3	29	165	10	PA	1	PA-D	PA-D	PA-D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots	
Center	0
Left	0
Center Upstream	0
Center Right	0
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m <50m from Channel Channel (record Yes or No)	
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0		0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0		0 B C P
Row Crop	P C B 0		0 B C P
Pasture/ Range	P C B 0		0 B C P
Logging Operations	P C B 0		0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0		0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0		0 B C P

Bank Stability			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (optional)	☐
913	
Upstream (required)	☐
914	

Inter-Transect: AB

Wetted Width (m):

2.2

Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	41	71		(P)A	0	P A D	P A D	(P) A D
Left Center	0.6	52	80	0	(P)A	03	(P)A D	P A D	P A D
Center	1.1	49	3		(P)A	0	P A D	P A D	P A D
Right Center	1.7	46	16		(P)A	1	P A D	P A D	(P) A D
Right Bank	2.2	22	>1	0	(P)A		P A D	P A D	(P) A D
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).									

Microalgae Thickness Codes

0 = No microalgae present. Feels rough, not slimy.

1 = Present but not visible. Feels slimy.

2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail.

3 = 1-5mm.

4 = 5-20mm.

5 = >20mm.

UD = Cannot determine if microalgae present.

= substrate too small or covered with silt (formerly Z code).

D = Div., not assessed.

F. 100-100000000	
Control Type	%
Control Type	
Control Type	
Control Type	
Control Type	9b
Control Type	10
Control Type	

Site Code: MC-5	Site Name:	Date: 8-12-7-2012
Wetted Width (m): 2.1	Bankfull Width (m): 4.5	Bankfull Height (m): 36

Transect B

Transect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	4	71		(P)A	0	P A D	P A D	(P)A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.5	22	130	50	(P)A	3	(P)A D	P A D	P A D	
Center	1.1	24	160	20	(P)A	3	(P)A D	P A D	P A D	
Right Center	1.6	26	25		(P)A	2	P A D	P A D	P A D	
Right Bank	2.1	10	71		(P)A	0	P A D	P A D	(P)A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

RIPARIAN VEGETATION (facing downstream)			INSTREAM HABITAT COMPLEXITY			DENSIMETER READINGS (0-17) count covered dots		
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)					
Vegetation Class	Left Bank	Right Bank	Filamentous Algae	0	1 2 3 4	Center Left	0	
Upper Canopy (>5 m high)			Aquatic Macrophytes/ Emergent Vegetation	0	1 2 3 4	Center Upstream	0	
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Boulders	0	1 2 3 4	Center Right	0	
Lower Canopy (0.5 m-5 m high)			Woody Debris >0.3 m	0	1 2 3 4	Center Downstream	0	
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0	1 2 3 4	Optional		
Ground Cover (<0.5 m high)			Undercut Banks	0	1 2 3 4	Left Bank		
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Overhang. Vegetation	0	1 2 3 4	Right Bank		
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Live Tree Roots	0	1 2 3 4			
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Artificial Structures	0	1 2 3 4			

HUMAN INFLUENCE (circle only the closest to wetted channel)		Left Bank		Channel	Right Bank	
0 = Not Present B = On-Bank C = Between Bank & 10m from Channel P = >10m & 50m from Channel Channel (record Yes or No)						
Walls/ Rip-rap/ Dams	P	C	B	0	Y	N
Buildings	P	C	B	0	Y	N
Pavement/ Cleared Lot	P	C	B	0	Y	N
Road/ Railroad	P	C	B	0	Y	N
Pipes (Inlet/ Outlet)	P	C	B	0	Y	N
Landfill/ Trash	P	C	B	0	Y	N
Park/ Lawn	P	C	B	0	Y	N
Row Crop	P	C	B	0	Y	N
Pasture/ Range	P	C	B	0	Y	N
Logging Operations	P	C	B	0	Y	N
Mining Activity	P	C	B	0	Y	N
Vegetation Management	P	C	B	0	Y	N
Bridges/ Abutments	P	C	B	0	Y	N
Orchards/ Vineyards	P	C	B	0	Y	N

Bank Stability			
Left Bank	Steady	Unstable	Stable
Right Bank	Steady	Unstable	Stable

BEAVER DAM

Inter-Transect: BC

Wetted Width (m):

3.3

Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	15	71		DA	0	PAD	PAD	DA D	0 = No microalgae present. Feels rough, not slimy.
Left Center	0.5	41	71		DA	0	PAD	PAD	DA D	1 = Present but not visible. Feels slimy.
Center	1.7	40	11		DA	0	PAD	PAD	DA D	2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center	2.5	40	10		DA	0	PAD	PAD	DA D	3 = 1-5mm.
Right Bank	3.3	40	71		DA	0	PAD	PAD	DA D	4 = 5-20mm.
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										5 = >20mm.
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

Flow Habitat	
Flow Class	
Flow Type	
Flow Velocity	50
Flow Depth	
Flow Width	50
Flow Area	
Flow Volume	

BEAVER DAN

PIC 915

BACK WATER SITE FOR

more macrophyte growth in
BACKWATER section

Site Code: <u>MC-8</u>	Site Name:	Date: <u>8/12/2012</u>
Wetted Width (m): <u>5.0</u>	Bankfull Width (m): <u>5.7</u>	Bankfull Height (m): <u>40</u>
Transect C		

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm; UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	3	71		(P)A	0	P A D	P A D	(P) A D	
Left Center	1.3	55	>1		(P)A	0	P A D	P A D	(P) A D	
Center	2.5	50	71		(P)A	0	P A D	P A D	(P) A D	
Right Center	3.8	55	22		(P)A	1	(P) A D	P A D	(P) A D	
Right Bank	5.0	58	71		(P)A	0	P A D	P A D	(P) A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIOMETER READINGS (0-17) count covered dots	
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			
Vegetation Class	Left Bank	Right Bank	Filamentous Algae	0 1 2 3 4	Center
Upper Canopy (>5 m high)					
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	Left
Lower Canopy (0.5 m-5 m high)					
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Upstream
Ground Cover (<0.5 m high)					
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Woody Debris >0.3 m	0 1 2 3 4	Center Right
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Center Downstream
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Undercut Banks	0 1 2 3 4	Optional
			Overhang. Vegetation	0 1 2 3 4	Left Bank
			Live Tree Roots	0 1 2 3 4	
			Artificial Structures	0 1 2 3 4	Right Bank

HUMAN INFLUENCE (circle only the closest to wetted channel)		BANK STABILITY	
0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m <50m from Channel Channel (record Yes or No)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m <50m from Channel Channel (record Yes or No)	
Left Bank	Channel	Right Bank	
Walls/Rip-rap/ Dams	P C B 0	Y N 0 B C P	
Buildings	P C B 0	Y N 0 B C P	
Pavement/ Cleared Lot	P C B 0	Y N 0 B C P	
Road/ Railroad <u>TRAIL</u>	P C B 0	Y N 0 B C P	
Pipes (Inlet/ Outlet)	P C B 0	Y N 0 B C P	
Landfill/ Trash	P C B 0	Y N 0 B C P	
Park/ Lawn	P C B 0	Y N 0 B C P	
Row Crop	P C B 0	Y N 0 B C P	
Pasture/ Range	P C B 0	Y N 0 B C P	
Logging Operations	P C B 0	Y N 0 B C P	
Mining Activity	P C B 0	Y N 0 B C P	
Vegetation Management	P C B 0	Y N 0 B C P	
Bridges/ Abutments	P C B 0	Y N 0 B C P	
Orchards/ Vineyards	P C B 0	Y N 0 B C P	

BANK STABILITY	
Left Bank	eroded
Right Bank	eroded

Inter-Transect: CD

Wetted Width (m): 4.8

Inter-Transsect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	3	71		(P)A	0	P A D	P A D	(P)A D	0 = No microalgae present. Feels rough, not slimy.
Left Center	1.2	50	71		(P)A	0	P A D	P A D	(P)A D	1 = Present but not visible. Feels slimy.
Center	2.4	53	13		(P)A	1	P A D	P A D	P A D	2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail.
Right Center	3.6	45	210	20	(P)A	3	P A D	P A D	(P)A D	3 = 1-5mm; 4 = 5-20mm; 5 = >20mm
Right Bank	4.8	8	210		(P)A	0	P A D	P A D	(P)A D	UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code).
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										D = Dry; not assessed

FLYING MILEAGE	
Starting Time	h
10:00	
11:00	
12:00	
13:00	
14:00	
15:00	
16:00	
17:00	170
18:00	

Site Code: MC-3	Site Name:	Date: 8-12-2012
Wetted Width (m): 4.3	Bankfull Width (m): 5.9	Bankfull Height (m): 0.42
		Transect D

Transect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	8	71		P A	0	P A D	P A D	P A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	1.1	30	71		P A	0	P A D	P A D	P A D	
Center	2.2	31	12		P A	1	P A D	P A D	P A D	
Right Center	3.2	35	36		P A	1	P A D	P A D	P A D	
Right Bank	4.3	1	100	0	P A	2	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

RIPARIAN VEGETATION (facing downstream)		Vegetation Class		Left Bank		Right Bank	
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		Upper Canopy (>5 m high)					
Trees and saplings >5 m high		0 1 2 3 4		0 1 2 3 4			
Lower Canopy (0.5 m-5 m high)							
All vegetation 0.5 m to 5 m		0 1 2 3 4		0 1 2 3 4			
Ground Cover (<0.5 m high)							
Woody shrubs & saplings <0.5 m		0 1 2 3 4		0 1 2 3 4			
Herbs/ grasses		0 1 2 3 4		0 1 2 3 4			
Barren, bare soil/ duff		0 1 2 3 4		0 1 2 3 4			

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang, Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots	
Center	0
Left	0
Center Upstream	0
Center Right	0
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	Left Bank		Channel	Right Bank	
Walls/ Riprap/ Dams	P C B 0	Y N	0 B C P		
Buildings	P C B 0	Y N	0 B C P		
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P		
Road/ Railroad	P C B 0	Y N	0 B C P		
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P		
Landfill/ Trash	P C B 0	Y N	0 B C P		
Park/ Lawn	P C B 0	Y N	0 B C P		
Row Crop	P C B 0	Y N	0 B C P		
Pasture/ Range	P C B 0	Y N	0 B C P		
Logging Operations	P C B 0	Y N	0 B C P		
Mining Activity	P C B 0	Y N	0 B C P		
Vegetation Management	P C B 0	Y N	0 B C P		
Bridges/ Abutments	P C B 0	Y N	0 B C P		
Orchards/ Vineyards	P C B 0	Y N	0 B C P		

Bank Stability			
Left Bank	graded	substrate	erosion
Right Bank	graded	substrate	erosion

Inter-Transect: DE										Wetted Width (m): 4.5
Inter-Transect Substrates										
Position	Dist from L.B. (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	5	13		(P)A	0	P A D	P A D	(P)A D	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	1.1	55	60		(P)A	1	P A D	P A D	(P)A D	
Center	2.3	69	81	0	(P)A	2	P A D	P A D	(P)A D	
Right Center	3.4	42	205	0	(P)A	3	P A D	P A D	(P)A D	
Right Bank	4.5	5	101	0	(P)A	1	P A D	P A D	(P)A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

Flux Habitat	
Channel Type	%
Channel 1	
Channel 2	
Channel 3	
Channel 4	10
Channel 5	10
Channel 6	50
Channel 7	

Site Code: PK-3	Site Name:	Date: 8/27/2012
Wetted Width (m): 4.3	Bankfull Width (m): 4.6	Bankfull Height (m): 3.8
		Transect E

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	28	10		PA	0	PAD	PAD	PAD
Left Center	1.1	54	48		PA	1	PAD	PAD	PAD
Center	2.2	55	78	0	PA	3	PAD	PAD	PAD
Right Center	3.2	52	185	0	PA	3	PAD	PAD	PAD
Right Bank	4.3	25	3	0	PA	3	PAD	PAD	PAD

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

Microalgae Thickness Codes
 0 = No microalgae present. Feels rough, not slimy.
 1 = Present but not visible. Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail.
 3 = 1-5mm.
 4 = 5-20mm.
 5 = >20mm.
 UD = Cannot determine if microalgae present; substrate too small or covered with silt. (formerly Z code)
 D = Dry, not assessed

RIPARIAN VEGETATION (facing downstream)			0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank		
Upper Canopy (>5 m high)				
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4		
Lower Canopy (0.5 m-5 m high)				
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4		
Ground Cover (<0.5 m high)				
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4		
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4		
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4		

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots	
Center	2
Left	0
Center Upstream	0
Center Right	4
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)		0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m - <50m from Channel Channel (record Yes or No)	
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0	Y N	0 B C P
Row Crop	P C B 0	Y N	0 B C P
Pasture/ Range	P C B 0	Y N	0 B C P
Logging Operations	P C B 0	Y N	0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0	Y N	0 B C P

Bank Stability			
Left Bank	eroded	vegetated	Channel
Right Bank	eroded	vegetated	Channel

Inter-Transect: EF										Wetted Width (m): 4.0
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	10	71		(P)A	0	P A D	P A D	(P)A D	0 = No microalgae present. Feels rough, not slimy.
Left Center	1.0	30	6		(P)A	0	P A D	P A D	(P)A D	1 = Present but not visible. Feels slimy.
Center	2.0	29	58		(P)A	3	(P)A D	P A D	P A D	2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail.
Right Center	3.0	31	305		(P)A	3	(P)A D	P A D	(P)A D	3 = 1-5mm.
Right Bank	4.0	25	1		(P)A		(P)A D	P A D	(P)A D	4 = 5-20mm.
										5 = >20mm.
										UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code)
										D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

FLOW HABITATS	
Channel Type	Flow
Channel	
Pool	
Run	
Shoal	
Slack	50
Swamp	10
Wetland	40
Wetland	

Site Code: MLB	Site Name:	Date: 8/27/2012
Wetted Width (m): 3.8	Bankfull Width (m): 4.7	Bankfull Height (m): 4.4
Transect F		

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	4	28		PA	1	PA D	PA D	PA D
Left Center	1.0	30	26		PA	0	PA D	PA D	PA D
Center	1.9	36	43		PA	2	PA D	PA D	PA D
Right Center	2.9	24	23		PA	1	PA D	PA D	PA D
Right Bank	3.8	10	71		PA	0	PA D	PA D	PA D

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

Microalgae Thickness Codes
 0 = No microalgae present. Feels rough, not slimy.
 1 = Present but not visible. Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm.
 4 = 6-20mm.
 5 = >20mm.
 UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code)
 D = Dry, not assessed

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIMETER READINGS (0-17) count covered dots	
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			
Vegetation Class	Left Bank	Right Bank	Filamentous Algae	0 1 2 3 4	Center Left
Upper Canopy (>5 m high)			Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	Center Upstream
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Right
Lower Canopy (0.5 m-5 m high)			Woody Debris >0.3 m	0 1 2 3 4	Center Downstream
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Optional
Ground Cover (<0.5 m high)			Undercut Banks	0 1 2 3 4	Left Bank
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Overhang, Vegetation	0 1 2 3 4	Right Bank
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Live Tree Roots	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Artificial Structures	0 1 2 3 4	

HUMAN INFLUENCE (circle only the closest to wetted channel)	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0		0 B C P
Road/ Railroad TRAIL	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0		0 B C P
Row Crop	P C B 0		0 B C P
Pasture/ Range	P C B 0		0 B C P
Logging Operations	P C B 0		0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0		0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0		0 B C P

Habitat Stability			
Left Bank	Stable	Unstable	Unstable
Right Bank	Stable	Unstable	Unstable

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (required)	☐
Upstream (required)	☐

917
916

Inter-Transect: FG										Wetted Width (m): <u>1.8</u>
Inter-Transect Substrates										
Position	Dist. from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	8	71		PA	0	PAD	PAD	PA D	0 = No microalgae present. Feels rough, not slimy.
Left Center	0.5	13	14		PA	1	PAD	PAD	PA D	1 = Present but not visible. Feels slimy.
Center	0.9	18	21		PA	1	PAD	PAD	PA D	2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center	1.4	12	84	0	PA	2	PA D	PAD	PA D	3 = 1-5mm; 4 = 5-20mm; 5 = >20mm;
Right Bank	1.8	5	1		PA	0	PAD	PAD	PA D	UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code).
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										D = Dry; not assessed

FLEX HABITATS	
Channel Type	%
Channel	
Bank	
Bed	65
Bank	
Bed	35
Bank	

Site Code: MC-5	Site Name:	Date: 8/12/2012
Wetted Width (m): 4.0	Bankfull Width (m): 5.7	Bankfull Height (m): 4.2
Transect G		

Transect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	31	71		PA	0	PAD	PAD	PAD	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code). D = Dry - not assessed
Left Center	1.0	8	11		PA	2	PAD	PAD	PAD	
Center	2.0	15	21		PA	2	PAD	PAD	PAD	
Right Center	3.0	9	16		PA	1	PAD	PAD	PAD	
Right Bank	4.0	10	1		PA	0	PAD	PAD	PAD	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

RIPARIAN VEGETATION (facing downstream)	0 = Absent (0%) 3 = Heavy (40-75%) 1 = Sparse (<10%) 4 = Very Heavy (>75%) 2 = Moderate (10-40%)																
	Vegetation Class						Left Bank						Right Bank				
Upper Canopy (>5 m high)																	
Trees and saplings >5 m high	0	1	2	3	4	0	1	2	3	4							
Lower Canopy (0.5 m-5 m high)																	
All vegetation 0.5 m to 5 m	0	1	2	3	4	0	1	2	3	4							
Ground Cover (<0.5 m high)																	
Woody shrubs & saplings <0.5 m	0	1	2	3	4	0	1	2	3	4							
Herbs/ grasses	0	1	2	3	4	0	1	2	3	4							
Barren, bare soil/ duff	0	1	2	3	4	0	1	2	3	4							

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)				
Filamentous Algae	0	1	2	3	4
Aquatic Macrophytes/ Emergent Vegetation	0	1	2	3	4
Boulders	0	1	2	3	4
Woody Debris >0.3 m	0	1	2	3	4
Woody Debris <0.3 m	0	1	2	3	4
Undercut Banks	0	1	2	3	4
Overhang. Vegetation	0	1	2	3	4
Live Tree Roots	0	1	2	3	4
Artificial Structures	0	1	2	3	4

DENSIOMETER READINGS (0-17) count covered dots	
Center	0
Left	0
Center Upstream	0
Center Right	3
Center Downstream	0
Optional:	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m <50m from Channel Channel (record Yes or No)											
	Left Bank				Channel		Right Bank					
Walls/ Rip rap/ Dams	P	C	B	0	Y	N	0	B	C	P		
Buildings	P	C	B	0	Y	N	0	B	C	P		
Pavement/ Cleared Lot	P	C	B	0			0	B	C	P		
Road/ Railroad	P	C	B	0	Y	N	0	B	C	P		
Pipes (Inlet/ Outlet)	P	C	B	0	Y	N	0	B	C	P		
Landfill/ Trash	P	C	B	0	Y	N	0	B	C	P		
Park/ Lawn	P	C	B	0			0	B	C	P		
Row Crop	P	C	B	0			0	B	C	P		
Pasture/ Range	P	C	B	0			0	B	C	P		
Logging Operations	P	C	B	0			0	B	C	P		
Mining Activity	P	C	B	0	Y	N	0	B	C	P		
Vegetation Management	P	C	B	0			0	B	C	P		
Bridges/ Abutments	P	C	B	0	Y	N	0	B	C	P		
Orchards/ Vineyards	P	C	B	0			0	B	C	P		

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: GH

Wetted Width (m): 3.7

Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	10	71		ⓅA	0	P A D	P A D	ⓅA D	0 = No microalgae present. Feels rough, not slimy.
Left Center	0.9	22	4		PA	0	P A D	P A D	P A D	1 = Present but not visible. Feels slimy.
Center	1.5	56	11		ⓅA	1	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail.
Right Center	2.8	61	104	0	ⓅA	2	P A D	P A D	ⓅA D	3 = 1-5mm;
Right Bank	3.7	41	95	0	ⓅA	1	P A D	P A D	ⓅA D	4 = 5-20mm;
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										5 = >20mm;
										UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

Flow Habitat	
Channel Type	5
Channel Size	
Flow	
Flow	
Flow	5
Flow	
Flow	45
Flow	

Site Code: MC-5	Site Name:	Date: 7/12/2012
Wetted Width (m): 4.0	Bankfull Width (m): 4.4	Bankfull Height (m): 4.0

Transect H

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	1	8		(P) A	0	P A D	P A D	(P) A D
Left Center	1.0	8	24		(P) A	1	P A D	P A D	(P) A D
Center	2.0	11	70		(P) A	2	(P) A D	P A D	(P) A D
Right Center	3.0	35	38		P A	2	P A D	P A D	P A D
Right Bank	4.0	21	71		(P) A	0	P A D	P A D	(P) A D

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

Microalgae Thickness Codes
 0 = No microalgae present. Feels rough, not slimy.
 1 = Present but not visible. Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm.
 4 = 5-20mm.
 5 = >20mm.
 UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code).
 D = Dry, not assessed.

RIPARIAN VEGETATION (facing downstream)			INSTREAM HABITAT COMPLEXITY			DENSIMETER READINGS (0-17) count covered dots		
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)					
Vegetation Class	Left Bank	Right Bank						
Upper Canopy (>5 m high)								
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Filamentous Algae	0 1 2 3 4		Center		
Lower Canopy (0.5 m-5 m high)								
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4		Left		
Ground Cover (<0.5 m high)								
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4		Upstream		
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Woody Debris >0.3 m	0 1 2 3 4		Center		
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4		Right		
			Undercut Banks	0 1 2 3 4		Downstream		
			Overhang, Vegetation	0 1 2 3 4		Optional		
			Live Tree Roots	0 1 2 3 4		Left Bank		
			Artificial Structures	0 1 2 3 4		Right Bank		

HUMAN INFLUENCE (circle only the closest to wetted channel)		Left Bank		Channel	Right Bank	
0 = Not Present B = On Bank C = Between Bank & 10m from Channel P = >10m - <50m from Channel Channel (record Yes or No)						
Walls/ Rip-rap/ Dams		P C B 0		Y N	0 B C P	
Buildings		P C B 0		Y N	0 B C P	
Pavement/ Cleared Lot		P C B 0		Y N	0 B C P	
Road/ Rail/ road	TRAIL	P C B 0		Y N	0 B C P	
Pipes (Inlet/ Outlet)		P C B 0		Y N	0 B C P	
Landfill/ Trash		P C B 0		Y N	0 B C P	
Park/ Lawn		P C B 0		Y N	0 B C P	
Row Crop		P C B 0		Y N	0 B C P	
Pasture/ Range		P C B 0		Y N	0 B C P	
Logging Operations		P C B 0		Y N	0 B C P	
Mining Activity		P C B 0		Y N	0 B C P	
Vegetation Management		P C B 0		Y N	0 B C P	
Bridges/ Abutments		P C B 0		Y N	0 B C P	
Orchards/ Vineyards		P C B 0		Y N	0 B C P	

BANK STABILITY			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: HI										Wetted Width (m): 3.1
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	8	11		(P)	0	P A D	P A D	(P) A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.8	18	45		(P) A	2	P A D	P A D	P A D	
Center	1.6	14	19		(P) A	2	P A D	P A D	P A D	
Right Center	2.3	5	14		(P) A	2	P A D	P A D	P A D	
Right Bank	3.1	5	71		(P) A	0	P A D	P A D	(P) A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

Flow Habitat	
Channel Type	4
Channel Size	
Flow	
W/S	50
W/S	25
W/S	
W/S	35
W/S	

Site Code: <u>MC-3</u>	Site Name:	Date: <u>8/27/2012</u>
Wetted Width (m): <u>2.7</u>	Bankfull Width (m): <u>4.5</u>	Bankfull Height (m): <u>4.4</u>

Transect I

Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	10	3		(P)A	0	P A D	P A D	(P)A D	0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.7	39	36		(P)A	0	~~P~~ A D	P A D	P A D	
Center	1.4	38	24		(P)A	0	P A D	P A D	(P)A D	
Right Center	2.0	25	71		(P)A	0	P A D	P A D	P A D	
Right Bank	2.7	5	71		(P)A	0	P A D	P A D	(P)A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)		3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank			
Upper Canopy (>5 m high)					
Trees and saplings >5 m high	0 1 2 3 4	0	1	2	3 4
Lower Canopy (0.5 m-5 m high)					
All vegetation 0.5 m to 5 m	0 1 2 3 4	0	1	2	3 4
Ground Cover (<0.5 m high)					
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0	1	2	3 4
Herbs/ grasses	0 1 2 3 4	0	1	2	3 4
Barren, bare soil/ duff	0 1 2 3 4	0	1	2	3 4

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)				
Filamentous Algae	0	1	2	3	4
Aquatic Macrophytes/ Emergent Vegetation	0	1	2	3	4
Boulders	0	1	2	3	4
Woody Debris >0.3 m	0	1	2	3	4
Woody Debris <0.3 m	0	1	2	3	4
Undercut Banks	0	1	2	3	4
Overhang. Vegetation	0	1	2	3	4
Live Tree Roots	0	1	2	3	4
Artificial Structures	0	1	2	3	4

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	0
Center Upstream	0
Center Right	0
Center Downstream	0
Optional	
Left Bank	
Right Bank	

Inter-Transect: IJ						Wetted Width (m): 2.7				
Inter-Transect Substrates										
Position	Dist. from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	19	10		0 A	0	P A D	P A D	0 A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy. 1 = Present but not visible. Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail. 3 = 1-5mm. 4 = 5-20mm. 5 = >20mm. UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.2	21	54		0 A	2	P A D	P A D	P A D	
Center	1.4	17	23		0 A	1	P A D	P A D	P A D	
Right Center	2.0	11	29		0 A	1	P A D	P A D	P A D	
Right Bank	2.7	3	71		0 A	0	P A D	P A D	0 A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

FLY HABITATS	
GENERAL TYPE	NO.
Channel Bank	
Bank	
Pool	30
Run	70
Shoal	
Slack	
Wet	

Site Code: <u>M-5</u>	Site Name:	Date: <u>8-12-7</u> 2012
Wetted Width (m): <u>3.1</u>	Bankfull Width (m): <u>54</u>	Bankfull Height (m): <u>46</u>
Transect J		

Transect Substrates									
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes
Left Bank	0	2	11		PA	0	PA D	PA D	PA D
Left Center	0.8	34	18		PA	0	PA D	PA D	PA D
Center	1.6	21	18		PA	1	PA D	PA D	PA D
Right Center	2.3	16	24		PA	1	PA D	PA D	PA D
Right Bank	3.1	1	71		PA	0	PA D	PA D	PA D
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)									

Microalgae Thickness Codes

0 = No microalgae present. Feels rough, not slimy.
 1 = Present but not visible. Feels slimy.
 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them; scraping leaves visible trail.
 3 = 1-5mm.
 4 = 5-20mm.
 5 = >20mm.
 UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code).
 D = Dry, not assessed.

