PROGRESS REPORT
TEMPORARY WATER QUALITY STANDARDS
FOURTH 3-YEAR REVIEW CYCLE

NEW WORLD MINING DISTRICT
RESPONSE AND RESTORATION PROJECT

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Prepared for:

USDA Forest Service
Gallatin National Forest
Bozeman, Montana

Prepared by:

Tetra Tech
851 Bridger Drive
P.O. Box 1413
Bozeman, Montana 59715

November 2011

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INTRODUCTION

The New World Mining District (District) Response and Restoration Project is a mine waste cleanup project that is being undertaken by the U.S. Department of Agriculture (USDA) Forest Service under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to mitigate historic mining impacts to human health and the environment. This historic mining district, which is centered about four miles northeast of the northeast entrance to Yellowstone National Park, has hard rock mining wastes and acidic discharges that contain elevated levels of trace metals. Surface water quality in area streams is degraded by metal contaminants present in stream sediments, adjacent mining waste rock, adit discharges, and natural seeps/springs. Water quality in these streams does not meet State of Montana water quality standards.

Integral to the cleanup of mining-related contamination in the District are provisions provided in the State of Montana Water Quality Act that allows cleanup work to proceed while state water quality standards are exceeded. These are known as temporary water quality standards, and were adopted by the State of Montana Board of Environmental Review (Board) in 1999 for Daisy Creek, Fisher Creek, and a portion of the upper Stillwater River. The Board reviews these standards every three years to determine whether adequate efforts have been made to implement the plans submitted as the basis for the temporary standards. The purpose of this progress report is to present information to support the Board's review of the temporary standards. This is the fourth 3-year review cycle for the District's temporary standards.

TEMPORARY WATER QUALITY STANDARDS

Under the State of Montana Water Quality Act (§§ 75-5-101 et seq., Montana Code Annotated {MCA}), the state has promulgated regulations to protect, maintain, and improve the quality of surface waters in the state. The State of Montana has classified the streams in the District as B-1. The definition of B-1 is waters that are suitable for drinking, culinary and food processing (after conventional treatment), bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply. Water quality in certain upper reaches of the District's streams does not meet B-1 narrative standards and certain water quality criteria specified in Montana Department of Environmental Quality (MDEQ) Circular DEQ-7 (MDEQ, 2006), in part due to past mining activities.

The Montana Water Quality Act allows for the adoption of temporary water quality standards for a specific water body or segment in those instances in which substantive information indicates that the water body or segment is not supporting its designated use. On January 22, 1999, the USDA Forest Service submitted a petition to the Board for adoption of temporary water quality standards for Fisher Creek, Daisy Creek, and a portion of the upper Stillwater River. This petition was approved by the Board on June 4, 1999, allowing temporary standards to be adopted for a period of 15 years from the date of approval.

Section 75-5-312 (10), MCA, provides for a 3-year review of temporary standards and the implementation plan. The review includes a public hearing at a regularly scheduled Board meeting that allows opportunity for public comment. The first 3-year review was completed in 2002, the second in 2005 (Maxim 2005b), and the third 3-year review was completed in 2008 (Tetra Tech 2008c). In all three reviews, the Board chose to take no action at the end of each review process, leaving the temporary standards unchanged.

SUPPORT DOCUMENT AND IMPLEMENTATION PLAN

A Support Document and Implementation Plan was submitted with a petition for temporary standards in January 1999 (Stanley and Maxim, 1998). The Support Document and Implementation Plan fulfilled the requirements of the Montana Water Quality Act (75-5-312) by describing:

- the chemical, biological, and physical condition of the stream segments,
- existing water quality standards that were not being achieved,
- temporary modifications to the standards that were requested for the stream segments,
- existing beneficial uses,
- designated uses considered attainable in the absence of water quality limiting factors,
- a description of the proposed actions that will eliminate water quality limiting factors, and
- a schedule for cleanup.

The Support Document and Implementation Plan was revised on May 20, 2003 to update the cleanup schedule presented in the original plan (Maxim, 2003a).

SITE LOCATION AND DESCRIPTION

The New World Mining District occurs within both the Gallatin and Custer National Forests, and adjoins Yellowstone National Park's northeast corner. The Absaroka-Beartooth Wilderness Area bounds the District to the north and east with the southern boundary of the District formed by the Montana-Wyoming state line. The District lies entirely within Park County, Montana (**Figure 1**).

The communities of Cooke City and Silver Gate, Montana are the only population centers near the District. The neighboring communities of Mammoth, Wyoming and Gardiner, Montana are located about 50 miles to the west. Red Lodge, Montana is located about 65 miles to the northeast by way of the Beartooth Highway (U.S. Highway 212), and Cody, Wyoming is located 60 miles to the southeast.

The District covers an area of about 25,600 acres. The District includes both District Property and non-District Property, where District Property is defined as all property or interests in property that was relinquished to the United States by Crown Butte Mines, Inc., (CBMI), the former owner of the property, (**Figure 1**). Acquisition of the Reeb Estate land holdings further consolidated District Property ownership in 2009 (**Figure 2**). Historic mining disturbances affect about 50 acres located on District Property. Mining disturbances on non-District Property include a number of smaller sites and three larger sites, the McLaren Tailings and McLaren Mill Site, which cover an additional 17 acres, and the Great Republic Smelter, which is located south of the town of Cooke City and covers 0.5 acre. The McLaren Tailings, McLaren Mill Site, and the Great Republic Smelter sites exist on both private and National Forest System (NFS) lands.

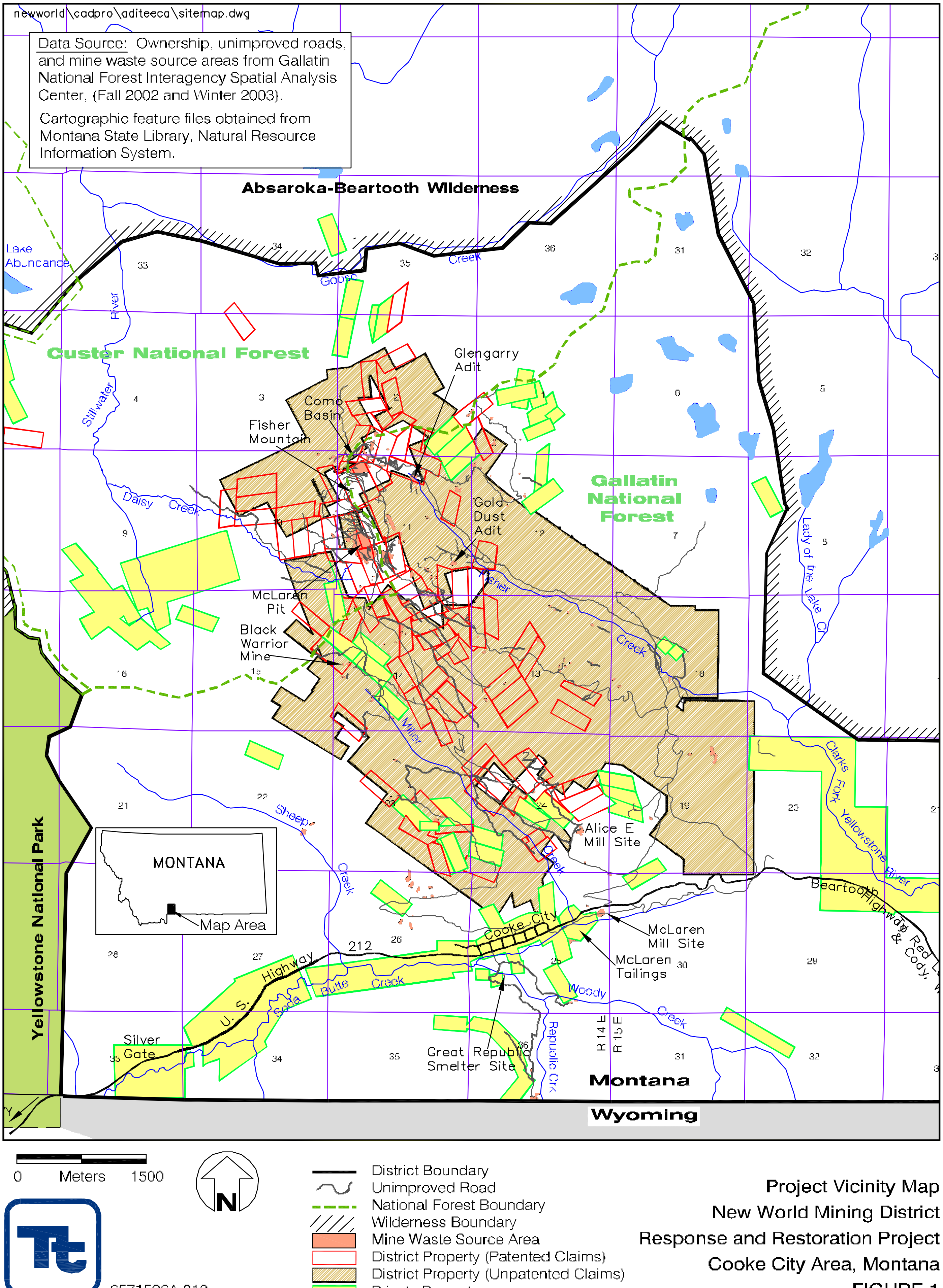
The District is located at an elevation that ranges from 7,900 feet to over 10,400 feet above sea level. The site is snow-covered for much of the year. The only route of travel open on a year-round basis to Cooke City is the highway between Mammoth and Cooke City. The topography of the District is rugged and mountainous with numerous glacial erosional features, and is situated at the headwaters of three rivers that are tributaries to the Yellowstone River. The three tributaries are the Clark's Fork of the Yellowstone River, the Stillwater River, and the Lamar River. The Lamar River flows through Yellowstone Park. The major headwater tributary streams in the District include Daisy, Miller, Fisher, Goose, Sheep, Lady of the Lake, Republic, Woody, and Soda Butte Creeks (**Figure 1**).

PROJECT BACKGROUND

On August 12, 1996, the United States signed a Settlement Agreement with CBMI to purchase CBMI's interest in its District holdings. This transfer of property to the U.S. government effectively ended CBMI's proposed mine development plans and provided $22.5 million to cleanup historic mining impacts in the District. In June 1998, all interested parties and CBMI signed a Consent Decree (Decree). The Decree, approved by the United States District Court, finalized the terms of the Agreement and made available the funds that are being used for mine cleanup.

The Forest Service is the lead agency responsible for implementing the cleanup of mining related impacts in the District. Other state and federal agencies are cooperating with the effort, including the U.S. Department of Interior (DOI), the U.S. Environmental Protection Agency (EPA), and MDEQ. As specified in the Decree, the USDA Forest Service is able to use its Superfund authority, which is granted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, the Superfund enabling law), to proceed with the cleanup. The Superfund law, in concert with guidance provided by the EPA, establishes a process whereby cleanup actions follow specific guidelines and protocols. The USDA Forest Service is executing the Response and Restoration Project by following the process for Non-Time-Critical Removal Actions (EPA, 1993). Under the terms of the Decree, work has to be completed on District Property before beginning work on any non-District Property. As funds are available after District Property is cleaned up to the satisfaction of the United States, other mining disturbances in the District may be addressed.

Under Superfund, particulars such as characterizing the nature and extent of pollution, assessing risks, identifying and evaluating cleanup alternatives, and keeping the public informed and involved are part of the cleanup process. Following EPA guidance, the Forest Service has modified this process to address the specific nature of contaminants and other related aspects in the District. Cleanup activities conducted by the Forest Service began in 1999.



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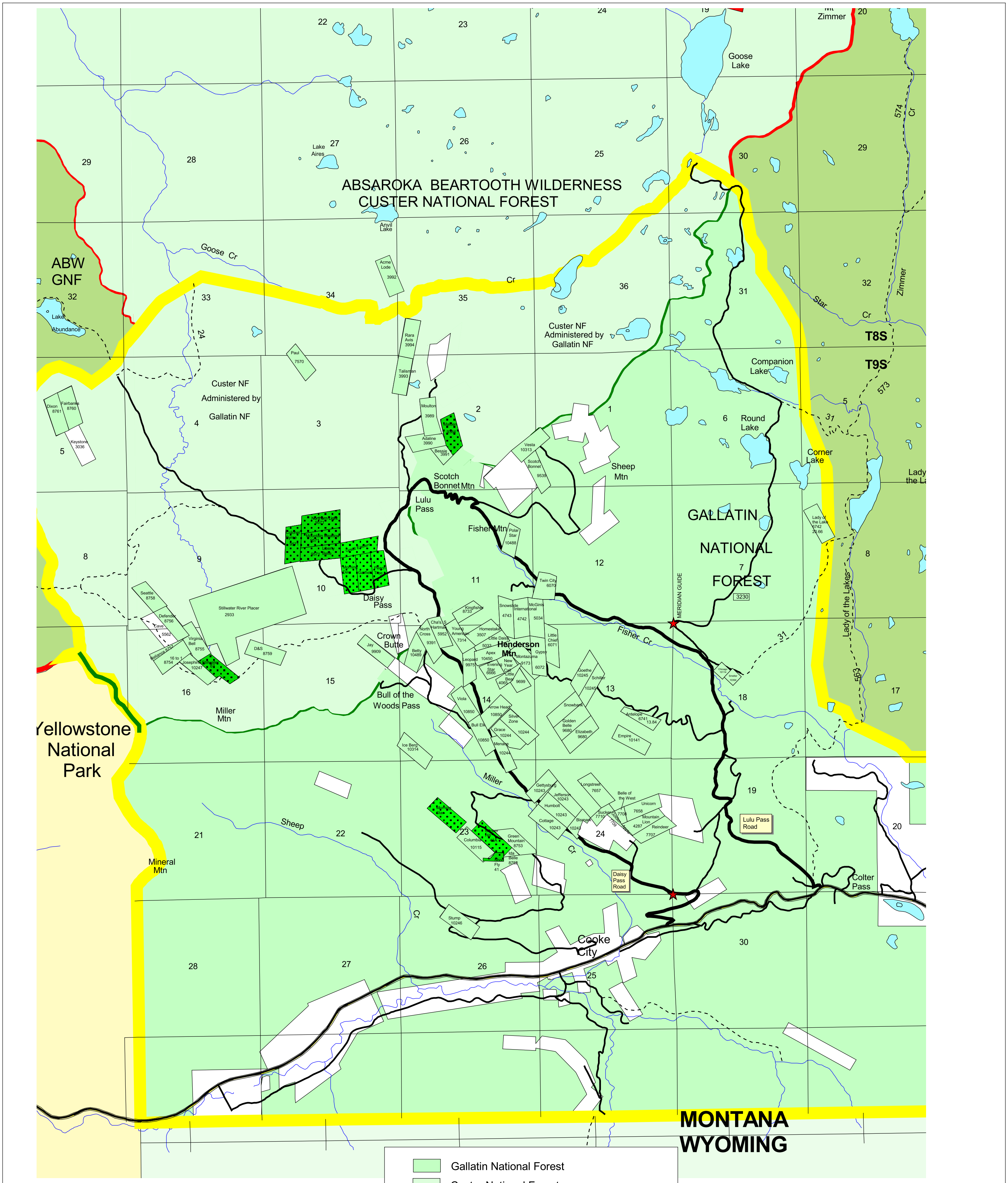
Project Vicinity Map
New World Mining District
Response and Restoration Project
Cooke City Area, Montana
FIGURE 1



1 0 1 Miles

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- Gallatin National Forest
- Custer National Forest
- Patented Claims - Other Private Ownership
- US and Other Private Ownership
- Absaroka Beartooth Wilderness
- New World Mining Withdrawal
- National Forest Boundary

prepared by: Gallatin National Forest/jsr **November 4, 2011**

New World Mining District Land Status After Reeb Estate Acquisitions Cooke City Area, Montana

FIGURE 2

PROBLEM DESCRIPTION

The Forest Service has developed a conceptual model that describes and characterizes sources of mine wastes in the District and pathways by which metal contaminants move within the environment. This model is based on results of numerous previous investigations into the source and movement of metal contaminants. The conceptual model provides insight into the likely mechanisms that are involved in releasing pollutants into the environment, and the pathways in which humans and other environmental receptors are exposed to pollutants.

Major sources of contaminants at the site are acidic, metal-laden water discharges that originate from mine waste dumps located near mine openings, tailings deposits, and underground massive sulfide deposits that have been exposed to atmospheric weathering conditions by either exposure in mine workings or along natural fractures and faults. Significant discharges include the McLaren Subsurface Drains and other acidic, metals containing seeps and springs flowing into a tributary to Daisy Creek in the vicinity of the McLaren Pit. Currently, nine other mine adits with perennial discharges produce acidic and/or metals-containing water that exceed aquatic life standards (one of which is on non-District property). In addition, there are numerous naturally occurring, acid seeps and springs in the headwaters of Fisher Creek and Daisy Creek that are acidic and/or metal-containing.

Other waste sources include over 150 mine waste rock dumps on District Property that totaled about 430,000 cubic yards of mine waste, with most contaminants volumetrically residing in a few large waste sites including the McLaren Pit, the Como Basin, and the Glengarry Mine waste rock dump (**Figure 1**).

Response actions have included removal of mine waste and tailings from a number of mine sites to an engineered waste repository in 2001, capping of the McLaren Pit and associated mine waste in 2003, and capping and amending sulfide-bearing soil materials in the Como Basin in 2005/2006. Mine waste and ore concentrates were also removed from a number of other mine sites in 2005, including the Glengarry, Gold Dust, Black Warrior, Little Daisy, McLaren Mill Site (NFS land), and Republic Smelter Site (private and NFS land). The existing waste repository was expanded in order to accommodate these wastes.

The primary mechanisms whereby contaminants present in mine wastes move through the environment include the following:

- Physical erosion and transport of contaminated mine waste or sediment,
- Contaminants dissolving in rain or snowmelt to become runoff into area streams and/or infiltrating into groundwater,
- Contaminated water moving through underground mine workings and improperly abandoned exploratory borings where sulfide minerals are exposed,
- Contaminants in groundwater that discharge into area streams, and
- Contaminated surface water that recharge underlying groundwater.

Except for some of the larger waste dumps, individual contributions of specific mine waste sources via the pathways identified above are difficult to quantify. Work by previous investigators, primarily the U.S. Geological Survey (USGS), has shown that metals loadings in area streams are derived from groundwater inflow, adit discharges, tributary inputs, and leachate from waste dumps (Kimball, et.al., 1999). For example, a study on Fisher Creek (before closure of the Glengarry Adit and removal of the waste dumps) showed that 20% of dissolved copper load in the creek came from the Glengarry Adit discharge, with 14% attributed to leachate from the Glengarry dump, 21% to tributary input from the

Como Basin, and 14% in tributary input from Fisher Mountain. About 30% of the remaining dissolved copper load could not be attributed to any particular source.

Secondary sources of contaminants include stream sediments that have been transported downstream from other contaminated sources and metals that form chemical precipitates in streambeds as chemical conditions in streams change. These secondary metals-containing stream sediment sources also contribute to a decrease in water quality in Daisy and Fisher creeks.

Risks to humans and animals from mine waste sources are primarily related to direct contact or ingestion of metals contaminants. Because the main sources present on District Property are located away from permanent human residents, consumption of groundwater or surface water is not considered a significant exposure pathway. Although site specific exposure risk to animals from surface water or consumption of surface water has not been quantified, other sources of information on wildlife populations do not indicate that animals are at risk from exposure to mine waste contaminants at the site.

Exposure pathways to aquatic organisms primarily occur in-stream. Aquatic exposure results from contact with or consumption of metals-laden sediment and surface water. Plants that might recolonize waste dumps are exposed to metal contaminants primarily from root uptake. These plants are often weakened or even absent due to chemical conditions in waste materials.

Using the above information as a rough approximation of the potential beneficial effect of response and restoration actions, it is evident that cleanup actions directed at reducing or treating flows from the more substantial adit discharges should directly result in water quality improvements. This is also true of leachate generated from waste dumps that directly impact surface water. The effect on surface water or groundwater quality resulting from cleanup actions directed at mine waste sources located farther from surface water drainages or in areas where groundwater is deeper is much harder to quantify. Likewise, the effect response or restoration actions may have on other sources, such as secondary stream sediment, is very difficult to quantify. Metals in stream sediment have complicated chemical reactions with surface water and water quality can change markedly with varying flow rates. However, even for these more distant sources, water monitoring data following response and restoration actions indicate that there has been a positive effect on water and sediment quality. Future monitoring of these environmental media should show continued improvements over time.

PROJECT ACTIVITIES

Details of projects activities are described in work plans that have been prepared annually for the project since 1999 (Maxim, 1999; 2000; 2001a; 2002a; 2003b; 2004a; 2005a; 2006a; Tetra Tech 2008a, 2008b, 2009a, and 2009b). Activities that have been conducted to date include the following:

- Established a database management system, catalogued existing information available for the site, evaluated existing information and data; identified and filled data gaps; and developed a suitable base map of the District to support environmental studies, engineering design, and response action construction.
- Recorded the locations and characteristics of mine waste dumps, adits, and stream sediments, and developed a database of site characteristics.
- Ranked mine waste sources according to a modified Hazard Ranking System to aid in the prioritization of sites identified for clean up.
- Identified unrecorded cultural features.
- Improved portions of the Daisy Pass and Lulu Pass roads to accommodate construction traffic and minimize erosion.
- Improved a previously constructed surface water diversion around the Como Shaft.
- Evaluated water quality treatment alternatives for acid mine discharges.
- Installed and monitored wells in the McLaren Pit and Como Basin; monitored surface water and groundwater quality District-wide; sampled and analyzed soil and mine wastes throughout the District.
- Completed a repository siting evaluation and collected hydrogeologic data on two prospective repository sites.
- Completed surface water tracer studies on Fisher Creek, Daisy Creek, and Miller Creek to determine surface water inputs of metal contaminants.
- Prepared the Selective Source Response Action Engineering Evaluation and Cost Analysis (EE/CA) in 2001. In accordance with the preferred alternative identified in this document, removed about 32,000 cubic yards of waste rock and mill tailings from 14 mine waste areas and disposed of these wastes in an engineered repository (Repository). About 4.6 acres of the former waste areas were revegetated as part of this response action.
- Prepared the McLaren Pit Response Action EE/CA in 2001. In accordance with the preferred alternative identified in this document, waste rock dumps from the Daisy Creek headwaters area were consolidated into the historically operated McLaren Open Pit. This waste source accounts for about 67% of the total waste rock volume on District Property. Construction activities were initiated in 2002 with consolidation of waste in the former mine pit, and completed in 2003 with the construction of an impermeable cap over the consolidated wastes.
- Reopened the McLaren Adit to conduct an evaluation of the underground mine workings and water sources within. A borehole leaking metals-containing water into the underground workings was grouted closed in 2003.
- Prepared the Miller Creek Response Action EE/CA in 2004. In accordance with the preferred alternative identified in this document, conducted a Source Controls Removal Action at four mine

sites in the Miller Creek drainage in 2004 and at two mine sites in 2006 including the Little Daisy and the Black Warrior mine waste sites.

- Prepared the Como Basin/Glengarry Adit/Fisher Creek Response Action EE/CA in 2002. In accordance with the preferred alternative identified in this document, removed 34,900 cubic yards of waste rock and ore concentrates from various mine waste areas on District properties and from the NFS portion of the McLaren Mill Site and NFS land and private property at the Republic Smelter Site. About 21.4 acres of the former waste areas, including the Repository, were revegetated as part of this response action. Final capping and closure of the Repository was conducted in 2006.
- Reopened the Glengarry Adit and Como Raise to more fully characterize underground sources of water within the mine. Prepared the Como Basin/Glengarry Adit/Fisher Creek Response Action EE/CA in 2002 using the findings found during the reopening work. Discharge from the adit was eliminated by backfilling and hydraulic plugging the Como Raise, grouting a fracture in the underground workings, installing several watertight plugs and backfilling the workings with rock and cement. Construction work began in 2003 and was completed in 2005.
- In accordance with the preferred alternative of the Como Basin/Glengarry Adit/Fisher Creek Response Action EE/CA; an impermeable cap was placed on the Como Basin and cover soil materials were amended with lime in 2005 and 2006. The Como Basin site and adjacent road corridors were revegetated. Other response actions included regrading of the road corridor, stabilization of vehicle cut-across areas, placement of runoff controls, and placement of revegetation/erosion mat between the Glengarry and Como Basin sites. Improvements were also made to stream channels below the Como Basin. The Como Basin Response Actions were completed in 2006.
- Monitored revegetation at reclaimed sites.
- Prepared an Adit Discharge EE/CA in 2010 for remaining adit discharges on District Property. The EE/CA provides preferred alternatives to address source control/treatment of contaminated water from adit discharges.
- Stabilized the incised channel of the upper portion of Fisher Creek in the vicinity of the Glengarry Mine Site in 2008.
- Plugged and regraded the area around the Glengarry Millsite adit in 2008.
- Reconstructed Glengarry portal closure in 2009 in response to slumping of the 2005 portal closure.
- Relocated and restored the Lake Abundance hiking/equestrian trail.
- Constructed a rock lined ditch to direct discharge from the Lower Tredennic adit into an infiltration basin.
- Constructed a closure and infiltration basin to passively treat discharge from the McLaren adit in 2010.
- Prepared Long-Term Operations and Maintenance Plan to guide activities that will occur when reclamation work is completed.
- Road surface stabilization, drainage improvements, cut and fill slope stabilization, or road obliterations on 28.5 miles of District roads.

All of the activities listed have been documented in work plans, reports, or technical memoranda and have been issued to MDEQ, EPA, DOI, and the public for review and comment. Most of these documents are available for downloading on the project web site (http://www.fs.fed.us/r1/gallatin), and all are available at two project information repositories: the Chamber of Commerce office in Cooke City, Montana and the Gallatin National Forest Supervisor's Office in Bozeman, Montana.

RESPONSE ACTION CLEANUP PROJECTS

The original Support Document and Implementation Plan identified 18 Operable Units (OUs) in the District. An OU is defined as a discrete action that comprises an incremental step toward comprehensively addressing site problems. The OUs that contribute the majority of impacts to water quality were identified as the following:

- McLaren Pit
- Glengarry Adit and Shafts (underground mine)
- Spalding Tunnels (underground mine)
- Como Basin
- Gold Dust Adit (underground mine)

The remaining 13 OUs are smaller contributors to water quality degradation, and most were defined in a broader sense rather than as specific sites in the Support Document and Implementation Plan. These broadly defined OUs include many smaller prospects and waste dumps that lie scattered throughout the District. In the Revised Support Document and Implementation Plan, the originally proposed OUs were reorganized into watershed-based units.

By following the Non-Time-Critical Removal Action process, the Response and Restoration Project uses the EE/CA process to identify, scope, and evaluate cleanup alternatives that can address specific mining-related risks and impacts. Preparing an EE/CA involves taking a comprehensive look at site characteristics and human health and environmental risks, and then follows an established process of screening relevant response options, developing response alternatives, and evaluating alternatives in detail. The detailed analysis of alternatives weighs the expected results of an alternative against seven criteria. After weighing the pros and cons of a number of alternatives, the Forest Service selects a preferred alternative and issues the EE/CA to MDEQ, EPA, and DOI for review and comment. Comments received from these agencies are considered, and the revised EE/CA is submitted to the public to solicit additional comment. Significant comments received on the public draft of the EE/CA are addressed in a Final EE/CA, and a decision document, called an Action Memorandum, is issued.

There have been five EE/CAs written for the project to date. Five decision documents have been written and signed, and construction has been completed on the first four response actions. A brief summary of each of the response actions conducted to date is presented below.

SELECTIVE SOURCE RESPONSE ACTION

Using a hazard ranking system to rank all the sites in the District, source area characteristics were appraised and an initial cleanup project was proposed in 1999. The first draft of the Selective Source Response Action EE/CA, which targeted removal of eight waste dumps impacting surface water in the Fisher Creek headwaters, was written, and the preferred alternative, waste removal to a repository site on National Forest System lands in the lower portion of the Fisher Creek drainage near the Lulu Pass road, was selected. As a result of public comment, the 1999 cleanup work was delayed so that more groundwater quality and flow information could be collected at the repository site.

Following an additional year of data collection at the repository site, the Selective Source Response Action EE/CA was re-released to the public in 2000, and the preferred alternative re-selected (Maxim, 2001b). An engineering design package was prepared in the fall of 2000 which detailed reclamation plans for the selected sites, and presented plans and specifications for construction of a repository with a bottom liner, leachate collection system, and a double-lined capping system.

The Selective Source Response Action was initiated in 2001 and completed in 2002. This initial cleanup project involved removing approximately 32,000 cubic yards of mine waste rock and mill tailings from eight mine waste areas, disposing of these wastes in the Selective Source Repository, and revegetating about 4.6 acres of the former waste areas. The waste areas cleaned up and the volume of waste permanently disposed represent about 9% of the area and 8% of the volume of waste stored on District Property.

The major components of repository construction involved development of a rock quarry, construction of a 15,700 cubic yard rock toe buttress, installation of a 2.5 acre bottom liner system with toe drains and sump, and installation of temporary and permanent cover systems. Due to difficulties involved with construction and the short construction season, temporary measures used to winterize the construction site in 2001 could not prevent spring runoff from wetting the waste placed in the repository, which resulted in the repository sump filling with water in the spring of 2002. Measures were taken in 2002 to correct the problems associated with the temporary closure, but, while these measures considerably reduced the amount of water that leaked into the repository, saturated soil conditions that occur during spring runoff caused water to enter the repository each year. Water that accumulates in the sump is actively managed, with accumulated water currently being disposed of at the Cody, Wyoming, sewage treatment lagoon (about 315,450 gallons since 2001). The Repository was permanently closed in 2006 and leaks along the margin of the temporary cover were repaired. The rate of water accumulation in the repository has successively decreased each year since the repair as moisture in the repository waste reaches equilibrium (Tetra Tech, 2011).

MCLAREN PIT RESPONSE ACTION

Planning and preparation for the McLaren Pit Response Action began in 1999. A considerable amount of environmental and engineering data was needed and subsequently collected during the 2000 field season. The USGS, working with the USDA Forest Service, conducted an ionic tracer study of metals loading in Daisy Creek in 2000, and the Forest Service collected data in the McLaren Pit that would support preparation of an EE/CA. Hydrologic and metals loading models were completed with these data, indicating that the McLaren Pit seasonally contributed from 20% to 50% of the metals load in Daisy Creek. With the results of these studies substantially complete in the fall of 2000, a draft of the McLaren Pit Response Action EE/CA was prepared and submitted to the public in May 2001 (Maxim, 2001c).

The preferred alternative for the McLaren Pit Response Action was consolidation of waste rock from dumps in the Daisy Creek headwaters into the McLaren Pit, and covering the consolidated wastes with an impermeable cap. This waste source covered about 10 acres and accounted for about 67% of the total waste rock volume on District Property. Waste dumps consolidated into the pit included two adjacent sites, the *McLaren Pit Spoils* (wastes located below the county road and west of the pit) and the *Multicolor Dump*. These two waste areas were about 24,000 cubic yards of waste rock and covered about 3.5 acres of disturbance.

An engineering design and construction package for the McLaren Pit response action was completed in March 2002, and construction contractor, URS, was selected to do the work. Construction involved capping about 11 acres of the pit with a geomembrane liner, covering the liner with a drainage layer and soil, and constructing runon and runoff channels to convey water off and away from the capped wastes.

Construction began in July 2002 with consolidation of waste rock from the edges of the pit, regrading of the waste to prepare for construction of the multi-layered cap, and construction of runoff and runon ditches and channels. In 2003, the multi-layered cap was completed.

Water quality data collected since 2004 indicate that improvements in surface water quality resulting from capping could be measured during both low and high flows. Improvements to water quality are most dramatic during high flows because there is now a greater contribution of uncontaminated water during the spring snowmelt period in upper Daisy Creek. With the cap in place, snowmelt cannot become contaminated by infiltrating into metal and sulfide rich soil, waste materials, and bedrock of the McLaren Pit.

GLENGARRY/COMO BASIN/FISHER CREEK RESPONSE ACTION

The Glengarry Mine was targeted for rehabilitation since the inception of the Response and Restoration Project because it was one of the principal sources of metals loading in the headwaters of Fisher Creek. The mine historically discharged between 23 and 57 gallons per minute (gpm) of low pH, iron-, zinc- and copper-laden water directly into Fisher Creek.

The Glengarry Mine consisted of 3,060 feet of drifting and two nearly vertical raises. One of the raises extended 425 feet upward and surfaced in the Como Basin at the foot of the north flank of Fisher Mountain. The top of this raise passed through the Meagher Limestone formation, and a massive sulfide deposit hosted in the Meagher.

In September and October 2000, the Glengarry was reopened for assessment purposes. During this first phase assessment, accumulated debris and precipitated iron hydroxide mud two to five feet deep were removed from the underground workings beginning at the portal and extending back to a "Y" intersection 1,540 feet in from the portal. The two branches of the "Y" were made accessible, but debris and mud were not removed past the “Y” intersection. The following year, the second raise was reopened from the surface in the Como Basin and repaired down to a point well below the base of the Meagher Limestone. Three separate short horizontal workings were encountered in the raise in the Meagher Limestone at 35, 75, and 100 feet below the surface. At the first raise, debris was removed and temporary ladders were installed to determine the nature of the raise above a timbered bulkhead, 50 feet above the level of the drift. However, removing this bulkhead was considered too dangerous so no further reopening work was conducted in the first raise.

Using a detailed water sampling program within the Glengarry drift and the Como Raise, major inflows of water and metals loads were identified. Water flowing into the Glengarry came from essentially three point sources and one diffuse source. The point sources were the Como Raise, the first raise, and a roof leak located 1,050 feet from the adit portal (1050 roof leak). Diffuse roof leaks were observed primarily in the first 1,200 feet in porphyritic intrusive rock. A loading analysis showed that the vast majority of metals loading into the adit could be attributed to the raises and the 1050 roof leak, with the primary source of copper being the Como Raise. The 1050 roof leak contributed more arsenic, aluminum, and cadmium load than the raises, although roughly equal loads of iron, lead, and zinc were attributed to the raises and the 1050 roof leak.

A Draft EE/CA was released to the public in June 2002 that evaluated response action alternatives to address mining impacts from mining-related sources in Fischer Creek, including the Glengarry Adit, the Como Basin, and remaining mine waste dumps in the Fisher Creek drainage (Maxim, 2002b). The EE/CA was structured around each of these three source areas, with source-specific response action alternatives developed for each. The preferred alternative selected in the EE/CA was a combination of several alternatives that addressed each source area.

For the Glengarry Adit, the preferred alternative selected was to eliminate the adit discharge at the portal. This alternative included grouting and backfilling the Como raise, grouting the 1050 roof leak, installing several water tight plugs in the main drift, and partially backfilling the drift. For the Como Basin (the second source area), the preferred alternative involved capping unconsolidated and disturbed materials in the basin with an impermeable geomembrane capping system similar to that constructed in the McLaren Pit. Soil cover over the impermeable liner would be salvaged from the capped area and amended with lime for suitability of revegetation. The preferred alternative for remaining mine dumps in the Fisher Creek drainage involved removing the two largest waste rock dumps (the Glengarry and Gold Dust) to the Selective Source Repository, and implementing run-on and runoff controls at dumps that were identified as posing potential sediment and erosion hazards.

Work on the preferred alternatives for the Glengarry/Como Basin/Fisher Creek sources was initiated in 2003 in the Glengarry Adit and involved grouting the Como Raise and the 1050 roof leak, and preparing the plug sites. Run-on and runoff controls were also completed at selected dumps in Fisher Creek. Plugging and backfilling the Glengarry was completed in 2005. Construction of the cap in the Como Basin and removing the Glengarry and Gold Dust dumps was completed in 2006.

In 2009 it was discovered that the earthen Glengarry portal plug had subsided as a result of saturation. Discussions between the Forest Service and Tetra Tech personnel determined an urgent portal plug reconstruction was required to minimize the risk of a catastrophic failure of the plug that might cause a significant sediment loading discharge to the receiving waters of Fisher Creek during the 2010 spring runoff period. The reconstruction included removal of the original plug, drain pipe installation, coarse rock backfill and final reclamation.

Monitoring data has indicated significant water quality improvements in Fisher Creek resulting from plugging of the Glengarry adit. Water quality improvements resulting from capping the Como Basin, in the first season of monitoring, have not been apparent. However, trends in improvement in upper Fisher Creek, from capping the Como Basin, are anticipated, in time, to be similar to what was observed in Daisy Creek below the McLaren cap.

MILLER CREEK RESPONSE ACTION

A Draft EE/CA for sources located on District Property in the Miller Creek drainage was completed in June 2003 (Maxim, 2004b). This EE/CA evaluated response options and technologies to mitigate potential impacts from mine waste areas that contribute to surface water quality degradation in the Miller Creek drainage. The preferred alternative selected in the EE/CA for Miller Creek was removal of two of the larger dumps in the drainage to the Selective Source Repository, and implementing surface water controls at four dumps where surface water is in contact with waste dump materials. The other mine waste dumps not included in the preferred alternative did not significantly impact water quality.

The Black Warrior and Little Daisy waste rock dumps were removed in 2006 as part of the Miller Creek Response Action. The Black Warrior dump was the only mine waste deposit in the Miller Creek drainage that presented a human health risk, and contained about 22% of the total mine waste on District Property in this drainage. At the Little Daisy Mine, waste rock existed at the mouth of the adit and discharge from the adit flowed through the dump. While impacts to groundwater or surface water from this dump could not be demonstrated, removal of the Little Daisy dump was conducted because infiltration of water through waste materials is identified as a major pathway for contaminant movement in the conceptual model developed for the site. Removal of these two dumps from the watershed eliminated 46% of the total volume of waste present in Miller Creek.

In addition to alternatives related to mine waste dumps in the Miller Creek drainage, the Miller Creek EE/CA examined restoration actions to respond to impacts to natural resources. The major impact to natural resources is related to sediment contamination derived from roadways throughout the District. Areas of known and potential acid production and other areas of anomalous metal concentrations in soil and bedrock represent significant sources of contamination that are exacerbated by surface disturbances such as roads that expose these materials to ongoing erosion. Many roads that cross these areas were historically developed to access the numerous mines and prospects in the District. Sediments derived from roads impact surface water quality as well as aquatic habitat, and reducing sediment derived from roads should, therefore, improve water quality. About 28 miles of road will be treated in the future as a part of the Miller Creek Response Action, including drainage structures along the Lake Abundance road, which provides access to the lake from Daisy Pass.

ADIT DISCHARGE RESPONSE ACTION

Response Actions associated with adit discharges in the District are currently being evaluated in a separate EE/CA, the draft of which was released in 2006. A number of adits were reclaimed between 2001 and 2005 resulting in a cessation of water discharge at a number of these adit sites. This work included plugging an exploratory borehole in 2003 that discharged water into the McLaren adit. This borehole had contributed more than 70% of the copper load measured in the discharge at the portal. In 2005, several boreholes were plugged that discharged water into the Gold Dust adit thereby reducing the discharge out of this adit, as well.

The Adit Discharge EE/CA lists 14 perennially flowing adit discharges in the district of which ten adit discharges (including the McLaren Subsurface Drains) are acidic, metals-laden, and exceed aquatic life or human health standards/guidelines. Considered response actions to treat or eliminate the discharges range from construction of a passive/active treatment system to installation of hydraulic plugs. The Draft EE/CA (Tetra Tech, 2006) addresses risks to water quality from adit discharges by analyzing potential treatment scenarios and resulting load reductions that might be realized. Final reclamation work was conducted at four of these adits, the Black Warrior Adit, Glengarry Mill-Site Adit, the Lower Tredennic Adit in 2008/2009 and the McLaren Adit in 2010 after the draft version the EE/CA was prepared. Therefore, only five remaining discharges were carried through the screening and evaluation of potential response action alternatives in the Final EE/CA. The result of the Final EE/CA is a preferred alternative to continue monitoring reclamation performance.