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIOMETER READINGS (0-17) count covered dots	
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			
Vegetation Class	Left Bank	Right Bank			
Upper Canopy (>5 m high)					
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4			
Lower Canopy (0.5 m-5 m high)					
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4			
Ground Cover (<0.5 m high)					
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4			
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4			
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4			
Filamentous Algae	0 1 2 3 4			Center	0
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4			Left	0
Boulders	0 1 2 3 4			Center Upstream	0
Woody Debris >0.3 m	0 1 2 3 4			Center Right	3
Woody Debris <0.3 m	0 1 2 3 4			Center Downstream	0
Undercut Banks	0 1 2 3 4			Optional	
Overhang, Vegetation	0 1 2 3 4			Left Bank	
Live Tree Roots	0 1 2 3 4			Right Bank	
Artificial Structures	0 1 2 3 4				

HUMAN INFLUENCE (circle only the closest to wetted channel)		BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)	
0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m - <50m from Channel; Channel (record Yes or No)			
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0	Y N	0 B C P
Row Crop	P C B 0	Y N	0 B C P
Pasture/ Range	P C B 0	Y N	0 B C P
Logging Operations	P C B 0	Y N	0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0	Y N	0 B C P

Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: JK										Wetted Width (m): 3.0
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	1	21		PA	0	PA D	PA D	PA D	0 = No microalgae present, Feels rough, not slimy. 1 = Present but not visible, Feels slimy. 2 = Present and visible but <1mm. Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm. 4 = 6-20mm. 5 = >20mm. UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.8	14	35		PA	2	PA D	PA D	PA D	
Center	1.5	18	12		PA	1	PA D	PA D	PA D	
Right Center	2.3	14	82	0	PA	3	PA D	PA D	PA D	
Right Bank	3.0	2	4		PA	0	PA D	PA D	PA D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/Falls	
Rapid	
Riffle	5
Run	70
Glide	
Pool	25
Dry	

Site Code: <u>MC-5</u>	Site Name:	Date: <u>2/27/2012</u>
Wetted Width (m): <u>4.2</u>	Bankfull Width (m): <u>5.8</u>	Bankfull Height (m): <u>4.0</u>

Transect K

Transect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	2	20		PA	1	PA D	PA D	PA D	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; U = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code); D = Dry, not assessed
Left Center	1.1	13	21		PA	1	PA D	PA D	PA D	
Center	2.1	23	16		PA	1	PA D	PA D	PA D	
Right Center	3.2	30	12		PA	1	PA D	PA D	PA D	
Right Bank	4.2	28	20		PA	0	PA D	PA D	PA D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIMETER READINGS (0-17) count covered dots	
0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			
Vegetation Class	Left Bank	Right Bank	Filamentous Algae	0 1 2 3 4	Center
Upper Canopy (>5 m high)			Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	Left
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Upstream
Lower Canopy (0.5 m-5 m high)			Woody Debris >0.3 m	0 1 2 3 4	Center Right
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Center Downstream
Ground Cover (<0.5 m high)			Undercut Banks	0 1 2 3 4	Optional
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Overhang, Vegetation	0 1 2 3 4	Left Bank
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Live Tree Roots	0 1 2 3 4	Right Bank
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Artificial Structures	0 1 2 3 4	

HUMAN INFLUENCE (circle only the closest to wetted channel)	Left Bank	Channel	Right Bank
Walls/ Road/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0	Y N	0 B C P
Row Crop	P C B 0	Y N	0 B C P
Pasture/ Range	P C B 0	Y N	0 B C P
Logging Operations	P C B 0	Y N	0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0	Y N	0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (required)	☐
Upstream (optional)	☐

REACH DOCUMENTATION

Standard Reach Length (wetted width ≤ 10 m) = 150 m Distance between transects = 15 m
 Alternate Reach Length (wetted width > 10 m) = 250 m Distance between transects = 25 m

Project Name: TRWAMP	Date: 9 / 6 / 2012	Sample Collection Time: 1000
Stream Name: MARTIS CREEK	Site Name/ Description: EAST MARTIS CREEK	
Site Code: MC-6	Crew Members: JAC BJL	
Latitude (actual - decimal degrees): °N	datum: NAD83	GPS Device:
Longitude (actual - decimal degrees): °W	other:	

AMBIENT WATER QUALITY MEASUREMENTS

* Turbidity, silica, oxygen saturation, and air temp are optional; calibration date required on page 24

Actual Reach Length (m)
 (see reach length guidelines at top of form)

Water Temp (Deg C)	pH	Alkalinity (mg/L)	Turbidity (ntu)*	Oxygen Sat. (%)*
9.13	7.46			97.7%
Dissolved O ₂ (mg/L)	Specific Conduct (uS/cm)	Salinity (ppt)	silica (mg/L)*	Air Temp (Deg C)*
11.25	172 120	0.08	0.112	

Explanation:

DISCHARGE MEASUREMENTS

check if discharge measurements not possible ☐

1st measurement = left bank (looking downstream)

(explain in field notes section)

VELOCITY AREA METHOD (preferred)

cal. date

Transect Width (m): **68cm**

BUOYANT OBJECT METHOD (use ONLY if velocity area method not possible)

	Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)		Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)		Float 1	Float 2	Float 3
1	1.7	16.12		11	34.7	30	0.412				
2	5.1	20.16	0.05	12	38.1	29	0.412				
3	8.5	17	0.05	13	41.5	29	0.368				
4	11.9	17	0.05	14	44.9	29	0.360				
5	14.3	29	0.317	15	48.3	29	0.307				
6	17.7	29	0.317	16	51.7	29	0.169				
7	21.1	31	0.397	17	55.1	26	0.90%				
8	24.5	31	0.410	18	58.5	18	0.50%				
9	27.9	31	0.441	19	61.9	14	0.20%				
10	31.3	30	0.441	20	65.3	8	0.50%				

Float Reach Cross Section

	width (m)	Upper Section	Middle Section	Lower Section
Distance (m)				
Float Time (sec)				
width (m) depth (cm)				
Width				
Depth 1				
Depth 2				
Depth 3				
Depth 4				
Depth 5				

NOTABLE FIELD CONDITIONS (check one box per topic)

Evidence of recent rainfall (enough to increase surface runoff)	NO	minimal	>10% flow increase
Evidence of fires in reach or immediately upstream (<500 m)	NO	< 1 year	< 5 years
Dominant landuse/ landcover in area surrounding reach	Agriculture	Forest	Rangeland
	Urban/Industrial	Suburb/Town	Other

ADDITIONAL COBBLE EMBEDDEDNESS MEASURES

(carry over from transect forms if needed to attain target count of 25; measure in %)

1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	

ADD 10% OF Flow to total measured (ADDED SIDE CHANNEL)

- RIFLES = 100% SECTIONS TO GRASS/WEEDS; SUBSTRATE DENSE MUDS = MACROPHYTES, SEEDS MUDS ACROSS ENTIRE WIDTH IN SHALLOW RIFLES

Site Code: <u>MC6</u>		Date: <u>05.06.2012</u>				AUTOLEVEL ☐ CLINOMETER ☐ HANDLEVEL ☐ OTHER ☐															
SLOPE and BEARING FORM (transect based - for Full PHAB only)																					
Starting Transect	MAIN SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)					SUPPLEMENTAL SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)															
	Stadia rod measurements	Slope (%) or Elevation Difference	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)	Stadia rod measurements	Slope or Elevation Difference	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)											
		cm ☐ % ☐					cm ☐ % ☐														
K	1060																				
J				265																	
I				305																	
H				301																	
G				268																	
F				228																	
E				274																	
D				275																	
C				235																	
B	2			261																	
A	4.37			295																	
additional calculation area	$\rightarrow 3.65/100 \rightarrow 0.02456 \rightarrow 2.46\%$																				
ADDITIONAL HABITAT CHARACTERIZATION						High Gradient ☐		Low Gradient ☐													
Parameter	Optimal					Suboptimal					Marginal					Poor					
Epifaunal Substrate/ Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover (50% for low-gradient streams); mix of submerged logs, undercut banks, cobble or other stable habitat					40-70% mix of stable habitat (30-50% for low-gradient streams); well-suited for full colonization potential					20-40% mix of stable habitat (10-30% in low-gradient streams); substrate frequently disturbed or removed					Less than 20% stable habitat (10% in low-gradient streams); lack of habitat is obvious; substrate unstable or lacking					
Score:	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition (<20% in low-gradient streams)					Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 5-30% of the bottom affected (20-50% in low-gradient streams)					Moderate deposition of new gravel, sand, or fine sediment on bars; 30-50% of the bottom affected (50-80% in low-gradient streams)					Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently (>80% in low-gradient streams)					
Score:	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern					Some channelization present, (e.g., bridge abutments); evidence of past channelization (> 20yrs) may be present but recent channelization not present					Channelization may be extensive; embankments or shoring structures present on both banks; 40 to 80% of stream reach disrupted					Banks shored with gabion or cement; Diver 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely					
Score:	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Site Code: MC-6	Site Name:	Date: 9-15 / 2012
Wetted Width (m): 1.1	Bankfull Width (m): 2.3	Bankfull Height (m): 30

Transect A

Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	47	25		(P)A	0	P A D	P A D	P A D	Microalgae Thickness Codes 0 = No microalgae present; Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.3	48	71		(P)A	0	P A D	P A D	P A D	
Center	0.6	47	71		(P)A	0	P A D	P A D	P A D	
Right Center	0.8	48	71		(P)A	0	P A D	P A D	P A D	
Right Bank	1.1	44	71		(P)A	0	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred):

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIMETER READINGS (0-17) count covered dots	
Vegetation Class	Left Bank	Right Bank	Filamentous Algae	0 1 2 3 4	Center
Upper Canopy (>5 m high)			Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	Left
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Upstream
Lower Canopy (0.5 m-5 m high)			Woody Debris >0.3 m	0 1 2 3 4	Center Right
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Center Downstream
Ground Cover (<0.5 m high)			Undercut Banks	0 1 2 3 4	Optional
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Overhang Vegetation	0 1 2 3 4	Left Bank
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Live Tree Roots	0 1 2 3 4	Right Bank
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Artificial Structures	0 1 2 3 4	

HUMAN INFLUENCE (circle only the closest to wetted channel)	Left Bank		Channel	Right Bank	
	P C B 0	Y (N)	0	B C P	
Walls/ Rip-rap/ Dams	P C B 0	Y (N)	0	B C P	
Buildings	P C B 0	Y (N)	0	B C P	
Pavement/ Cleared Lot	P C B 0	Y (N)	0	B C P	
Road/ Railroad	P C B 0	Y (N)	0	B C P	
Pipes (Inlet/ Outlet)	P C B 0	Y (N)	0	B C P	
Landfill/ Trash	P C B 0	Y (N)	0	B C P	
Park/ Lawn	P C B 0		0	B C P	
Row Crop	P C B 0		0	B C P	
Pasture/ Range	P C B 0		0	B C P	
Logging Operations	P C B 0		0	B C P	
Mining Activity	P C B 0	Y (N)	0	B C P	
Vegetation Management	P C B 0		0	B C P	
Bridges/ Abutments	P C B 0	Y (N)	0	B C P	
Orchards/ Vineyards	P C B 0		0	B C P	

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (optional)	☐
928	
Upstream (required)	☐
927	

Inter-Transect: AB

Wetted Width (m):

0.9

Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	22	82	35	(P)A	~~35~~ 1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center	0.2	28	115	40	(P)A	1	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center	0.5	30	15		P A	1	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center	0.7	30	92	25	(P)A	1	P A D	P A D	P A D	3 = 1-5mm;
Right Bank	0.9	25	81	5	(P)A	1	P A D	P A D	P A D	4 = 5-20mm;
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										5 = >20mm;
										UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

FLOW HABITATS

(% between transects, total=100%)

Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	25
Run	50
Glide	25
Pool	
Dry	

Site Code:	Site Name: MC-6	Date: 9/16/2012
Wetted Width (m): 1.15	Bankfull Width (m): 2.5	Bankfull Height (m): 2.9
Transect B		

Transect Substrates										Microalgae Thickness Codes
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	5	16		(P) A	1	P X D	P X D	(P) A D	
Left Center	0.3	15	200	35	(P) A	1	P X D	P X D	(P) A D	
Center	0.6	15	280		(P) A	1	P X D	P X D	(P) A D	
Right Center	0.9	19	10		(P) A	0	P X D	P X D	P X D	
Right Bank	1.2	8	10		(P) A	0	P X D	P X D	(P) A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

Microalgae Thickness Codes
 0 = No microalgae present, Feels rough, not slimy;
 1 = Present but not visible, Feels slimy;
 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
 3 = 1-5mm;
 4 = 5-20mm;
 5 = >20mm;
 UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
 D = Dry, not assessed

RIPARIAN VEGETATION (facing downstream)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)		3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
	Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)				
Trees and saplings >5 m high	(0) 2 3 4	(0) 1 2 3 4		
Lower Canopy (0.5 m-5 m high)				
All vegetation 0.5 m to 5 m	(0) 1 2 3 4	(0) 1 2 3 4		
Ground Cover (<0.5 m high)				
Woody shrubs & saplings <0.5 m	0 (1) 2 3 4	0 (1) 2 3 4		
Herbs/ grasses	0 1 2 3 (4)	0 1 2 3 (4)		
Barren, bare soil/ duff	(0) 1 2 3 4	0 (1) 2 3 4		

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	(0) 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	(0) (1) 2 3 4
Boulders	(0) (1) 2 3 4
Woody Debris >0.3 m	(0) 1 2 3 4
Woody Debris <0.3 m	0 (1) 2 3 4
Undercut Banks	0 1 (2) 3 4
Overhang, Vegetation	0 1 (2) 3 4
Live Tree Roots	(0) 1 2 3 4
Artificial Structures	(0) 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots	
Center	
Left	(0)
Center Upstream	(0)
Center Right	(0)
Center Downstream	(0)
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No)		
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B (0)	Y N	B C P
Buildings	P C B (0)	Y N	B C P
Pavement/ Cleared Lot	P C B (0)	Y N	B C P
Road/ Railroad	P C B (0)	Y N	B C P
Pipes (Inlet/ Outlet)	P C B (0)	Y N	B C P
Landfill/ Trash	P C B (0)	Y N	B C P
Park/ Lawn	P C B (0)		B C P
Row Crop	P C B (0)		B C P
Pasture/ Range	P C B (0)		B C P
Logging Operations	P C B (0)		B C P
Mining Activity	P C B (0)	Y N	B C P
Vegetation Management	P C B (0)		B C P
Bridges/ Abutments	P C B (0)	Y N	B C P
Orchards/ Vineyards	P C B (0)		B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	(stable)
Right Bank	eroded	vulnerable	(stable)

cobble + Boulders covered with
 dense moss = macrophytes

Inter-Transect: BC

Wetted Width (m):

80

Inter-Transect Substrates

Position	Dist from I.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	8	37		(P) A	1	P X D	P X D	(P) A D	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.2	11	7		(P) A	1	P X D	P X D	(P) A D	
Center	0.4	18	52		(P) A	1	(P) A D	P X D	(P) A D	
Right Center	0.6	19	23		(P) A	1	P X D	P X D	(P) A D	
Right Bank	0.80	15	1		(P) A	0	P X D	P X D	(P) A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS

(% between transects, total=100%)

Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	70
Run	25
Glide	
Pool	5
Dry	

Site Code: ML-6	Site Name:	Date: 9-16 / 2012
Wetted Width (m): 1.22	Bankfull Width (m): 2.2	Bankfull Height (m): 3.1

Transect C

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm: Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	35	150	60	P A	1	P A D	P A D	P A D	
Left Center	0.3	46	190	50	P A	1	P A D	P A D	P A D	
Center	0.6	52	135	35	P A	2	P A D	P A D	P A D	
Right Center	0.9	42	141	0	P A	2	P A D	P A D	P A D	
Right Bank	1.2	37	130	0	P A	2	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang, Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIMETER READINGS (0-17) count covered dots	
Center Left	0
Center Upstream	0
Center Right	0
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel):	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No)		
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0	Y N	0 B C P
Row Crop	P C B 0	Y N	0 B C P
Pasture/ Range	P C B 0	Y N	0 B C P
Logging Operations	P C B 0	Y N	0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0	Y N	0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0	Y N	0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: CD										Wetted Width (m): 120
Inter-Transect Substrates										
Position	Dist from L.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	8	69	10	PA	1	P X D	P X D	PA D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy; 1 = Present but not visible. Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present; substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.3	10	30		PA	1	P X D	P X D	PA D	
Center	0.6	18	5		PA	0	P X D	P X D	PA D	
Right Center	0.9	15	33		PA	1	P X D	P X D	PA D	
Right Bank	112	9	40		PA	1	P X D	P X D	PA D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	90
Run	
Glide	
Pool	10
Dry	

Site Code: <u>KC6</u>	Site Name:	Date: <u>9/6/2012</u>
Wetted Width (m): <u>1.6</u>	Bankfull Width (m): <u>2.4</u>	Bankfull Height (m): <u>1.4</u>

Transect D**Transect Substrates**

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	4	36		(P)A	1	P X D	P X D	(P)A D	0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.4	8	15		(P)A	0	P X D	P X D	(P)A D	
Center	0.8	20	82	10	(P)A	1	P X D	P X D	(P)A D	
Right Center	1.2	18	51		(P)A	1	(P)A D	P X D	(P)A D	
Right Bank	1.6	9	71		(P)A	0	P X D	P X D	(P)X D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

RIPARIAN VEGETATION (facing downstream)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)	3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Vegetation Class	Left Bank	Right Bank
Upper Canopy (>5 m high)		
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4
Lower Canopy (0.5 m-5 m high)		
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4
Ground Cover (<0.5 m high)		
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang, Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIOMETER READINGS (0-17) <i>count covered dots</i>	
Center Left	0
Center Upstream	0
Center Right	0
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No)
	Left Bank Channel Right Bank
Walls/ Rip-rap/ Dams	P C B 0 Y N 0 B C P
Buildings	P C B 0 Y N 0 B C P
Pavement/ Cleared Lot	P C B 0 Y N 0 B C P
Road/ Railroad	P C B 0 Y N 0 B C P
Pipes (Inlet/ Outlet)	P C B 0 Y N 0 B C P
Landfill/ Trash	P C B 0 Y N 0 B C P
Park/ Lawn	P C B 0 Y N 0 B C P
Row Crop	P C B 0 Y N 0 B C P
Pasture/ Range	P C B 0 Y N 0 B C P
Logging Operations	P C B 0 Y N 0 B C P
Mining Activity	P C B 0 Y N 0 B C P
Vegetation Management	P C B 0 Y N 0 B C P
Bridges/ Abutments	P C B 0 Y N 0 B C P
Orchards/ Vineyards	P C B 0 Y N 0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: DE										Wetted Width (m): 6
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	5	20		(P)A	2	P X D	P X D	(P)A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy; 1 = Present but not visible. Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Left Center	0.2	10	15		(P)A	0	P X D	P X D	P X D	
Center	0.3	20	41		(P)A	1	(P)A D	P X D	(P)A D	
Right Center	0.5	9	56		(P)A	1	P X D	P X D	(P)X D	
Right Bank	0.6	5	20		(P)A	0	P X D	P X D	(P)A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	80
Run	20
Glide	
Pool	
Dry	

Site Code: M-6	Site Name:	Date: 9/6/2012
Wetted Width (m): 1.3	Bankfull Width (m): 2.3	Bankfull Height (m): 2.8
Transect E		

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed.
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	38	160	10	(P) A	2	P A D	P A D	(P) A D	
Left Center	0.3	36	21		(P) A	1	P A D	P A D	P A D	
Center	0.7	35	96	40	(P) A	2	(P) A D	P A D	(P) A D	
Right Center	1.0	35	71		(P) A	0	P A D	P A D	P A D	
Right Bank	1.3	5	>1		(P) A	0	P A D	P A D	(P) A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	(0) 1 2 3 4	(0) 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	(0) 1 2 3 4	0 (1) 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 (1) 2 3 4	0 (1) 2 3 4	
Herbs/ grasses	0 1 2 3 (4)	0 1 2 3 (4)	
Barren, bare soil/ duff	0 (1) 2 3 4	0 (1) 2 3 4	

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	(0) 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 (1) 2 3 4
Boulders	(0) 1 2 3 4
Woody Debris >0.3 m	(0) 1 2 3 4
Woody Debris <0.3 m	(0) 1 2 3 4
Undercut Banks	0 1 (2) 3 4
Overhang. Vegetation	0 1 (2) 3 4
Live Tree Roots	(0) 1 2 3 4
Artificial Structures	(0) 1 2 3 4

DENSIMETER READINGS (0-17) count covered dots	
Center Left	(0)
Center Upstream	(0)
Center Right	(0)
Center Downstream	(0)
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No)		
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B (0)	Y (N)	(0) B C P
Buildings	P C B (0)	Y (N)	(0) B C P
Pavement/ Cleared Lot	P C B (0)	Y (N)	(0) B C P
Road/ Railroad	P C B (0)	Y (N)	(0) B C P
Pipes (Inlet/ Outlet)	P C B (0)	Y (N)	(0) B C P
Landfill/ Trash	P C B (0)	Y (N)	(0) B C P
Park/ Lawn	P C B (0)		(0) B C P
Row Crop	P C B (0)		(0) B C P
Pasture/ Range	P C B (0)		(0) B C P
Logging Operations	P C B (0)		(0) B C P
Mining Activity	P C B (0)	Y (N)	(0) B C P
Vegetation Management	P C B (0)		(0) B C P
Bridges/ Abutments	P C B (0)	Y (N)	(0) B C P
Orchards/ Vineyards	P C B (0)		(0) B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	(stable)
Right Bank	eroded	vulnerable	(stable)

Inter-Transect: EF										Wetted Width (m): 1.8
Inter-Transect Substrates										
Position	Dist from L.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Bank	0	10	56		(P) A	1	P A D	P A D	(P) A D	
Left Center	0.5	12	190	10	(P) A	1	P A D	P A D	(P) A D	
Center	0.9	18	26		P A	1	P A D	P A D	(P) A D	
Right Center	1.4	13	55		(P) A	1	P A D	P A D	(P) A D	
Right Bank	1.8	9	71		(P) A	0	P A D	P A D	(P) A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	75
Run	10
Glide	
Pool	15
Dry	

Site Code: MC-6	Site Name:	Date: 7-16-2012
Wetted Width (m): 1.1	Bankfull Width (m): 2.2	Bankfull Height (m): 31
Transect F		

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail; 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt. (formerly Z code); D = Dry, not assessed
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	12	10		(P) A	1	P X D	P X D	(P) A D	
Left Center	0.3	10	159	5	(P) A	2	P X D	P X D	(P) A D	
Center	0.6	12	72	D	(P) A	1	P X D	P X D	(P) A D	
Right Center	1.8	19	50		(P) A	1	P X D	P X D	(P) A D	
Right Bank	1.1	20	34		(P) A	1	P X D	P X D	P X D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

RIPARIAN VEGETATION (facing downstream)		INSTREAM HABITAT COMPLEXITY		DENSIMETER READINGS (0-17) count covered dots	
Vegetation Class	Left Bank	Right Bank			
0 = Absent (0%) 3 = Heavy (40-75%) 1 = Sparse (<10%) 4 = Very Heavy (>75%) 2 = Moderate (10-40%)					
Upper Canopy (>5 m high)					
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Filamentous Algae	0 1 2 3 4	Center Left
Lower Canopy (0.5 m-5 m high)					
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	Center Upstream
Ground Cover (<0.5 m high)					
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Boulders	0 1 2 3 4	Center Right
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Woody Debris >0.3 m	0 1 2 3 4	Center Downstream
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Woody Debris <0.3 m	0 1 2 3 4	Optional
			Undercut Banks	0 1 2 3 4	Left Bank
			Overhang, Vegetation	0 1 2 3 4	Right Bank
			Live Tree Roots	0 1 2 3 4	
			Artificial Structures	0 1 2 3 4	

HUMAN INFLUENCE (circle only the closest to wetted channel)	Left Bank			Channel	Right Bank		
	P	C	B		P	C	B
Walls/ Rip-rap/ Dams	P	C	B	Y	P	C	B
Buildings	P	C	B	Y	P	C	B
Pavement/ Cleared Lot	P	C	B	Y	P	C	B
Road/ Railroad	P	C	B	Y	P	C	B
Pipes (Inlet/ Outlet)	P	C	B	Y	P	C	B
Landfill/ Trash	P	C	B	Y	P	C	B
Park/ Lawn	P	C	B	Y	P	C	B
Row Crop	P	C	B	Y	P	C	B
Pasture/ Range	P	C	B	Y	P	C	B
Logging Operations	P	C	B	Y	P	C	B
Mining Activity	P	C	B	Y	P	C	B
Vegetation Management	P	C	B	Y	P	C	B
Bridges/ Abutments	P	C	B	Y	P	C	B
Orchards/ Vineyards	P	C	B	Y	P	C	B

0 = Not Present;
B = On Bank;
C = Between Bank & 10m from Channel;
P = >10m+<50m from Channel;
Channel (record Yes or No)

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (required)	☐
Upstream (required)	☐

926
925

Inter-Transect: FG										Wetted Width (m): 1.0
Inter-Transect Substrates										
Position	Dist from L.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	15	116	35	(P)A	1	P X D	P X D	(P)A D	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.3	22	74	0	(P)A	0/1	P X D	P X D	(P)A D	
Center	0.5	11	137	10	(P)A	1	P X D	P X D	(P)A D	
Right Center	0.8	18	13		(P)A	1	P X D	P X D	P X D	
Right Bank	1.0	5	71		(P)A	0	P X D	P X D	(P)A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	100
Run	
Glide	
Pool	
Dry	

Site Code: <u>ML-6</u>	Site Name:	Date: <u>9/6/2012</u>
Wetted Width (m): <u>9</u>	Bankfull Width (m): <u>1.7</u>	Bankfull Height (m): <u>30</u>
Transect G		

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Position	Dist from L.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	<u>0</u>	<u>8</u>	<u>17</u>		<u>(P)A</u>	<u>0</u>	<u>P A D</u>	<u>P A D</u>	<u>P A D</u>	
Left Center	<u>0.2</u>	<u>18</u>	<u>122</u>	<u>0</u>	<u>(P)A</u>	<u>1</u>	<u>P A D</u>	<u>P A D</u>	<u>(D) A D</u>	
Center	<u>0.5</u>	<u>16</u>	<u>159</u>	<u>10</u>	<u>(P)A</u>	<u>1</u>	<u>P A D</u>	<u>P A D</u>	<u>(D) A D</u>	
Right Center	<u>0.7</u>	<u>21</u>	<u>110</u>	<u>80</u>	<u>(P)A</u>	<u>1</u>	<u>P A D</u>	<u>P A D</u>	<u>(D) A D</u>	
Right Bank	<u>0.9</u>	<u>19</u>	<u>135</u>	<u>10</u>	<u>(D)A</u>	<u>1</u>	<u>P A D</u>	<u>P A D</u>	<u>(D) A D</u>	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