CLEANUP SCHEDULE

Table 1 shows the cleanup schedule for past work and work planned for the remaining time duration of the project. The first year of actual cleanup work was 2001. Remaining work on Non-District Property (**Table 1**) is contingent on receipt of a Certificate of Completion from the United States and the State of Montana, as well as availability of funding for cleanup. The schedule presented in **Table 1** may require modification as the project proceeds, as the schedule may be affected by a variety of factors including, but not limited to, weather conditions, availability of materials, equipment, and/or supplies, contract administration delays, or contract appeals.

TABLE 1
CLEANUP SCHEDULE
New World Mining District Response and Restoration Project

YEAR	PROJECT	NOTES
2001	Selective Source Response Action	Removal of waste from 8 sites to a constructed repository
2002	McLaren initial year	Waste rock consolidation and construction of drainage controls
2003	McLaren second year	Complete waste regrading; construct capping system
	Glengarry Adit initial year	Grout Como Raise; prepare Glengarry tunnel for grouting and backfilling
2004	Glengarry Adit second year	Backfill Glengarry Tunnel; install cemented fill
	Fisher Creek Source Controls	Regrade/revegetate waste dumps at 8 sites
	Miller Creek Source Controls	Regrade/amend/reveg waste dumps at 4 sites
2005/2006	Glengarry Adit third year	Install remaining plugs and cemented backfill
	Como Basin Cap and Cover Completed	Cap and cover disturbed and metals-enriched soil materials in-situ
	Lulu Pass Road Reclamation	Conducted in conjunction with Como Basin Response Action
	Fisher Creek Dump Removals	Glengarry and Gold Dust dumps
	Miller Creek Dump Removals	Black Warrior and Little Daisy dumps
	McLaren Mill Site Waste Removal	Cleanup funds outside Consent Decree (National Forest System land only)
	Great Republic Smelter Waste Removal	Cleanup funds outside Consent Decree
	Selective Source Repository Expansion and Closure	Fisher and Miller Creek Dumps, McLaren Mill Site and Republic Smelter wastes
	Monitoring Well Abandonment	Unused monitoring wells were abandoned in the Fisher Creek drainage and in the repository area
2007	Adit Discharge Response Action	Conduct ongoing adit discharge monitoring
2008	Glengarry Bypass Channel Restoration	Incised channel at Glengarry mine site will be stabilized
	Adit Discharge Response Action	Monitoring of McLaren Subsurface Drains for evaluation of response alternatives. Implementation of response alternatives on point source discharges in the District such as the Glengarry Mill Site adit.
	Neutron Probe Access Tube Removal	Plug and abandon nine neutron probe access tubes installed in McLaren capping system.
	Relocation of Lake Abundance Trail	Relocate and reclaim hiking/equestrian trail to Lake Abundance in the vicinity of Daisy Pass.
	Willow Plantings	Plant willows near Black Warrior and Glengarry mine sites.
2009-2011	Adit Discharge Response Action	Implementation of remaining response actions.
	Restoration/ Road Work throughout the project area	Preferred alternative from Miller Creek EE/CA
Contingent on Completion of District Property Work	Remaining Non-District Property	Response Actions following Certificate of Completion

Notes: District-wide monitoring and maintenance is performed annually

WATER QUALITY STATUS

Temporary standards were determined in the Support Document and Implementation Plan by calculating the mean and standard deviation for each parameter, and then adding two standard deviations from the mean. Temporary standards were determined numerically at three sampling stations in the District (stations CFY-2 on Fisher Creek, DC-5 on Daisy Creek, and SW-7 on the Stillwater River) according to the rule adopted by the Board. All data collected from 1989 through 1998 were used in the calculation. **Figure 3** shows the location of long-term water quality monitoring stations established in the Support Document and Implementation Plan. Numeric temporary water quality standards approved by the Board are presented in **Table 2** and compared with the most recent water quality data measured in June 2009 and April and September 2010 (June/July high flow monitoring was not conducted in 2010 due to a lapse in contracting). In general, concentrations measured 2009/2010 were considerably lower than respective temporary standards. Further discussion of existing water quality conditions compared to standards is presented below.

TABLE 2
MOST RECENT DATA COMPARED WITH TEMPORARY STANDARDS FOR FISHER CREEK, DAISY CREEK, AND A SEGMENT OF THE STILLWATER RIVER

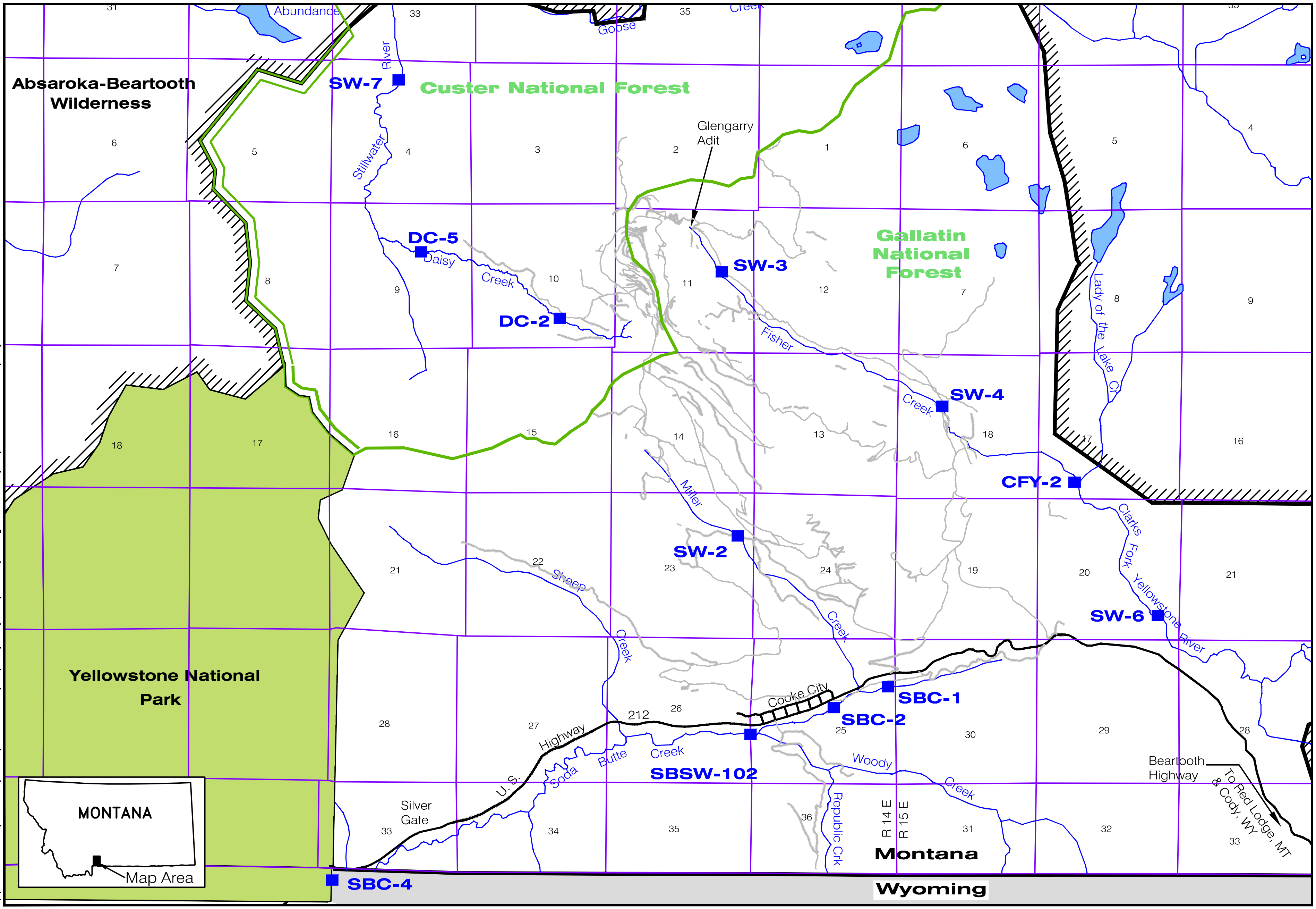
New World Mining District Response and Restoration Project

Parameter	Total Recoverable Concentration in micrograms per liter (except pH)												
	B-1 Chronic Standard*	Fisher Creek (CFY-2)				Daisy Creek (DC-5)				Stillwater River (SW-7)			
		Temp. Stand.	Apr-10	Jun-09	Sep-10	Temp. Stand.	Apr-10	Jun-09	Sep-10	Temp. Stand.	Apr-10	Jun-09	Sep-10
Aluminum	87**	470	9.6	130	21	9,510	1,600	810	2,400	670	370	190	480
Cadmium	0.27	--	<0.08	0.051	<0.08	4	1	0.15	0.81	--	<0.08	<0.04	<0.08
Copper	9.3	110	7.8	31	3.6	3,530	390	140	800	200	2.3	29	6.8
Iron	1,000	750	<50	130	<50	6,830	100	1,000	2,500	1,320	130	260	190
Lead	3.2	2	<0.1	0.37	<0.1	--	0.7	1.9	1	13	<0.1	0.37	0.43
Manganese	--	82	0.71	16	2.9	1,710	420	77	520	86	29	17	28
Zinc	120	44	7.2	8	9.2	540	120	26	140	49	59	6.1	<5
pH* **	--	> 5.7	7.4	7.2	7.3	>4.6	7.9	7.9	7.6	> 5.5	7.9	7.1	7.9

Notes: High flow monitoring (June/July) was not conducted in 2010 due to a lapse in contracting.
-- Standard not provided
* Indicates standard adjusted for hardness of 100 milligrams per liter where appropriate; -- indicates not applicable
** Aluminum B-1 chronic standard is applied to dissolved analyses in pH range of 6.5 to 9.0 s.u. only
*** Laboratory pH in standard units

SUMMARY STATISTICS

Appendix A, Table A-1 lists all the data collected at the long-term monitoring stations in the District since 1989. Summary statistics (mean, standard deviation, minimum, and maximum) for three groups of data are shown: pre-1999 data (yellow color band); all data (1989 through 2010; gray color band); and, 1999 to 2010 (light blue color band). For these summary statistics, parameters that were not detected above the practical quantitation limit (PQL), also known as the method detection limit (MDL), were estimated by dividing the PQL or MDL in half.



NORTH

SCALE IN FEET
0 4800

6571506A.213

Data Source: Unimproved roads and surface water sample locations from Gallatin National Forest Interagency Spatial Analysis Center.

Cartographic feature files obtained from Montana State Library, Natural Resource Information System.

SW-2 ■	Long-Term Surface Water Quality Monitoring Station
(solid black line)	District Boundary
(grey line)	Unimproved Road
(green dashed line)	National Forest Boundary
////	Wilderness Boundary

Long-Term Surface Water Quality
Monitoring Stations
New World Mining District
Response and Restoration Project
Cooke City Area, Montana
FIGURE 3

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Review of Table A-1 shows that, except at Station SW-3, the mean and standard deviation calculated for the most recently collected water quality data (blue shading) for most parameters have decreased compared to the mean for the pre-1999 data (yellow shading). This general observation indicates that contaminant concentrations and their variability are decreasing. While this general observation is encouraging, water quality data are sensitive to a wide variety of environmental factors that could influence the changes in concentrations seen over the past few years, including changes in the timing and amount of precipitation, the timing and methods used to collect water samples, and diurnal variations in water quality. Additional statistical evaluations of the data may be conducted in the future to determine if significant improvement in water quality has actually occurred since cleanup was completed.

A discussion of water quality data for each of the stream segments is presented in the following sections. Water quality data presented in **Table A-1** is shown graphically on **Figures 4 through 10** for copper, iron, and zinc. These three metals were selected for graphical presentation in this progress report because they depict changes in water quality. The scatter plot graphs are similar for all stations with the concentration of each metal shown on the Y-axis and flow in cubic feet per second (cfs) shown on the X-axis. The scales for both concentration and flow are mostly logarithmic although they can also be linear, depending on which scale best allows depiction of the range in values for each parameter. Also plotted on the figures are the temporary, acute, and chronic standards that apply at each station, with the standards for copper and zinc adjusted for station-specific hardness values.

FISHER CREEK WATER QUALITY

Figures 4, 5, 6, and 7 show copper, iron, and zinc concentrations vs. flow volume for each of the Fisher Creek long-term monitoring stations. For the Fisher Creek graphs, three different sets of data are grouped and plotted: 1989 to 2003, 2004 to 2006, and 2007 to 2010. Although several waste dumps were removed from the Fisher Creek drainage in 2001, the most important response actions in Fisher Creek were closure of the Glengarry Adit (largely complete in 2004 with final completion in September 2005) and capping of Como Basin (completed in October 2006). Therefore, pre-2004 data represent conditions prior to clean-up activities while the 2004 through 2006 represent conditions that occurred during reclamation and data from 2007 through 2010 represent conditions after reclamation was completed.

At Station SW-3, the graphs show that higher metals concentrations, particularly copper and zinc, are measured during low flow monitoring events (August to April) in comparison with high flow events (June and July) when the lowest metal concentrations are measured. Data collected at station SW-3 since closure of the Glengarry Adit in September 2004, indicate that metal concentrations have decreased to some of the lowest levels measured during both high and low flow monitoring events (**Figure 4**). This is indicative of significant water quality improvements in upper Fisher Creek due to closure of the Glengarry Adit.

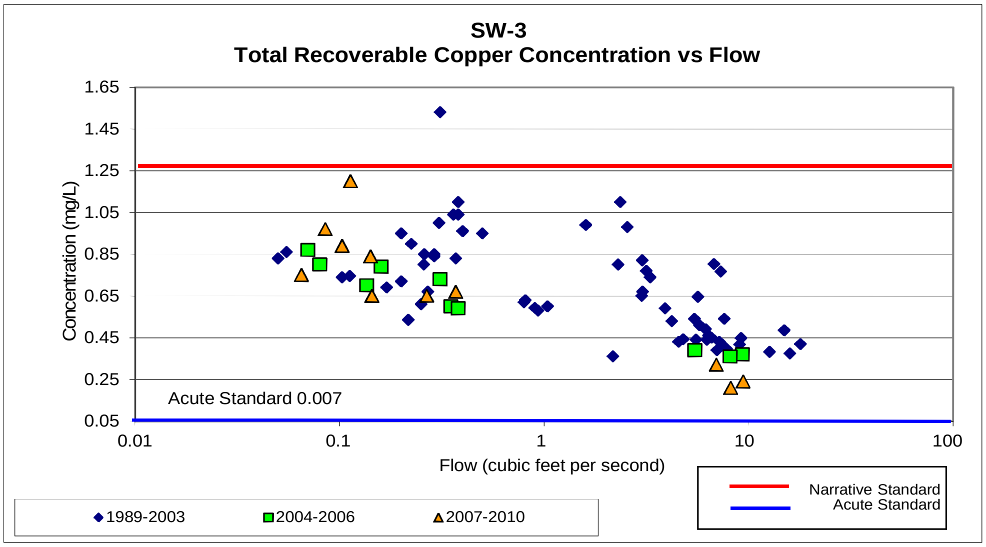
Although significant metal concentration decreases have been measured at station SW-3; cadmium, copper, lead, and zinc exceeded chronic aquatic life standards during the majority of low flow monitoring events conducted from 2007 through 2010. During high flow conditions, cadmium, lead, and zinc concentrations declined to levels below aquatic life standards while copper concentrations decreased to levels that remained above aquatic life standards. Iron exceeded the aesthetically based guideline in most sampling events during 2007 through 2010 and manganese exceeded its guideline during all monitoring events during this same time (**Table A-1**).

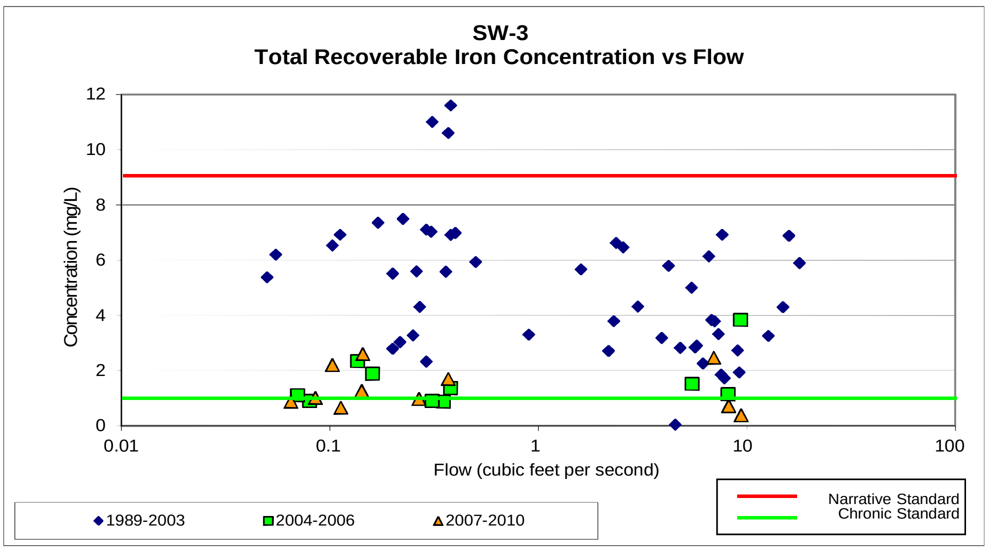
Geochemically, the reach of Fisher Creek between stations SW-3 and SW-4 changes considerably with a rise in pH (toward the near-neutral range) that allows metals to precipitate on the rocky substrate of the stream. The increase in pH with metals precipitation is one reason for the order of magnitude reduction in aluminum, cadmium, copper, iron, lead, manganese, and zinc concentrations measured at this station (**Table A-1**). Copper and zinc concentrations do not vary as much with flow at station SW-4 compared with station SW-3, but iron concentrations increase as flow increases (**Figure 5**). **Figure 5** indicates that most of the 2007 through 2010 data (after Glengarry Adit closure Como Basin reclamation) for copper, iron, and zinc are at the low end of historic concentration data measured at comparable flows.

At station SW-4; cadmium exceeded the chronic aquatic life standard only during the April and September monitoring events from 2007 through 2009. Cadmium concentrations were generally greater prior to 2007 and exceeded the chronic aquatic life standard more frequently. Copper exceeded acute and chronic aquatic life standards in all monitoring events since 1989. Zinc exceeded acute and chronic aquatic life standards in the April 2005 and September 2006 monitoring events but has been below these standards after reclamation was completed (**Table A-1**).

Water quality in Fisher Creek improves significantly at downstream stations CFY-2 and SW-6. Geochemically, the reach of Fisher Creek between station SW-4 and station CFY-2 changes with an increase in pH and lower metals concentrations. Iron and copper concentrations tend to increase as flow increases at both stations CFY-2 and SW-6. Concentration vs. flow graphs indicate that 2004 through 2010 copper, iron, and zinc concentrations are within normal historic ranges at comparable flows (**Figures 6** and **7**). Zinc concentrations appear independent of flow conditions at these stations.

At stations CFY-2 and SW-6, copper exceeded acute and chronic aquatic life standards during high flow monitoring events from 2005 through 2010 (**Figures 6** and **7**). Zinc exceeded acute and chronic aquatic life standards only during the September 2006 monitoring event at CFY-2 and was in compliance with these standards during all monitoring events at SW-6 except for copper during the June 2009 monitoring event.