RIPARIAN VEGETATION (facing downstream)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)		3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank		Right Bank	
Upper Canopy (>5 m high)				
Trees and saplings >5 m high	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>
Lower Canopy (0.5 m-5 m high)				
All vegetation 0.5 m to 5 m	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>
Ground Cover (<0.5 m high)				
Woody shrubs & saplings <0.5 m	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>
Herbs/ grasses	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>
Barren, bare soil/ duff	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	<u>0</u> 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	<u>0</u> 1 <u>2</u> 3 4
Boulders	<u>0</u> <u>2</u> 3 4
Woody Debris >0.3 m	<u>0</u> <u>2</u> 3 4
Woody Debris <0.3 m	<u>0</u> 1 2 3 4
Undercut Banks	<u>0</u> 1 <u>2</u> 3 4
Overhang Vegetation	<u>0</u> 1 <u>2</u> 3 4
Live Tree Roots	<u>0</u> 1 2 3 4
Artificial Structures	<u>0</u> 1 2 3 4

DENSIMETER READINGS (0-17) count covered dots	
Center Left	<u>0</u>
Center Upstream	<u>0</u>
Center Right	<u>0</u>
Center Downstream	<u>0</u>
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m < 50m from Channel; Channel (record Yes or No)			
	Left Bank	Channel	Right Bank	
Walls/ Rip-rap/ Dams	P C B <u>0</u>	Y <u>N</u>	<u>0</u> B C P	
Buildings	P C B <u>0</u>	Y <u>N</u>	<u>0</u> B C P	
Pavement/ Cleared Lot	P C B <u>0</u>		<u>0</u> B C P	
Road/ Railroad	P C B <u>0</u>	Y <u>N</u>	<u>0</u> B C P	
Pipes (Inlet/ Outlet)	P C B <u>0</u>	Y <u>N</u>	<u>0</u> B C P	
Landfill/ Trash	P C B <u>0</u>	Y <u>N</u>	<u>0</u> B C P	
Park/ Lawn	P C B <u>0</u>		<u>0</u> B C P	
Row Crop	P C B <u>0</u>		<u>0</u> B C P	
Pasture/ Range	P C B <u>0</u>		<u>0</u> B C P	
Logging Operations	P C B <u>0</u>		<u>0</u> B C P	
Mining Activity	P C B <u>0</u>	Y <u>N</u>	<u>0</u> B C P	
Vegetation Management	P C B <u>0</u>		<u>0</u> B C P	
Bridges/ Abutments	P C B <u>0</u>	Y <u>N</u>	<u>0</u> B C P	
Orchards/ Vineyards	P C B <u>0</u>		<u>0</u> B C P	

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	<u>stable</u>
Right Bank	eroded	vulnerable	<u>stable</u>

Inter-Transect: GH										Wetted Width (m): 1.3
Inter-Transect Substrates										
Position	Dist from L.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	20	50		0 A	1	P X D	P A D	P X D	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.3	18	92	0	0 A	2	P A D	P A D	P A D	
Center	0.7	17	95	0	0 A	1	P X D	P X D	0 A D	
Right Center	1.0	15	36		0 A	1	P A D	P X D	0 A D	
Right Bank	1.3	11	3		0 A	0	P X D	P A D	0 A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	90
Run	5
Glide	
Pool	5
Dry	

Site Code: <u>ML-6</u>	Site Name:	Date: <u>9-16-2012</u>
Wetted Width (m): <u>1.2</u>	Bankfull Width (m): <u>1.8</u>	Bankfull Height (m): <u>35</u>
Transect H		

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	11	60		(P)A	1	P A D	P A D	(P) A D	
Left Center	0.3	17	23		(P)A	1	P (A) D	P (A) D	P (A) D	
Center	0.6	12	90	0	(P)A	2	(P) A D	P A D	P A D	
Right Center	0.9	16	120	0	(P)A	1	P A D	P A D	(P) A D	
Right Bank	1.2	10	6		(P)A	0	P A D	P A D	(P) A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred).

RIPARIAN VEGETATION (facing downstream)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	(0) 1 2 3 4	(0) 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	(0) 1 2 3 4	0 (1) 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 (1) 2 3 4	0 (1) 2 3 4	
Herbs/ grasses	0 1 2 3 (4)	0 1 2 (3) 4	
Barren, bare soil/ duff	(0) 1 2 3 4	0 (1) 2 3 4	

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 (1) 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 (2) 3 4
Boulders	0 (1) 2 3 4
Woody Debris >0.3 m	0 (1) 2 3 4
Woody Debris <0.3 m	(0) 1 2 3 4
Undercut Banks	0 1 (2) 3 4
Overhang. Vegetation	0 (1) 2 3 4
Live Tree Roots	(0) 1 2 3 4
Artificial Structures	(0) 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	(0)
Center Upstream	16
Center Right	2
Center Downstream	2
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No)			
	Left Bank	Channel	Right Bank	
Walls/ Rip-rap/ Dams	P C B (0)	Y (N)	(0) B C P	
Buildings	P C B (0)	Y (N)	(0) B C P	
Pavement/ Cleared Lot	P C B (0)	Y (N)	(0) B C P	
Road/ Railroad	P C B (0)	Y (N)	(0) B C P	
Pipes (Inlet/ Outlet)	P C B (0)	Y (N)	(0) B C P	
Landfill/ Trash	P C B (0)	Y (N)	(0) B C P	
Park/ Lawn	P C B (0)		(0) B C P	
Row Crop	P C B (0)		(0) B C P	
Pasture/ Range	P C B (0)		(0) B C P	
Logging Operations	P C B (0)		(0) B C P	
Mining Activity	P C B (0)	Y (N)	(0) B C P	
Vegetation Management	P C B (0)		(0) B C P	
Bridges/ Abutments	P C B (0)	Y (N)	(0) B C P	
Orchards/ Vineyards	P C B (0)		(0) B C P	

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	(stable)
Right Bank	eroded	vulnerable	(stable)

Inter-Transect: HI										Wetted Width (m): 2.1
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	5	42		(P)	0	P X D	P X D	P X D	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code); D = Dry, not assessed.
Left Center	0.5	6	78	0	(P) A	1	P X D	P X D	(P) A D	
Center	1.1	10	161	10	0 A	1	P X D	P X D	(P) A D	
Right Center	1.4	8	116	0	(P) A	1	P X D	P X D	(P) A D	
Right Bank	2.1	10	25		(P) A	1	P X D	P X D	P X D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	90
Run	
Glide	
Pool	10
Dry	

Site Code: <u>M6</u>	Site Name: <u>-</u>	Date: <u>9-16-2012</u>
Wetted Width (m): <u>80</u>	Bankfull Width (m): <u>2.3</u>	Bankfull Height (m): <u>36</u>

Transect I

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	15	18		(P)A	0	P A D	P A D	P A D	
Left Center	0.2	19	24		(P)A	0	P A D	P A D	P A D	
Center	0.4	20	210	40	(P)A	2	P A D	P A D	(P) A D	
Right Center	0.4	16	17		(P)A	1	P A D	P A D	P A D	
Right Bank	0.8	5	71		(P)A	0	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

RIPARIAN VEGETATION (facing downstream)	0 = Absent (0%) 3 = Heavy (40-75%) 1 = Sparse (<10%) 4 = Very Heavy (>75%) 2 = Moderate (10-40%)											
	Left Bank						Right Bank					
Vegetation Class												
Upper Canopy (>5 m high)												
Trees and saplings >5 m high	0	1	2	3	4	0	1	2	3	4		
Lower Canopy (0.5 m-5 m high)												
All vegetation 0.5 m to 5 m	0	1	2	3	4	0	1	2	3	4		
Ground Cover (<0.5 m high)												
Woody shrubs & saplings <0.5 m	0	1	2	3	4	0	1	2	3	4		
Herbs/ grasses	0	1	2	3	4	0	1	2	3	4		
Barren, bare soil/ duff	0	1	2	3	4	0	1	2	3	4		

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)				
	Filamentous Algae	0	1	2	3
Aquatic Macrophytes/ Emergent Vegetation	0	1	2	3	4
Boulders	0	1	2	3	4
Woody Debris >0.3 m	0	1	2	3	4
Woody Debris <0.3 m	0	1	2	3	4
Undercut Banks	0	1	2	3	4
Overhang. Vegetation	0	1	2	3	4
Live Tree Roots	0	1	2	3	4
Artificial Structures	0	1	2	3	4

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	0
Center Upstream	0
Center Right	0
Center Downstream	9
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No)											
	Left Bank				Channel	Right Bank						
Walls/ Rip-rap/ Dams	P	C	B	0	Y	0	B	C	P			
Buildings	P	C	B	0	Y	0	B	C	P			
Pavement/ Cleared Lot	P	C	B	0	Y	0	B	C	P			
Road/ Railroad	P	C	B	0	Y	0	B	C	P			
Pipes (Inlet/ Outlet)	P	C	B	0	Y	0	B	C	P			
Landfill/ Trash	P	C	B	0	Y	0	B	C	P			
Park/ Lawn	P	C	B	0	Y	0	B	C	P			
Row Crop	P	C	B	0	Y	0	B	C	P			
Pasture/ Range	P	C	B	0	Y	0	B	C	P			
Logging Operations	P	C	B	0	Y	0	B	C	P			
Mining Activity	P	C	B	0	Y	0	B	C	P			
Vegetation Management	P	C	B	0	Y	0	B	C	P			
Bridges/ Abutments	P	C	B	0	Y	0	B	C	P			
Orchards/ Vineyards	P	C	B	0	Y	0	B	C	P			

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: IJ										Wetted Width (m): 0.75
Inter-Transect Substrates										
Position	Dist from I.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	9	20		(P)A	0	P A D	P A D	P A D	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.2	18	81	0	(P)A	1	(P)A D	P A D	(P)A D	
Center	0.4	11	105	0	(P)A	1	(P)A D	UD	(P)A D	
Right Center	0.6	16	44		(P)A	1	P A D	P A D	(P)A D	
Right Bank	0.8	9	30		(P)A	1	P A D	P A D	(P)A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	60
Run	15
Glide	
Pool	25
Dry	

Site Code: <u>ML6</u>	Site Name:	Date: <u>9-16</u> / 2012
Wetted Width (m): <u>1.8</u>	Bankfull Width (m): <u>1.8</u>	Bankfull Height (m): <u>30</u>

Transect J

Transect Substrates										Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Position	Dist from I.B (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	
Left Bank	0	10	81	40	(P)	1	P X D	P X D	(P) A D	
Left Center	0.2	19	45		(P) A	1	P A D	P A D	(P) A D	
Center	0.4	20	80	0	(P) A	2	P X D	P A D	(P) A D	
Right Center	0.6	15	127	0	(P) A	2	P X D	P A D	(P) A D	
Right Bank	0.8	11	10		(P) A	0	P A D	P A D	(P) A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

RIPARIAN VEGETATION (facing downstream)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)		3 = Heavy (40-75%) 4 = Very Heavy (>75%)	
	Left Bank	Right Bank	Left Bank	Right Bank
Vegetation Class				
Upper Canopy (>5 m high)				
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4		
Lower Canopy (0.5 m-5 m high)				
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4		
Ground Cover (<0.5 m high)				
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4		
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4		
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4		

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots	
Center	0
Left	0
Center Upstream	0
Center Right	0
Center Downstream	0
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+ <50m from Channel; Channel (record Yes or No)		
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0	Y N	0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0		0 B C P
Row Crop	P C B 0		0 B C P
Pasture/ Range	P C B 0		0 B C P
Logging Operations	P C B 0		0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0		0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0		0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Inter-Transect: JK										Wetted Width (m): 65
Inter-Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	19	15		(P) A	1	P A D	P A D	(P) A D	Microalgae Thickness Codes 0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.2	19	15		(P) A	0	P A D	P A D	(P) A D	
Center	0.3	20	15		(P) A	1	P A D	P A D	(P) A D	
Right Center	0.5	15	15		(P) A	1	P A D	P A D	(P) A D	
Right Bank	0.7	10	20		(P) A	1	P A D	P A D	(P) A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

FLOW HABITATS	
(% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	75
Run	10
Glide	
Pool	15
Dry	

Site Code: MC-6	Site Name:	Date: 9-16-2012
Wetted Width (m): 21.3	Bankfull Width (m): 21	Bankfull Height (m): 29
Transect K		

Transect Substrates										
Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	5	31		(P) A	0	P A D	P A D	(P) A D	Microalgae Thickness Codes 0 = No microalgae present. Feels rough, not slimy; 1 = Present but not visible. Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; U = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	0.3	10	152	10	(P) A	2	(P) A D	P A D	(P) A D	
Center	0.7	20	119	0	(P) A	2	(P) A D	P A D	(P) A D	
Right Center	1.0	19	73	0	(P) A	2	(P) A D	P A D	(P) A D	
Right Bank	1.7	8	101		(P) A	0	P A D	P A D	(P) A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)										

RIPARIAN VEGETATION (facing downstream)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)											
	Left Bank						Right Bank					
Vegetation Class	Left Bank						Right Bank					
Upper Canopy (>5 m high)												
Trees and saplings >5 m high	0	1	2	3	4	0	1	2	3	4		
Lower Canopy (0.5 m-5 m high)												
All vegetation 0.5 m to 5 m	0	1	2	3	4	0	1	2	3	4		
Ground Cover (<0.5 m high)												
Woody shrubs & saplings <0.5 m	0	1	2	3	4	0	1	2	3	4		
Herbs/ grasses	0	1	2	3	4	0	1	2	3	4		
Barren, bare soil/ duff	0	1	2	3	4	0	1	2	3	4		

INSTREAM HABITAT COMPLEXITY	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)				
	Filamentous Algae	0	1	2	3
Aquatic Macrophytes/ Emergent Vegetation	0	1	2	3	4
Boulders	0	1	2	3	4
Woody Debris >0.3 m	0	1	2	3	4
Woody Debris <0.3 m	0	1	2	3	4
Undercut Banks	0	1	2	3	4
Overhang. Vegetation	0	1	2	3	4
Live Tree Roots	0	1	2	3	4
Artificial Structures	0	1	2	3	4

DENSIMETER READINGS (0-17) count covered dots	
Center	0
Left	0
Center Upstream	0
Center Right	0
Center Downstream	0
Optional	
Left Bank	0
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No)											
	Left Bank				Channel	Right Bank						
Walls/ Rip-rap/ Dams	P	C	B	0	Y	N	0	B	C	P		
Buildings	P	C	B	0	Y	N	0	B	C	P		
Pavement/ Cleared Lot	P	C	B	0	Y	N	0	B	C	P		
Road/ Railroad	P	C	B	0	Y	N	0	B	C	P		
Pipes (Inlet/ Outlet)	P	C	B	0	Y	N	0	B	C	P		
Landfill/ Trash	P	C	B	0	Y	N	0	B	C	P		
Park/ Lawn	P	C	B	0			0	B	C	P		
Row Crop	P	C	B	0			0	B	C	P		
Pasture/ Range	P	C	B	0			0	B	C	P		
Logging Operations	P	C	B	0			0	B	C	P		
Mining Activity	P	C	B	0	Y	N	0	B	C	P		
Vegetation Management	P	C	B	0	Y	N	0	B	C	P		
Bridges/ Abutments	P	C	B	0	Y	N	0	B	C	P		
Orchards/ Vineyards	P	C	B	0			0	B	C	P		

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (required)	☐
Upstream (optional)	☐

Appendix C
Laboratory Analytical Data and
Field Parameter Data

Community Level Laboratory Analytical Data and Field Parameter Data

StationName	Sample Type	Sample Collection Date	Ammonia as N mg/L	Dissolved Phosphorus mg/L	Nitrate and Nitrite as N mg/L	Nitrate as N mg/L	Nitrite as N mg/L	Ortho-phosphate mg/L	Total Kjeldahl Nitrogen (TKN) mg/L	Total Nitrogen as N mg/L	Total Phosphorus mg/L	Total Suspended Solids mg/L	Turbidity NTU	C10-C22 mg/L	C22-C36 mg/L	C6-C10 mg/L	Total Extractable Hydrocarbons (C6-C36) mg/L	pH	Electrical Conductivity µS
Water Year 2010																			
DSC-TC1		2/24/2010		0.018		0.11	0.073	0.016	0.49	0.68	0.24	82	120						
DSC-TC1		2/26/2010		0.078		0.36	0.034	0.081	0.71	1.1	0.16	71	63						
DSC-TC1		3/29/2010		0.1		0.21	0.01 U	0.044	0.49	0.7	0.13	14	24						
DSC-TC1		4/22/2010		0.057		0.69	0.01 U	0.044	0.27	0.96	0.18	20	30						
DSC-TC1		4/27/2010		0.049		0.39	0.01 U	0.042	0.42	0.81	0.27	38	48						
DSC-TC1		5/25/2010		0.13		1.6	0.01 U	0.089	0.28	1.9	0.14	2	5.1						
DSC-TC1	DUP	5/25/2010		0.077		1.6	0.01 U	0.092	0.27	1.9	0.11	3	5						
DSC-TT1		2/5/2010		0.01 U	0.22			0.037	3	3.2	0.44	1600	1300						
DSC-TT1		2/24/2010		0.058		0.12	0.1	0.068	1	1.2	0.12	270 J	990						
DSC-TT1	DUP	2/24/2010		0.045		0.11	0.073	0.07	1.2	1.4	0.14	480 J	940						
DSC-TT1		2/26/2010		0.084		0.28	0.045	0.1	2.9	3.3	0.26	2200	470						
DSC-TT1		3/12/2010		0.012		0.43	0.33	0.057	2.3	3.1	2	1500	770						
DSC-TT1		3/29/2010		0.055		0.15	0.01 U	0.092	0.39	0.54	0.076	33	58						
DSC-TT1		4/22/2010		0.028		0.12	0.015	0.042	1.5	1.7	0.42	470	400						
DSC-TT1		4/27/2010		0.081		0.14	0.01 U	0.084	1.7	1.9	1.5	1000	470						
DSC-TT1		5/10/2010		0.048		0.3	0.056	0.059	1.8	2.2	0.53	470	300						
Quality Control	BB	3/12/2010		0.01 U		0.01 U	0.01 U	0.01 U	0.05 U	0.07 U	0.01 U	1 U	0.1 U						
Water Year 2011																			
DSC-MC1		10/4/2010				0.17	0.01 U		0.31	0.48	0.25	4	7.9						
DSC-MC1		10/4/2010				0.17	0.01 U		0.31	0.48	0.25	4	7.9						
DSC-MC1		10/24/2010				0.27	0.01 U		0.31	0.58	0.088	190	54						
DSC-MC1		10/24/2010				0.27	0.01 U		0.31	0.58	0.088	190	54						
DSC-MC1		12/14/2010			0.25	0.25	0.01 U						140						
DSC-MC1		12/14/2010			0.25	0.25	0.01 U						140						
DSC-MC1		3/2/2011				0.17	0.01 U		0.7	0.87	0.19	250	220						
DSC-MC1		3/2/2011				0.17	0.01 U		0.7	0.87	0.19	250	220						
DSC-MC1		3/6/2011				0.23	0.01 U		0.62	0.85	0.19	240	120						
DSC-MC1		3/6/2011				0.23	0.01 U		0.62	0.85	0.19	240	120						
DSC-MC1		3/28/2011				0.59	0.01 U		0.055	0.65	0.048	15	13						
DSC-MC1		3/28/2011				0.59	0.01 U		0.055	0.65	0.048	15	13						
DSC-MC1		4/11/2011				0.49	0.01 U		0.1	0.59	0.051	11	7.3						
DSC-MC1		4/11/2011				0.49	0.01 U		0.1	0.59	0.051	11	7.3						
DSC-MC1		5/25/2011				0.01 U	0.025 U		1.4	1.4	0.33	640	230						
DSC-MC1		5/25/2011				0.01 U	0.025 U		1.4	1.4	0.33	640	230						
DSC-MC2		12/14/2010	0.05 U	0.03		0.012	0.01 U	0.028	0.27	0.28	0.099	3	1.3						
DSC-MC2		12/14/2010	0.05 U	0.03		0.012	0.01 U	0.028	0.27	0.28	0.099	3	1.3						
DSC-MC2		12/18/2010	0.05 U	0.036		0.04	0.01 U	0.046	0.05 U	0.07 U	0.058	11	2.8						
DSC-MC2		12/18/2010	0.05 U	0.036		0.04	0.01 U	0.046	0.05 U	0.07 U	0.058	11	2.8						
DSC-MC2		1/17/2011	0.05 U	0.025	0.01 U	0.01 U	0.01 U	0.012	0.16	0.16	0.024	1 U	0.35						
DSC-MC2	DUP	1/17/2011	0.05 U	0.03	0.01 U	0.01 U	0.01 U	0.011	0.08	0.08	0.022	1	0.42						
DSC-MC2	TRIPLICATE	1/17/2011	0.05 U	0.025	0.01 U	0.01 U	0.01 U	0.012	0.054	0.07 U	0.02	1 U	0.52						
DSC-MC2		1/17/2011	0.05 U	0.025	0.01 U	0.01 U	0.01 U	0.012	0.16	0.16	0.024	1 U	0.35						
DSC-MC2	DUP	1/17/2011	0.05 U	0.03	0.01 U	0.01 U	0.01 U	0.011	0.08	0.08	0.022	1	0.42						
DSC-MC2	TRIPLICATE	1/17/2011	0.05 U	0.025	0.01 U	0.01 U	0.01 U	0.012	0.054	0.07 U	0.02	1 U	0.52						
DSC-MC2		3/2/2011	0.063	0.03		0.13	0.01 U	0.015	0.16	0.29	0.036	1 U	1.9						
DSC-MC2		3/2/2011	0.063	0.03		0.13	0.01 U	0.015	0.16	0.29	0.036	1 U	1.9						
DSC-MC2		3/10/2011	0.082	0.024		0.18	0.01 U	0.02	0.22	0.4	0.032	1 U	1.9						
DSC-MC2		3/10/2011	0.082	0.024		0.18	0.01 U	0.02	0.22	0.4	0.032	1 U	1.9						
DSC-MC2		3/14/2011	0.05 U	0.03		0.18	0.01 U	0.025	0.36	0.54	0.1	73	11						
DSC-MC2		3/14/2011	0.05 U	0.03		0.18	0.01 U	0.025	0.36	0.54	0.1	73	11						
DSC-MC2		3/31/2011	0.05 U	0.018		0.01 U	0.01 U	0.016	0.14	0.14	0.017	9	2.8						
DSC-MC2		3/31/2011	0.05 U	0.018		0.01 U	0.01 U	0.016	0.14	0.14	0.017	9	2.8						
DSC-MC2		5/25/2011	0.05 U	0.036		0.21	0.025 U	0.023	0.37	0.58	0.072	8	2.1						

StationName	Sample Type	Sample Collection Date	Ammonia as N mg/L	Dissolved Phosphorus mg/L	Nitrate and Nitrite as N mg/L	Nitrate as N mg/L	Nitrite as N mg/L	Ortho-phosphate mg/L	Total Kjeldahl Nitrogen (TKN) mg/L	Total Nitrogen as N mg/L	Total Phosphorus mg/L	Total Suspended Solids mg/L	Turbidity NTU	C10-C22 mg/L	C22-C36 mg/L	C6-C10 mg/L	Total Extractable Hydrocarbons (C6-C36) mg/L	pH	Electrical Conductivity µS
DSC-MC2		5/25/2011	0.05 U	0.036		0.21	0.025 U	0.023	0.37	0.58	0.072	8	2.1						
DSC-MC3		12/14/2010	0.05 U	0.051		0.01 U	0.01 U	0.039	0.82	0.82	0.17	170	83						
DSC-MC3		12/14/2010	0.05 U	0.051		0.01 U	0.01 U	0.039	0.82	0.82	0.17	170	83						
DSC-MC3		12/18/2010	0.053	0.062		0.01 U	0.01 U	0.088	0.33	0.33	0.092	16	15						
DSC-MC3		12/18/2010	0.053	0.062		0.01 U	0.01 U	0.088	0.33	0.33	0.092	16	15						
DSC-MC3		3/14/2011	0.05 U	0.05		0.011	0.01 U	0.034	0.17	0.19	0.065	25	10						
DSC-MC3		3/14/2011	0.05 U	0.05		0.011	0.01 U	0.034	0.17	0.19	0.065	25	10						
DSC-MC3		3/31/2011	0.05 U	0.034		0.013	0.01 U	0.038	0.12	0.14	0.065	6	8.3						
DSC-MC3		3/31/2011	0.05 U	0.034		0.013	0.01 U	0.038	0.12	0.14	0.065	6	8.3						
DSC-MC3		4/18/2011	0.05 U	0.04		0.01 U	0.01 U	0.026	0.14	0.14	0.05	1	4.9						
DSC-MC3		4/18/2011	0.05 U	0.04		0.01 U	0.01 U	0.026	0.14	0.14	0.05	1	4.9						
DSC-MC3		6/6/2011	0.05 U	0.023		0.019	0.01 U	0.013	1.3	1.3	0.13	530	120						
DSC-MC3		6/6/2011	0.05 U	0.023		0.019	0.01 U	0.013	1.3	1.3	0.13	530	120						
DSC-TC1		10/4/2010				0.07	0.01 U		0.37	0.44	1.5	20	36						
DSC-TC1		10/4/2010				0.07	0.01 U		0.37	0.44	1.5	20	36						
DSC-TC1		10/24/2010				0.021	0.01 U		0.18	0.21	0.072	140	42						
DSC-TC1		10/24/2010				0.021	0.01 U		0.18	0.21	0.072	140	42						
DSC-TC1		12/14/2010			0.055	0.055	0.01 U		0.81	0.92	0.22	240	120						
DSC-TC1		12/14/2010			0.055	0.055	0.01 U		0.81	0.92	0.22	240	120						
DSC-TC1		12/18/2010			0.079	0.073	0.01 U		0.71	0.86	0.072	58	96						
DSC-TC1		12/18/2010			0.079	0.073	0.01 U		0.71	0.86	0.072	58	96						
DSC-TC1		12/28/2010				1.1	0.01 U		0.24	1.3	0.058	6	12						
DSC-TC1		12/28/2010				1.1	0.01 U		0.24	1.3	0.058	6	12						
DSC-TC1		2/22/2011				0.82	0.01 U		0.26	1.1	0.064	1	5.8						
DSC-TC1	DUP	2/22/2011				0.82	0.01 U		0.3	1.1	0.077	1 U	6.5						
DSC-TC1	TRIPLICATE	2/22/2011				0.82	0.01 U		0.35	1.2	0.067	1 U	5.9						
DSC-TC1		2/22/2011				0.82	0.01 U		0.26	1.1	0.064	1	5.8						
DSC-TC1	DUP	2/22/2011				0.82	0.01 U		0.3	1.1	0.077	1 U	6.5						
DSC-TC1	TRIPLICATE	2/22/2011				0.82	0.01 U		0.35	1.2	0.067	1 U	5.9						
DSC-TC1		3/6/2011				0.7	0.01 U		0.28	0.98	0.054	34	29						
DSC-TC1		3/6/2011				0.7	0.01 U		0.28	0.98	0.054	34	29						
DSC-TC1		3/14/2011				0.64	0.01 U		0.6	1.2	0.13	150	100						
DSC-TC1		3/14/2011				0.64	0.01 U		0.6	1.2	0.13	150	100						
DSC-TT1		10/24/2010				0.16	0.01 U		0.21	0.37	0.098	1300	300						
DSC-TT1		10/24/2010				0.16	0.01 U		0.21	0.37	0.098	1300	300						
DSC-TT1		12/14/2010			0.031	0.031	0.01 U		2	2	0.63	1000	600						
DSC-TT1		12/14/2010			0.031	0.031	0.01 U		2	2	0.63	1000	600						
DSC-TT1		1/17/2011			0.14	0.1	0.044		2.7	2.8	0.25	1200	620						
DSC-TT1	DUP	1/17/2011			0.13	0.094	0.038		2.7	2.9	0.27	1200	660						
DSC-TT1		1/17/2011			0.14	0.1	0.044		2.7	2.8	0.25	1200	620						
DSC-TT1	DUP	1/17/2011			0.13	0.094	0.038		2.7	2.9	0.27	1200	660						
DSC-TT1		3/2/2011				0.13	0.021		1.6	1.8	0.26	220	530						
DSC-TT1		3/2/2011				0.13	0.021		1.6	1.8	0.26	220	530						
DSC-TT1		3/14/2011				0.79	0.01 U		0.5	1.3	0.37	900	910						
DSC-TT1		3/14/2011				0.79	0.01 U		0.5	1.3	0.37	900	910						
DSC-TT1		3/28/2011				0.09	0.01 U		1.7	1.8	0.36	580	370						
DSC-TT1		3/28/2011				0.09	0.01 U		1.7	1.8	0.36	580	370						
DSC-TT1		3/31/2011												1 U	1.5	1 U	1.5		
DSC-TT1		3/31/2011												1 U	1.5	1 U	1.5		
DSC-TT1		4/20/2011				0.16	0.01 U		1.3	1.4	0.46	1100	300						
DSC-TT1		4/20/2011				0.16	0.01 U		1.3	1.4	0.46	1100	300						
DSC-TT1		5/25/2011				0.19	0.025 U		1.9	2.1	0.36	870	350						
DSC-TT1		5/25/2011				0.19	0.025 U		1.9	2.1	0.36	870	350						

StationName	Sample Type	Sample Collection Date	Ammonia as N mg/L	Dissolved Phosphorus mg/L	Nitrate and Nitrite as N mg/L	Nitrate as N mg/L	Nitrite as N mg/L	Ortho-phosphate mg/L	Total Kjeldahl Nitrogen (TKN) mg/L	Total Nitrogen as N mg/L	Total Phosphorus mg/L	Total Suspended Solids mg/L	Turbidity NTU	C10-C22 mg/L	C22-C36 mg/L	C6-C10 mg/L	Total Extractable Hydrocarbons (C6-C36) mg/L	pH	Electrical Conductivity µS
Water Year 2012																			
DSC-DC1		3/15/2012										750							
DSC-DC1	FIELD	3/15/2012											>1000					8	135.8
DSC-DC1		3/16/2012										140							
DSC-DC1	FIELD	3/16/2012											170 / 172					8.05	126.1
DSC-DC1		3/28/2012										960							
DSC-DC1	FIELD	3/28/2012											939					8.13	86.1
DSC-DC1		4/12/2012										1200							
DSC-DC1	FIELD	4/12/2012											>1000					8.55	211
DSC-DC1		4/26/2012										730							
DSC-DC1	FIELD	4/26/2012											152					8.39	99.6
DSC-MC1		10/5/2011			0.34	0.31	0.032		0.54	0.89	0.13	180	40						
DSC-MC1		1/21/2012				0.01 UJ	0.01 U		0.21	0.21	0.093	26	18						
DSC-MC1		1/26/2012				0.24	0.01 U		0.51	0.75	0.056	20	20						
DSC-MC2		1/20/2012	0.05 U	0.96		0.01 UJ	0.01 UJ	1.1	3.7	3.7	0.94	69	16						
DSC-MC2		1/25/2012	0.05 U	0.1		0.39	0.01 U	0.084	0.63	1	0.14	1 U	1.1						
DSC-MC2		3/5/2012	0.063	0.058		0.2	0.01 U	0.053	0.46	0.66	0.084	2	2.3						
DSC-MC2		3/13/2012	0.05 U	0.091		0.037	0.01 U	0.11	0.69	0.73	0.21	43	11						
DSC-MC2		3/16/2012	0.05 U	0.099		0.05	0.01 U	0.07	0.5	0.6	0.15	17	6.8						
DSC-MC2		3/21/2012	0.05 U	0.014		0.01 U	0.01 U	0.025	0.21	0.21	0.035	5	2.8						
DSC-MC2		3/28/2012	0.05 U	0.022		0.01 U	0.01 U	0.016	0.25	0.25	0.036	1	0.81						
DSC-MC2		4/26/2012	0.05 U	0.038		0.049	0.01 U	0.01 U	0.28	0.33	0.12	6	2.5						
DSC-MC3		10/5/2011	0.17	0.41	0.81	0.81	0.01 U	0.58	3.6	4.4	0.77	110	46						
DSC-MC3		3/16/2012	0.05 U	0.021		0.01 U	0.01 U	0.017	0.34	0.34	0.13	39	26						
DSC-MC3		3/21/2012	0.05 U	0.014		0.01 U	0.01 U	0.021	0.095	0.095	0.042	1 U	9.8						
DSC-MC3		4/26/2012	0.05 U	0.015		0.055	0.055	0.01 U	0.55	0.66	0.13	290	120						
DSC-MC3	DUP	4/26/2012	0.05 U	0.016		0.053	0.053	0.01 U	0.47	0.58	0.088	290	120						
DSC-MC3	TRIPLICATE	4/26/2012	0.05 U	0.016		0.072	0.051	0.01 U	1.3 J	1.4 J	0.096	280	130						
DSC-MC3		8/14/2012	0.17	0.15		0.13	0.012	0.15	3.2	3.3	0.17	810	310						
DSC-TC1		1/20/2012				0.056 J	0.01 UJ		1.2	1.3	0.25	360	98						
DSC-TC1		3/16/2012										68							
DSC-TC1	FIELD	3/16/2012											111 / 111					7.72	382
DSC-TC1	DUP	3/16/2012										69							
DSC-TC1	TRIPLICATE	3/16/2012										68							
DSC-TC1		3/21/2012										3							
DSC-TC1	FIELD	3/21/2012											12.1 / 12.7					7.81	182.9
DSC-TC1		3/28/2012										2							
DSC-TC1	FIELD	3/28/2012											13.8					8.58	280
DSC-TC1		4/26/2012										99							
DSC-TC1	FIELD	4/26/2012											103					8.76	243
DSC-TC2		3/13/2012										120							
DSC-TC2	FIELD	3/13/2012											112					7.51	3730
DSC-TC2		3/16/2012										440							
DSC-TC2	FIELD	3/16/2012											350 / 338					7.03	4060
DSC-TC2		3/21/2012										140							
DSC-TC2	FIELD	3/21/2012											278 / 285					7.55	687
DSC-TC2		3/28/2012										180							
DSC-TC2	FIELD	3/28/2012											518					7.86	1202
DSC-TC2		4/12/2012										570							
DSC-TC2	FIELD	4/12/2012											643					8.13	7260
DSC-TT1		10/5/2011			0.31	0.31	0.01 U		1.5	1.8	0.18	540	120						
DSC-TT1		1/20/2012				0.13 J	0.018 J		2.7	3	0.37 J	1300 J	600						
DSC-TT1	DUP	1/20/2012				0.12 J	0.01 UJ		2.8	3.1	0.79 J	2400 J	600						
DSC-TT1	TRIPLICATE	1/20/2012				0.11 J	0.01 UJ		2.1	2.3	0.14 J	2000 J	610						
DSC-TT1		1/26/2012				0.07	0.01 U		1.3	1.4	0.096	450	300						
DSC-TT1		3/16/2012										1100							

StationName	Sample Type	Sample Collection Date	Ammonia as N mg/L	Dissolved Phosphorus mg/L	Nitrate and Nitrite as N mg/L	Nitrate as N mg/L	Nitrite as N mg/L	Ortho-phosphate mg/L	Total Kjeldahl Nitrogen (TKN) mg/L	Total Nitrogen as N mg/L	Total Phosphorus mg/L	Total Suspended Solids mg/L	Turbidity NTU	C10-C22 mg/L	C22-C36 mg/L	C6-C10 mg/L	Total Extractable Hydrocarbons (C6-C36) mg/L	pH	Electrical Conductivity µS
DSC-TT1	FIELD	3/16/2012											932 / 942					8.06	36.4
DSC-TT1		3/28/2012										1500							
DSC-TT1	FIELD	3/28/2012											>1000					7.96	184.9
DSC-TT2		3/1/2012										48							
DSC-TT2	FIELD	3/2/2012										63	116					7.8	1315
DSC-TT2		3/8/2012											106					8.1	1240
DSC-TT2		3/13/2012										650							
DSC-TT2	FIELD	3/13/2012											426					7.87	593
DSC-TT2		3/16/2012										1400							
DSC-TT2	FIELD	3/16/2012											371 / 395					7.3	79.7
DSC-TT2		3/28/2012										26							
DSC-TT2	FIELD	3/28/2012											37.6					8.41	234
DSC-TT3		3/16/2012										360							
DSC-TT3	FIELD	3/16/2012											378 / 353					7.71	76.7
DSC-TT3		3/28/2012										330							
DSC-TT3	FIELD	3/28/2012											261					7.57	6790
DSC-TT3		4/12/2012										1600							
DSC-TT3	FIELD	4/12/2012											>1000					8.03	294
DSC-TT3		4/26/2012										340							
DSC-TT3	FIELD	4/26/2012											401					7.93	275
DSC-TT3		8/14/2012										80							
DSC-TT4		3/1/2012										1000							
DSC-TT4	FIELD	3/1/2012											>1000					8.11	2130
DSC-TT4		3/5/2012										96							
DSC-TT4	FIELD	3/5/2012											151 / 155					7.57	396
DSC-TT4		3/13/2012										470							
DSC-TT4	FIELD	3/13/2012											982					7.81	1890
DSC-TT4		3/16/2012										460							
DSC-TT4	FIELD	3/16/2012											654 / 630					7.23	247
DSC-TT4		3/21/2012										50							
DSC-TT4	FIELD	3/21/2012											45.3 / 47.6					7.58	171.2
DSC-TT4		3/28/2012										320							
DSC-TT4	FIELD	3/28/2012											900					8.22	745
DSC-TT5		3/2/2012										770							
DSC-TT5	FIELD	3/2/2012											>1000					8.27	362
DSC-TT5		3/5/2012										650							
DSC-TT5	FIELD	3/5/2012											705 / 701					7.9	104.3
DSC-TT5		3/13/2012										33							
DSC-TT5	FIELD	3/13/2012											98.6					8.36	118.3
DSC-TT5		3/16/2012										280							
DSC-TT5	FIELD	3/16/2012											264 / 242					7.31	95.3
DSC-TT5		3/28/2012										390							
DSC-TT5	FIELD	3/28/2012											272					8.26	107.7

Notes:

U = not detected at concentration indicated

J = estimated value due to precision issue

Field parameters were not collected prior to 3/1/12 event.

Tributary Level Laboratory Analytical Data

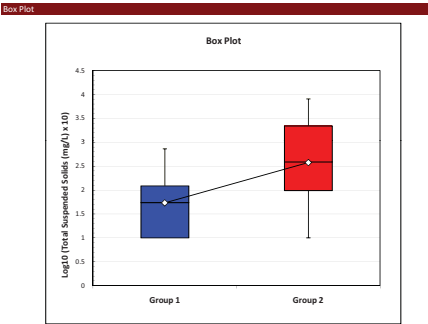
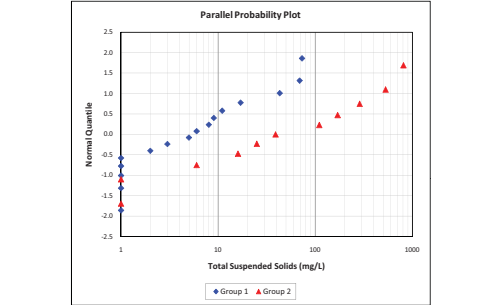
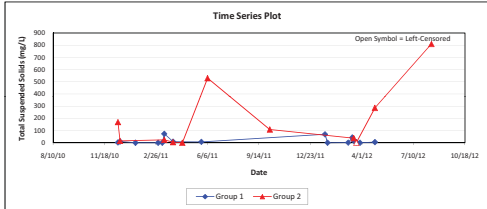
StationName	Sample Type	Sample Collection Date	Ammonia as N µg/L	Dissolved Phosphorus µg/L	Nitrate and Nitrite as N µg/L	Ortho-phosphate µg/L	Total Kjeldahl Nitrogen (TKN) µg/L	Total Nitrogen as N µg/L	Total Phosphorus µg/L	Total Suspended Solids mg/L	Turbidity NTU
Water Year 2011											
DST-MC1		12/14/2010	5	34	205	18	999	1204	186	82.24	37.2
DST-MC1		12/14/2010	5	34	205	18	999	1204	186	82.24	37.2
DST-MC1		12/18/2010	3	41	215	28	534	749	103	28	15.5
DST-MC1		12/18/2010	3	41	215	28	534	749	103	28	15.5
DST-MC1		3/15/2011	4	24	88	18	376	464	94	37	19.3
DST-MC1		3/15/2011	4	24	88	18	376	464	94	37	19.3
DST-MC1		4/1/2011	3	21	15	12	231	246	45	12	6.75
DST-MC1		4/1/2011	3	21	15	12	231	246	45	12	6.75
DST-MC1		5/5/2011	1	26	4	19	219	223	47	6	7.25
DST-MC1		5/5/2011	1	26	4	19	219	223	47	6	7.25
DST-MC1		6/6/2011	5	33	10	22	274	284	67	16.5	11.2
DST-MC1		6/6/2011	5	33	10	22	274	284	67	16.5	11.2
DST-MC1		6/29/2011	4	33	7	20	275	282	51	4.8	3.2
DST-MC1		6/29/2011	4	33	7	20	275	282	51	4.8	3.2
DST-MC2		12/14/2010	3	32	7	14	319	326	63	19.23	11.2
DST-MC2		12/14/2010	3	32	7	14	319	326	63	19.23	11.2
DST-MC2		12/18/2010	4	33	13	13	233	246	50	12	11.2
DST-MC2		12/18/2010	4	33	13	13	233	246	50	12	11.2
DST-MC2		3/15/2011	4	27	48	23	475	523	83	32	14.5
DST-MC2		3/15/2011	4	27	48	23	475	523	83	32	14.5
DST-MC2		4/1/2011	2	25	6	14	202	208	48	12.67	9.95
DST-MC2		4/1/2011	2	25	6	14	202	208	48	12.67	9.95
DST-MC2		5/5/2011	1	72	6	61	446	452	152	34	18
DST-MC2		5/5/2011	1	72	6	61	446	452	152	34	18
DST-MC2		6/6/2011	4	30	8	17	192	200	50	13	10.3
DST-MC2		6/6/2011	4	30	8	17	192	200	50	13	10.3
DST-MC2		6/29/2011	3	33	2	22	309	311	56	11.2	6.5
DST-MC2		6/29/2011	3	33	2	22	309	311	56	11.2	6.5
DST-MC3		12/14/2010	10	52	29	34	872	901	154	60	27.25
DST-MC3		12/14/2010	10	52	29	34	872	901	154	60	27.25
DST-MC3		12/18/2010	4	44	42	27	383	425	76	21	12.45
DST-MC3		12/18/2010	4	44	42	27	383	425	76	21	12.45
DST-MC3		3/15/2011	6	33	48	26	377	425	100	25.61	12.4
DST-MC3		3/15/2011	6	33	48	26	377	425	100	25.61	12.4
DST-MC3		4/1/2011	2	27	3	18	220	223	58	12.67	9.5
DST-MC3		4/1/2011	2	27	3	18	220	223	58	12.67	9.5
DST-MC3		5/5/2011	2	35	5	28	218	223	68	14	10.25
DST-MC3		5/5/2011	2	35	5	28	218	223	68	14	10.25
DST-MC3		6/6/2011	5	35	7	24	302	309	73	13.5	14.6
DST-MC3		6/6/2011	5	35	7	24	302	309	73	13.5	14.6
DST-MC3		6/29/2011	2	40	3	31	337	340	68	8.4	7.75
DST-MC3		6/29/2011	2	40	3	31	337	340	68	8.4	7.75
DST-MC4		12/14/2010	5	48	133	31	651	784	127	35.19	22.2
DST-MC4		12/14/2010	5	48	133	31	651	784	127	35.19	22.2
DST-MC4		12/18/2010	3	31	83	20	394	477	64	14	8.75
DST-MC4		12/18/2010	3	31	83	20	394	477	64	14	8.75
DST-MC4		3/15/2011	3	23	102	16	296	398	64	24	10.1
DST-MC4		3/15/2011	3	23	102	16	296	398	64	24	10.1
DST-MC4		4/1/2011	1	18	37	9	241	278	47	11	6.25
DST-MC4		4/1/2011	1	18	37	9	241	278	47	11	6.25
DST-MC4		5/5/2011	1	17	16	4	333	349	52	16	5.5
DST-MC4		5/5/2011	1	17	16	4	333	349	52	16	5.5
DST-MC4		6/6/2011	4	23	61	11	329	390	59	14.5	10.1
DST-MC4		6/6/2011	4	23	61	11	329	390	59	14.5	10.1
DST-MC4		6/29/2011	1	18	80	12	391	471	50	8.4	1.85
DST-MC4		6/29/2011	1	18	80	12	391	471	50	8.4	1.85
DST-MC5		12/14/2010	4	41	99	21	515	614	114	37.5	23.5
DST-MC5		12/14/2010	4	41	99	21	515	614	114	37.5	23.5
DST-MC5		12/18/2010	3	43	196	32	503	699	96	22	12.5
DST-MC5		12/18/2010	3	43	196	32	503	699	96	22	12.5
DST-MC5		3/15/2011	3	28	90	20	305	395	57	17.07	9.95
DST-MC5	DUP	3/15/2011	3	27	87	20	301	388	57	17.07	9.9
DST-MC5	TRIPLICATE	3/15/2011	4	28	89	20	310	399	59	17.5	10
DST-MC5		3/15/2011	3	28	90	20	305	395	57	17.07	9.95
DST-MC5	DUP	3/15/2011	3	27	87	20	301	388	57	17.07	9.9
DST-MC5	TRIPLICATE	3/15/2011	4	28	89	20	310	399	59	17.5	10
DST-MC5		4/1/2011	1	21	15	12	174	189	35	4.5	3.1
DST-MC5		4/1/2011	1	21	15	12	174	189	35	4.5	3.1
DST-MC5		5/5/2011	3	22	5	16	149	154	35	3.5	4.1
DST-MC5		5/5/2011	3	22	5	16	149	154	35	3.5	4.1
DST-MC5		6/6/2011	3	33	9	18	245	254	48	6.5	7.5
DST-MC5		6/6/2011	3	33	9	18	245	254	48	6.5	7.5
DST-MC5		6/29/2011	2	31	7	21	243	250	48	4.4	3.1
DST-MC5		6/29/2011	2	31	7	21	243	250	48	4.4	3.1
DST-MC6		12/14/2010	6	31	246	10	645	891	104	33.85	25.25
DST-MC6		12/14/2010	6	31	246	10	645	891	104	33.85	25.25

StationName	Sample Type	Sample Collection Date	Ammonia as N µg/L	Dissolved Phosphorus µg/L	Nitrate and Nitrite as N µg/L	Ortho-phosphate µg/L	Total Kjeldahl Nitrogen (TKN) µg/L	Total Nitrogen as N µg/L	Total Phosphorus µg/L	Total Suspended Solids mg/L	Turbidity NTU
DST-MC6		12/18/2010	5	30	268	15	426	694	59	12	10.75
DST-MC6		12/18/2010	5	30	268	15	426	694	59	12	10.75
DST-MC6		3/15/2011	3	13	126	8	281	407	42	14.63	7.5
DST-MC6		3/15/2011	3	13	126	8	281	407	42	14.63	7.5
DST-MC6		4/1/2011	6	14	16	5	188	204	34	5.2	3.5
DST-MC6		4/1/2011	6	14	16	5	188	204	34	5.2	3.5
DST-MC6		5/5/2011	4	25	4	9	403	407	40	2.5	3.25
DST-MC6		5/5/2011	4	25	4	9	403	407	40	2.5	3.25
DST-MC6		6/6/2011	3	31	7	19	445	452	76	16.5	9.95
DST-MC6		6/6/2011	3	31	7	19	445	452	76	16.5	9.95
DST-MC6		6/29/2011	2	30	2	21	717	719	93	11.6	6.5
DST-MC6		6/29/2011	2	30	2	21	717	719	93	11.6	6.5
Water Year 2012											
DST-MC1		1/21/2012	6	153	435	121	1152	1587	244	30.56	13.45
DST-MC1		3/14/2012	2	39	18	27	574	592	66	15.33	5.75
DST-MC1		3/16/2012		33						24	15.4
DST-MC1		3/21/2012	5	33	25	14	486	511	49	6	4.75
DST-MC1		4/20/2012	5	32	7	11	222	229	44	5.6	3.5
DST-MC1		4/23/2012		33						8	5.25
DST-MC1		4/26/2012	3	36	25	14	451	476	57	16.4	7.6
DST-MC2		1/21/2012	4	65	183	45	443	626	101	13.33	10.5
DST-MC2		3/14/2012	1	34	2	22	572	574	57	3.6	2.1
DST-MC2		3/16/2012	2	37	14	16	658	672	60	10.89	5.15
DST-MC2		3/21/2012	2	30	4	12	215	219	44	5.5	2.25
DST-MC2		4/20/2012	6	45	3	13	237	240	55	7.2	4.25
DST-MC2		4/23/2012	4	28	3	12	475	478	45	8.5	5.15
DST-MC2		4/26/2012	3	37	6	16	753	759	82	46.5	9.95
DST-MC3		1/21/2012	3	200	302	181	968	1270	255	20	10.45
DST-MC3		3/14/2012	2	28	2	20	602	604	55	6.67	2.75
DST-MC3		3/16/2012	3	36	41	22	558	599	78	16	8.05
DST-MC3		3/21/2012	5	32	4	16	432	436	47	4	2.05
DST-MC3		4/20/2012	4	62	1	17	211	212	77	4.4	1.75
DST-MC3		4/23/2012	3	31	2	13	230	232	54	6.5	3.5
DST-MC3		4/26/2012	7	44	3	21	347	350	61	9	7.25
DST-MC4		1/21/2012	6	108	661	67	682	1343	142	16.22	10.25
DST-MC4		3/14/2012	6	37	45	26	678	723	90	28.67	8.2
DST-MC4		3/16/2012	15	18	242	7	542	784	68	17	7.65
DST-MC4		3/21/2012	6	24	78	11	283	361	41	8.5	3.55
DST-MC4		4/20/2012	5	31	109	6	286	395	47	7.2	3.75
DST-MC4		4/23/2012	5	23	100	8	765	865	98	38.5	10.1
DST-MC4		4/26/2012	4	100	102	62	402	504	143	18	7.8
DST-MC5		1/21/2012	6	167	361	138	1189	1550	214	19.44	10.65
DST-MC5		3/14/2012	2	58	5	49	633	638	89	14	5.5
DST-MC5		3/16/2012	2	43	86	31	660	746	103	29.41	9.9
DST-MC5	DUP	3/16/2012	1	43	85	31	654	739	102	29	9.95
DST-MC5	TRIPLICATE	3/16/2012	1	45	85	30	658	743	101	29	9.95
DST-MC5		3/21/2012	8	34	37	21	342	379	58	7.66	5.15
DST-MC5		4/20/2012	6	37	20	16	193	213	53	6.4	3.25
DST-MC5		4/23/2012	5	27	53	12	257	310	77	10.5	6.1
DST-MC5		4/26/2012	4	603	48	222	535	583	665	24.5	8.5
DST-MC6		1/21/2012	179	112	419	78	1845	2264	122	8.33	2.25
DST-MC6		3/14/2012	3	54	58	25	490	548	68	7.2	2.5
DST-MC6		3/16/2012	3	40	197	14	544	741	78	14	8
DST-MC6		3/21/2012	5	27	36	11	588	624	42	6.5	4.3
DST-MC6		4/20/2012	5	32	3	9	507	510	52	4	1.8
DST-MC6		4/23/2012	3	25	4	8	669	673	45	8	2.5
DST-MC6		4/26/2012	5	38	4	9	600	604	50	4.95	2.35

Appendix D

Statistical Results

EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-MC3
Snow melt	2010-11	
Rain	2011-12	



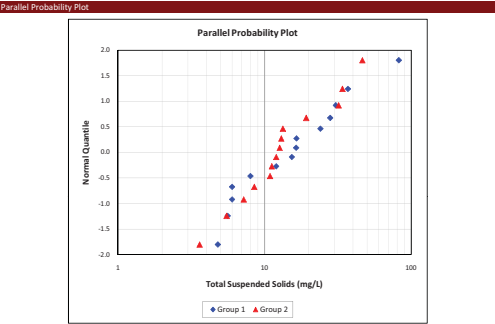
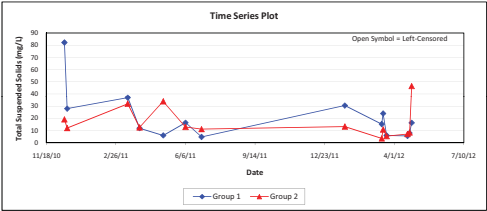
t Test (Independent)		Data	LogData	RKData
Mean (robust ROS)				
Group 1	15.4505942	1.7325054	11.2812500	
Group 2	18.2712355	2.57575054	17.954545	
Delta	0.0000000	0.0000000	0.0000000	
Std (robust ROS)				
Group 1	20.9115688	0.6670952	4.4851856	
Group 2	26.4795006	1.0144206	8.33203021	
degrees of freedom	10.1139204	15.8924609	17.9208493	
Effect Size (d)	165.7307265	0.8432457	6.6722945	
t Statistic	-2.0693366	-2.4026127	-2.230366	
1-Critical	-1.8214610	-1.7335033	-1.7335033	
p-value (2-sided)	0.0683716	0.0296717	0.04002962	
Power	0.4010123	0.74272954	0.08866010	
Descript Analysis				
Beta	0.2	NA	NA	
Additional N (each Group)	2	NA	NA	