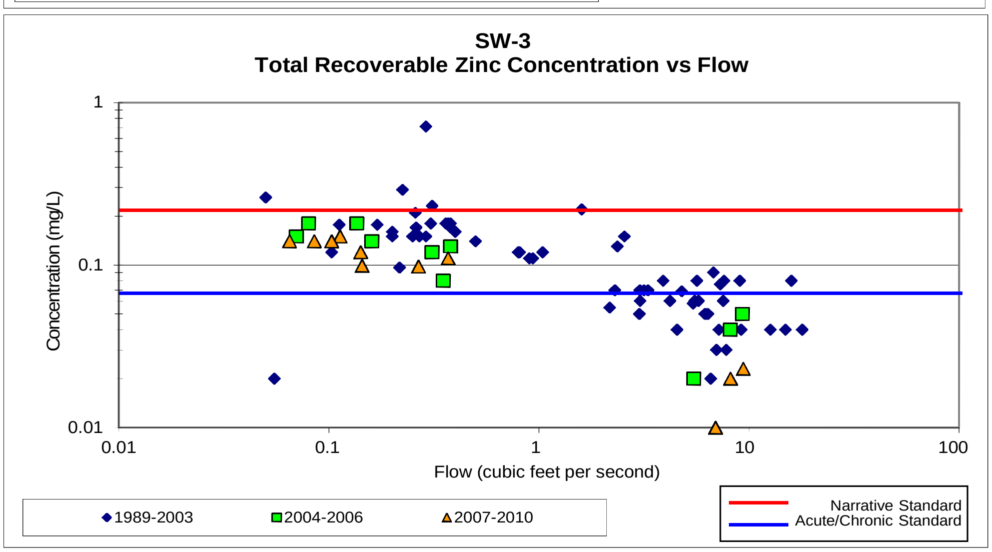
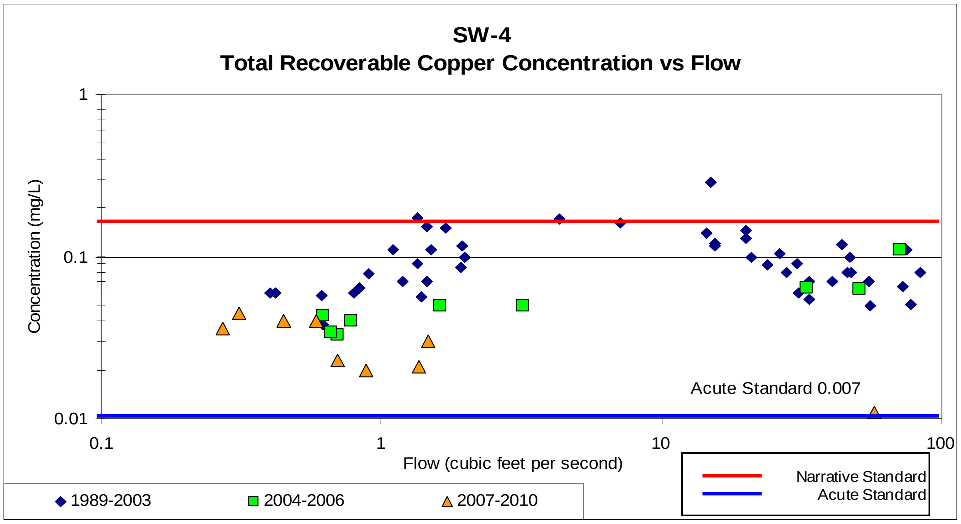
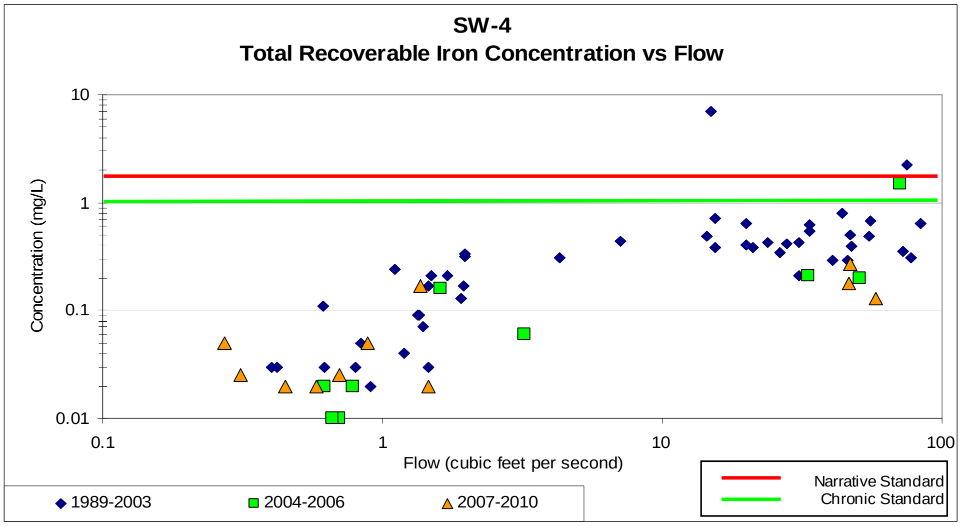


Figure 4. Concentration vs flow graphs for station SW-3.





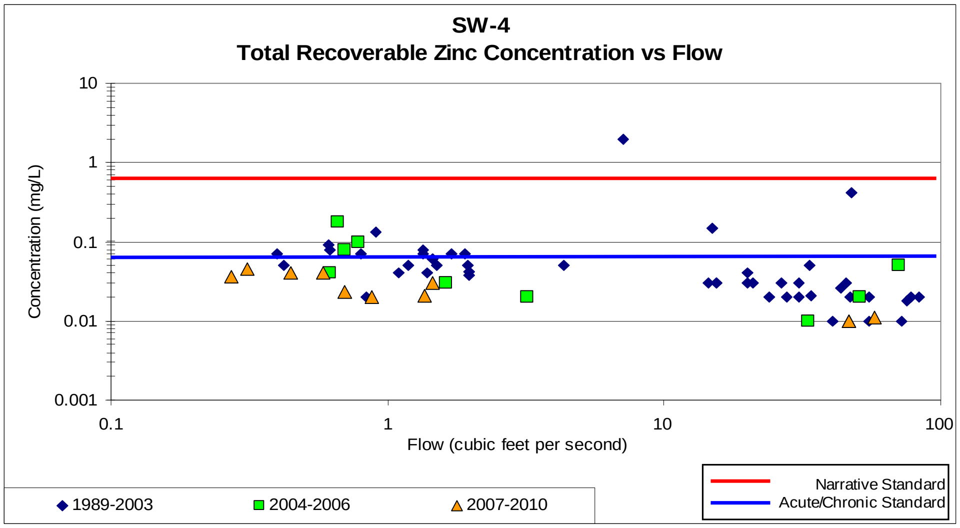
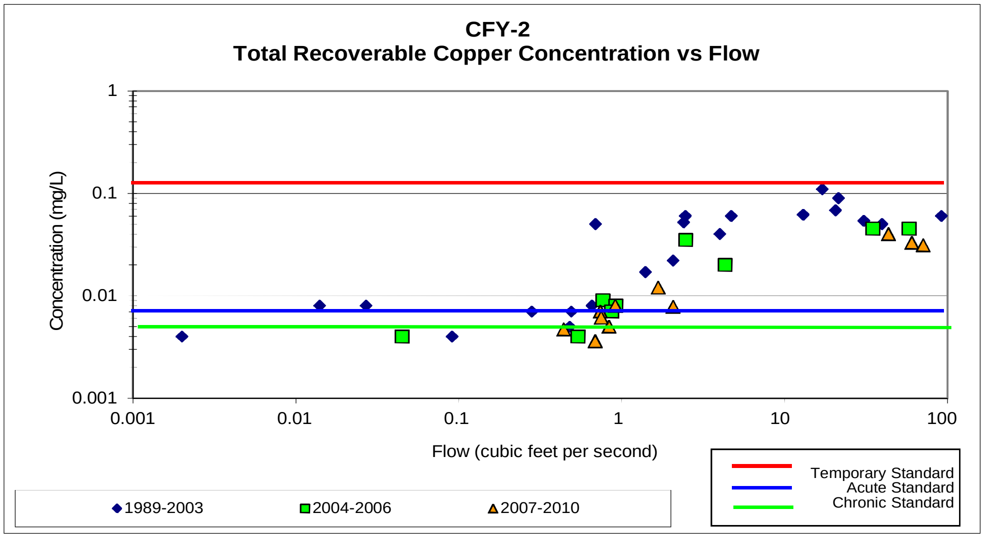
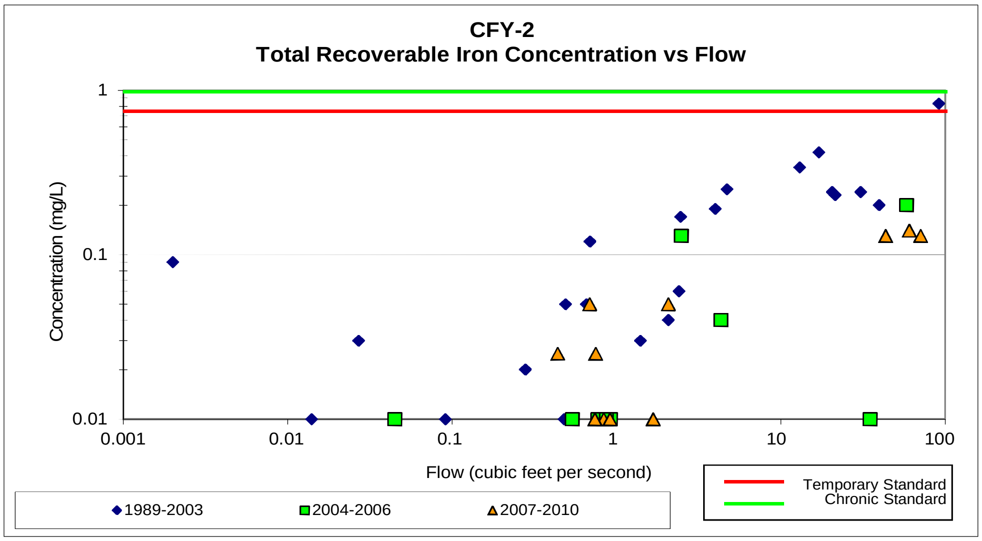


Figure 5. Concentration vs flow graphs for station SW-4.





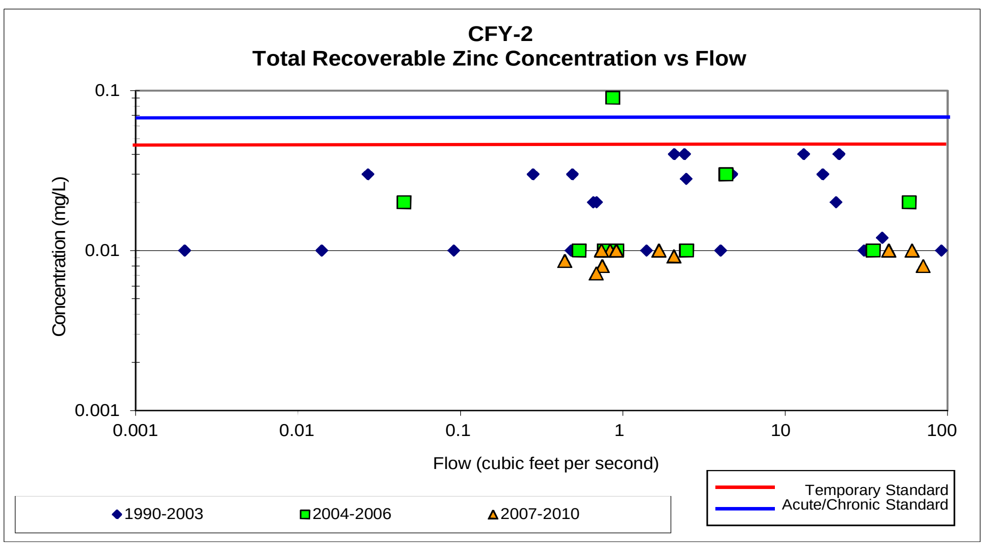
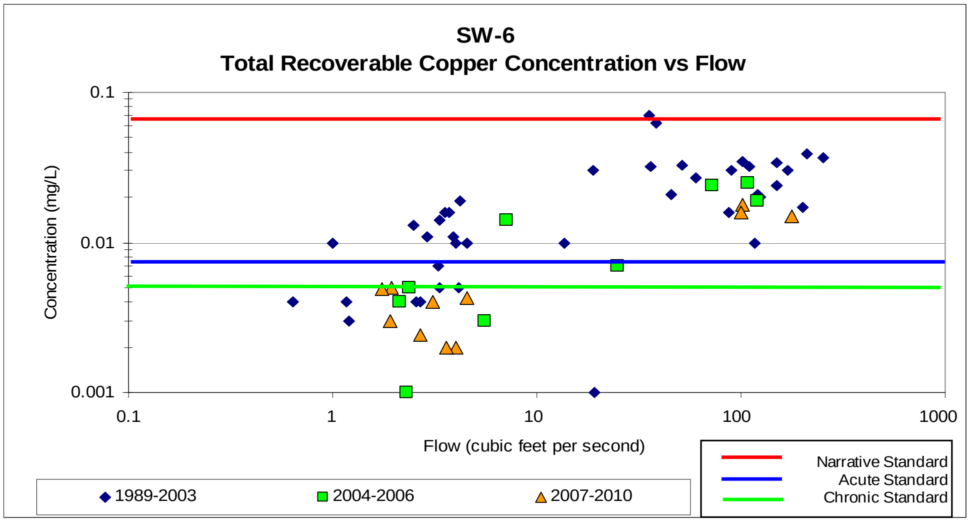
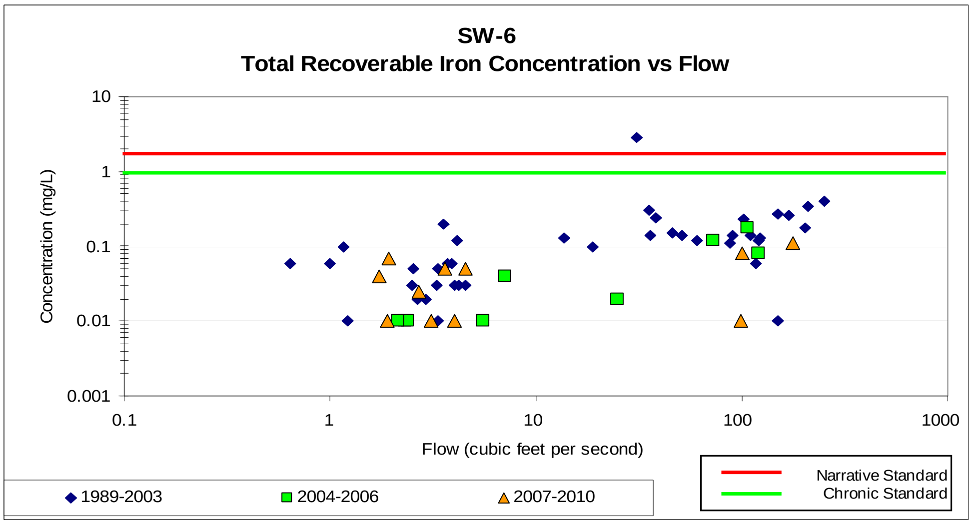


Figure 6. Concentration vs flow graphs for station CFY-2.





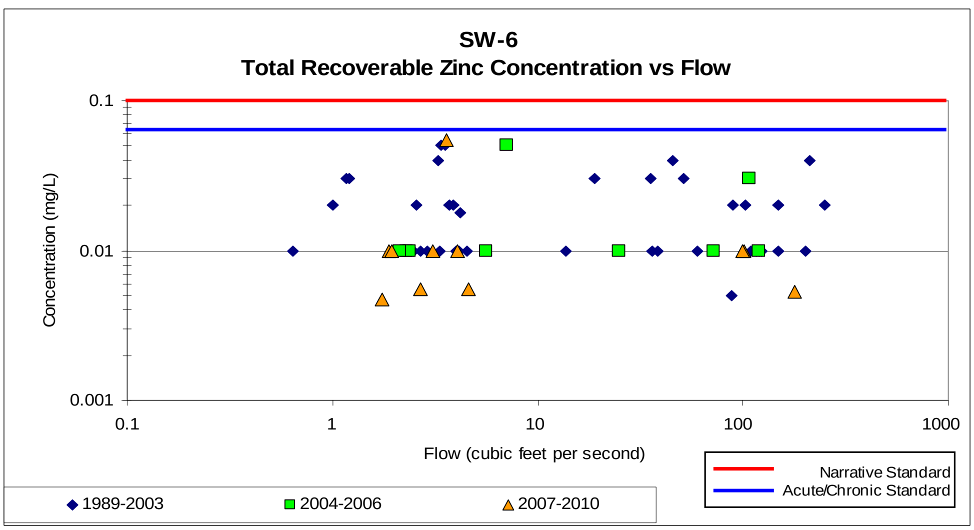


Figure 7. Concentration vs flow graphs for station SW-6.

DAISY CREEK WATER QUALITY

For the Daisy Creek graphs (**Figures 8 and 9**), two different data sets are plotted: 1989 to 2003 and 2004 through 2010. The 2004 through 2010 data are shown separately in order to be compared with data collected before the McLaren Pit cap was completed in 2003. Copper, iron, and zinc concentrations measured in samples collected from the two Daisy Creek stations (Stations DC-2 and DC-5) in 2004 through 2010 were below both temporary (applicable at DC-2) and narrative (applicableat DC-5) water quality standards except for iron at DC-2 during the September 2010 monitoring event (**Figures 8 and 9**). However, the acute and/or chronic aquatic life standards for cadmium, copper, iron, and zinc were exceeded at both stations in the 2004 through 2010 monitoring events. Lead has exceeded the chronic aquatic life standard during September monitoring events in 2005 through 2010 at DC-2. Lead concentrations also exceeded the chronic aquatic life standard at DC-5 from 2004 through 2009 but were lower than the standard in April and September 2010 samples (**Table A-1**).

Monitoring of station DC-2 from 2004 through 2010 indicated an improvement in water quality since emplacement of the McLaren Pit cap in October 2003. With the cap in place, there is a greater contribution of uncontaminated water during the spring snowmelt period in upper Daisy Creek. Snowmelt cannot become contaminated by infiltrating into metal and sulfide rich waste materials and bedrock of the McLaren Pit. These effects of capping are represented by data in **Figures 8 and 9** that show water quality improvement was greater during high flow events compared to low flow events.

Post-capping decreases in metals concentrations during high flow period averaged 63% for aluminum, cadmium, copper, iron, lead, manganese, and zinc. During the low flow period, concentrations of these metals decreased an average of 9% compared to pre-capping concentrations although the average reduction in loading was 56% (Tetra Tech 2011).

Concentration vs. flow graphs for station DC-2 demonstrate that post-capping metal concentrations (2004 to 2010) during high flows have been some of the lowest ever measured. These graphs also indicate that post-capping, low flow monitoring events exhibit lower metal concentrations in comparison with pre-capping metal concentrations (**Figure 8**).

At station DC-2, cadmium, copper, iron and zinc exceeded acute and/or chronic aquatic life standards in all monitoring events conducted during 2005 through 2010. Zinc exceeded acute and chronic aquatic life standards nearly all of the monitoring events. Lead exceeded the chronic aquatic life standard in all monitoring events. Copper, iron, and manganese exceeded the human health standard or guidelines during most monitoring events (**Table A-1**).

At station DC-5, pH of the water increases notably from that measured at station DC-2 due to the addition of more carbonate-rich water from bedrock and tributary sources located downstream of station DC-2. Metal concentrations are also considerably lower at this station, as the higher pH results in precipitation of much of the metals load on streambed substrate upstream of station DC-5. Similar to results shown for station DC-2, concentration vs. flow graphs for station DC-5 indicate that post-capping metal concentrations (2004 to 2010) during high flows have been some of the lowest ever measured. These graphs also indicate that many of the post-capping, low flow monitoring events exhibit lower metal concentrations in comparison with pre-capping metal concentrations (**Figure 9**).

At station DC-5, copper exceeded acute and chronic aquatic life standards in all monitoring events conducted except for June 2006 (**Figure 9** and **Table A-1**). Cadmium, iron, and zinc exceeded acute and/or chronic aquatic life standards during most monitoring events. Lead exceeded the chronic aquatic life standard during most monitoring events but was less than the standard during April and September 2010. Iron and manganese exceeded human health guidelines in all sampling events (**Table A-1**).