Summary Statistics									
	Total Suspended Solids	n	% dext	min	max	mean	median	STDDEV	CV
Group 1	DSC-MC2	16	75%	0.001	0.073	0.016	0.006	0.024	1.550
Group 2	DSC-MC3	11	91%	0.0010	0.810	0.181	0.039	0.265	1.461

Group 1				Statistical Comparison
EventType	Year	Site	Group 2 vs Group 1	
Mix Rain/Snow	2009-10	DST-MC1	Analysis	
Snow melt	2010-11		Total Suspended Solids	
Rain	2011-12		SW Standard	
				None
				GW Standard
				None
				Standard Type
				None
				Alpha
				0.05
				Mean % Difference (robust ROS)
				21.47864446

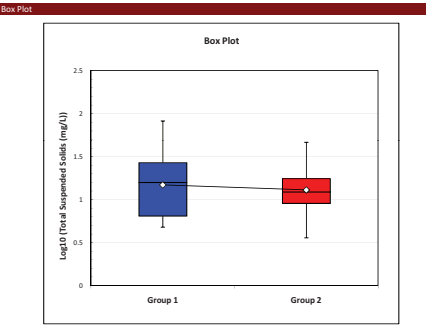
Group 2			
EventType	Year	Site	
Mix Rain/Snow	2009-10	DST-MC2	
Snow melt	2010-11		
Rain	2011-12		

Time Series - Mann-Kendall (MK) Trend Analyses			
		Group 1	Group 2
Count (n)		14	14
Count (nondetects)		0	0
SW Standard		5	-32
VarS		333	334
Trend		Decreasing	Decreasing
p-value		0.04459929	0.09444374



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests			
		Group 1	Group 2
p-value (SW)		0.51413730	0.75090213
p-value (L)		0.66662552	0.14297991

Note: Values should be greater than alpha (0.



t Test (Independent)	Data	LogData	RkData
Mean (robust ROS)			
Group 1	20.88785714	1.17012003	15.10714286
Group 2	16.40142857	1.112746786	13.89285714
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	20.43510184	0.36605357	8.74242115
Group 2	12.4297929	0.306923287	7.95220959
degrees of freedom	21.46119860	25.23270300	25.77008560
Effect Size (d)	-4.48642857	-0.05737324	-1.21428571
t Statistic	0.70182936	0.44938474	0.38444755
t Critical	1.72074287	1.70814075	1.70814075
p-value (2-sided)	0.49087309	0.65718626	0.70403221
Power	0.15991985	0.10987322	0.09879121
Power Analysis			
Beta	0.2	0.2	0.2
Additional n (each Group)	71	190	264

Summary Statistics								
		Total Suspended Solids	n	% dect	min	max	mean	median
Group 1	DST-MC1	14	100%	0.005	0.0822	0.021	0.016	0.020
Group 2	DST-MC2	14	100%	0.0036	0.047	0.016	0.012	0.012

CV

0.978

0.758

EventType	Year	Site
Mix Rain/Snow	2009-10	DST-MC4
Snow melt	2010-11	
Rain	2011-12	

Time Series Plot

Open Symbol = Left-Censored

Total Suspended Solids (mg/L)

Date

Group 1 (Blue line with diamond markers)

Group 2 (Red line with triangle markers)

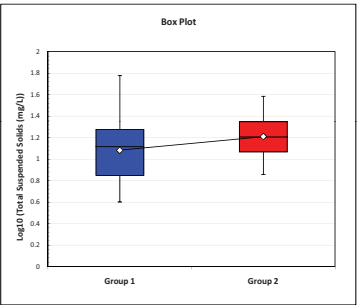
Date	Group 1 (mg/L)	Group 2 (mg/L)
1/18/10	60	45
2/18/10	45	40
3/18/10	45	40
4/18/10	45	40
5/18/10	45	40
6/18/10	45	40
7/18/10	45	40
8/18/10	45	40
9/18/10	45	40
10/18/10	45	40
11/18/10	45	40
12/18/10	45	40
1/18/11	45	40
2/18/11	45	40
3/18/11	45	40
4/18/11	45	40
5/18/11	45	40
6/18/11	45	40
7/18/11	45	40
8/18/11	45	40
9/18/11	45	40
10/18/11	45	40
11/18/11	45	40
12/18/11	45	40
1/18/12	45	40
2/18/12	45	40
3/18/12	45	40
4/18/12	45	40
5/18/12	45	40
6/18/12	45	40
7/10/12	45	40

Parallel Probability Plot

Normal Quantile

Total Suspended Solids (mg/L)

Group 1 (blue diamonds) Group 2 (red triangles)

Box Plot

t-Test (Independent)			
	Data	LogData	RkData
Mean (robust ROS)			
Group 1	15.83928571	0.00244587	13.39287514
Group 2	18.37	1.29124362	16.60741286
Delta	2.53071429	1.28879775	0.00000000
Std (robust ROS)			
Group 1	14.28541034	0.18182212	8.80379851
Group 2	9.79853212	0.26441777	7.94531528
degrees of freedom	2.031054566	23.4538101	2.14389866
Effect size	2.53071429	0.12676303	-4.21438371
t-Statistic	-0.44662003	-0.12320798	-1.37843001
t-Critical	-1.17387512	-1.17387512	-1.70840475
p-value	0.55804142	0.23766456	0.20785851
Power	0.17273548	0.03106829	0.37218263
Power Analysis			
Additional n (each Group)	0.8	0.2	0.6

Summary Statistics									
	Total Suspended Solids	n	% dext	min	max	mean	median	STDEV	CV
Group 1	DST-MC3	14	100%	0.004	0.06	0.016	0.013	0.014	0.902
Group 2	DST-MC4	14	100%	0.0072	0.039	0.018	0.016	0.010	0.533

EventType	Year	Site
Mix Rain/Snow	2009-10	DST-MC6
Snow melt	2010-11	
Rain	2011-12	

Time Series Plot

Open Symbol = Left-Censored

Total Suspended Solids (mg/L)

Date

Group 1 (Blue line with diamond markers)

Group 2 (Red line with triangle markers)

Date	Group 1 (mg/L)	Group 2 (mg/L)
11/18/10	38	10
12/15/10	25	10
2/06/11	20	10
3/06/11	10	5
4/06/11	5	15
5/06/11	10	12
6/06/11	10	10
7/06/11	10	10
8/06/11	10	10
9/06/11	10	10
10/06/11	10	10
11/06/11	10	10
12/06/11	10	10
1/06/12	10	10
2/06/12	10	10
3/06/12	10	10
4/06/12	10	10
5/06/12	10	10
6/06/12	10	10
7/06/12	10	10
8/06/12	10	10
9/06/12	10	10
10/06/12	10	10
11/06/12	10	10
12/06/12	10	10
1/06/13	10	10
2/06/13	10	10
3/06/13	10	10
4/06/13	10	10
5/06/13	10	10
6/06/13	10	10
7/06/13	10	10
8/06/13	10	10
9/06/13	10	10
10/06/13	10	10
11/06/13	10	10
12/06/13	10	10
1/06/14	10	10
2/06/14	10	10
3/06/14	10	10
4/06/14	10	10
5/06/14	10	10
6/06/14	10	10
7/06/14	10	10
8/06/14	10	10
9/06/14	10	10
10/06/14	10	10
11/06/14	10	10
12/06/14	10	10
1/06/15	10	10
2/06/15	10	10
3/06/15	10	10
4/06/15	10	10
5/06/15	10	10
6/06/15	10	10
7/06/15	10	10
8/06/15	10	10
9/06/15	10	10
10/06/15	10	10
11/06/15	10	10
12/06/15	10	10
1/06/16	10	10
2/06/16	10	10
3/06/16	10	10
4/06/16	10	10
5/06/16	10	10
6/06/16	10	10
7/06/16	10	10
8/06/16	10	10
9/06/16	10	10
10/06/16	10	10
11/06/16	10	10
12/06/16	10	10
1/06/17	10	10
2/06/17	10	10
3/06/17	10	10
4/06/17	10	10
5/06/17	10	10
6/06/17	10	10
7/06/17	10	10
8/06/17	10	10
9/06/17	10	10
10/06/17	10	10
11/06/17	10	10
12/06/17	10	10
1/06/18	10	10
2/06/18	10	10
3/06/18	10	10
4/06/18	10	10
5/06/18	10	10
6/06/18	10	10
7/06/18	10	10
8/06/18	10	10
9/06/18	10	10
10/06/18	10	10
11/06/18	10	10
12/06/18	10	10
1/06/19	10	10
2/06/19	10	10
3/06/19	10	10
4/06/19	10	10
5/06/19	10	10
6/06/19	10	10
7/06/19	10	10
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11/06/19	10	10
12/06/19	10	10
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2/06/20	10	10
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4/06/20	10	10
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6/06/20	10	10
7/06/20	10	10
8/06/20	10	10
9/06/20	10	10
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2/06/21	10	10
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8/06/21	10	10
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11/06/21	10	10
12/06/21	10	10
1/06/22	10	10
2/06/22	10	10
3/06/22	10	10
4/06/22	10	10
5/06/22	10	10
6/06/22	10	10
7/06/22	10	10
8/06/22	10	10
9/06/22	10	10
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11/06/22	10	10
12/06/22	10	10
1/06/23	10	10
2/06/23	10	10
3/06/23	10	10
4/06/23	10	10
5/06/23	10	10
6/06/23	10	10
7/06/23	10	10
8/06/23	10	10
9/06/23	10	10
10/06/23	10	10
11/06/23	10	10
12/06/23	10	10
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2/06/24	10	10
3/06/24	10	10
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12/06/24	10	10
1/06/25	10	10
2/06/25	10	10
3/06/25	10	10
4/06/25	10	10
5/06/25	10	10
6/06/25	10	10
7/06/25	10	10
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9/06/25	10	10
10/06/25	10	10
11/06/25	10	10
12/06/25	10	10
1/06/26	10	10
2/06/26	10	10
3/06/26	10	10
4/06/26	10	10
5/06/26	10	10
6/06/26	10	10
7/06/26	10	10
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11/06/26	10	10
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6/06/27	10	10
7/06/27	10	10
8/06/27	10	10
9/06/27	10	10
10/06/27	10	10
11/06/27	10	10
12/06/27	10	10
1/06/28	10	10
2/06/28	10	10
3/06/28	10	10
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5/06/28	10	10
6/06/28	10	10
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3/06/29	10	10
4/06/29	10	10
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7/06/29	10	10
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6/06/30	10	10
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5/07/02	10	10
6/07/02	10	10
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11/07/02	10	10
12/07/02	10	10
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2/07/03	10	10
3/07/03	10	10
4/07/03	10	10
5/07/03	10	10
6/07/03	10	10
7/07/03	10	10
8/07/03	10	10
9/07/03	10	10
10/07/03	10	10
11/07/03	10	10
12/07/03	10	10
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2/07/04	10	10
3/07/04	10	10
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4/07/05	10	10
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9/07/05	10	10
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2/07/06	10	10
3/07/06	10	10
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6/07/06	10	10
7/07/06	10	10
8/07/06	10	10
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3/07/08	10	10
4/07/08	10	10
5/07/08	10	10
6/07/08	10	10
7/07/08	10	10
8/07/08	10	10
9/07/08	10	10
10/07/08	10	10
11/07/08	10	1

Parallel Probability Plot

Normal Quantile

Total Suspended Solids (mg/L)

Legend: Group 1 (blue diamonds), Group 2 (red triangles)

A box plot titled "Box Plot" comparing the distribution of Log10 Total Suspended Solids (mg/L) for two groups. The y-axis is labeled "Log10 Total Suspended Solids (mg/L)" and ranges from 0 to 1.8 in increments of 0.2. The x-axis has two categories: "Group 1" and "Group 2". Group 1 is represented by a blue box with a median line at approximately 1.05 and a mean point at approximately 1.0. Group 2 is represented by a red box with a median line at approximately 0.9 and a mean point at approximately 0.95. A line connects the mean points of the two groups. Whiskers extend from the boxes to the minimum and maximum values of the data.

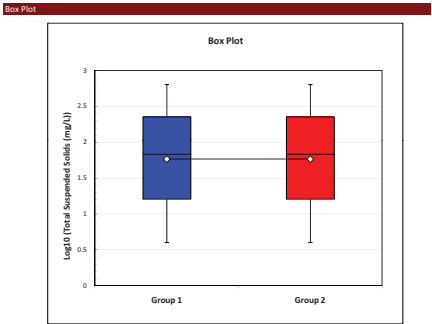
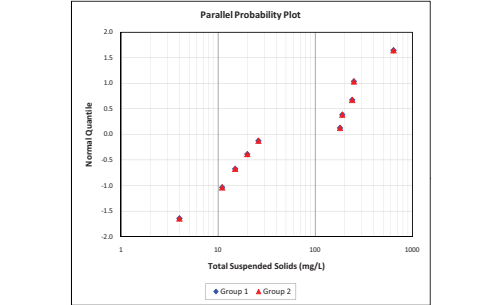
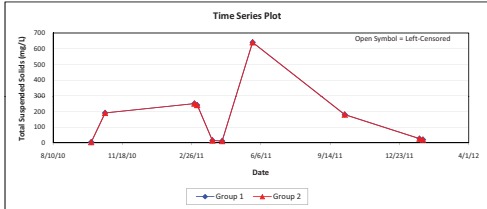
Group	Min	Q1	Median	Mean	Q3	Max
Group 1	0.55	0.85	1.05	1.0	1.35	1.65
Group 2	0.4	0.75	0.9	0.95	1.15	1.5

Note: Values should be greater than alpha (0.

t-Test (Independent)			
	Date	Log(Date)	R(Date)
Mean (robust ROS)	14.80037543	1.05757099	15.85747426
Group 1	10.66142657	0.00000000	12.14657114
Delta		0.00000000	0.00000000
Std (robust ROS)	15.45518924	0.33621539	9.04779738
Group 2	7.25692631	0.20035656	7.39133771
degrees of freedom	12.44213152	25.45901125	25.00479449
Effect size (d)	-4.16214286	-0.12136216	0.00000000
t-Statistic	1.74487718	1.02243413	0.86026842
t-Critical	1.71048807	1.70814075	1.70844075
p-value (2-tailed)	0.05206437	0.31636959	0.39303213
Power	0.5884422	0.24960405	0.20147886
Power Analysis			
Additional n (each Group)	0.2	0.2	0.2
	0.8	0.7	0.42

Summary Statistics									
	Total Suspended Solids	n	% dext	min	max	mean	median	STDDEV	CV
Group 1	DST-MC5	14	100%	0.004	0.0375	0.015	0.012	0.011	0.712
Group 2	DST-MC6	14	100%	0.0025	0.034	0.011	0.008	0.008	0.743

EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-MC1
Snow melt	2010-11	
Rain	2011-12	



T-Test (Independent)			
	Data	LogData	RKData
Mean (robust ROS)			
Group 1	157.600000000	1.76539046	10.50000000
Group 2	157.6	1.765390461	10.5
Delta	0.000000000	0.000000000	0.000000000
Std (robust ROS)			
Group 1	197.55741781	0.73997743	6.05530071
Group 2	197.5574178	0.73997743	6.055300708
degrees of freedom	18.000000000	18.000000000	18.000000000
Effect Size (d)	0.000000000	0.000000000	0.000000000
Statistic	0.000000000	0.000000000	0.000000000
Test Critical	1.73406359	1.73406359	1.73406359
p-value (2-sided)	1.000000000	1.000000000	1.000000000
Power	0.050000000	0.050000000	0.050000000
Power Analysis			
Beta	0.2	0.2	0.2
Additional N (each Group)	>300	>300	>300

Summary Statistics									
	Total Suspended Solids	n	% dext	min	max	mean	median	STDEV	CV
Group 1	DSC-MC1	10	100%	0.004	0.64	0.158	0.103	0.198	1.254
Group 2	DSC-MC1	10	100%	0.0040	0.640	0.158	0.103	0.198	1.254

EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-TT1
Snow melt	2010-11	
Rain	2011-12	

Time Series Plot

Y-axis: Total Suspended Solids (mg/L) (0 to 2500)

X-axis: Date (10/14/09 to 7/30/12)

Legend: Group 1 (Left-Censored, Open Symbol), Group 2 (Right-Censored, Filled Symbol)

Annotations: Open Symbol = Left-Censored

Date	Group 1 (mg/L)	Group 2 (mg/L)
10/14/09	0	0
1/22/10	0	1900
5/2/10	0	1000
8/10/10	0	1000
11/18/10	0	1800
3/26/11	0	1500
6/6/11	0	1500
9/14/11	0	1000
12/23/11	0	1900
4/3/12	0	1500
7/30/12	0	0

Parallel Probability Plot

Normal Quantile

Total Suspended Solids (mg/L)

◆ Group 1 ▲ Group 2

Box Plot

Log₁₀ Total Suspended Solids (mg/L) x 10

Group 1 Group 2

Group	Min	Q1	Median	Q3	Max
Group 1	1.0	2.0	2.4	3.0	3.6
Group 2	2.5	3.7	3.8	4.1	4.6

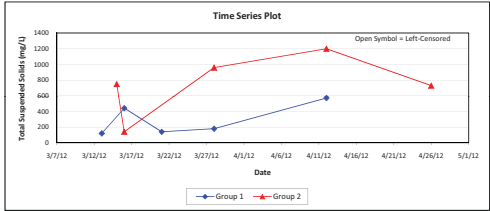
t-Test (Independent)	Data	LogData	RkData
Mean (robot ROS)			
Group 1	74.14912281	2.443747006	10.68421053
Group 2	567.0476119	8.878765138	29.38869218
Delta	0.00000000	0.00000000	0.00000000
Sd (robot ROS)			
Group 1	93.71586448	0.74936372	6.23437110
Group 2	567.9133726	0.402808919	7.55289425
degrees of freedom	21.00067127	36.98818478	37.70505139
Effect Size	892.8984962	1.424569152	18.69918511
t-Statistic	-7.08691899	-7.36801418	-7.48566344
t-Critical	-1.72074287	-1.70651790	-1.68709360
p-value (2-sided)	0.00000000	0.00000000	0.00000000
Power	0.99978656	0.99997022	0.99999978
Power Analysis			
Beta	NA	NA	NA
Additional n (each Group)	NA	NA	NA

Summary Statistics									
	Total Suspended Solids	n	% dext	min	max	mean	median	STDDEV	CV
Group 1	DSC-TC1	19	100%	0.001	0.36	0.074	0.038	0.094	1.264
Group 2	DSC-TT1	21	100%	0.0330	2.200	0.967	1.000	0.568	0.587

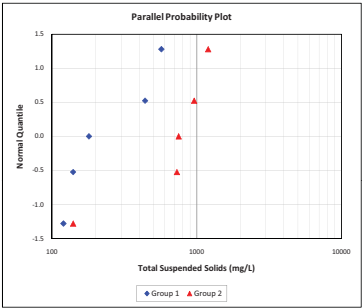
Group 1			Statistical Comparison
EventType	Year	Site	Group 2 vs Group 1
Mix Rain/Snow	2009-10	DSC-TC2	Analysis
Snow melt	2010-11		Total Suspended Solids
Rain	2011-12		SW Standard
			VarS
			GW Standard
			None
			Standard Type
			None
			Alpha
			0.05
			Mean % Difference (robust ROS)
			-160.6896552

Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-DC1
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
	Group 1	Group 2
Count (n)	5	5
Count (nondetects)	0	0
VarS	17	17
Trend	Increasing	Increasing
p-value	0.11033568	0.40324797

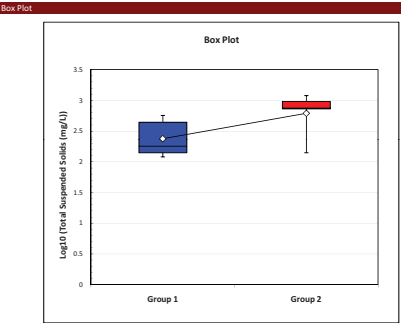


Parallel Probability Plot



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
	Group 1	Group 2
p-value (SW)	0.28413637	0.04183795
p-value (L)	0.47338234	0.90448051

Note: Values should be greater than alpha (0.



Test (Independent)	Data	LogData	RkData
Mean (robust ROS)			
Group 1	290.00000000	2.37598186	3.70000000
Group 2	756	2.789192928	7.3
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	202.71134913	0.30469389	1.98740609
Group 2	393.3573439	0.37005862	2.906888371
degrees of freedom	5.98494214	7.71573572	7.06901902
Effect Size (d)	466.00000000	0.41321106	3.60000000
t-Statistic	-2.35467681	-1.92752127	-2.86000219
t Critical	-2.01504837	-1.89457860	-1.89457860
p-value (2-sided)	0.07811537	0.10219482	0.06278466
Power	0.37396888	0.48731998	0.35356300
Power Analysis			
Beta	0.2	0.2	0.2
Additional n (each Group)	1	2	1

Summary Statistics									
	Total Suspended Solids	n	% dect	min	max	mean	median	STDEV	CV
Group 1	DSC-TC2	5	100%	0.120	0.57	0.290	0.180	0.203	0.699
Group 2	DSC-DC1	5	100%	0.1400	1.200	0.756	0.750	0.393	0.520

EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-TT3
Snow melt	2010-11	
Rain	2011-12	

Time Series Plot

Open Symbol = Left-Censored

Total Suspended Solids (mg/L)

Date

Legend: Group 1 (Blue Diamond), Group 2 (Red Diamond)

Date	Group 1 (mg/L)	Group 2 (mg/L)
2/12/12	~100	-
3/12/12	~1300	~350
4/12/12	~1400	~1550
4/21/12	~350	~350
5/11/12	-	~350
5/31/12	-	~250
6/20/12	-	~150
7/10/12	-	~100
7/30/12	-	~50
8/28/12	-	~50
9/8/12	-	-

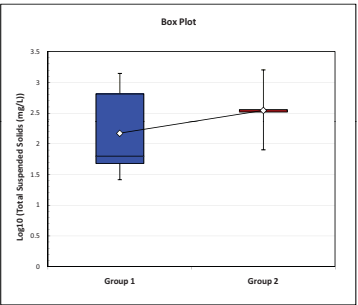
Parallel Probability Plot

Normal Quantile

Total Suspended Solids (mg/L)

Group 1 (Blue Diamond) Group 2 (Red Triangle)

Group	Total Suspended Solids (mg/L)	Normal Quantile
Group 1	~25	~-1.3
Group 1	~45	~-0.5
Group 1	~65	~0.0
Group 1	~1000	~0.5
Group 1	~1200	~1.3
Group 2	~65	~-1.3
Group 2	~100	~-0.5
Group 2	~150	~0.0
Group 2	~250	~0.5
Group 2	~1200	~1.3

Box Plot

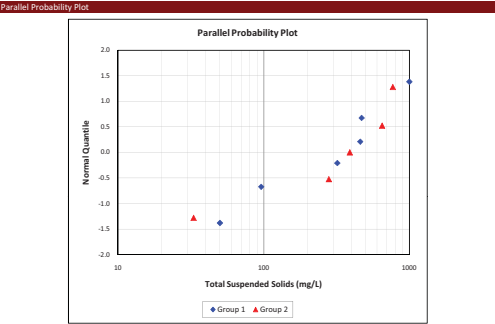
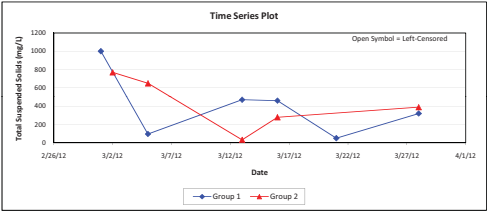
t-Test (Independent)			
	Data	LogData	RkData
Mean (robust ROS)			
Group 1	437.40000000	2.17091931	
Group 2	542	2.94274705	6.4
Delta	0.00000000		0.00000000
Std (robust ROS)			
Group 1	598.50964095	0.76034500	3.66015151
Group 2	602.428419	0.602079157	3.23017287
Degrees of freedom	7.79956259	6.58467006	7.93109767
Effect size (d)	104.60000000	0.37131616	1.80000000
t-Statistic	0.75420843	0.93352276	0.93325653
t-Critical	-1.88457860	-1.94318027	-1.94318027
p-value (2-tailed)	0.739220572	0.35920000	0.35920000
Power	0.07472358	0.17621128	0.17755414
Power Analysis			
0.2	0.2	0.2	0.2
Additional n (each Group)	19	19	19

Summary Statistics									
	Total Suspended Solids	n	% dext	min	max	mean	median	STDDEV	CV
Group 1	DSC-TT2	5	100%	0.026	1.4	0.437	0.063	0.599	1.368
Group 2	DSC-TT3	5	100%	0.0800	1.600	0.542	0.340	0.602	1.111

Group 1			Statistical Comparison
EventType	Year	Site	Group 2 vs Group 1
Mix Rain/Snow	2009-10	DSC-TT4	Analysis
Snow melt	2010-11		Total Suspended Solids
Rain	2011-12		SW Standard
			None
			GW Standard
			None
			Standard Type
			None
			Alpha
			0.05
			Mean % Difference (robust ROS)
			-6.32721202

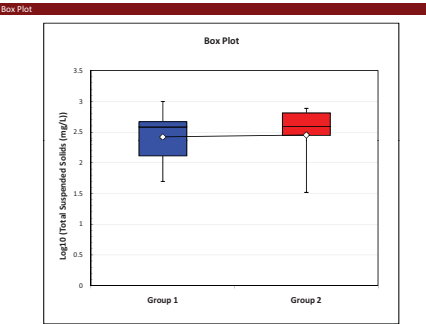
Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-TT5
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
	Group 1	Group 2
Count (n)	6	5
Count (nondetects)	0	0
SW Standard	-7	-4
VarS	28	17
Trend	Decreasing	Decreasing
p-value	0.12982818	0.23121636



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
	Group 1	Group 2
p-value (SW)	0.547129504	0.13193424
p-value (L)	1.00000000	0.93641692

Note: Values should be greater than alpha (0.