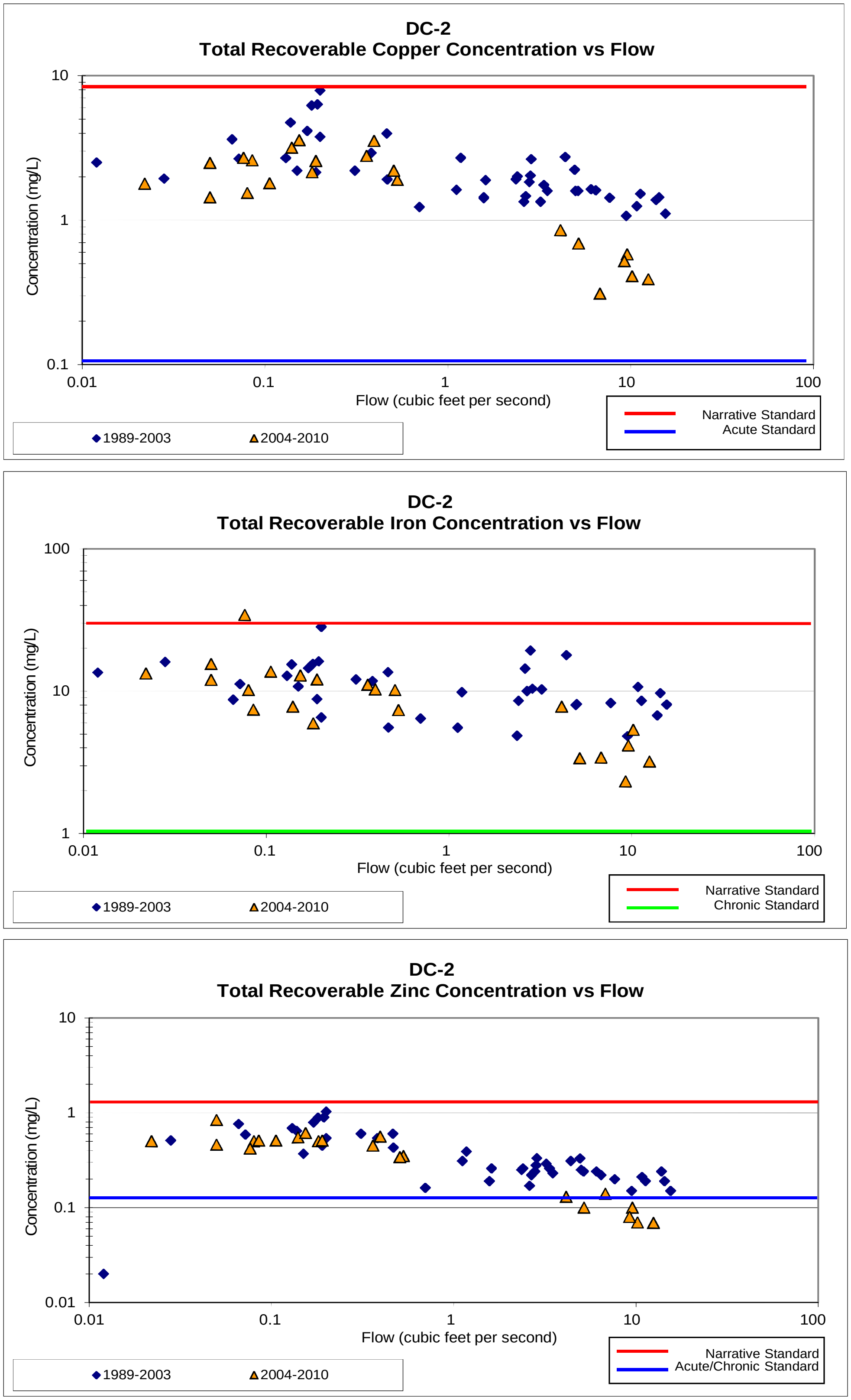


Figure 8. Concentration vs flow graphs for station DC-2.

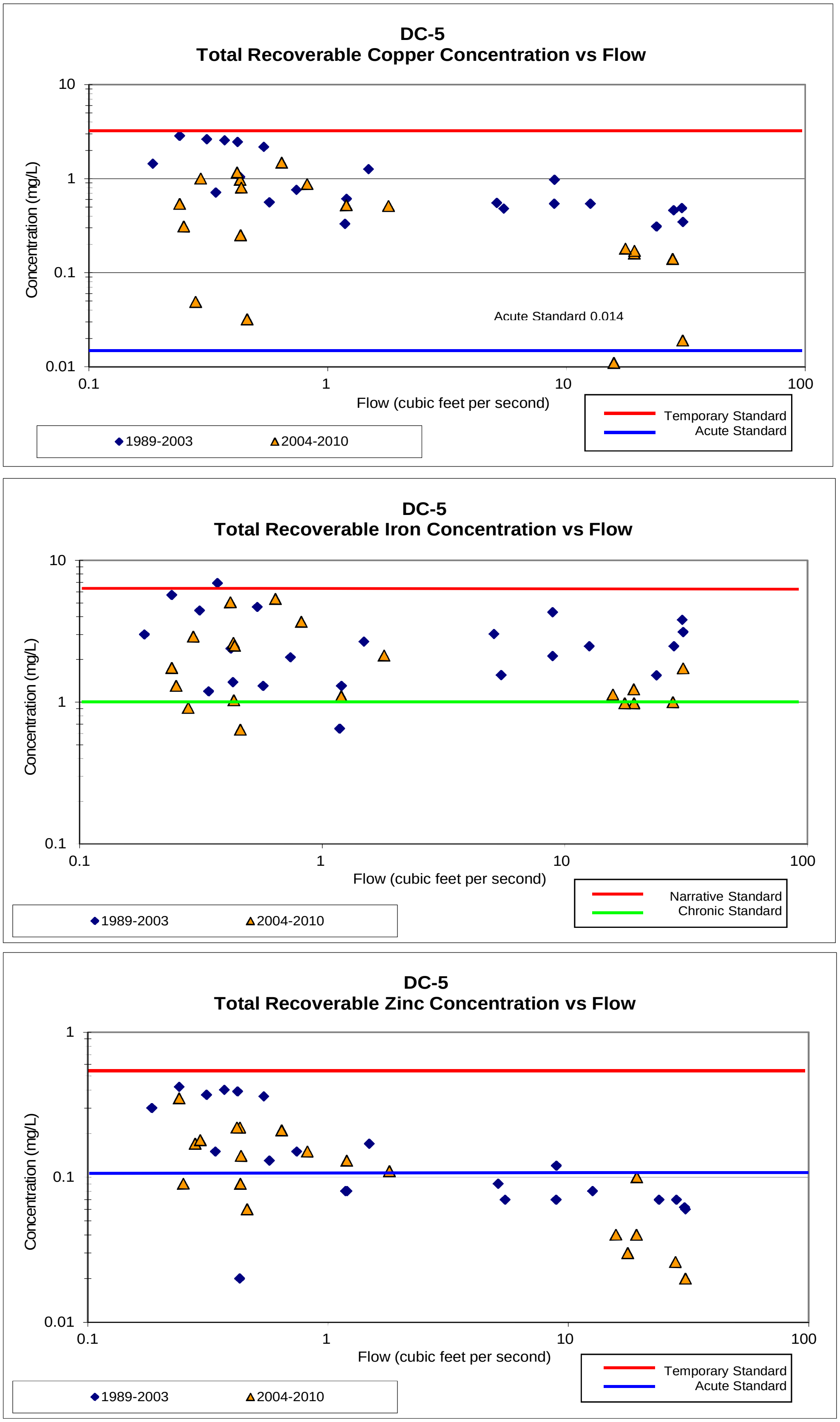
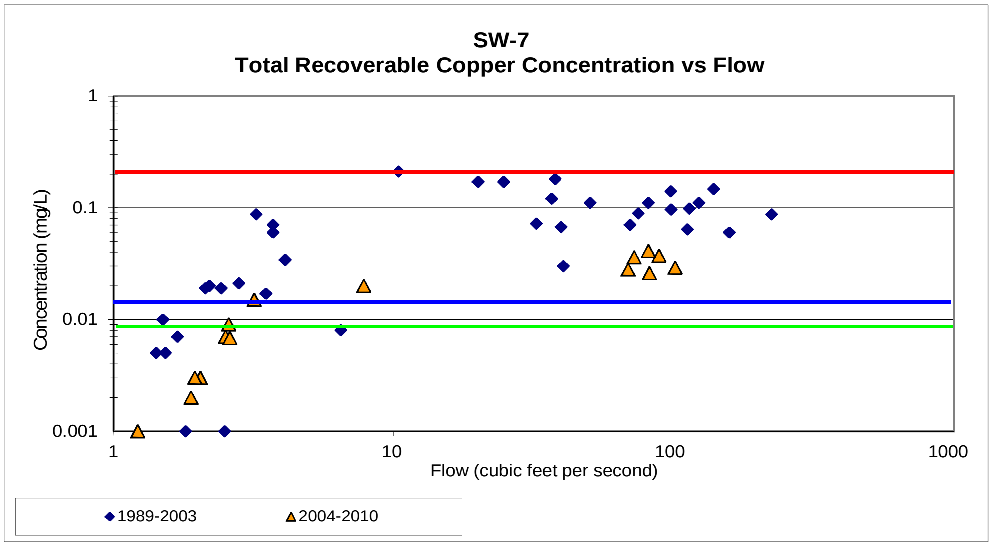


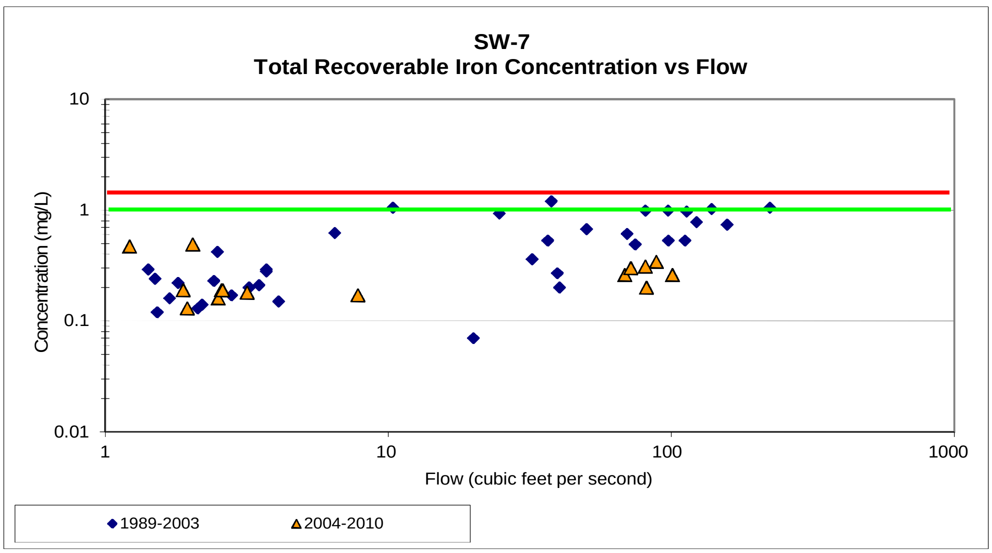
Figure 9. Concentration vs flow graphs for station DC-5.

STILLWATER RIVER WATER QUALITY

Station SW-7 is located on the Stillwater River about 3.7 miles downstream of the McLaren Pit (**Figure 3**). As with the Daisy Creek graphs, two different data sets are plotted in **Figure 10** for data collected at Station SW-7: 1989 to 2003 and 2004 to 2010. Copper concentrations measured at this station generally increase as flow increases, while iron and zinc concentrations are not as strongly related to flow conditions (i.e. concentrations increase or decrease independent of flow). The trend of increasing copper concentrations with increasing stream flow indicate that suspended sediment is entrained during higher flow conditions. In addition, dissolved metal analysis has been conducted on filtered water samples at this station since 2004 and indicates that the higher metal concentrations measured during June can be attributed to suspended sediment.

At station SW-7, copper exceeded acute and/or chronic aquatic life standards in June monitoring events conducted during 2005 through 2010. Iron exceeded the human health guideline in April during 2005 and 2006, June 2007, and September 2009. Manganese exceeded the human health guideline in April 2006 (**Table A-1**). There was no exceedance of the temporary standards at station SW-7 during 2005 through 2010. No temporary standards have been exceeded at station SW-7 since the standards became effective in 1999 with two exceptions; (estimated) zinc concentration was 60 micrograms per liter in October 2002 and 59 micrograms per liter in April 2010 (**Table A-1**).





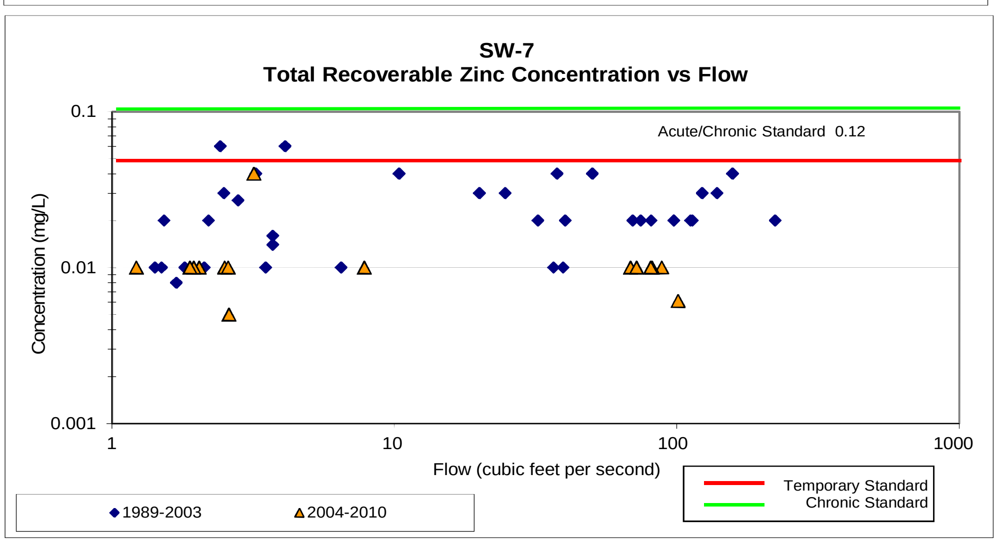


Figure 10. Concentration vs flow graphs for station SW-7.

SUMMARY

The USDA Forest Service believes that the temporary water quality standards are an important element in the implementation of response and restoration activities addressing historic mining impacts in the New World Mining District. The rule adopting temporary standards in portions of Fisher Creek, Daisy Creek, and the Stillwater River has allowed the New World Response and Restoration Project to proceed with site characterization and cleanup actions. Multiple cleanup actions have been completed and additional monitoring will occur in accordance with the Long Term Operations and Maintenance Plan which will be revised based on discussions with the MDEQ. Therefore, no adjustment in the temporary standards is proposed or recommended as a result of this Fourth 3-Year Temporary Standards Review.

During the past several years, significant water quality improvements have been measured in the Daisy Creek/Stillwater River and the Fisher Creek drainages. Water quality improvements can be attributed to response actions that include capping and reclamation of the McLaren Pit area, closure (plugging) of the Glengarry Adit, and capping and reclamation activities in the Como Basin.

Biological impairment of Fisher Creek, Daisy Creek, and the headwaters of the Stillwater River is not believed to have changed since the filing of the Support Document and Implementation Plan. Biological monitoring (macroinvertebrate and fisheries) is planned to occur once annually during the first three year period of the operations and maintenance program (2013 through 2015). Data collected during this time will be compared to results of aquatics/biological monitoring data collected in 1999 and 2001. This proposed level of sampling is considered the minimum amount that would take place. An interagency aquatic group may convene to determine the appropriate level of sampling to be conducted after 2014. Biological monitoring will be used, in addition to water quality data, to determine if implemented response actions have improved conditions for aquatic life populations.

There are no known or simple solutions to the water quality problems at the New World Mining District. Improvements to water quality from standard practice reclamation techniques such as revegetation, capping, water diversion, erosion control, and portal plugging have been measured. However, the maximum effect of the reclamation activities may not be realized for several years due to this amount of time needed for the attainment of relative equilibrium conditions.

In consideration of an increased understanding of the site gained through the numerous technical studies, implemented response actions, and ongoing monitoring it is unlikely that any of the completed or proposed response actions would by themselves, or in combination with other actions, eliminate all of the existing water quality limiting factors. Technical studies have indicated the occurrence of natural acid drainage/inflow combined with high levels of mineralization apart from any of the impacts resulting from historic mining activities. These natural conditions exacerbate mining-related impacts by providing natural water inflow with high concentrations of metals and other interfering parameters to both surface and groundwater. A recent evaluation of the nature, character, and impact of naturally occurring acidic metal-laden waters on surface water and groundwater quality throughout the District (Tetra Tech, 2009c) suggested natural conditions will limit improvements to water quality, even in the absence of or improvements related to the reclamation of historic mining activities.

REFERENCES

EPA, 1993a. Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA. EPA/540-R-93-057. Publication 9360.0-32. Office of Emergency and Remedial Response. Washington D.C. August.

Kimball, B.A., D.A. Nimick, L.J. Gerner, and R.L Runkel, 1999. Quantification of Metal Loading in Fisher Creek Using Tracer-Injection and Synoptic Sampling Studies, Park County, Montana, August 1997. Water Resources Investigations Report 99-4119. U.S. Geological Survey. Prepared in cooperation with the USEPA.

Maxim Technologies, 2006a. 2006/2007 Work Plan. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service. October.

Maxim Technologies, 2005a. 2005/2006 Work Plan. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service. July.

Maxim Technologies, 2005b. Revised Progress Report Temporary Water Quality Standards Second 3-Year Review Cycle. New World Mining District Response and Restoration Project. Prepared for the USDA Forest Service, May 20.

Maxim Technologies, 2004a. 2004/2005 Work Plan. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service. June.

Maxim Technologies, 2004b. Miller Creek Response Action Engineering Evaluation/Cost Analysis. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service. January.

Maxim Technologies, 2003a. Revised Support Document and Implementation Plan for Temporary Water Quality Standards. New World Mining District Response and Restoration Project. Prepared for the USDA Forest Service, May 20.

Maxim Technologies, 2003b. 2003/2004 Work Plan. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service. May.

Maxim Technologies, 2003c. Removal Action Engineering Evaluation/Cost Analysis, Mining Waste on National Forest System Lands Located Along Soda Butte Creek, Cooke City Area, Montana. Draft Prepared for the USDA Forest Service. February.

Maxim Technologies, 2002a. 2002/2003 Work Plan. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service, July 22.

Maxim Technologies, 2002b. Como Basin/Glengarry Adit/Fisher Creek Engineering Evaluation/Cost Analysis. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service. June.

Maxim Technologies, 2001a. 2001 Work Plan. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service, June 25.

Maxim Technologies, 2001b. Selective Source Response Action Engineering Evaluation/Cost Analysis. Final. New World Mining District Response and Restoration Project. Prepared for the USDA Forest Service, January.

Maxim Technologies, 2001c. McLaren Pit Engineering Evaluation/Cost Analysis. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service. December.

Maxim Technologies, 2000. 2000 Work Plan. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service, March 10.

Maxim Technologies, 1999. 1999 Work Plan. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service, November 10.

Montana Department of Environmental Quality (MDEQ). 2006. Circular DEQ-7 Montana Numeric Water Quality Standards, Planning, Prevention and Assistance Division, Standards and Economic Analysis Section, February.

Stanley and Maxim Technologies, Inc., 1998. Support Document and Implementation Plan. Submitted by Crown Butte Mines, Inc. in Support of Its Petition for Temporary Modification of Water Quality Standards for Selected Parameters for Fisher and Daisy Creeks and a Headwater Segment of the Stillwater River, Park County, Montana.

Tetra Tech, 2011. 2010 Surface Water and Groundwater Monitoring Report. New World Mining District Response and Restoration Project. In preparation for the USDA Forest Service. In progress.

Tetra Tech, 2009a. Long-Term Operations and Maintenance Plan. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service. June.

Tetra Tech, 2009b. 2009/2010 Work Plan. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service. March.

Tetra Tech, 2009c. Pre-Mining Water Quality. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service. April.

Tetra Tech, 2008a. 2007/2008 Work Plan. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service. January.