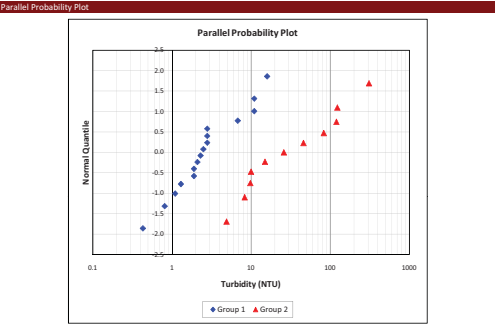
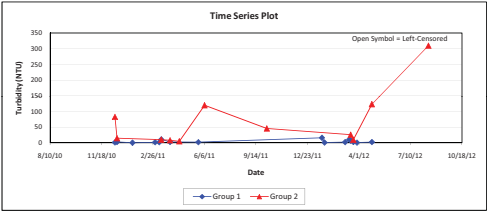
t Test (Independent)	Data	LogData	RAData
Mean (robust ROS)			
Group 1	399.33333333	2.42020782	6.00000000
Group 2	424.6	2.45128132	6
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	343.45693568	0.48530932	1.34664011
Group 2	293.9231192	0.549953702	3.674234614
degrees of freedom	8.98023983	8.13525255	8.27758054
Effect Size (d)	25.26666667	0.03102031	0.00000000
t Statistic	-0.13146426	-0.09622305	0.00000000
t Critical	-1.85954803	-1.85954803	1.85954803
p-value (2-sided)	0.89910677	0.92451047	1.00000000
Power	0.06111849	0.05810582	0.05000000
Power Analysis			
Beta	0.2	0.2	0.2
Additional n (each Group)	>300	>300	>300

Summary Statistics									
	Total Suspended Solids	n	% dect	min	max	mean	median	STDEV	CV
Group 1	DSC-TT4	6	100%	0.050	1	0.399	0.390	0.343	0.860
Group 2	DSC-TT5	5	100%	0.0330	0.770	0.425	0.390	0.294	0.692

Group 1			Statistical Comparison
EventType	Year	Site	Group 2 vs Group 1
Mix Rain/Snow	2009-10	DSC-MC2	Analysis
Snow melt	2010-11		Turbidity
Rain	2011-12		SW Standard
			None
			GW Standard
			None
			Standard Type
			None
			Alpha
			0.05
			Mean % Difference (robust ROS)
			-1528.843962

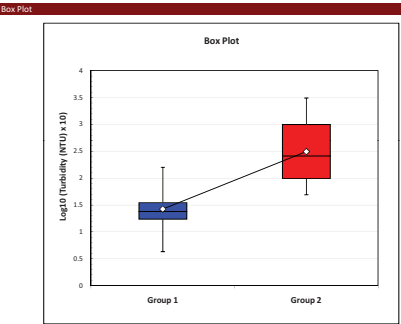
Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-MC3
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
	Group 1	Group 2
Count (n)	16	11
Count (nondetects)	0	0
SW Standard	5	13
VarS	None	488
Trend	Increasing	Increasing
p-value	0.20750749	0.17510069



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
	Group 1	Group 2
p-value (SW)	0.43958457	0.51040526
p-value (L)	0.02438909	0.65861479

Note: Values should be greater than alpha (0.



t Test (Independent)	Data	LogData	RAData
Mean (robust ROS)			
Group 1	4.22125000	1.42484826	9.37500000
Group 2	68.75757576	2.494091108	20.72727273
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	4.54289023	0.42659428	6.12506503
Group 2	91.59825579	0.590220955	4.818524859
degrees of freedom	10.03383096	17.01010845	24.44620448
Effect Size (d)	64.53632576	1.06924484	11.35227273
t Statistic	-2.33478273	-5.15377556	-5.37814941
t Critical	-1.81246110	-1.73960672	-1.71088207
p-value (2-sided)	0.04439803	0.00009610	0.0001835
Power	0.69358988	0.99834757	0.99939213
Power Analysis			
Beta	NA	NA	NA
Additional n (each Group)	NA	NA	NA

Summary Statistics								
	Turbidity	n	% dect	min	max	mean	median	STDEV
Group 1	DSC-MC2	16	100%	0.000	0.016	0.004	0.002	0.005
Group 2	DSC-MC3	11	100%	0.0049	0.310	0.069	0.026	0.092

CV

1.076

1.332

EventType	Year	Site
Mix Rain/Snow	2009-10	DST-MC2
Snow melt	2010-11	
Rain	2011-12	

Time Series Plot

Open Symbol = Left-Censored

Turdian (mg)

Date

Group 1 Group 2

Parallel Probability Plot

Normal Quantile

Turbidity (NTU)

Group 1 (blue diamonds) Group 2 (red triangles)

Box Plot

Log₁₀ (Turbidity (NTU))

Group 1

Group 2

Group	Min	Q1	Median	Q3	Max	Outlier
Group 1	0.5	0.75	0.9	1.15	1.55	None
Group 2	0.35	0.7	0.85	1.0	1.25	None

t-Test (Independent)	Data	LogData	RkData
Mean (robust ROS)	11.15000000	0.94200622	15.50000000
Group 2	8.642857143	0.89000777	12.5
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	9.03467679	0.30465040	7.89576130
Group 2	4.612018461	0.28456885	7.89595807
degrees of freedom	19.34444412	25.88004130	23.75648697
Effect size	-2.50714286	-0.07842622	0.00000000
t statistic	0.2479110	0.07778059	0.63666772
t Critical	1.7291379	1.7081405	1.7081405
p-value (2-tailed)	0.38740741	0.48507878	0.53036782
Power	0.21557473	0.16336054	0.14709594
Power Analysis			
0.2	0.2	0.2	0.2
Additional n (each Group)	66	69	88

Summary Statistics									
	Turbidity	n	% dect	min	max	mean	median	STDDEV	CV
Group 1	DST-MC1	14	100%	0.003	0.0372	0.011	0.007	0.009	0.810
Group 2	DST-MC2	14	100%	0.0021	0.018	0.009	0.010	0.005	0.534

Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DST-MC4
Snow melt	2010-11	
Rain	2011-12	

Time Series Plot

Open Symbol - Left-Censored

Turbidity (NTU)

Date

Group 1 (Blue line with diamond markers)

Group 2 (Red line with triangle markers)

Date	Group 1 (NTU)	Group 2 (NTU)
1/30/10	10	28
2/28/11	10	10
6/9/11	12	1
8/4/11	8	5
12/28/11	10	10
4/12/12	4	8
7/10/12	2	10

A Parallel Probability Plot for Turbidity (NTU). The x-axis is labeled 'Turbidity (NTU)' on a logarithmic scale with major ticks at 1, 10, and 100. The y-axis is labeled 'NormalQuantile' on a linear scale from -2.0 to 2.0 with increments of 0.5. The plot compares two groups: Group 1 (blue diamonds) and Group 2 (red triangles). The data points for both groups follow a very similar upward trend, indicating that the distributions are not significantly different. The points are closely clustered around a diagonal line that would represent the null hypothesis of no difference between the groups.

A box plot titled "Box Plot" comparing the distribution of $\text{Log}_{10}(\text{TurnSales})$ for two groups, Group 1 and Group 2. The y-axis is labeled $\text{Log}_{10}(\text{TurnSales})$ (NTUS) and ranges from 0 to 1.6 with increments of 0.2. Group 1 is represented by a blue box with a median around 0.85 and a mean (indicated by a red dot) around 0.88. Group 2 is represented by a red box with a median around 0.85 and a mean (indicated by a red dot) around 0.88. A horizontal line connects the two mean points. Whiskers extend from the boxes to the minimum and maximum values of the data.

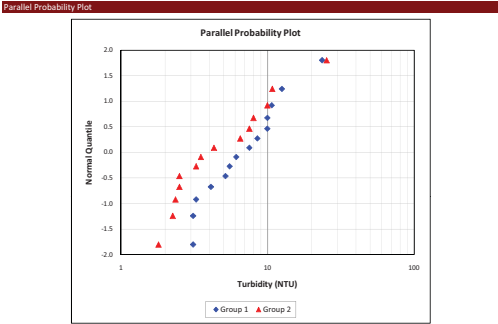
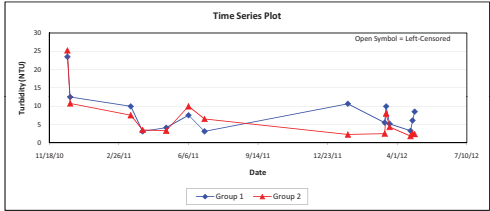
	T (Test Independent)		LogData		RkData	
Mean (robust ROS)						
Group 1	9.28571429		0.85639103		15.25000000	
Group 2	8.28958714		0.85209254		13.75	
Delta	0.00000000		0.00000000			
Std (robust ROS)						
Group 1	6.60478677		0.34597975		9.51264841	
Group 2	6.46989111		0.36989889		6.97845167	
degrees of freedom	23.8464139		24.13842172		23.8442105	
Effect Size d	-0.9964267		-0.0043607		-1.5000000	
t	0.8551292		0.03711495		0.47818451	
t Critical	1.7138752		3.71088207		3.7138752	
p (one-sided)	0.65324525		0.95687738		0.95687738	
Power (2-sided)	0.1104331		0.05355688		0.11409202	
Power Analysis						
alpha	0.2		0.1		0.1	
Additional (each Group)	184		>300		168	

Summary Statistics									
	Turbidity	n	% dect	min	max	mean	median	STDDEV	CV
Group 1	DST-MC3	14	100%	0.002	0.0273	0.009	0.009	0.007	0.711
Group 2	DST-MC4	14	100%	0.0019	0.022	0.008	0.008	0.005	0.584

Group 1			Statistical Comparison	
EventType	Year	Site	Group 2 vs Group 1	
Mix Rain/Snow	2009-10	DST-MC5	Analysis	
Snow melt	2010-11		Turbidity	
Rain	2011-12		SW Standard	
			VarS	
			GW Standard	
			None	
			Standard Type	
			None	
			Alpha	
			0.05	
			Mean % Difference (robust ROS)	
			19.88183161	

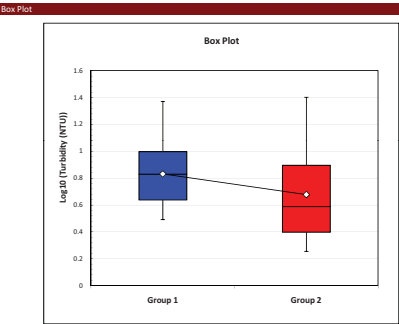
Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DST-MC6
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
	Group 1	Group 2
Count (n)	14	14
Count (nondetects)	0	0
SW Standard	-20	-50
VarS	333	333
Trend	Decreasing	Decreasing
p-value	0.14877189	0.00360994



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
	Group 1	Group 2
p-value (SW)	0.55350300	0.26974712
p-value (L)	1.00000000	0.49469470

Note: Values should be greater than alpha (0.



t Test (Independent)	Data	LogData	RAData
Mean (robust ROS)			
Group 1	8.05952381	0.83140115	16.60714286
Group 2	6.457142857	0.677598593	12.30285714
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	5.40148252	0.25908825	7.02243266
Group 2	6.19260903	0.333153068	9.025985076
degrees of freedom	25.52893984	24.51334638	24.51799896
Effect Size (d)	-1.60238095	-0.15380256	-4.21428571
t Statistic	0.72962442	1.36355937	1.37883532
t Critical	1.70814075	1.71088207	1.71088207
p-value (2-sided)	0.47268142	0.18590488	0.18120891
Power	0.16859689	0.36568814	0.37136823
Power Analysis			
Beta	0.2	0.2	0.2
Additional n (each Group)	64	10	9

Summary Statistics								
	Turbidity	n	% dect	min	max	mean	median	STDEV
Group 1	DST-MC5	14	100%	0.003	0.0235	0.008	0.007	0.005
Group 2	DST-MC6	14	100%	0.0018	0.025	0.006	0.004	0.006

CV

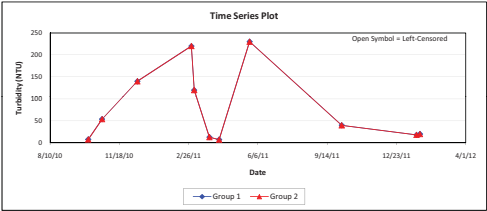
0.670

0.959

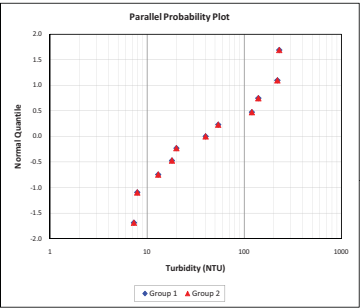
Group 1			Statistical Comparison
EventType	Year	Site	Group 2 vs Group 1
Mix Rain/Snow	2009-10	DSC-MC1	Analysis
Snow melt	2010-11		Turbidity
Rain	2011-12		SW Standard
			5
			VarS
			165
			GW Standard
			None
			Standard Type
			None
			Alpha
			0.05
			Mean % Difference (robust ROS)
			0

Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-MC1
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
	Group 1	Group 2
Count (n)	11	11
Count (nondetects)	0	0
SW Standard	-3	-3
VarS	165	165
Trend	Decreasing	Decreasing
p-value	0.43813483	0.43813483



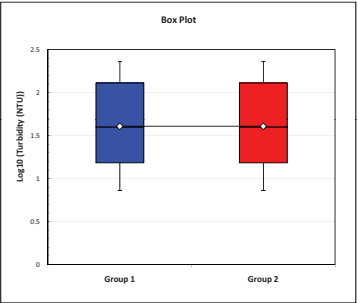
Parallel Probability Plot



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
	Group 1	Group 2
p-value (SW)	0.27966315	0.27966315
p-value (L)	0.65647634	0.65647634

Note: Values should be greater than alpha (0.

Box Plot



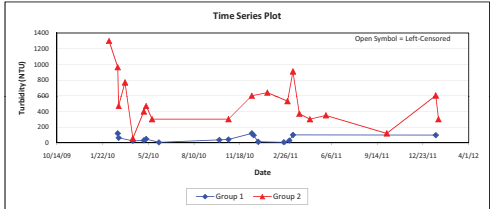
Test (Independent)	Data	LogData	RAData
Mean (robust ROS)			
Group 1	79.10909091	1.60864630	11.50000000
Group 2	79.10909091	1.60864630	11.5
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	84.84336691	0.56182678	6.63324958
Group 2	84.84336691	0.56182678	6.63324958
degrees of freedom	20.00000000	20.00000000	20.00000000
Effect Size (d)	0.00000000	0.00000000	0.00000000
t-Statistic	0.00000000	0.00000000	0.00000000
t Critical	1.72471822	1.72471822	1.72471822
p-value (2-sided)	1.00000000	1.00000000	1.00000000
Power	0.05000000	0.05000000	0.05000000
Power Analysis			
Beta	0.2	0.2	0.2
Additional n (each Group)	>300	>300	>300

Summary Statistics								
	Turbidity	n	% dect	min	max	mean	median	STDEV
Group 1	DSC-MC1	11	100%	0.007	0.23	0.079	0.040	0.085
Group 2	DSC-MC1	11	100%	0.0073	0.230	0.079	0.040	0.085

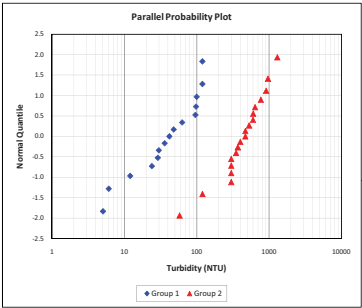
Group 1			Statistical Comparison
EventType	Year	Site	Group 2 vs Group 1
Mix Rain/Snow	2009-10	DSC-TC1	Analysis
Snow melt	2010-11		Turbidity
Rain	2011-12		SW Standard
			5
			VarS
			407
			Trend
			None
			p-value
			0.5000000
			0.04904986
			None
			Standard Type
			None
			Alpha
			0.05
			Mean % Difference (robust ROS)
			-828.984874

Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-TT1
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
	Group 1	Group 2
Count (n)	15	19
Count (nondetects)	0	0
Turbidity	0	-48
SW Standard	5	407
VarS	None	807
Trend	None	None
p-value	0.5000000	0.04904986

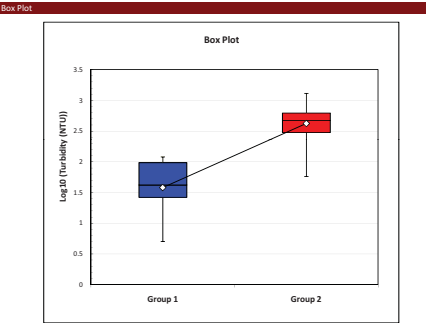


Parallel Probability Plot



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
	Group 1	Group 2
p-value (SW)	0.12500054	0.08755983
p-value (L)	0.78682823	0.20288132

Note: Values should be greater than alpha (0.



t Test (Independent)	Data	LogData	RAData
Mean (robust ROS)			
Group 1	55.27444444	1.57847644	8.46666667
Group 2	513.4912281	2.623104575	24.63157895
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	41.09861295	0.44605460	5.01236566
Group 2	306.0418024	0.314554606	6.33737175
degrees of freedom	18.81911872	24.24429262	31.99727228
Effect Size (d)	458.21678363	1.04482813	16.16491228
t Statistic	-6.45301286	-7.68756474	-8.30475485
t Critical	-1.73406359	-1.71088207	-1.69551874
p-value (2-sided)	0.00000595	0.00000008	0.00000000
Power	0.99991440	0.99999820	0.99999889
Power Analysis			
Beta	NA	NA	NA
Additional n (each Group)	NA	NA	NA

Summary Statistics								
	Turbidity	n	% dect	min	max	mean	median	STDEV
Group 1	DSC-TC1	15	100%	0.005	0.12	0.055	0.042	0.041
Group 2	DSC-TT1	19	100%	0.0580	1.300	0.513	0.470	0.306

CV

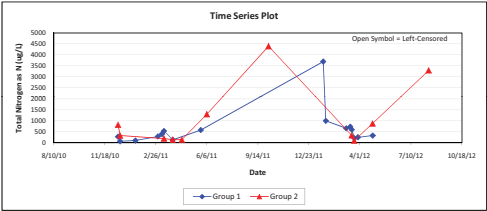
0.744

0.596

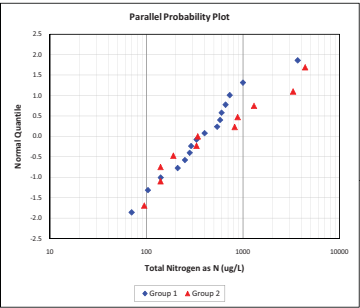
Group 1			Statistical Comparison	
EventType	Year	Site	Group 2 vs Group 1	
Mix Rain/Snow	2009-10	DSC-MC2	Analysis	
Snow melt	2010-11		Total Nitrogen as N	
Rain	2011-12		SW Standard	
			None	
			GW Standard	
			None	
			Standard Type	
			None	
			Alpha	
			0.05	
			Mean % Difference (robust ROS)	
			-78.17310982	

Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-MC3
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
Group 1		Group 2
Count (n)	16	11
Count (nondetects)	1	0
SW Standard	5	8
VarS	493	164
Trend	Increasing	Increasing
p-value	0.06867355	0.29232398

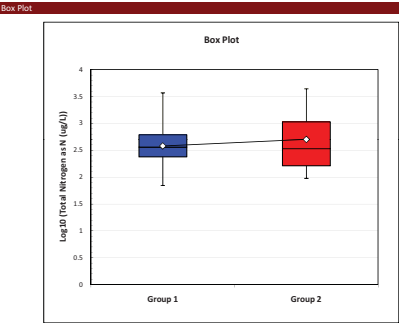


Parallel Probability Plot



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
Group 1		Group 2
p-value (SW)	0.80269135	0.43718236
p-value (L)	0.86268044	0.63204474

Note: Values should be greater than alpha (0.



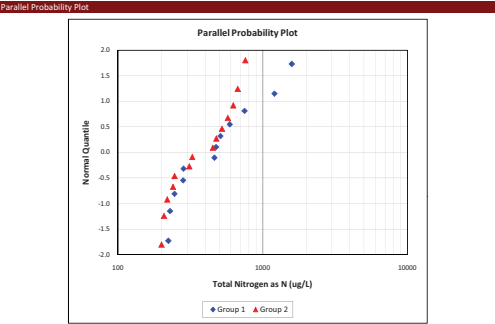
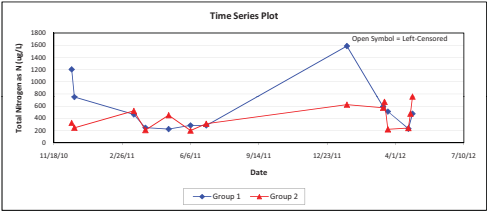
t Test (independent)	Data	LogData	RAData
Mean (robust ROS)			
Group 1	616.61658472	2.58004983	13.34375000
Group 2	1085	2.70293875	14.95454545
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	861.55213386	0.41396297	7.15709147
Group 2	1440.352387	0.566641265	9.220776934
degrees of freedom	14.92270121	17.14592259	17.94695606
Effect Size (d)	468.38341528	0.12294404	0.161079545
t Statistic	-0.96621484	-0.61549287	-0.48720720
t Critical	-1.76131012	-1.73960672	-1.73960672
p-value (2-sided)	0.35156846	0.54688525	0.63271911
Power	0.21991517	0.13829394	0.11369017
Power Analysis			
Beta	0.2	0.2	0.2
Additional n (each Group)	39	114	191

Summary Statistics									
	Total Nitrogen as N	n	% dect	min	max	mean	median	STDDEV	CV
Group 1	DSC-MC2	16	94%	0.070	3.7	0.617	0.365	0.862	1.397
Group 2	DSC-MC3	11	100%	0.0950	4.400	1.085	0.340	1.440	1.328

Group 1			Statistical Comparison
EventType	Year	Site	Group 2 vs Group 1
Mix Rain/Snow	2009-10	DST-MC1	Analysis
Snow melt	2010-11		Total Nitrogen as N
Rain	2011-12		SW Standard
			None
			GW Standard
			None
			Standard Type
			None
			Alpha
			0.05
			Mean % Difference (robust ROS)
			26.96697198

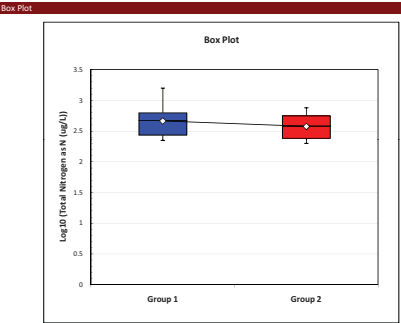
Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DST-MC2
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
	Group 1	Group 2
Count (n)	12	14
Count (nondetects)	0	0
Total Nitrogen as N	-10	23
SW Standard	213	334
VarS		
Trend	Decreasing	Increasing
p-value	0.26856693	0.11421990



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
	Group 1	Group 2
p-value (SW)	0.23599257	0.15432000
p-value (L)	0.28300493	0.34169062

Note: Values should be greater than alpha (0.



t Test (independent)	Data	LogData	RkData
Mean (robust ROS)			
Group 1	570.58333333	2.66526631	14.62500000
Group 2	416.7142857	2.575201934	12.53571429
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	426.26548670	0.28227875	7.69629486
Group 2	191.4641676	0.206843776	7.757042174
degrees of freedom	14.75990623	19.89027023	23.45125659
Effect Size (d)	-153.86904762	-0.09006437	-2.08928571
t Statistic	1.15458484	0.91464751	0.68754563
t Critical	1.76131012	1.72913279	1.71387152
p-value (2-sided)	0.26904367	0.37246724	0.49892405
Power	0.27687262	0.21272921	0.15770580
Power Analysis			
Beta	0.2	0.2	0.2
Additional n (each Group)	17	33	69

Summary Statistics								
	Total Nitrogen as N	n	% dect	min	max	mean	median	STDEV
Group 1	DST-MC1	12	100%	0.223	1.587	0.571	0.470	0.426
Group 2	DST-MC2	14	100%	0.2000	0.759	0.417	0.389	0.191

CV

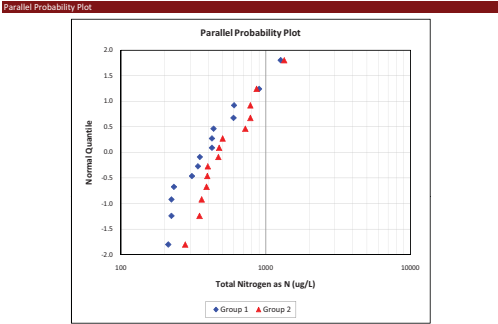
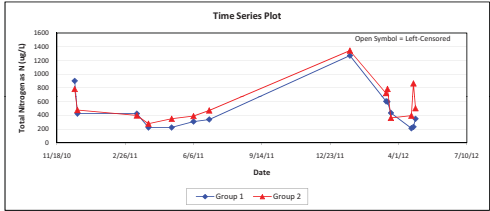
0.747

0.459

Group 1			Statistical Comparison
EventType	Year	Site	Group 2 vs Group 1
Mix Rain/Snow	2009-10	DST-MC3	Analysis
Snow melt	2010-11		Total Nitrogen as N
Rain	2011-12		SW Standard
			None
			GW Standard
			None
			Standard Type
			None
			Alpha
			0.05
			Mean % Difference (robust ROS)
			-24.01893419

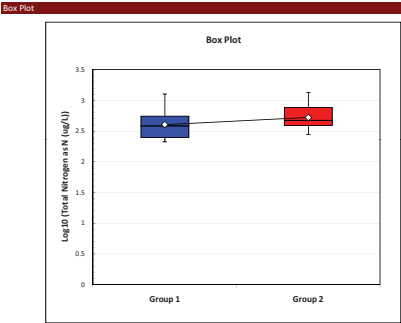
Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DST-MC4
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
	Group 1	Group 2
Count (n)	14	14
Count (nondetects)	0	0
Total Nitrogen as N	-11	14
SW Standard	5	14
VarS	332	333
Trend	Decreasing	Increasing
p-value	0.29146044	0.23799948



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
	Group 1	Group 2
p-value (SW)	0.25532058	0.32542512
p-value (L)	0.50323895	0.24420787

Note: Values should be greater than alpha (0.



t Test (independent)	Data	LogData	RkData
Mean (robust ROS)			
Group 1	467.78571429	2.60479969	12.21428571
Group 2	580.1428571	2.721339612	16.78571429
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	299.73608355	0.23587359	8.89838554
Group 2	289.7367126	0.191791492	7.070290729
degrees of freedom	25.97012541	24.96135946	24.73657107
Effect Size (d)	112.35714286	0.11653992	4.57142857
t Statistic	-1.00844789	-1.43443955	-1.50409332
t Critical	-1.70814075	-1.71088207	-1.71088207
p-value (2-sided)	0.32329922	0.16493023	0.14593603
Power	0.24528954	0.39225332	0.41930716
Power Analysis			
Beta	0.2	0.2	0.2
Additional n (each Group)	41	14	12

Summary Statistics									
	Total Nitrogen as N	n	% dect	min	max	mean	median	STDEV	CV
Group 1	DST-MC3	14	100%	0.212	1.27	0.468	0.388	0.300	0.641
Group 2	DST-MC4	14	100%	0.2780	1.343	0.580	0.474	0.290	0.499

Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DST-MC6
Snow melt	2010-11	
Rain	2011-12	

Time Series Plot

Total Nitrogen as N ($\mu\text{g/L}$)

Date

Open Symbol = Left-Censored

Legend: Group 1 (blue diamonds), Group 2 (red triangles)

Date	Group 1 (Total Nitrogen as N, $\mu\text{g/L}$)	Group 2 (Total Nitrogen as N, $\mu\text{g/L}$)
11/18/10	~600	~850
2/24/11	~150	~450
6/6/11	~150	~650
12/23/11	~1500	~2300 (Left-Censored)
4/1/12	~400	~550

Parallel Probability Plot

Normal Quantile

Total Nitrogen as N (ug/L)

◆ Group 1 ▲ Group 2

Box Plot

Log10 Total Nitrogen as a % (logA1)

Group 1 Group 2

Group	Min	Q1	Median	Q3	Max
Group 1	2.2	2.4	2.6	2.8	3.1
Group 2	2.3	2.7	2.8	2.9	3.3

Note: Values should be greater than alpha (0.