Tetra Tech, 2008b. 2008/2009 Work Plan. New World Mining District Response and Restoration Project. Final. Prepared for the USDA Forest Service. January.

Tetra Tech, 2008c. Progress Report Temporary Water Quality Standards Third 3-Year Review Cycle. New World Mining District Response and Restoration Project. Prepared for the USDA Forest Service, April.

Tetra Tech, 2006. Adit Discharge Engineering Evaluation/Cost Analysis. Draft. New World Mining District Response and Restoration Project. Prepared for the USDA Forest Service, December.

APPENDIX A

TABLE A-1

Progress Report – Fourth 3-Year Temporary Standards Review
New World Mining District Response and Restoration Project

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2011

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Flow Flag	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al(calc)	Al Flag	Arsenic Total Rec. (mg/l)	As(calc)	As Flag	Cadmium Total Rec. (mg/l)	Cd(calc)	Cd Flag	Chromium Total Rec. (mg/l)	Cr(calc)	Cr Flag	Copper Total Rec. (mg/l)	Cu(calc)	Cu Flag	Iron Total Rec. (mg/l)	Fe(calc)	Fe Flag	Lead Total Rec. (mg/l)	Pb(calc)	Pb Flag	Manganese Total Rec. (mg/l)	Mn(calc)	Mn Flag	Zinc Total Rec. (mg/l)	Zn(calc)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)						0.087			0.15			0.00016			0.049			0.0073			1			0.0013			NA			0.067		
Acute Standard (for Hardness = 50 mg/l)						0.75			0.34			0.001			1.02			0.0052			NA			0.034			NA			0.067		
Chronic Standard (for Hardness = 100 mg/l)						0.087			0.15			0.0027			0.086			0.0093			1			0.0032			NA			0.12		
Acute Standard (for Hardness = 100 mg/l)						0.75			0.34			0.0021			1.8			0.0140			NA			0.082			NA			0.12		
CFY-2	9-Aug-90	Hydrometrics Data	0.69		6.8	0.1	0.1		0.0050	0.0025	<	0.00100	0.0005	<	0.0200	0.01	<	0.05	0.05		0.12	0.12		0.01	0.005	<	0.04	0.04		0.02	0.01	<
CFY-2	5-Jun-91	Hydrometrics Data	91.6		6.9	0.5	0.5		0.0010	0.0005	<	0.00010	0.00005	<	0.0200	0.01	<	0.06	0.03	<	0.83	0.83		0.002	0.002		0.03	0.03		0.01	0.005	<
CFY-2	9-Jul-91	Hydrometrics Data	4.7		7.1	0.1	0.05	<	0.0050	0.0025	<	0.00020	0.0002		0.0200	0.01	<	0.06	0.06		0.25	0.25				J	0.03	0.03		0.03	0.03	
CFY-2	13-Aug-91	Hydrometrics Data	2.4		7.6	0.1	0.1		0.0050	0.0025	<	0.00020	0.0002		0.0200	0.01	<	0.052	0.052		0.06	0.06		0.002	0.001	<	0.04	0.04		0.04	0.04	
CFY-2	24-Sep-91	Hydrometrics Data	1.4		7	0.1	0.05	<	0.0050	0.0025	<	0.00010	0.00005	<	0.0200	0.01	<	0.017	0.017		0.03	0.015	<	0.002	0.001	<	0.02	0.01	<	0.01	0.01	
CFY-2	23-Jul-93	Hydrometrics Data	17.03		7.1	0.3	0.3		0.0010	0.0005	<	0.00010	0.0001		0.0010	0.0005	<	0.11	0.11		0.42	0.42		0.002	0.001	<	0.05	0.05		0.03	0.015	<
CFY-2	21-Sep-93	Hydrometrics Data	2.46		7.1	0.1	0.1		0.0010	0.0005	<	0.00020	0.0002		0.0010	0.0005	<	0.06	0.06		0.17	0.17		0.002	0.001	<	0.09	0.09		0.028	0.028	
CFY-2	15-Jun-94	Hydrometrics Data	39.63		6.9	0.2	0.2		0.0010	0.0005	<	0.00010	0.00005	<	0.0010	0.0005	<	0.05	0.05	J	0.2	0.2		0.002	0.001	<	0.03	0.03		0.012	0.012	J
CFY-2	6-May-99	Maxim	0.091		7.1	0.1	0.05	<				0.00010	0.00005	<				0.004	0.004		0.01	0.005	<	0.001	0.0005	<	0.005	0.0025	<	0.01	0.005	<
CFY-2	9-Jul-99	Maxim	21.46		7.2	0.2	0.2					0.00010	0.0001					0.09	0.09		0.23	0.23		0.001	0.0005	<	0.019	0.019		0.04	0.04	
CFY-2	29-Sep-99	Maxim	2.071		6.9	0.1	0.05	<				0.00020	0.0002					0.022	0.022		0.04	0.04		0.001	0.0005	<	0.017	0.017		0.04	0.04	J
CFY-2	13-Apr-00	Maxim	0.658		6.9	0.05	0.025	<				0.00010	0.00005	<				0.008	0.008		0.05	0.025	<	0.001	0.0005	<	0.005	0.0025	<	0.02	0.01	<
CFY-2	8-Jul-00	Maxim	20.55		6.8	0.2	0.2	J				0.00010	0.00005	<				0.068	0.068	J	0.24	0.24	J	0.001	0.0005	<	0.035	0.035	J	0.02	0.02	J
CFY-2	22-Sep-00	Maxim			7.1	0.1	0.05	<				0.00010	0.00005	<				0.004	0.004		0.01	0.01		0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<
CFY-2	28-Sep-00	Maxim			7.1	0.1	0.05	<				0.00010	0.00005	<				0.01	0.01		0.03	0.03		0.001	0.0005	<	0.004	0.004		0.01	0.005	<
CFY-2	10-Oct-00	Maxim			7.3	0.1	0.05	<				0.00010	0.00005	<				0.01	0.01		0.05	0.025	<	0.003	0.0015	<	0.005	0.0025	<	0.02	0.01	<
CFY-2	19-Oct-00	Maxim			6.8	0.1	0.05	<				0.00010	0.00005	<				0.008	0.008		0.05	0.025	<	0.001	0.0005	<	0.004	0.004		0.01	0.01	
CFY-2	21-Apr-01	Maxim	0.48		7.4	0.1	0.05	<				0.00010	0.00005	<				0.005	0.005		0.01	0.005	<	0.001	0.0005	<	0.003	0.0015	<	0.01	0.01	
CFY-2	26-Jun-01	Maxim	30.66		7.5	0.1	0.05	<				0.00010	0.0001					0.054	0.054		0.24	0.24		0.002	0.002	J	0.024	0.024		0.01	0.005	<
CFY-2	11-Oct-01	Maxim	0.49		7	0.1	0.05	<	0.0030	0.0015	<	0.00010	0.00005	<				0.007	0.007		0.05	0.025	<	0.001	0.0005	<	0.003	0.0015	<	0.03	0.03	J
CFY-2	26-Apr-02	Maxim	0.28		7	0.1	0.05	<				0.0001	0.00005	<				0.007	0.007		0.02	0.02		0.001	0.0005	<	0.005	0.005		0.03	0.03	
CFY-2	1-Jul-02	Maxim	13		7	0.3	0.3	J				0.0001	0.00005	<				0.062	0.062		0.34	0.34		0.001	0.001		0.03	0.03		0.04	0.04	J
CFY-2	8-Oct-02	Maxim	0.027		6.9	0.1	0.05	<				0.0002	0.0002					0.008	0.008		0.03	0.03		0.001	0.0005	<	0.003	0.0015	<	0.03	0.03	J
CFY-2	22-Apr-03	Maxim	0.002		7	0.05	0.025	<				0.0001	0.00005	<				0.004	0.004		0.09	0.09		0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<
CFY-2	1-Jul-03	Maxim	4		7.6	0.17	0.17					0.0001	0.00005	<				0.04	0.04		0.19	0.19		0.001	0.0005	<	0.024	0.024		0.01	0.005	<
CFY-2	30-Sep-03	Maxim	0.014		7.2	0.05	0.025	<				0.0001	0.00005	<				0.008	0.008		0.01	0.01		0.001	0.0005	<	0.003	0.0015	<	0.01	0.01	
CFY-2	6-Apr-04	Maxim	0.045		7.5	0.05	0.025	<				0.0001	0.00005	<				0.004	0.004		0.01	0.005	<	0.001	0.0005	<	0.005	0.0025	<	0.02	0.02	JF%
CFY-2	28-Jun-04	Maxim	2.48		7.5	0.09	0.09					0.0001	0.00005	<				0.035	0.035		0.13	0.13		0.001	0.0005	<	0.013	0.013		0.01	0.005	<
CFY-2	5-Oct-04	Maxim	4.33		7.3	0.08	0.08					0.0001	0.0001					0.02	0.02		0.04	0.04		0.001	0.0005	<	0.01	0.01		0.03	0.03	
CFY-2	5-Apr-05	Maxim	0.54			0.05	0.025	<				0.0001	0.00005	<				0.004	0.004		0.01	0.01		0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<
CFY-2	28-Jun-05	Maxim	58.17		9.2	0.2	0.2				--	0.0001	0.00005	<			--	0.045	0.045		0.2	0.2		0.001	0.001		0.021	0.021		0.02	0.02	
CFY-2	11-Oct-05	Maxim	0.77		6.9	0.05	0.025	<			--	0.0001	0.00005	<			--	0.009	0.009		0.01	0.005	<	0.001	0.0005	<	0.003	0.0015	<	0.01	0.01	
CFY-2	26-Apr-06	Tetra Tech	0.92		6.9	0.05	0.025	<				0.0001	0.00005	<				0.008	0.008		0.01	0.005	<	0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<
CFY-2	28-Jun-06	Tetra Tech	34.94		7.3	0.16	0.16					0.0001	0.00005	<				0.045	0.045		0.01	0.005	<	0.001	0.0005	<	0.025	0.025		0.01	0.005	<
CFY-2	26-Sep-06	Tetra Tech	0.87		7.2	0.05	0.025	<				0.0001	0.00005	<				0.007	0.007		0.01	0.005	<	0.001	0.0005	<	0.003	0.0015	<	0.09	0.09	
CFY-2	11-Apr-07	Tetra Tech	0.837		6.8	0.05	0.025	<				0.0001	0.00005	<				0.005	0.005		0.01	0.005	<	0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<
CFY-2	12-Jun-07	Tetra Tech	43.4		7.4	0.14	0.14					0.0001	0.00005	<				0.04	0.04		0.13	0.13		0.001	0.0005	<	0.01	0.01		0.01	0.005	<
CFY-2	17-Sep-07	Tetra Tech	0.915		7.3	0.05	0.025	<				0.0001	0.00005	<				0.008	0.008		0.01	0.01		0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<
CFY-2	17-Apr-08	Tetra Tech	0.74		7.2	0.05	0.025	<				0.0001	0.00005	<				0.007	0.007		0.01	0.005	<	0.001	0.0005	<	0.003	0.0015	<	0.01	0.01	
CFY-2	14-Jul-08	Tetra Tech	60.47		7.3	0.06	0.06					0.0001	0.00005	<				0.033	0.033		0.14	0.14		0.001	0.0005	<	0.016	0.016		0.01	0.005	<
CFY-2	22-Sep-08	Tetra Tech	1.675		7.2	0.05	0.025	<				0.0001	0.00005	<				0.012	0.012		0.01	0.005	<	0.001	0.001	JF%<	0.006	0.006		0.01	0.01	
CFY-2	09-Apr-09	Tetra Tech	0.44		7.2	0.0055	0.0055					0.000045	0.000045	J				0.0047	0.0047		0.025	0.0125	<	0.00005	0.000025	<	0.0009	0.0009		0.0086	0.0086	
CFY-2	23-Jun-09	Tetra Tech	70.9		7.2	0.13	0.13					0.000051	0.000051	J				0.031	0.031		0.13	0.13		0.00037	0.00037		0.016	0.016		0.008	0.008	
CFY-2	29-Sep-09	Tetra Tech	0.748		7.2	0.053	0.053					0.000056	0.000056	J				0.0061	0.0061		0.025	0.0125	<	0.00005	0.000025	<	0.001	0.001		0.008	0.008	
CFY-2	06-Apr-10	Tetra Tech	0.687		7.1	0.0096	0.0096					0.00008	0.00004	<				0.0036	0.0036		0.05	0.025	<	0.0001	0.00005	<	0.00071	0.00071		0.0072	0.0072	
CFY-2	27-Sep-10	Tetra Tech	2.07		6.9	0.021	0.021					0.00008	0.00004	<				0.0078	0.0078		0.05	0.025	<	0.0001	0.00005	<	0.0029	0.0029		0.0092	0.0092	
Station CFY-2: Pre-1999 Samples (n)			8		8	8			8			8			8			8			8			7			8			8		
Minimum			0.690		6.800	0.050			0.001			0.00005			0.001			0.017			0.015			0.001			0.010			0.005		
Maximum			91.600		7.600	0.500			0.003			0.00050			0.010			0.110			0.830			0.005			0.090			0.040		
Mean			19.989		7.063	0.175			0.002			0.00017			0.006			0.054			0.258			0.002			0.040			0.019		
Standard Deviation (SD)			31.828		0.245	0.156			0.001			0.00015			0.005			0.027			0.262			0.001			0.023			0.012		
Mean + (2 x SD); for pH: Mean - (2 x SD)			83.644		6.573	0.487			0.0036			0.00047			0.0163			0.108			0.783			0.005			0.087			0.043		
Station CFY-2: 1989-2010 Samples (n)			42		45	46			9			46			8			46			46			45			46			46		
Minimum			0.002		6.8	0.006			0.001			0.00004			0.001			0.004			0.005			0.00003			0.0007			0.0050		
Maximum			91.600		9.2	0.500			0.003			0.00050			0.010			0.110			0.830			0.00500			0.0900			0.0900		
Mean			12.849		7.2	0.088			0.002			0.00008			0.006			0.026			0.099			0.00073			0.0138			0.0159		
Standard Deviation (SD)			22.402		0.4	0.096			0.001			0.00008			0.005			0.026			0.150			0.00077			0.0176			0.0160		
Mean + (2 x SD); for pH: Mean - (2 x SD)			57.653		6.417	0.280			0.004			0.00024			0.016			0.077			0.399			0.002			0.049			0.048		
Station CFY-2: 1999-2010 Samples (n)			34		37	38			1			38			0			38			38			38			38			38		
Minimum			0.002		6.800	0.006			0.002			0.00004			0.000			0.0036			0.005			0.000			0.001			0.005		
Maximum			70.900		9.200	0.300			0.002			0.00020			0.000			0.0900			0.340			0.002			0.035			0.090		
Mean			11.169		7.200	0.070			0.002			0.00006						0.0198			0.065			0.001			0.008			0.015		
Standard Deviation (SD)			19.834		0.401	0.068						0.00004						0.0216			0.088			0.000			0.010			0.017		
Mean + (2 x SD); for pH: Mean - (2 x SD)			50.836		6.399	0.206						0.00013						0.063			0.241			0.001			0.028			0.049		
Temporary Standard - CFY-2					5.7	0.47			NA			NA			NA			0.11			0.75			0.002			0.082			0.044		

Notes:
mg/l = milligrams/liter;
su = standard units
n = number of samples

< = less than detection
J = estimated value

NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2011

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Flow Flag	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al(calc)	Al Flag	Arsenic Total Rec. (mg/l)	As(calc)	As Flag	Cadmium Total Rec. (mg/l)	Cd(calc)	Cd Flag	Chromium Total Rec. (mg/l)	Cr(calc)	Cr Flag	Copper Total Rec. (mg/l)	Cu(calc)	Cu Flag	Iron Total Rec. (mg/l)	Fe(calc)	Fe Flag	Lead Total Rec. (mg/l)	Pb(calc)	Pb Flag	Manganese Total Rec. (mg/l)	Mn(calc)	Mn Flag	Zinc Total Rec. (mg/l)	Zn(calc)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)						0.087			0.15			0.00016			0.049			0.0073			1			0.0013			NA			0.067		
Acute Standard (for Hardness = 50 mg/l)						0.75			0.34			0.001			1.02			0.0052			NA			0.034			NA			0.067		
Chronic Standard (for Hardness = 100 mg/l)						0.087			0.15			0.0027			0.086			0.0093			1			0.0032			NA			0.12		
Acute Standard (for Hardness = 100 mg/l)						0.75			0.34			0.0021			1.8			0.0140			NA			0.082			NA			0.12		
SW-3	2-Aug-89	Hydrometrics Data				0.1	0.05	<	0.0050	0.0025	<	0.00100	0.0005	<				0.03	0.03		0.03	0.015	<	0.01	0.005	<	0.11	0.11		0.01	0.01	
SW-3	15-Sep-89	Hydrometrics Data	0.36		3.2	3.7	3.7		0.0050	0.0025	<	0.00100	0.0005	<				1.04	1.04		5.58	5.58		0.01	0.005	<	1.24	1.24		0.18	0.18	
SW-3	20-Oct-89	Hydrometrics Data	0.26		3.5	3.7	3.7		0.0050	0.0025	<	0.00100	0.0005	<				0.85	0.85		5.59	5.59		0.01	0.005	<	1.23	1.23		0.17	0.17	
SW-3	17-Mar-90	Hydrometrics Data	0.25		3.6	2.2	2.2		0.0050	0.0025	<	0.00100	0.0005	<				0.61	0.61		3.27	3.27		0.01	0.005	<	1	1		0.15	0.15	
SW-3	28-May-90	Hydrometrics Data	0.9		3.7	3	3		0.0050	0.0025	<	0.00040	0.0004		0.0200	0.01	<	0.593	0.593		3.3	3.3		0.003	0.003		0.49	0.49		0.11	0.11	
SW-3	5-Jun-90	Hydrometrics Data	5.75		3.7	2.1	2.1											0.51	0.51		2.9	2.9								0.06	0.06	
SW-3	13-Jun-90	Hydrometrics Data	4.54		3.8	1.8	1.8											0.43	0.43		0.04	0.04								0.04	0.04	
SW-3	20-Jun-90	Hydrometrics Data	6.15		3.9	1.8	1.8					0.00200	0.002		0.0200	0.01	<	0.49	0.49		2.26	2.26		0.01	0.005	<	0.23	0.23		0.05	0.05	
SW-3	27-Jun-90	Hydrometrics Data	17.89		4	1.7	1.7		0.0050	0.0025	<	0.00010	0.0001		0.0200	0.01	<	0.419	0.419		5.89	5.89		0.004	0.004		0.16	0.16		0.04	0.04	
SW-3	3-Jul-90	Hydrometrics Data	14.9		3.8	1.6	1.6					0.00100	0.0005	<	0.0200	0.01	<	0.486	0.486		4.3	4.3		0.01	0.005	<	0.19	0.19		0.04	0.04	
SW-3	10-Jul-90	Hydrometrics Data	3.9		3.7	1.7	1.7					0.00100	0.0005	<	0.0200	0.01	<	0.59	0.59		3.18	3.18		0.01	0.005	<	0.27	0.27		0.08	0.08	
SW-3	17-Jul-90	Hydrometrics Data	2.3		3.6	2	2											0.8	0.8		3.79	3.79								0.07	0.07	
SW-3	26-Jul-90	Hydrometrics Data	1.6		3.6	2.6	2.6		0.0050	0.0025	<	0.00040	0.0004		0.0200	0.01	<	0.99	0.99		5.66	5.66		0.003	0.003		0.56	0.56		0.22	0.22	
SW-3	25-Sep-90	Hydrometrics Data	0.4		3.4	3.3	3.3		0.0050	0.0025	<	0.00090	0.0009		0.0200	0.01	<	0.96	0.96		6.98	6.98		0.007	0.007		1.29	1.29		0.16	0.16	
SW-3	15-Mar-91	Hydrometrics Data	0.2		2.4	2.7	2.7		0.0050	0.0025	<	0.00100	0.0005	<	0.0200	0.01	<	0.72	0.72		2.79	2.79		0.01	0.005	<	0.89	0.89		0.15	0.15	
SW-3	5-Jun-91	Hydrometrics Data	7		3.5	1.1	1.1		0.0010	0.0005	<	0.00010	0.0001		0.0200	0.01	<	0.39	0.39		3.78	3.78		0.002	0.002		0.16	0.16		0.03	0.03	
SW-3	9-Jul-91	Hydrometrics Data	3		3.8	1.46	1.46		0.0050	0.0025	<	0.00180	0.0018	J	0.0200	0.01	<	0.65	0.65		4.32	4.32		0.002	0.002	J	0.29	0.29		0.05	0.05	
SW-3	14-Aug-91	Hydrometrics Data	0.5		3.5	2.9	2.9		0.0050	0.0025	<	0.00070	0.0007		0.0200	0.02		0.95	0.95		5.93	5.93		0.004	0.004		0.93	0.93		0.14	0.14	
SW-3	24-Sep-91	Hydrometrics Data	0.2		3.5	4.3	4.3		0.0050	0.0025	<	0.00220	0.0022		0.0200	0.01	<	0.95	0.95		5.51	5.51		0.006	0.006		1.26	1.26		0.16	0.16	
SW-3	23-Jul-93	Hydrometrics Data	2.36			3.3	3.3		0.0010	0.001		0.00040	0.0004		0.0030	0.003		1.1	1.1		6.62	6.62		0.002	0.001	<	0.56	0.56		0.13	0.13	
SW-3	21-Sep-93	Hydrometrics Data	0.38		3.2	3.8	3.8		0.0010	0.0005	<	0.00100	0.001		0.0010	0.0005	<	1.1	1.1		11.6	11.6		0.009	0.009		1.67	1.67		0.17	0.17	
SW-3	14-Jun-94	Hydrometrics Data	5.42		3.8	2.6	2.6		0.0010	0.0005	<	0.00030	0.0003		0.0010	0.0005	<	0.54	0.54	J	5	5		0.007	0.007		0.29	0.29		0.058	0.058	J
SW-3	14-Jul-95	Hydrometrics Data	7.29		3.7	2.5	2.5		0.0020	0.002		0.00040	0.0004		0.0010	0.001		0.766	0.766	J	3.32	3.32	J	0.008	0.008		0.41	0.41		0.076	0.076	
SW-3	27-Sep-95	Hydrometrics Data	0.31		3.2	4.8	4.8		0.0010	0.0005	<	0.00090	0.0009		0.0010	0.001		1.53	1.53		11	11		0.008	0.008		1.66	1.66		0.231	0.231	
SW-3	21-May-96	Hydrometrics Data			3.2	4.3	4.3					0.00100	0.001					0.92	0.92		4.8	4.8		0.006	0.006		0.891	0.891		0.22	0.22	
SW-3	12-Jun-96	Hydrometrics Data	9.04		3.6													0.417	0.417		2.73	2.73	J							0.08	0.08	J
SW-3	20-Jun-96	Hydrometrics Data	7.795		4.1	1.6	1.6					0.00020	0.0002					0.395	0.395		1.72	1.72		0.003	0.0015	<	0.167	0.167		0.03	0.03	
SW-3	26-Jun-96	Hydrometrics Data	12.65		4													0.381	0.381		3.25	3.25								0.04	0.04	
SW-3	2-Jul-96	Hydrometrics Data	15.9		4													0.374	0.374		6.88	6.88								0.08	0.08	J
SW-3	11-Jul-96	Hydrometrics Data	9.18		3.8	1.3	1.3	J				0.00010	0.0001					0.448	0.448		1.93	1.93		0.003	0.0015	<	0.163	0.163		0.04	0.04	
SW-3	18-Jul-96	Hydrometrics Data	5.644		3.3													0.646	0.646		2.84	2.84								0.08	0.04	<
SW-3	25-Jul-96	Hydrometrics Data	6.767		3.4													0.803	0.803		3.83	3.83								0.09	0.09	
SW-3	21-Aug-96	Hydrometrics Data	2.552		3.3													0.98	0.98		6.46	6.46								0.15	0.15	
SW-3	11-Sep-96	Hydrometrics Data	0.38		3.1	3.5	3.5					0.00090	0.0009	J				1.04	1.04		6.91	6.91		0.008	0.008		1.32	1.32		0.18	0.18	
SW-3	8-Jul-97	UOS Data				1.81	1.81		0.0100	0.005	<	0.00500	0.0025	<	0.0100	0.005	<	0.411	0.411		2.6	2.6					0.165	0.165		0.0368	0.0368	
SW-3	27-Mar-98	UOS Data	0.17		3.3	3.15	3.15											0.691	0.691		7.35	7.35					1.31	1.31		0.177	0.177	
SW-3	23-Apr-98	UOS Data	0.112		3.5	3.08	3.08											0.745	0.745		6.92	6.92					1.26	1.26		0.177	0.177	
SW-3	5-May-98	UOS Data	0.217		3.6	2.51	2.51											0.535	0.535		3.03	3.03					0.502	0.502		0.0965	0.0965	
SW-3	13-May-98	UOS Data	4.783		3.7	2.26	2.26											0.443	0.443		2.82	2.82					0.348	0.348		0.0689	0.0689	
SW-3	29-May-98	UOS Data	2.172		3.9	1.77	1.77											0.361	0.361		2.71	2.71					0.231	0.231		0.0547	0.0547	
SW-3	6-May-99	Maxim	0.2244		3.4	3.9	3.9					0.00110	0.0011					0.9	0.9		7.49	7.49		0.007	0.007		1.35	1.35		0.29	0.29	
SW-3	9-Jul-99	Maxim	7.53		4.2	1.5	1.5					0.00020	0.0002					0.41	0.41		1.85	1.85		0.002	0.002		0.162	0.162		0.06	0.06	
SW-3	30-Sep-99	Maxim	0.306		3.3	3.1	3.1					0.00050	0.0005					1	1		7.03	7.03		0.002	0.002		1.3	1.3		0.18	0.18	J
SW-3	13-Apr-00	Maxim	0.055		3.4	3.2	3.2					0.00140	0.0014					0.86	0.86		6.2	6.2		0.008	0.008		1.32	1.32		0.02	0.01	<
SW-3	18-May-00	Maxim	0.935		3.5													0.58	0.58											0.11	0.11	
SW-3	18-May-00	Maxim	0.797		3.5													0.62	0.62											0.12	0.12	
SW-3	18-May-00	Maxim	1.04		3.5	2.5	2.5					0.00040	0.0004					0.6	0.6		3.19	3.19		0.003	0.003		0.56	0.56		0.12	0.12	
SW-3	18-May-00	Maxim			3.5													0.62	0.62											0.12	0.12	
SW-3	18-May-00	Maxim	0.809		3.5													0.63	0.63											0.12	0.12	
SW-3	18-Jun-00	Maxim	7.18		3.9	1.8	1.8					0.00020	0.0002					0.43	0.43		2.67	2.67		0.003	0.003		0.18	0.18		0.04	0.04	
SW-3	18-Jun-00	Maxim	6.37		3.9													0.46	0.46											0.05	0.05	
SW-3	18-Jun-00	Maxim	6.24		3.9													0.44	0.44											0.05	0.05	
SW-3	18-Jun-00	Maxim	5.52		3.9													0.44	0.44											0.06	0.06	

Notes:
mg/l = milligrams/liter;
su = standard units
n = number of samples

< = less than detection
J = estimated value

NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2011

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Flow Flag	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al(calc)	Al Flag	Arsenic Total Rec. (mg/l)	As(calc)	As Flag	Cadmium Total Rec. (mg/l)	Cd(calc)	Cd Flag	Chromium Total Rec. (mg/l)	Cr(calc)	Cr Flag	Copper Total Rec. (mg/l)	Cu(calc)	Cu Flag	Iron Total Rec. (mg/l)	Fe(calc)	Fe Flag	Lead Total Rec. (mg/l)	Pb(calc)	Pb Flag	Manganese Total Rec. (mg/l)	Mn(calc)	Mn Flag	Zinc Total Rec. (mg/l)	Zn(calc)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)						0.087			0.15			0.00016			0.049			0.0073			1			0.0013			NA			0.067		
Acute Standard (for Hardness = 50 mg/l)						0.75			0.34			0.001			1.02			0.0052			NA			0.034			NA			0.067		
Chronic Standard (for Hardness = 100 mg/l)						0.087			0.15			0.0027			0.086			0.0093			1			0.0032			NA			0.12		
Acute Standard (for Hardness = 100 mg/l)						0.75			0.34			0.0021			1.8			0.0140			NA			0.082			NA			0.12		
SW-3	8-Jul-00	Maxim	3.02		3.7													0.82	0.82	J										0.07	0.07	J
SW-3	8-Jul-00	Maxim	3.03		3.7	2	2	J				0.00010	0.00005	<				0.67	0.67	J	3.11	3.11	J	0.002	0.002		0.37	0.37	J	0.06	0.06	J
SW-3	8-Jul-00	Maxim	3.16		3.7													0.77	0.77	J										0.07	0.07	J
SW-3	8-Jul-00	Maxim	3.3		3.7													0.74	0.74	J										0.07	0.07	J
SW-3	16-Aug-00	Maxim				2.8	2.8					0.00110	0.0011					0.95	0.95		5.21	5.21		0.007	0.007		1.06	1.06		0.15	0.15	
SW-3	1-Sep-00	Maxim			3.4	2.8	2.8					0.00060	0.0006					0.82	0.82		7.38	7.38		0.005	0.005		1.11	1.11		0.16	0.16	
SW-3	17-Sep-00	Maxim				3.1	3.1											0.76	0.76		22	22		0.003	0.003		1.5	1.5		0.15	0.15	
SW-3	19-Oct-00	Maxim			2.9	2.9	2.9					0.00010	0.00005	<				0.67	0.67		7.84	7.84	J	0.007	0.007		1.29	1.29		0.39	0.39	
SW-3	6-Dec-00	Maxim			3.3	3	3					0.00100	0.001					0.72	0.72		6.44	6.44		0.007	0.007		1.25	1.25		0.18	0.18	
SW-3	21-Apr-01	Maxim	0.103		3.4	2.6	2.6					0.00100	0.001					0.74	0.74		6.21	6.21		0.006	0.006		1.12	1.12		0.12	0.12	
SW-3	11-Jun-01	Maxim			3.9	1.7	1.7		0.0030	0.0015	<	0.00010	0.00005	<				0.48	0.48		1.92	1.92		0.003	0.0015	<	0.2	0.2		0.05	0.05	J
SW-3	26-Jun-01	Maxim	4.208		3.7	2.5	2.5					0.00030	0.0003					0.53	0.53		6.53	6.53		0.007	0.007	J	0.31	0.31		0.06	0.06	
SW-3	31-Aug-01	Maxim	0.29		3.3	2.7	2.7					0.00560	0.0056					0.84	0.84		10.1	10.1		0.012	0.012		1.17	1.17		0.15	0.15	
SW-3	11-Oct-01	Maxim	0.27		3.5	2.4	2.4		0.0030	0.0015	<	0.00110	0.0011					0.67	0.67		5.79	5.79		0.004	0.004		0.87	0.87		0.15	0.15	
SW-3	26-Apr-02	Maxim	0.37		3.4	3.1	3.1					0.001	0.001					0.83	0.83		7.1	7.1		0.006	0.006		1.28	1.28		0.18	0.18	
SW-3	1-Jul-02	Maxim	7.6		4	1.7	1.7	J				0.0003	0.0003					0.54	0.54		4.31	4.31		0.003	0.003		0.3	0.3		0.08	0.08	J
SW-3	8-Oct-02	Maxim	0.29		3.4	3.6	3.6					0.001	0.001					0.85	0.85		10.6	10.6		0.009	0.009		1.48	1.48		0.71	0.71	J
SW-3	23-Apr-03	Maxim	0.05		3.1	2.51	2.51					0.0012	0.0012					0.83	0.83		6.92	6.92		0.008	0.008		1.3	1.3		0.26	0.26	
SW-3	1-Jul-03	Maxim	6.57		4	1.62	1.62					0.0002	0.0002					0.45	0.45		2.32	2.32		0.002	0.002		0.29	0.29		0.02	0.02	
SW-3	31-Jul-03	Maxim				2.83	2.83		0.001	0.0005	<	0.0005	0.0005					1.04	1.04		5.38	5.38		0.005	0.005		0.78	0.78		0.14	0.14	JF%
SW-3	14-Aug-03	Maxim				3.1	3.1		0.001	0.0005	<	0.0005	0.0005					1.15	1.15		6.13	6.13		0.01	0.01		1.31	1.31		0.13	0.13	
SW-3	21-Aug-03	Maxim				3	3					0.0009	0.0009					1.06	1.06		10.9	10.9		0.009	0.009		1.5	1.5		0.14	0.14	
SW-3	22-Aug-03	Maxim				3.1	3.1					0.0009	0.0009					0.94	0.94		8.58	8.58		0.013	0.013		1.48	1.48		0.19	0.19	
SW-3	30-Sep-03	Maxim	0.258		3.5	2.86	2.86					0.0008	0.0008					0.8	0.8		10.5	10.5		0.009	0.009		1.74	1.74		0.21	0.21	
SW-3	5-Apr-04	Maxim	0.136		3.6	2.2	2.2					0.0008	0.0008					0.7	0.7		2.34	2.34		0.004	0.004		0.9	0.9		0.18	0.18	JF%
SW-3	28-Jun-04	Maxim	9.32		4.2	2.27	2.27					0.0002	0.0002					0.37	0.37		3.84	3.84		0.005	0.005		0.18	0.18		0.05	0.05	
SW-3	5-Oct-04	Maxim	0.35		4.1	1.52	1.52					0.0005	0.0005					0.6	0.6		0.87	0.87		0.002	0.002		0.29	0.29		0.08	0.08	
SW-3	5-Apr-05	Maxim	0.08			1.75	1.75					0.0009	0.0009					0.8	0.8		0.9	0.9		0.002	0.002		0.49	0.49		0.18	0.18	
SW-3	28-Jun-05	Maxim	8.13		4.2	1.49	1.49				--	0.0001	0.0001				--	0.36	0.36		1.14	1.14		0.002	0.002		0.14	0.14		0.04	0.04	
SW-3	29-Aug-05	Maxim	0.38		4.3	1.36	1.36				--	0.0006	0.0006				--	0.59	0.59		1.36	1.36		0.002	0.002		0.42	0.42		0.13	0.13	(1)
SW-3	11-Oct-05	Maxim	0.31		3.8	2.31	2.31				--	0.0007	0.0007				--	0.73	0.73		0.9	0.9		0.002	0.002		0.52	0.52		0.12	0.12	
SW-3	26-Apr-06	Tetra Tech	0.07		3.9	2.61	2.61					0.0009	0.0009					0.87	0.87		1.1	1.1		0.001	0.001		0.54	0.54		0.15	0.15	
SW-3	28-Jun-06	Tetra Tech	5.46		4.9	1.74	1.74					0.0001	0.0001					0.39	0.39		1.52	1.52		0.002	0.002		0.18	0.18		0.02	0.02	
SW-3	26-Sep-06	Tetra Tech	0.16		4.3	2.81	2.81					0.0008	0.0008					0.79	0.79		1.89	1.89		0.002	0.002		0.59	0.59		0.14	0.14	
SW-3	11-Apr-07	Tetra Tech	0.065		4.0	2.14	2.14					0.001	0.001					0.75	0.75		0.87	0.87		0.001	0.001		0.45	0.45		0.14	0.14	
SW-3	12-Jun-07	Tetra Tech	6.94		5.8	1.72	1.72					0.0002	0.0002					0.32	0.32		2.46	2.46		0.002	0.002		0.13	0.13		0.01	0.01	
SW-3	17-Sep-07	Tetra Tech	0.142		3.9	2.51	2.51					0.0008	0.0008					0.84	0.84		1.26	1.26		0.002	0.002		0.57	0.57		0.12	0.12	
SW-3	17-Apr-08	Tetra Tech	0.0852		3.9	2.13	2.13					0.0011	0.0011					0.97	0.97		1.01	1.01		0.001	0.001		0.54	0.54		0.14	0.14	
SW-3	14-Jul-08	Tetra Tech	8.17		5.3	0.74	0.74					0.0001	0.0001					0.21	0.21		0.72	0.72		0.001	0.001		0.1	0.1		0.02	0.02	
SW-3	22-Sep-08	Tetra Tech	0.37		4	2.95	2.95					0.0007	0.0007					0.67	0.67		1.69	1.69		0.002	0.002	JF%	0.58	0.58		0.11	0.11	
SW-3	08-Apr-09	Tetra Tech	0.113		3.8	2.1	2.1					0.0011	0.0011					1.2	1.2		0.65	0.65		0.001	0.001		0.61	0.61		0.15	0.15	
SW-3	23-Jun-09	Tetra Tech	9.4		5	0.47	0.47					0.00013	0.00013					0.24	0.24		0.38	0.38		0.00039	0.00039		0.098	0.098		0.023	0.023	
SW-3	29-Sep-09	Tetra Tech	0.144		4.2	2.1	2.1					0.00066	0.00066					0.65	0.65		2.6	2.6		0.0019	0.0019		0.53	0.53		0.099	0.099	
SW-3	06-Apr-10	Tetra Tech	0.103		4.1	1.8	1.8					0.0011	0.0011					0.89	0.89		2.2	2.2		0.00067	0.00067		0.49	0.49		0.14	0.14	
SW-3	27-Sep-10	Tetra Tech	0.267		3.9	2	2					0.00065	0.00065					0.65	0.65		0.97	0.97		0.001	0.001		0.5	0.5		0.098	0.098	
Station SW-3: Pre-1999 Samples (n)			37		37	34			19			26			18			40			40			25			31			40		
Minimum			0.112		2.400	0.050			0.0005			0.00010			0.0005			0.030			0.015			0.001			0.110			0.010		
Maximum			17.890		4.100	4.800			0.0050			0.00250			0.0200			1.530			11.600			0.009			1.670			0.231		
Mean			4.411		3.565	2.529			0.0021			0.00076			0.0078			0.677			4.485			0.005			0.685			0.103		
Standard Deviation (SD)			4.819		0.327	1.041			0.0011			0.00065			0.0050			0.291			2.446			0.002			0.507			0.063		
Mean + (2 x SD); for pH: Mean - (2 x SD)			14.050		2.911	4.611			0.0043			0.00207			0.0179			1.258			9.377			0.009			1.700			0.229		
Station SW-3: 1989-2010 Samples (n)			84		88	82			23			73			18			98			88			73			79			98		
Minimum			0.050		2.400	0.050			0.001			0.0001			0.0005			0.0300			0.0150			0.0004			0.0980			0.0100		
Maximum			17.890		5.800	4.800			0.005			0.0056			0.0200			1.5300			22.0000			0.0130			1.7400			0.7100		
Mean			3.368		3.728	2.422			0.002			0.0008			0.0078			0.6871			4.4747			0.0044			0.7174			0.1173		
Standard Deviation (SD)			4.062		0.475	0.859			0.001			0.0008			0.0050			0.2504			3.3935			0.0029			0.4917			0.0907		
Mean + (2 x SD); for pH: Mean - (2 x SD)			11.493		2.778	4.140			0.004			0.00227			0.018			1.188			11.262			0.010			1.701			0.299		
Station SW-3: 1999-2010 Samples (n)			47		51	48			4			47			0			58			48			48			48			58		
Minimum			0.050		2.900	0.470			0.001			0.000			0.000			0.210			0.380			0.000			0.098			0.010		
Maximum			9.400		5.800	3.900			0.002			0.006			0.000			1.200			22.000			0.013			1.740			0.710		
Mean			2.547		3.847	2.347			0.001			0.001						0.694			4.466			0.004			0.738			0.127		
Standard Deviation (SD)			3.168		0.531	0.705			0.001			0.001						0.221			4.044			0.003			0.486			0.105		
Mean + (2 x SD); for pH: Mean - (2 x SD)			8.883		2.785	3.756			0.002			0.00238						1.136			12.553			0.011			1.709			0.337		
Narrative Standard - SW-3					2.1	4.54			NA			0.002			NA			1.256			9.259			0.01			1.718			0.225		