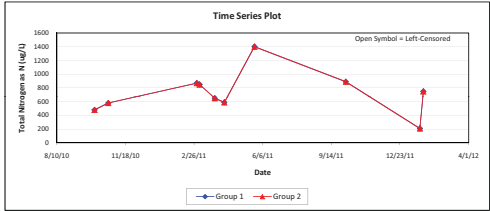
t Test (Independent)		Data	LogData	RAData
Mean (robust ROS)				
Group 1		497.83333333	2.60890296	11.9257143
Group 2		695.5714286	2.77908103	11.97142857
Delta		0.00000000	0.00000000	0.00000000
Std (robust ROS)				
Group 1		364.1722623	0.28080636	7.57070913
Group 2		483.4588656	0.28851758	7.84609817
degrees of freedom		24.15828173	24.96867798	24.85368738
Effect Size (d)		197.7388827	0.17018515	5.14408714
t statistic		-1.22242817	1.75732047	-1.711566
t Critical		-1.71088207	-1.71088207	-1.71088207
p-value (2-sided)		0.23025414	0.09093924	0.09093924
p-value		0.31683095	0.44817254	0.09394872
Power Analysis				
Beta				
Additional n (each Group)		0.2	0.2	0.2
		24	24	6

Summary Statistics									
	Total Nitrogen as N	n	% dect	min	max	mean	median	STDDEV	CV
Group 1	DST-MC5	14	100%	0.154	1.55	0.498	0.387	0.364	0.731
Group 2	DST-MC6	14	100%	0.2040	2.264	0.696	0.614	0.483	0.695

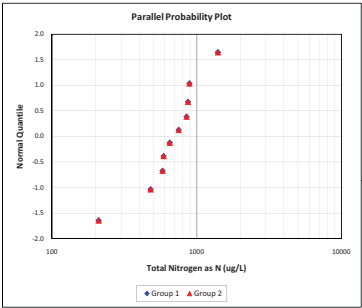
Group 1			Statistical Comparison
EventType	Year	Site	Group 2 vs Group 1
Mix Rain/Snow	2009-10	DSC-MC1	Analysis
Snow melt	2010-11		Total Nitrogen as N
Rain	2011-12		SW Standard
			None
			VarS
			Trend
			p-value
			None
			Standard Type
			None
			Alpha
			0.05
			Mean % Difference (robust ROS)
			0

Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-MC1
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
	Group 1	Group 2
Count (n)	10	10
Count (nondetects)	0	0
Total Nitrogen as N	7	7
SW Standard	125	125
None		
VarS		
Trend	Increasing	Increasing
p-value	0.29575252	0.29575252



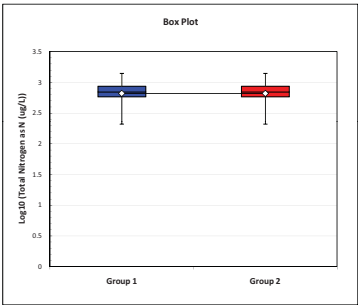
Parallel Probability Plot



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
	Group 1	Group 2
p-value (SW)	0.25502280	0.25502298
p-value (L)	0.60548383	0.60548383

Note: Values should be greater than alpha (0.

Box Plot



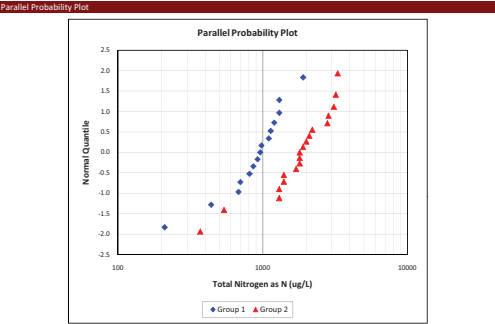
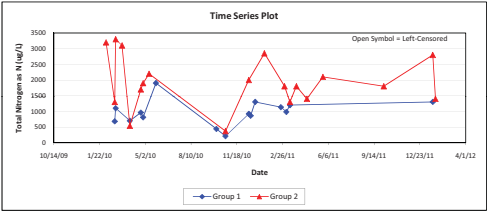
t Test (Independent)	Data	LogData	RAData
Mean (robust ROS)			
Group 1	727.00000000	2.81901714	10.50000000
Group 2	727	2.819017138	10.5
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	314.50313547	0.21732885	6.05530071
Group 2	314.5031355	0.217328851	6.055300708
degrees of freedom	18.00000000	18.00000000	18.00000000
Effect Size (d)	0.00000000	0.00000000	0.00000000
t Statistic	0.00000000	0.00000000	0.00000000
t Critical	1.73406359	1.73406359	1.73406359
p-value (2-sided)	1.00000000	1.00000000	1.00000000
Power	0.05000000	0.05000000	0.05000000
Power Analysis			
Beta	0.2	0.2	0.2
Additional n (each Group)	>300	>300	>300

Summary Statistics								
	Total Nitrogen as N	n	% dect	min	max	mean	median	STDEV
Group 1	DSC-MC1	10	100%	0.210	1.4	0.727	0.700	0.315
Group 2	DSC-MC1	10	100%	0.2100	1.400	0.727	0.700	0.315

Group 1			Statistical Comparison
EventType	Year	Site	Group 2 vs Group 1
Mix Rain/Snow	2009-10	DSC-TC1	Analysis
Snow melt	2010-11		Total Nitrogen as N
Rain	2011-12		SW Standard
			None
			GW Standard
			None
			Standard Type
			None
			Alpha
			0.05
			Mean % Difference (robust ROS)
			-100.7819687

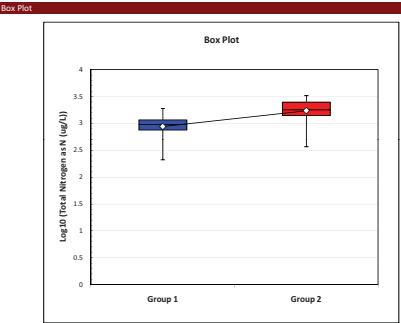
Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-TT1
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
	Group 1	Group 2
Count (n)	15	19
Count (nondetects)	0	0
Total Nitrogen as N	36	-22
SW Standard	5	811
VarS	407	
Trend	Increasing	None
p-value	0.04144347	0.23048266



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
	Group 1	Group 2
p-value (SW)	0.04728817	0.00711395
p-value (L)	0.45838056	0.29922745

Note: Values should be greater than alpha (0.



t Test (independent)	Data	LogData	RkData
Mean (robust ROS)			
Group 1	966.22222222	2.94034130	10.50000000
Group 2	1940	3.235708356	23.02631579
Delta	0.000000000	0.000000000	0.000000000
Std (robust ROS)			
Group 1	399.54113892	0.22585531	6.18754509
Group 2	829.7456103	0.245111018	8.860765085
degrees of freedom	27.11817431	31.17538324	31.60198212
Effect Size (d)	973.77777778	0.29536706	12.52631579
t Statistic	-4.49754870	-3.64601169	-4.84489022
t Critical	-1.70328842	-1.69551874	-1.69551874
p-value (2-sided)	0.00012662	0.00099986	0.0003609
Power	0.99527323	0.96989569	0.99819576
Power Analysis			
Beta	NA	NA	NA
Additional n (each Group)	NA	NA	NA

Summary Statistics								
	Total Nitrogen as N	n	% dect	min	max	mean	median	STDEV
Group 1	DSC-TC1	15	100%	0.210	1.9	0.966	0.960	0.400
Group 2	DSC-TT1	19	100%	0.3700	3.300	1.940	1.800	0.830

CV

0.414

0.428

Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-MC3
Snow melt	2010-11	
Rain	2011-12	

Time Series Plot

Total Phosphorus (µg/l)

Open Symbol = Left-Censored

Date

Group 1 (Blue line with diamond markers)

Group 2 (Red line with triangle markers)

Date	Group 1 (µg/l)	Group 2 (µg/l)
8/10/10	~100	~100
11/7/10	~100	~100
2/26/11	~100	~100
6/4/11	~100	~100
9/14/11	~100	~750
12/23/11	~900	~100
4/1/12	~100	~100
7/10/12	~100	~100
10/8/12	~100	~100

Parallel Probability Plot

Normal Quantile

Total Phosphorus (ug/L)

◆ Group 1 ▲ Group 2

A box plot titled "Box Plot" comparing the Log10 (Total Phosphorus (ug/L)) for two groups. The y-axis ranges from 0 to 3.5 with increments of 0.5. Group 1 (blue box) has a median around 1.8, a mean around 1.9, and whiskers extending from approximately 1.2 to 3.0. Group 2 (red box) has a median around 2.0, a mean around 2.1, and whiskers extending from approximately 1.7 to 2.9. A line connects the two medians.

Group	Min	Q1	Median	Mean	Q3	Max
Group 1	1.2	1.6	1.8	1.9	2.1	3.0
Group 2	1.7	1.85	2.0	2.1	2.2	2.9

Note: Values should be greater than alpha (0.

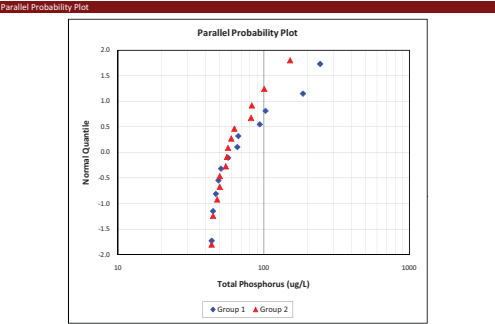
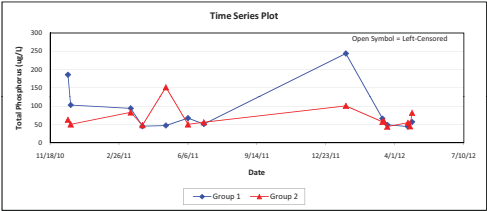
t-Test (Independent)			
	Data	LogData	RkData
Mean (robust ROS)			
Group 1	134.43750000	1.87325733	12.43750000
Group 2	162.6060006	2.04608573	16.27272727
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	221.51568140	0.43248046	8.57390568
Group 2	206.3456011	0.346258802	6.68425904
degrees of freedom	22.66462019	24.31048348	24.48196649
Effect Size (d)	28.16856061	0.17283808	3.83527727
t-Statistic	-0.33818886	-1.16498869	-0.3303118
t-Critical	-1.71714434	-1.71088207	-1.71088207
p-value (2-sided)	0.73875853	0.2620629	0.20486856
Power	0.0088412	0.2900310	0.34476781
Descript Analysis			
Beta	0.2	0.2	0.2
Additional N (each Group)	>300	27	19

Summary Statistics									
	Total Phosphorus	n	% dect	min	max	mean	median	STDDEV	CV
Group 1	DSC-MC2	16	100%	0.017	0.94	0.134	0.078	0.222	1.648
Group 2	DSC-MC3	11	100%	0.0420	0.770	0.163	0.105	0.206	1.269

Group 1			Statistical Comparison
EventType	Year	Site	Group 2 vs Group 1
Mix Rain/Snow	2009-10	DST-MC1	Analysis
Snow melt	2010-11		Total Phosphorus
Rain	2011-12		SW Standard
			None
			GW Standard
			None
			Standard Type
			None
			Alpha
			0.05
			Mean % Difference (robust ROS)
			22.995523

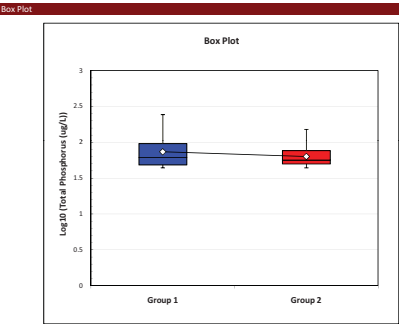
Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DST-MC2
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
	Group 1	Group 2
Count (n)	12	14
Count (nondetects)	0	0
Total Phosphorus	5	-22
VarS	213	333
Trend	Decreasing	Decreasing
p-value	0.07493037	0.31084945



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
	Group 1	Group 2
p-value (SW)	0.02548454	0.01311887
p-value (L)	0.07019373	0.06698663

Note: Values should be greater than alpha (0.



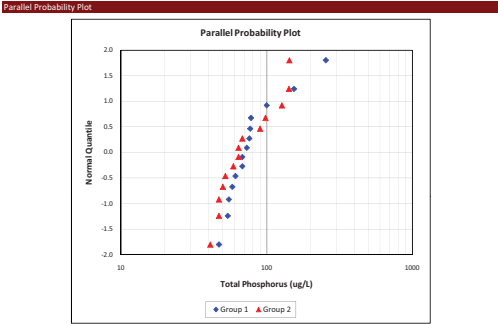
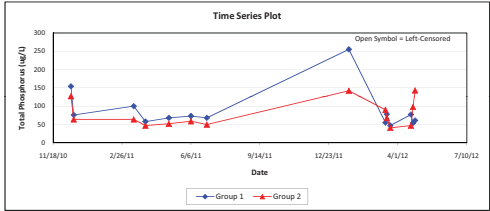
t Test (independent)	Data	LogData	RAData
Mean (robust ROS)			
Group 1	87.75000000	1.86757423	14.20833333
Group 2	67.57142857	1.80120148	12.89285714
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	63.56360336	0.34715996	8.69811456
Group 2	29.40359555	0.152895651	6.889731968
degrees of freedom	14.97894189	17.78097158	20.89837290
Effect Size (d)	-20.17857143	-0.06637275	-1.31547619
t Statistic	1.01090326	0.80723805	0.42247486
t Critical	1.76131012	1.73960672	1.72471822
p-value (2-sided)	0.33050900	0.43136667	0.67742096
Power	0.23271771	0.18209990	0.10381567
Power Analysis			
Beta	0.2	0.2	0.2
Additional n (each Group)	25	45	196

Summary Statistics									
	Total Phosphorus	n	% dect	min	max	mean	median	STDEV	CV
Group 1	DST-MC1	12	100%	0.044	0.244	0.088	0.062	0.064	0.724
Group 2	DST-MC2	14	100%	0.0440	0.152	0.068	0.057	0.029	0.435

Group 1			Statistical Comparison	
EventType	Year	Site	Group 2 vs Group 1	
Mix Rain/Snow	2009-10	DST-MC3	Analysis	
Snow melt	2010-11		Total Phosphorus	
Rain	2011-12		SW Standard	
			None	
			GW Standard	
			None	
			Standard Type	
			None	
			Alpha	
			0.05	
			Mean % Difference (robust ROS)	
			10.78431375	

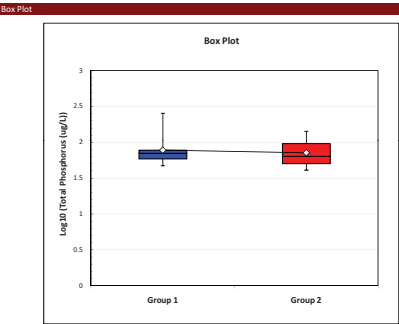
Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DST-MC4
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
	Group 1	Group 2
Count (n)	14	14
Count (nondetects)	0	0
Total Phosphorus	-30	5
VarS	333	332
Trend	Decreasing	Increasing
p-value	0.05591896	0.41307623



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
	Group 1	Group 2
p-value (SW)	0.010711534	0.11665549
p-value (L)	0.00324649	0.20928681

Note: Values should be greater than alpha (0.



t Test (independent)	Data	LogData	RAData
Mean (robust ROS)			
Group 1	87.42857143	1.89110090	15.71428571
Group 2	78	1.85183606	13.28571429
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	55.00309682	0.19543389	7.50823723
Group 2	36.02349661	0.186143	8.980136811
degrees of freedom	22.41938732	25.93856131	25.20909620
Effect Size (d)	-9.42857143	-0.03791730	-2.42857143
t Statistic	0.53656072	0.52566083	0.77829804
t Critical	1.71714434	1.70814075	1.70814075
p-value (2-sided)	0.59721280	0.60394739	0.44515665
Power	0.12518894	0.12407001	0.18016512
Power Analysis			
Beta	0.2	0.2	0.2
Additional n (each Group)	130	135	56

Summary Statistics								
	Total Phosphorus	n	% dect	min	max	mean	median	STDEV
Group 1	DST-MC3	14	100%	0.047	0.255	0.087	0.071	0.055
Group 2	DST-MC4	14	100%	0.0410	0.143	0.078	0.064	0.036

CV

0.629

0.462

Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DST-MC6
Snow melt	2010-11	
Rain	2011-12	

Time Series Plot

Total Phosphorus (ug/L)

Date

Open Symbol = 1 ug/L Censored

Group 1 (Blue line with diamond markers)

Group 2 (Red line with triangle markers)

Date	Group 1 (ug/L)	Group 2 (ug/L)
11/18/10	~150	~80
2/26/11	~50	~40
6/6/11	~40	~90
9/14/11	~100	~100
12/23/11	~200	~120
4/1/12	~100	~60
7/10/12	~600	~60

A Parallel Probability Plot titled "Parallel Probability Plot" showing the distribution of Total Phosphorus (ug/L) for two groups. The x-axis is labeled "Total Phosphorus (ug/L)" and ranges from 10 to 1000 on a logarithmic scale. The y-axis is labeled "Normal Quantile" and ranges from -2.0 to 2.0. Group 1 is represented by blue diamonds and Group 2 by red triangles. Both groups show a similar upward trend, indicating that the data for both groups are approximately normally distributed. The points for Group 1 are generally higher than those for Group 2, suggesting higher values of Total Phosphorus in Group 1.

Group	Total Phosphorus (ug/L)	Normal Quantile
Group 1	15	-1.7
Group 1	20	-1.0
Group 1	25	-0.5
Group 1	30	-0.2
Group 1	35	0.0
Group 1	40	0.2
Group 1	45	0.4
Group 1	50	0.6
Group 1	60	0.8
Group 1	70	0.9
Group 1	80	1.0
Group 1	100	1.2
Group 1	150	1.3
Group 1	200	1.4
Group 1	300	1.5
Group 1	400	1.6
Group 1	500	1.7
Group 1	600	1.8
Group 1	700	1.9
Group 1	800	2.0
Group 2	15	-1.8
Group 2	20	-1.1
Group 2	25	-0.6
Group 2	30	-0.3
Group 2	35	-0.1
Group 2	40	0.1
Group 2	45	0.3
Group 2	50	0.5
Group 2	60	0.7
Group 2	70	0.9
Group 2	80	1.1
Group 2	100	1.3
Group 2	150	1.5
Group 2	200	1.7
Group 2	300	1.9
Group 2	400	2.1

A box plot titled "Box Plot" comparing the Log10 Total Phosphorus (µg/L) for two groups. The y-axis ranges from 0 to 3.0 with increments of 0.5. Group 1 (blue box) has a median around 1.8, a mean around 1.9, and a range from approximately 1.5 to 2.8. Group 2 (red box) has a median around 1.7, a mean around 1.75, and a range from approximately 1.5 to 2.1. A line connects the two medians.

Group	Min	Q1	Median	Mean	Q3	Max
Group 1	1.5	1.7	1.8	1.9	2.0	2.8
Group 2	1.5	1.6	1.7	1.75	1.85	2.1

Note: Values should be greater than alpha (0.

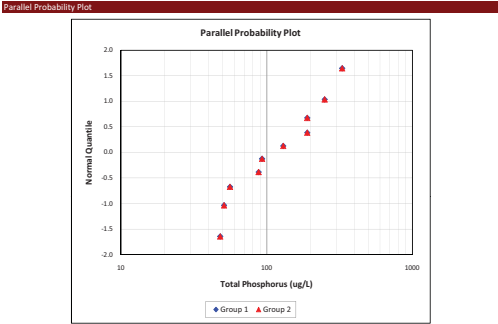
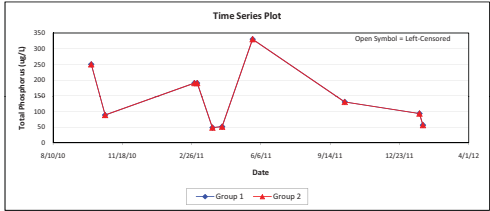
t Test (Independent)		Data	LogData	RAData
Mean (robust ROS)				
Group 1	120.83333333	1.9097246	16.00000000	
Group 2	64.64285714	1.78812042	13	
Delta	0.00000000	0.00000000	0.00000000	
Std (robust ROS)				
Group 1	163.2935567	0.33960318	5.57994083	
Group 2	26.78230828	0.17106609	7.87156518	
degrees of freedom	13.68989169	19.1973731	25.89039305	
Effect Size (d)	-56.19047619	1.11414222	0.80000000	
t statistic	1.27056959	1.29087372	0.56403408	
t Critical	1.77093338	1.72913927	1.708140475	
p-value (2-sided)	0.21986257	0.23466672	0.5846677	
Power	0.31259108	0.33838984	0.21874655	
Power Analysis				
Beta	0.2	0.2	0.2	
Additional n (each Group)	14	14	32	

Summary Statistics									
	Total Phosphorus	n	% dect	min	max	mean	median	STDEV	CV
Group 1	DST-MC5	14	100%	0.035	0.665	0.121	0.068	0.163	1.351
Group 2	DST-MC6	14	100%	0.0340	0.122	0.065	0.056	0.027	0.414

Group 1			Statistical Comparison
EventType	Year	Site	Group 2 vs Group 1
Mix Rain/Snow	2009-10	DSC-MC1	Analysis
Snow melt	2010-11		Total Phosphorus
Rain	2011-12		SW Standard
			None
			GW Standard
			None
			Standard Type
			None
			Alpha
			0.05
			Mean % Difference (robust ROS)
			0

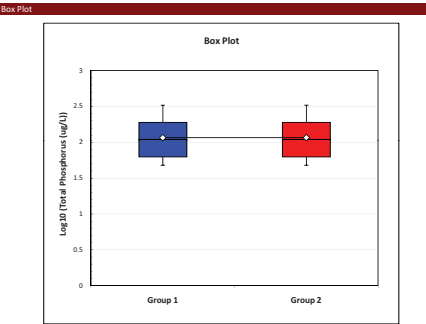
Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-MC1
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
	Group 1	Group 2
Count (n)	10	10
Count (nondetects)	0	0
Total Phosphorus	-10	-10
SW Standard	5	5
VarS	124	124
Trend	Decreasing	Decreasing
p-value	0.20948086	0.20948086



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
	Group 1	Group 2
p-value (SW)	0.45611269	0.45611269
p-value (L)	0.89003466	0.89003466

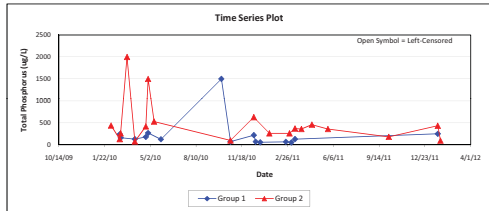
Note: Values should be greater than alpha (0.



t Test (independent)	Data	LogData	RkData
Mean (robust ROS)			
Group 1	142.60000000	2.06378696	10.50000000
Group 2	142.6	2.063786956	10.5
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	95.21111046	0.29991157	6.03692343
Group 2	95.21111046	0.299911569	6.036923425
degrees of freedom	18.00000000	18.00000000	18.00000000
Effect Size (d)	0.00000000	0.00000000	0.00000000
t Statistic	0.00000000	0.00000000	0.00000000
t Critical	1.73406359	1.73406359	1.73406359
p-value (2-sided)	1.00000000	1.00000000	1.00000000
Power	0.05000000	0.05000000	0.05000000
Power Analysis			
Beta	0.2	0.2	0.2
Additional n (each Group)	>300	>300	>300

Summary Statistics									
	Total Phosphorus	n	% dect	min	max	mean	median	STDEV	CV
Group 1	DSC-MC1	10	100%	0.048	0.33	0.143	0.112	0.095	0.668
Group 2	DSC-MC1	10	100%	0.0480	0.330	0.143	0.112	0.095	0.668

Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-TT1
Snow melt	2010-11	
Rain	2011-12	

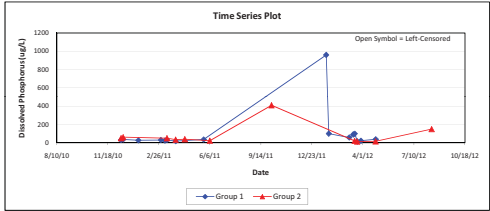
t Test (Independent)

Summary Statistics									
	Total Phosphorus	n	% det	min	max	mean	median	STDDEV	CV
Group 1	DSC-TC1	15	100%	0.054	1.5	0.235	0.130	0.358	1.519
Group 2	DSC-TT1	19	100%	0.0760	2.000	0.466	0.360	0.485	1.040

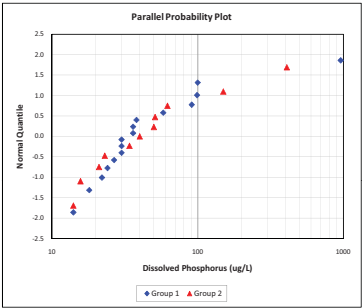
Group 1			Statistical Comparison	
EventType	Year	Site	Group 2 vs Group 1	
Mix Rain/Snow	2009-10	DSC-MC2	Analysis	
Snow melt	2010-11		Dissolved Phosphorus	
Rain	2011-12		SW Standard	
			VarS	
			GW Standard	
			None	
			Standard Type	
			None	
			Alpha	
			0.05	
			Mean % Difference (robust ROS)	
			21.47017926	

Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-MC3
Snow melt	2010-11	
Rain	2011-12	

Time Series - Mann-Kendall (MK) Trend Analyses		
	Group 1	Group 2
Count (n)	16	11
Count (nondetects)	0	0
SW Standard	5	-19
VarS	489	165
Trend	Increasing	None
p-value	0.27823903	0.08056247

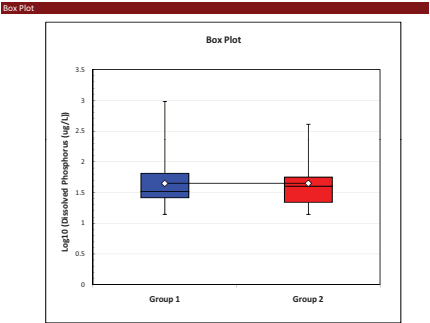


Parallel Probability Plot



Shapiro-Wilk (SW) and Lilliefors (L) Normality Tests		
	Group 1	Group 2
p-value (SW)	0.00208415	0.24433429
p-value (L)	0.00863596	0.35158611

Note: Values should be greater than alpha (0.



t Test (Independent)			
	Data	LogData	RAData
Mean (robust ROS)			
Group 1	100.79166667	1.64838321	13.90625000
Group 2	79.15151515	1.649672515	14.13636364
Delta	0.00000000	0.00000000	0.00000000
Std (robust ROS)			
Group 1	230.87222296	0.43701011	7.58335623
Group 2	116.10248	0.435606604	8.786611716
degrees of freedom	23.32987897	21.70015764	19.46188406
Effect Size (d)	-21.64015152	0.00128930	0.23011364
t Statistic	0.32057517	-0.00754684	-0.07063620
t Critical	1.71387152	-1.72074287	-1.72913279
p-value (2-sided)	0.75155750	0.99405332	0.94446618
Power	0.08842522	0.05070139	0.05681752
Power Analysis			
Beta	0.2	0.2	0.2
Additional n (each Group)	>300	>300	>300

Summary Statistics								
	Dissolved Phosphorus	n	% dect	min	max	mean	median	STDEV
Group 1	DSC-MC2	16	100%	0.014	0.96	0.101	0.033	0.231
Group 2	DSC-MC3	11	100%	0.0140	0.410	0.079	0.040	0.116

CV

2.291

1.467

EventType	Year	Site
Mix Rain/Snow	2009-10	DST-MC2
Snow melt	2010-11	
Rain	2011-12	

Time Series Plot

Standardized Phagocytosis (μA_2)

Date

Open Symbol = Left-Censored

Legend: Group 1 (Blue line with diamond markers), Group 2 (Red line with triangle markers)

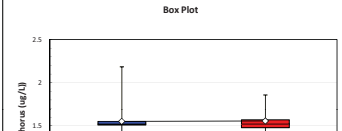
Date	Group 1 (μA_2)	Group 2 (μA_2)
11/28/10	~40	~35
2/06/11	~25	~25
6/06/11	~25	~45
12/23/11	~155	~50
4/17/12	~30	~30
7/02/12	~30	~30

Parallel Probability Plot

Normal Quantile

Dissolved Phosphorus ($\mu\text{g/L}$)

Group 1 (blue diamonds) Group 2 (red triangles)



A box plot titled "Box Plot" comparing the distribution of "Log10 (Statistical Phosphorus) (ug/l)" for two groups: "Group 1" and "Group 2". The y-axis ranges from 0 to 2.5 with increments of 0.5. Group 1 is represented by a blue box with a median around 1.5, a mean around 1.55, and whiskers extending from approximately 1.35 to 2.2. Group 2 is represented by a red box with a median around 1.5, a mean around 1.55, and whiskers extending from approximately 1.4 to 1.9. The two groups have very similar distributions.

Group	Min	Q1	Median	Mean	Q3	Max
Group 1	1.35	1.45	1.50	1.55	1.55	2.20
Group 2	1.40	1.45	1.50	1.55	1.55	1.90

t-Test (Independent)	Data	LogData	RkData
Mean (robust ROS)			
Group 1	40.7857142857	1.5493888889	14.2857142857
Group 2	37.7142857143	1.4285714286	14.2857142857
Delta	0.0000000000	0.0000000000	0.0000000000
Std (robust ROS)			
Group 1	32.71813062	0.19888815	8.157978489
Group 2	31.41825655	0.155115535	8.456965127
degrees of freedom	0.116142446	22.8860568	25.9639735
Effect Size	-3.074123857	0.050018843	0.471428571
t-Statistic	0.32263437	-0.0806773	0.13409355
Critical	1.73960672	-1.71714434	-1.70840165
p-value (2-tailed)	0.7513282	0.9360000	0.89203187
Power	0.8872862	0.1500047	0.6429578
Power Analysis			
Sets	0.2	0.2	0.2
Additional n (each Group)	>30	>30	>30

Summary Statistics									
	Dissolved Phosphorus	n	% detc	min	max	mean	median	STDDEV	CV
Group 1	DST-MC1	14	100%	0.021	0.153	0.041	0.033	0.033	0.803
Group 2	DST-MC2	14	100%	0.0250	0.072	0.038	0.033	0.014	0.372

Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DST-MC4
Snow melt	2010-11	
Rain	2011-12	

Time Series Plot

Dissolved Phosphorus ($\mu\text{g/L}$)

Date

Open Symbol = Left-Censored

Legend: Group 1 (Blue line with diamond markers), Group 2 (Red line with triangle markers)

Date	Group 1 ($\mu\text{g/L}$)	Group 2 ($\mu\text{g/L}$)
11/18/10	55	35
2/26/11	35	10
6/6/11	45	15
12/23/11	200	105
4/1/12	30	25
7/10/12	45	65

Parallel Probability Plot

A Parallel Probability Plot comparing the distribution of Dissolved Phosphorus (ug/L) for two groups. The y-axis represents the Normal Quantile, ranging from -2.0 to 2.0. The x-axis represents Dissolved Phosphorus (ug/L) on a logarithmic scale, with major ticks at 10, 100, and 1000. Group 1 is represented by blue diamonds and Group 2 by red triangles. Both groups show a similar increasing trend, suggesting they follow the same underlying distribution. The data points for Group 1 are approximately: (20, -1.7), (25, -1.0), (30, -0.5), (40, 0.0), (50, 0.5), (60, 0.8), (80, 1.0), (100, 1.3), (150, 1.8). The data points for Group 2 are approximately: (15, -1.8), (20, -1.0), (25, -0.5), (30, 0.0), (40, 0.5), (50, 0.8), (60, 1.0), (80, 1.3), (100, 1.8).

Dissolved Phosphorus (ug/L)	Normal Quantile (Group 1)	Normal Quantile (Group 2)
20	-1.7	-1.8
25	-1.0	-1.0
30	-0.5	-0.5
40	0.0	0.0
50	0.5	0.5
60	0.8	0.8
80	1.0	1.0
100	1.3	1.3
150	1.8	1.8

Box Plot

Log10 (Dissolved Phosphorus (ug/L))

Group 1 Group 2

Group	Min	Q1	Median	Q3	Max
Group 1	1.4	1.5	1.6	1.65	2.3
Group 2	1.2	1.3	1.4	1.5	2.0

t-Test (Independent)			
	Data	LogData	RAData
Mean (robust ROS)			
Group 1	49.92587143	1.62402688	17.92587143
Group 2	37.07142857	1.486517949	11.07142857
Delta	0.90200000	0.90900000	0.68000000
Std (robust ROS)			
Group 1	44.2836348	0.31206783	9.51206099
Group 2	46.86859071	0.26178632	9.95912893
degrees of freedom	22.7391555	25.2393552	21.92131588
Effect Size (d)	-12.85714286	-0.1438893	-9.95714286
t-Statistic	0.90300751	1.57244132	1.39548814
t-Critical	1.71714344	1.70814075	1.70204287
p-value (2-sided)	0.37163385	0.06450000	0.16903774
Power	0.21145852	0.46657322	0.74501537
Power Analysis			
Delta	0.2	0.2	NA
Additional n (each Group)	38	4	NA

Summary Statistics									
	Dissolved Phosphorus	n	% dect	min	max	mean	median	STDEV	CV
Group 1	DST-MC3	14	100%	0.027	0.2	0.050	0.036	0.044	0.886
Group 2	DST-MC4	14	100%	0.0170	0.108	0.037	0.024	0.030	0.800

EventType	Year	Site
Mix Rain/Snow	2009-10	DST-MC6
Snow melt	2010-11	
Rain	2011-12	

Time Series Plot

Dissolved Phosphorus (µg/L)

Date

Open Symbol = Left-Censored

Group 1 (Blue diamonds)

Group 2 (Red triangles)

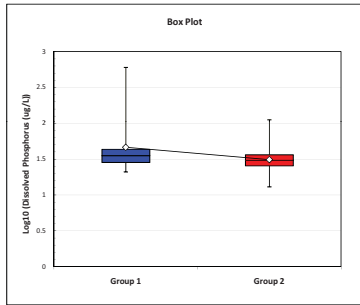
Date	Group 1 (µg/L)	Group 2 (µg/L)
11/18/10	~50	~20
2/26/11	~20	~10
6/4/11	~20	~10
9/24/11	~150	~100
12/13/11	~180	~120
4/1/12	~50	~20
7/10/12	~600	~10

Parallel Probability Plot

Normal Quantile

Dissolved Phosphorus (ug/L)

Group 1 (blue diamonds) Group 2 (red triangles)

Box Plot

t Test (Independent)		Data	LogData	RKData
Mean (robust ROS)		84.88095238	1.66431307	16.67875143
Group 1		35.85714286	1.49239403	12.32142857
Delta		0.00000000	0.00000000	0.00000000
Std (robust ROS)				
Group 1	153.52934000		0.38964434	8.31034335
Group 2	24.16882016		0.22746765	7.8092882304
degrees of freedom	13.64392436		20.93880524	25.90093132
Effect Size (d)	-49.0230592		-0.17964048	-0.54714286
t Statistic	1.18022392		0.38451104	1.42696035
t Critical	1.77093318		1.27421882	1.70814075
p-value (2-sided)	0.26077858		0.17066327	0.16571946
Power	0.28242167		0.38451104	0.39144614
Power Analysis				
Beta	0.2	0.2	0.2	0.2
Additional n (each Group)	18	8	8	8

Summary Statistics									
	Dissolved Phosphorus	n	% dect	min	max	mean	median	STDEV	CV
Group 1	DST-MC5	14	100%	0.021	0.603	0.085	0.036	0.154	1.809
Group 2	DST-MC6	14	100%	0.0130	0.112	0.036	0.031	0.024	0.674

Group 2		
EventType	Year	Site
Mix Rain/Snow	2009-10	DSC-TT1
Snow melt	2010-11	
Rain	2011-12	

Time Series Plot

Y-axis: Dissolved Phosphorus (µg/L)

X-axis: Date

Legend: Group 1 (Blue line with diamond markers), Group 2 (Red line with triangle markers)

Note: Open Symbol = Left-Censored

Date	Group 1 (µg/L)	Group 2 (µg/L)
2/12/10		10 (Left-Censored)
2/21/10		50
3/1/10	20	80
3/21/10	100	15
4/12/10	55	55
5/2/10	50	80
5/22/10	105	45

Parallel Probability Plot

Normal Quantile

Dissolved Phosphorus (ug/L)

◆ Group 1 ▲ Group 2

Group	Dissolved Phosphorus (ug/L)	Normal Quantile
Group 1	15	-1.4
Group 1	25	-1.4
Group 1	40	-0.8
Group 1	55	-0.3
Group 1	70	0.2
Group 1	85	0.7
Group 1	100	1.4
Group 2	10	-1.6
Group 2	15	-0.9
Group 2	30	-0.5
Group 2	45	-0.3
Group 2	50	0.4
Group 2	60	0.9
Group 2	70	1.5

Box Plot

Log10 (Dissolved Phosphorus (ug/L))

Group 1 Group 2

Group	Min	Q1	Median	Mean	Q3	Max
Group 1	1.25	1.75	1.80	1.78	1.95	2.00
Group 2	1.00	1.35	1.55	1.55	1.75	1.90

Note: Values should be greater than alpha (0.

t Test (Independent)		Data	LogData	RAData
Mean (robust ROS)				
Group 1	67.58333333	1.7680307	9.16666667	
Group 2	46.08211368	1.56156432	6.25	
Delta	0.00000000	0.00000000		
Std (robust ROS)				
Group 1	32.7573470	0.38280262	0.61733328	
Group 2	28.13876382	0.35948122	3.99500344	
degrees of freedom	4.95930869	1.91602691	10.64844481	
Effect Size (d)	-1.50120105	-0.26048972	-0.64666667	
t statistic	1.28672212	1.21138551	3.13956742	
t Critical	1.83311292	1.79584881	1.82146110	
p-value (2-sided)	0.21817133	0.23165555	0.00615556	
Power	0.29903787	0.25833889	0.31635637	
Power Analysis				
Beta				
Additional n (each Group)	0.2	0.2	0.2	
	7	9	6	

Summary Statistics									
	Dissolved Phosphorus	n	% dect	min	max	mean	median	STDEV	CV
Group 1	DSC-TC1	6	100%	0.018	0.1035	0.068	0.068	0.033	0.485
Group 2	DSC-TT1	8	88%	0.0100	0.084	0.046	0.050	0.028	0.615

Appendix E
Quality Assurance/Quality Control Documentation

Data Quality

E.1 Overview

This appendix summarizes the quality assurance/quality control (QA/QC) procedures that were implemented in the laboratory and field to ensure that the data collected during the 2011-2012 Truckee River Water Quality Monitoring Program for the Town of Truckee and Placer County. The purpose of the data review was to evaluate the data to ensure they were of known quality and met the project objectives. A general description of the laboratory and field QA/QC procedures is discussed in Section E.2. Upon receipt from the laboratory, a complete data quality evaluation was performed on all data generated during this program to ensure that the reported data accurately represent the concentrations of constituents present in the water samples. The process results of the data quality evaluation are discussed in Section E.3.

E.2 Laboratory Quality Assurance/Quality Control Procedures

Quality assurance is defined as the integrated program designed for assuring reliability of monitoring and measurement of data. Quality control is defined as the routine application of procedures for obtaining prescribed standards of performance in the monitoring and measuring process. This section presents quality control procedures that were conducted by the laboratory to ensure analytical data quality. A description of the general practices required of the laboratory is summarized below.

E.2.1 Standard Operating Procedures (SOPs)

Western Environmental Testing Laboratory (Wet Lab) and High Sierra performed all analyses and QA/QC procedures in accordance with published analytical methods and internal SOPs. The internal SOPs provide step-by-step instructions for performing analytical methods. Utilizing SOPs is a method to ensure uniformity and compliance in the measurement process.

E.2.2 Purity of Standards, Solvents and Reagents

The purity/quality of reagents, solvents and standards used in the analytical process is a critical component in the generation of high quality data. All reagents used were of reagent-grade (equivalent) or higher grade quality whenever obtainable. Where applicable, reference standard solutions were traceable to the National Institute of Standards Technology (NIST), the American Association for Laboratory Accreditation (AALA), or to an equivalent source. Each new lot of reagent-grade chemicals was tested for quality of performance, and laboratory records were kept to document the results of lot tests.

E.2.3 Calibration

Instrument calibration is performed to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for target compounds. Calibration procedures vary by analytical method. In general, each instrument is calibrated initially using certified standards, followed by periodic (i.e., daily) calibration verifications to confirm that the initial calibration is valid.

E.2.4 Method Blank

A method blank (MB) is a QC sample that consists of all reagents specific to the method and is carried through every aspect of the procedure, including preparation, cleanup and analysis. The MB is used to identify any interferences or contamination of the analytical system that may lead to the reporting of elevated analyte concentrations or false positive data. Potential sources of contamination include solvent, reagents, glassware, or the laboratory environment. The MB is prepared with each group of samples processed. One batch of samples is generally defined as a group of 20 samples or less of the same sample matrix that are processed using the same procedures, reagents and standards within the same time period.

E.2.5 Laboratory Control Sample

A laboratory control sample (LCS) is a laboratory-generated clean matrix sample that is fortified with known concentrations of target analytes. The LCS is then carried along with the environmental samples through the entire sample preparation/analysis sequence. Review of the LCS recovery data is used to monitor the performance of the analytical methods. The results of the LCS, used in conjunction with the matrix spike samples, can provide evidence that the laboratory performed the method correctly or the sample matrix affected the results.

E.2.6 Matrix Spike Sample

Matrix spikes (MS) and matrix spike duplicates (MSDs) are analyzed to evaluate the effect of the sample matrix on the accuracy of the analytical procedures. A matrix spike is an environmental sample that has been spiked with known concentrations of target analytes. The matrix-spiked sample is then carried through the entire analytical sequence like all other samples. The analyte concentrations detected during the analysis are compared to the known spike concentrations to obtain a percent recovery for each spiked analyte. The recoveries are compared to acceptance limits and the results are used to evaluate accuracy and the presence of matrix interferences.

The difference between the MS and the MSD analyses is expressed as the relative percent difference (RPD). RPDs are used to evaluate analytical precision and can also be a measure of relative sample heterogeneity.

E.3 Data Quality Evaluation

Upon receipt from the laboratory, each analytical report was thoroughly reviewed and the data evaluated to determine if the data met the project objectives. Data

reviewed included storm water samples. Initially, the data were screened for the following major items:

- A 100 percent check between electronic data provided by the laboratory and the hard copy reports;
- Conformity check between the chain-of-custody forms, compositing protocol, and laboratory reports;
- A check for laboratory data report completeness; and,
- A check for typographical errors on the laboratory reports.

After performing the aforementioned data screening, the laboratory was notified of any deficiencies, if any, by way of a telephone call detailing the problems encountered during the initial screening process.

Following the initial screening, a more complete QA/QC review was performed, which included an evaluation of method holding times, method blank contamination, and accuracy and precision. Accuracy was evaluated by reviewing MS, MSD and LCS recoveries; precision was evaluated by reviewing field duplicate, spike duplicate and laboratory sample duplicate RPDs.

A total of 607 constituents were measured among 107 samples (including field QC samples). Data quality assessment was based upon review of holding times, laboratory blanks, laboratory control samples, laboratory duplicates, matrix spikes and matrix spike duplicates, reporting limits, and field duplicates. Based on the data review, none of the constituent results were rejected. The following sections describe specific items that were evaluated during the QA/QC review process and data that were qualified as estimated due to laboratory QC exceedances.

E.3.1 Holding Times

A sample holding time is defined as the maximum allowable time a sample can be stored after sample collection and preservation until analysis. During the data review process, it was determined that there were 12 holding time exceedances. The exceedances occurred on all samples collected on January 20, 2012 (Sites DSC-TC1, DSC-TT1 and its field duplicate and triplicate samples, DSC-MC1, and DSC-MC2), and were caused by a laboratory instrument error that led to the analysis of nitrate (six results) and nitrite (six results) outside of the EPA recommended 48 hour hold time. The error was resolved and no further hold time exceedances occurred.

E.3.2 Blank Evaluation

As mentioned previously, analytical results from laboratory method blanks were evaluated during the QA/QC review process. Blanks can be used to identify the presence and potential source of sample contamination. If no contamination is present in the blanks, then no further action is required. Laboratory method blanks were analyzed with every batch of samples for most analyses.

In the 2011-2012 dataset, no analytes were detected in the laboratory method blanks at concentrations greater than their respective reporting limits. Therefore, none of the data were qualified as a result of laboratory or field contamination.

E.3.3 Accuracy and Precision

Accuracy is the degree of agreement between a measurement and the true or expected value or between the average of a number of measurements and the true or expected value. Systematic errors affect accuracy. For chemical properties, accuracy is expressed as percent recovery (%R), which is calculated as follows:

$$\%R = [(C_s - C)/S] * 100$$

where:

%R	=	percent recovery
C _s	=	spiked sample concentration
C	=	background sample concentration
S	=	concentration equivalent of spike added

MS, MSD and LCS results were checked to assess the accuracy of the analytical process. MS and MSD results provided an evaluation of accuracy in environmental sample matrices; whereas, LCS results provided a measure of accuracy throughout the entire recovery process.

Precision is an estimate of variability. In other words, precision is an estimate of agreement among individual measurements of the same physical or chemical property, under prescribed similar conditions. Precision can be calculated as the relative percent difference (RPD) as follows:

$$RPD = 2 * [(S - D)/(S + D)] * 100$$

where:

RPD	=	relative percent difference
S	=	concentration measured in original sample
D	=	concentration measured in duplicate sample

Duplicate sample results (field splits and laboratory duplicates) were checked to assess the variability and precision between samples. Depending on the analytical method, various types of laboratory duplicate results were compared to assess precision. For example, some methods require the analysis of an MS and an MSD sample pair, whereas other methods are not as specific. When MS/MSD analyses are not specified, the laboratory calculated precision using a sample and a duplicate of the same sample.

Control limits for spike recoveries and RPDs are shown on Table D-1. These are the acceptance limits used to evaluate the usability of the project data.

Table E-1
Accuracy and Precision Control Limits

Analyte	% Recovery (Accuracy)	RPD (Precision)
Ammonia	80 - 120	20
Nitrate/Nitrite (as N)	80 - 120	20
Orthophosphate	80 - 120	20
Phosphorus (total)	80 - 120	20
Phosphorus (dissolved)	80 - 120	20
TKN	80 - 120	20
TSS	80 - 120	20
Turbidity --		20

The following sections discuss the results of accuracy and precision measurements.

Laboratory Duplicates

In the 2011-2012 dataset, no results were qualified as estimated due to a laboratory duplicate exceedances.

Field Duplicates

There are no specific regulatory criteria available to evaluate field duplicate results. However, because field duplicates are more susceptible than laboratory duplicates to concentration variability, an RPD criterion of 50 percent was used during the data evaluation.

In the 2011-2012 dataset, three triplicate samples were collected and analyzed for 18 total constituents to assess field precision. The field precision in the samples collected from DSC-TT1 on January 20, 2012 exceeded the criteria of 50 percent for total phosphorus and total suspended solids. Therefore, these six results were qualified with "Js" to indicate estimated concentrations as a result of field precision issues.

Laboratory Control Samples

In the 2011-2012 dataset, no results were qualified due to out-of-range LCS recoveries.

Matrix Spike/Matrix Spike Duplicate Samples (MS/MSDs)

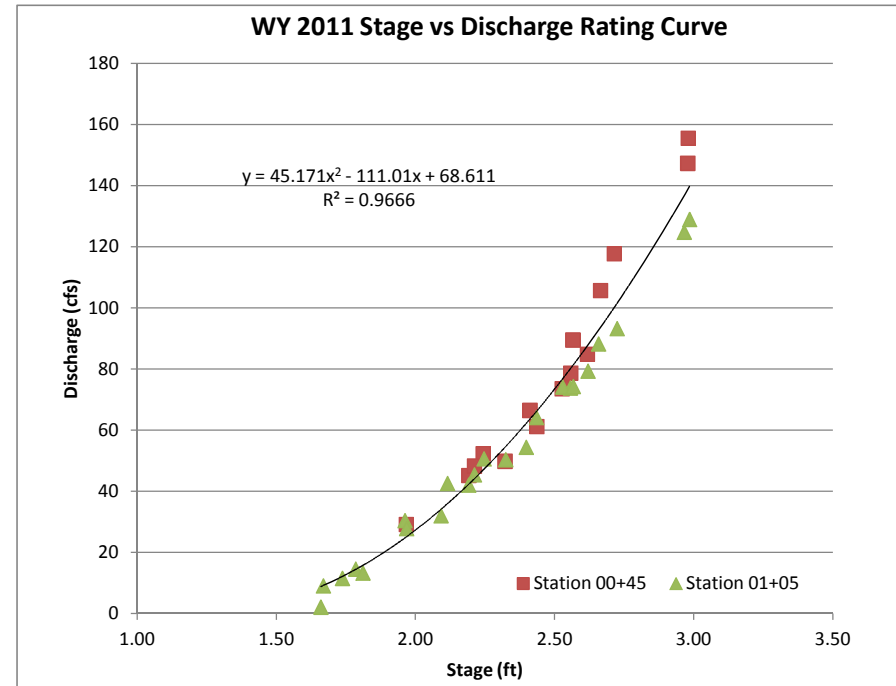
In the 2011-2012 dataset, no results were qualified due to out-of-range MS or MSD recoveries.

Overall Summary

All results were evaluated against Truckee River Water Quality Monitoring Program specified quality control criteria. In total, 12 results were qualified with “Js” due to holding time exceedances and 6 results were qualified as estimated due to field precision issues. The QA/QC review of analytical results found all the data to be of acceptable quality and usable for the intended purposes, including sample data qualified as estimated due to holding time or precision issues.

Appendix F
Rating Curves for Water Years 2011 and 2012

WY2011 Martis Creek @ Franks Fish Bridge Velocity Measurements		
Station 01+05		
Date	Stage (ft)	Flow (cfs)
11/18/2010	1.66	2.09
12/30/2010	1.96	30.42
1/12/2011	1.67	9.05
1/18/2011	1.79	14.53
1/28/2011	1.74	11.5
2/14/2011	1.81	13.23
3/10/2011	2.09	31.99
3/30/2011	2.12	42.53
4/7/2011	2.72	93.22
4/14/2011	2.40	54.4
4/22/2011	2.97	124.76
4/26/2011	2.66	88.2
5/2/2011	2.56	73.825
5/10/2011	2.62	79.2825
5/20/2011	2.25	50.6085
5/26/2011	2.44	64.1005
5/27/2011	2.32	50.345
6/2/2011	2.19	42.0155
6/6/2011	2.99	128.921
6/8/2011	2.53	74.113
6/14/2011	2.57	74.2585
6/24/2011	2.21	45.3605
7/1/2011	1.97	27.795
Station 00+45		
4/7/2011	2.71	117.72
4/14/2011	2.41	66.459
4/22/2011	2.98	155.545
4/26/2011	2.67	105.7
5/2/2011	2.57	89.5155
5/10/2011	2.62	84.8435
5/20/2011	2.24	52.309
5/26/2011	2.44	61.1675
5/27/2011	2.32	49.834
6/2/2011	2.19	45.171
6/6/2011	2.98	147.338
6/8/2011	2.53	73.543
6/14/2011	2.56	78.6525
6/24/2011	2.21	48.269
7/1/2011	1.97	29.1755



WY2012 Martis Creek @ Franks Fish Bridge Velocity Measurements		
Station 00+75		
Date	Stage (ft)	Flow (cfs)
9/30/2011	2.64	1.77
10/10/2011	2.68	3.58
10/17/2011	2.63	2.05
10/28/2011	2.62	2.24
11/10/2011	2.67	3.62
11/16/2011	2.61	2.54
12/30/2011	2.53	1.14
3/8/2012	2.58	9.17
3/14/2012	2.71	25.96
3/16/2012	3.13	74.72
3/19/2012	2.59	22.56
3/23/2012	2.64	23.31
3/30/2012	2.60	21.22
4/4/2012	2.65	26.67
4/9/2012	2.52	16.63
4/18/2012	2.55	20.22
4/20/2012	2.60	27.22
4/23/2012	2.75	41.20
4/26/2012	3.02	79.75