Notes:
mg/l = milligrams/liter;
su = standard units
n = number of samples

< = less than detection
J = estimated value

NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2011

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Flow Flag	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al(calc)	Al Flag	Arsenic Total Rec. (mg/l)	As(calc)	As Flag	Cadmium Total Rec. (mg/l)	Cd(calc)	Cd Flag	Chromium Total Rec. (mg/l)	Cr(calc)	Cr Flag	Copper Total Rec. (mg/l)	Cu(calc)	Cu Flag	Iron Total Rec. (mg/l)	Fe(calc)	Fe Flag	Lead Total Rec. (mg/l)	Pb(calc)	Pb Flag	Manganese Total Rec. (mg/l)	Mn(calc)	Mn Flag	Zinc Total Rec. (mg/l)	Zn(calc)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)						0.087			0.15			0.00016			0.049			0.0073			1			0.0013			NA			0.067		
Acute Standard (for Hardness = 50 mg/l)						0.75			0.34			0.001			1.02			0.0052			NA			0.034			NA			0.067		
Chronic Standard (for Hardness = 100 mg/l)						0.087			0.15			0.0027			0.086			0.0093			1			0.0032			NA			0.12		
Acute Standard (for Hardness = 100 mg/l)						0.75			0.34			0.0021			1.8			0.0140			NA			0.082			NA			0.12		
SW-4	2-Aug-89	Hydrometrics Data				0.1	0.05	<	0.005	0.0025	<	0.001	0.0005	<				0.03	0.03		0.03	0.015	<	0.01	0.005	<	0.11	0.11		0.01	0.01	
SW-4	15-Sep-89	Hydrometrics Data	1.35		6.4	0.2	0.2		0.005	0.0025	<	0.001	0.0005	<				0.09	0.09		0.09	0.09		0.01	0.005	<	0.07	0.07		0.07	0.07	
SW-4	20-Oct-89	Hydrometrics Data	1.19		6.6	0.1	0.1		0.005	0.0025	<	0.001	0.0005	<				0.07	0.07		0.04	0.04		0.01	0.005	<	0.06	0.06		0.05	0.05	
SW-4	17-Mar-90	Hydrometrics Data			6.5	0.1	0.05	<	0.005	0.0025	<	0.001	0.0005	<				0.04	0.04		0.03	0.015	<	0.01	0.005	<	0.02	0.01	<	0.07	0.07	
SW-4	29-May-90	Hydrometrics Data	15.4		6.9	0.8	0.8		0.005	0.0025	<	0.0001	0.00005	<	0.02	0.01	<	0.116	0.116		0.71	0.71		0.002	0.001	<	0.05	0.05		0.03	0.03	
SW-4	5-Jun-90	Hydrometrics Data	27.84		6.3	0.3	0.3											0.08	0.08		0.42	0.42								0.02	0.02	
SW-4	13-Jun-90	Hydrometrics Data	30.73		6.7	0.2	0.2											0.06	0.06		0.21	0.21								0.02	0.02	
SW-4	15-Jun-90	Hydrometrics Data	21.9																													
SW-4	20-Jun-90	Hydrometrics Data	47.46		6.9	0.3	0.3					0.001	0.0005	<	0.02	0.01	<	0.08	0.08		0.39	0.39		0.01	0.005	<	0.04	0.04		0.41	0.41	
SW-4	22-Jun-90	Hydrometrics Data	88.8																													
SW-4	26-Jun-90	Hydrometrics Data	112.4		6.4	0.5	0.5		0.005	0.0025	<	0.0002	0.0002		0.02	0.01	<	0.087	0.087		1.02	1.02		0.002	0.001	<	0.05	0.05		0.02	0.02	
SW-4	28-Jun-90	Hydrometrics Data	100.37																													
SW-4	3-Jul-90	Hydrometrics Data	83.9		6.5	0.4	0.4					0.002	0.002		0.02	0.01	<	0.08	0.08		0.65	0.65		0.01	0.01		0.04	0.04		0.02	0.02	
SW-4	5-Jul-90	Hydrometrics Data	49.4																													
SW-4	5-Jul-90	Hydrometrics Data			6.6																											
SW-4	6-Jul-90	Hydrometrics Data			6.7																											
SW-4	7-Jul-90	Hydrometrics Data			7																											
SW-4	8-Jul-90	Hydrometrics Data			7																											
SW-4	10-Jul-90	Hydrometrics Data	30.6		6.6	0.3	0.3					0.001	0.0005	<	0.02	0.01	<	0.09	0.09		0.43	0.43		0.01	0.005	<	0.05	0.05		0.03	0.03	
SW-4	10-Jul-90	Hydrometrics Data			6.8																											
SW-4	11-Jul-90	Hydrometrics Data			6.5																											
SW-4	12-Jul-90	Hydrometrics Data	25		6.8																											
SW-4	12-Jul-90	Hydrometrics Data			6.5																											
SW-4	13-Jul-90	Hydrometrics Data			6.5																											
SW-4	14-Jul-90	Hydrometrics Data			6.5																											
SW-4	15-Jul-90	Hydrometrics Data			6.4																											
SW-4	16-Jul-90	Hydrometrics Data			6.5																											
SW-4	17-Jul-90	Hydrometrics Data	14.4		6.5	0.4	0.4											0.14	0.14		0.49	0.49								0.03	0.03	
SW-4	17-Jul-90	Hydrometrics Data			6.4																											
SW-4	18-Jul-90	Hydrometrics Data			6.4																											
SW-4	19-Jul-90	Hydrometrics Data	11.7		6.3																											
SW-4	19-Jul-90	Hydrometrics Data			6.4																											
SW-4	20-Jul-90	Hydrometrics Data			6.7																											
SW-4	21-Jul-90	Hydrometrics Data			6.4																											
SW-4	22-Jul-90	Hydrometrics Data			6.6																											
SW-4	23-Jul-90	Hydrometrics Data			6.7																											
SW-4	24-Jul-90	Hydrometrics Data			6.6																											
SW-4	25-Jul-90	Hydrometrics Data			6.7																											
SW-4	26-Jul-90	Hydrometrics Data			6.7																											
SW-4	27-Jul-90	Hydrometrics Data	7.1		6.7	0.3	0.3		0.005	0.0025	<	0.0004	0.0004		0.02	0.01	<	0.16	0.16		0.44	0.44		0.002	0.001	<	0.1	0.1		1.95	1.95	J
SW-4	23-Aug-90	Hydrometrics Data	3.2		6.4																											
SW-4	25-Sep-90	Hydrometrics Data	1.5		6.5	0.3	0.3		0.005	0.0025	<	0.0003	0.0003		0.02	0.01	<	0.11	0.11		0.21	0.21		0.002	0.001	<	0.13	0.13		0.05	0.05	
SW-4	15-Mar-91	Hydrometrics Data	0.8		6.4	0.1	0.05	<	0.005	0.0025	<	0.001	0.001		0.02	0.01	<	0.06	0.06		0.03	0.015	<	0.01	0.005	<	0.02	0.01	<	0.07	0.07	
SW-4	5-Jun-91	Hydrometrics Data	55.3		6.9	0.2	0.1	<	0.001	0.0005	<	0.0001	0.00005	<	0.02	0.01	<	0.05	0.025	<	0.67	0.335	<	0.002	0.001	<	0.03	0.015	<	0.01	0.005	<
SW-4	9-Jul-91	Hydrometrics Data	21		6.7	0.1	0.05	<	0.005	0.0025	<	0.0002	0.0002		0.02	0.02		0.1	0.1		0.38	0.38		0	0	J	0.05	0.05		0.03	0.03	
SW-4	14-Aug-91	Hydrometrics Data	1.7		6.3	0.4	0.4		0.005	0.0025	<	0.0002	0.0002		0.02	0.01	<	0.15	0.15		0.21	0.21		0.002	0.001	<	0.12	0.12		0.07	0.07	
SW-4	24-Sep-91	Hydrometrics Data	1.1		6.5	0.3	0.3		0.005	0.0025	<	0.0006	0.0006		0.02	0.01	<	0.11	0.11		0.24	0.24		0.002	0.001	<	0.08	0.08		0.04	0.04	
SW-4	27-May-92	Hydrometrics Data	77.78		7.4	0.2	0.2		0.005	0.0025	<	0.0001	0.00005	<	0.01	0.005	<	0.051	0.051		0.31	0.31		0.002	0.001	<	0.03	0.03		0.02	0.02	
SW-4	19-Jul-92	Hydrometrics Data	15		7.3	3.4	1.7	<	0.005	0.0025	<	0.0002	0.0002		0.01	0.005	<	0.29	0.29		7.1	3.55	<	0.002	0.001	<	0.16	0.16		0.15	0.075	<
SW-4	23-Sep-92	Hydrometrics Data	1.95		6.8	0.3	0.3		0.005	0.0025	<	0.0004	0.0004		0.01	0.005	<	0.117	0.117		0.17	0.17		0.002	0.001	<	0.13	0.13		0.05	0.05	
SW-4	21-Jul-93	Hydrometrics Data	19.92		7.1	0.3	0.3		0.001	0.0005	<	0.0001	0.0001		0.001	0.0005	<	0.146	0.146		0.65	0.65		0.002	0.001	<	0.09	0.09		0.04	0.04	J
SW-4	21-Sep-93	Hydrometrics Data	1.98		6.9	0.2	0.2		0.001	0.0005	<	0.0002	0.0002		0.001	0.0005	<	0.1	0.1		0.32	0.32		0.002	0.001	<	0.16	0.16		0.038	0.038	
SW-4	21-Sep-93	Hydrometrics Data	1.98		7.1	0.2	0.2		0.001	0.0005	<	0.0002	0.0002		0.001	0.0005	<	0.1	0.1		0.33	0.33		0.002	0.001	<	0.16	0.16		0.042	0.042	

Notes:
mg/l = milligrams/liter;
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NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2011

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Flow Flag	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al(calc)	Al Flag	Arsenic Total Rec. (mg/l)	As(calc)	As Flag	Cadmium Total Rec. (mg/l)	Cd(calc)	Cd Flag	Chromium Total Rec. (mg/l)	Cr(calc)	Cr Flag	Copper Total Rec. (mg/l)	Cu(calc)	Cu Flag	Iron Total Rec. (mg/l)	Fe(calc)	Fe Flag	Lead Total Rec. (mg/l)	Pb(calc)	Pb Flag	Manganese Total Rec. (mg/l)	Mn(calc)	Mn Flag	Zinc Total Rec. (mg/l)	Zn(calc)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)						0.087			0.15			0.00016			0.049			0.0073			1			0.0013			NA			0.067		
Acute Standard (for Hardness = 50 mg/l)						0.75			0.34			0.001			1.02			0.0052			NA			0.034			NA			0.067		
Chronic Standard (for Hardness = 100 mg/l)						0.087			0.15			0.0027			0.086			0.0093			1			0.0032			NA			0.12		
Acute Standard (for Hardness = 100 mg/l)						0.75			0.34			0.0021			1.8			0.0140			NA			0.082			NA			0.12		
SW-4	2-Mar-94	Hydrometrics Data	0.4		6.7	0.1	0.05	<	0.001	0.0005	<	0.0005	0.0005		0.001	0.0005	<	0.06	0.06		0.03	0.015	<	0.002	0.001	<	0.01	0.005	<	0.07	0.07	
SW-4	26-May-94	Hydrometrics Data	75.23			0.8	0.8		0.001	0.001		0.0001	0.0001		0.001	0.0005	<	0.11	0.11		2.25	2.25		0.003	0.003		0.06	0.06		0.018	0.018	
SW-4	15-Jun-94	Hydrometrics Data	33.79		6.7	0.5	0.5		0.001	0.0005	<	0.0001	0.0001		0.001	0.0005	<	0.07	0.07	J	0.55	0.55		0.002	0.001	<	0.05	0.05		0.021	0.021	J
SW-4	14-Jul-95	Hydrometrics Data	43.74		6.1	0.5	0.5		0.001	0.0005	<	0.0001	0.0001		0.002	0.002		0.118	0.118	J	0.8	0.8	J	0.002	0.001	<	0.07	0.07		0.026	0.013	<
SW-4	27-Sep-95	Hydrometrics Data	1.34		5.9	0.2	0.2		0.001	0.0005	<	0.0003	0.0003		0.001	0.0005	<	0.173	0.173		0.09	0.09		0.002	0.001	<	0.12	0.12		0.08	0.04	<
SW-4	21-May-96	Hydrometrics Data			6	0.2	0.2					0.0001	0.0001					0.063	0.063		0.18	0.18		0.003	0.0015	<	0.03	0.03		0.05	0.025	<
SW-4	29-May-96	Hydrometrics Data			7	0.4	0.4					0.0001	0.00005	<				0.086	0.086		0.44	0.44		0.003	0.0015	<	0.05	0.05		0.05	0.025	<
SW-4	5-Jun-96	Hydrometrics Data			5.7	1.1	1.1					0.0001	0.0001					0.139	0.139		3.17	3.17		0.005	0.005		0.067	0.067		0.03	0.015	<
SW-4	12-Jun-96	Hydrometrics Data	33.7		6													0.055	0.055		0.62	0.62	J							0.05	0.05	J
SW-4	19-Jun-96	Hydrometrics Data	72.157		6.6	0.2	0.2					0.0001	0.0001					0.066	0.066		0.35	0.35		0.003	0.0015	<	0.031	0.031		0.01	0.005	<
SW-4	26-Jun-96	Hydrometrics Data			8.1													0.066	0.066		1.14	1.14								0.02	0.02	
SW-4	2-Jul-96	Hydrometrics Data			7.7													0.11	0.11		2.17	2.17								0.08	0.08	J
SW-4	11-Jul-96	Hydrometrics Data	54.84		5.1	0.2	0.2	J				0.0001	0.00005	<				0.07	0.07		0.49	0.245	<	0.003	0.0015	<	0.033	0.033		0.02	0.02	
SW-4	18-Jul-96	Hydrometrics Data	26.42		6.3													0.105	0.105		0.34	0.34								0.03	0.015	<
SW-4	25-Jul-96	Hydrometrics Data	19.92		7.8													0.129	0.129		0.4	0.4								0.03	0.03	
SW-4	21-Aug-96	Hydrometrics Data	4.315		6.3													0.17	0.17		0.31	0.31								0.05	0.05	
SW-4	11-Sep-96	Hydrometrics Data	1.46		5.6	0.4	0.4					0.0003	0.0003	J				0.154	0.154		0.17	0.17		0.003	0.0015	<	0.15	0.15		0.06	0.06	
SW-4	27-Mar-98	UOS Data	0.69		7																											
SW-4	22-Apr-98	UOS Data	0.578		6.5																											
SW-4	5-May-98	UOS Data			6.9																											
SW-4	13-May-98	UOS Data	4.783		6.9																											
SW-4	6-May-99	Maxim	0.42		6.7	0.1	0.05	<				0.0004	0.0004					0.06	0.06		0.03	0.03		0.001	0.0005	<	0.021	0.021		0.05	0.05	
SW-4	9-Jul-99	Maxim	45.706		7.1	0.3	0.3					0.0001	0.0001					0.08	0.08		0.29	0.29		0.001	0.0005	<	0.027	0.027		0.03	0.03	
SW-4	9-Jul-99	Maxim			7.1	0.3	0.3					0.0001	0.0001					0.07	0.07		0.24	0.24		0.001	0.0005	<	0.028	0.028		0.02	0.02	
SW-4	30-Sep-99	Maxim	1.46		7.1	0.1	0.05	<				0.0003	0.0003					0.07	0.07		0.03	0.03		0.001	0.0005	<	0.072	0.072		0.06	0.06	J
SW-4	30-Sep-99	Maxim			6.9	0.1	0.05	<				0.0003	0.0003					0.08	0.08		0.03	0.03		0.001	0.0005	<	0.078	0.078		0.11	0.11	J
SW-4	13-Apr-00	Maxim	0.837		6.7	0.05	0.025	<				0.0004	0.0004					0.064	0.064		0.05	0.025	<	0.001	0.0005	<	0.014	0.014		0.02	0.01	<
SW-4	8-Jul-00	Maxim	15.48		7	0.3	0.3	J				0.0001	0.00005	<				0.12	0.12	J	0.38	0.38	J	0.001	0.0005	<	0.064	0.064	J	0.03	0.03	J
SW-4	19-Oct-00	Maxim	1.39		6.2	0.1	0.05	<				0.0001	0.00005	<				0.057	0.057		0.07	0.07	J	0.001	0.0005	<	0.058	0.058		0.04	0.04	
SW-4	19-Oct-00	Maxim			6	0.1	0.05	<				0.0001	0.00005	<				0.067	0.067		0.09	0.09		0.001	0.0005	<	0.065	0.065		0.04	0.04	
SW-4	21-Apr-01	Maxim	0.62		7	0.1	0.05	<				0.0003	0.0003					0.038	0.038		0.03	0.03		0.001	0.0005	<	0.008	0.008		0.08	0.08	
SW-4	26-Jun-01	Maxim	23.84		7.3	0.3	0.3					0.0002	0.0002					0.089	0.089		0.43	0.43		0.001	0.001	J	0.048	0.048		0.02	0.02	
SW-4	11-Oct-01	Maxim	0.61		6.7	0.2	0.2		0.003	0.0015	<	0.0003	0.0003					0.058	0.058		0.11	0.11		0.001	0.0005	<	0.009	0.009		0.09	0.09	
SW-4	26-Apr-02	Maxim			6.7	0.1	0.05	<				0.0003	0.0003					0.03	0.03		0.01	0.005	<	0.001	0.0005	<	0.006	0.006		0.04	0.04	
SW-4	1-Jul-02	Maxim	47		7.1	0.3	0.3	J				0.0001	0.00005	<				0.1	0.1		0.5	0.5		0.001	0.0005	<	0.051	0.051		0.02	0.02	J
SW-4	8-Oct-02	Maxim	1.91		7.2	0.1	0.1					0.0004	0.0004					0.085	0.085		0.13	0.13		0.001	0.0005	<	0.088	0.088		0.07	0.07	J
SW-4	23-Apr-03	Maxim			6.3	0.05	0.025	<				0.0003	0.0003					0.049	0.049		0.1	0.1		0.001	0.0005	<	0.013	0.013		0.08	0.08	
SW-4	1-Jul-03	Maxim	40.8		7.4	0.25	0.25					0.0001	0.00005	<				0.07	0.07		0.29	0.29		0.001	0.0005	<	0.044	0.044		0.01	0.005	<
SW-4	30-Sep-03	Maxim	0.903		6.5	0.05	0.025	<				0.0002	0.0002					0.079	0.079		0.02	0.02		0.001	0.0005	<	0.055	0.055		0.13	0.13	
SW-4	5-Apr-04	Maxim	0.784		7	0.05	0.025	<				0.0002	0.0002					0.04	0.04		0.02	0.02		0.001	0.0005	<	0.005	0.005		0.1	0.1	JF%
SW-4	28-Jun-04	Maxim	70.91		7.4	0.8	0.8					0.0001	0.00005	<				0.11	0.11		1.48	1.48		0.003	0.003		0.045	0.045		0.05	0.05	
SW-4	5-Oct-04	Maxim	3.21		7.4	0.12	0.12					0.0002	0.0002					0.05	0.05		0.06	0.06		0.001	0.0005	<	0.029	0.029		0.02	0.02	
SW-4	5-Apr-05	Maxim	0.7		7	0.05	0.025	<			--	0.0002	0.0002				--	0.033	0.033		0.01	0.01		0.001	0.0005	<	0.008	0.008		0.08	0.08	JF%
SW-4	28-Jun-05	Maxim	50.84		7.1	0.25	0.25				--	0.0001	0.00005	<			--	0.063	0.063		0.2	0.2		0.001	0.0005	<	0.028	0.028		0.02	0.02	
SW-4	11-Oct-05	Maxim	1.62		6.7	0.05	0.025	<			--	0.0002	0.0002				--	0.05	0.05		0.16	0.16		0.001	0.0005	<	0.005	0.005		0.03	0.03	
SW-4	26-Apr-06	Tetra Tech	0.62		6.5	0.05	0.025	<				0.0002	0.0002					0.043	0.043		0.02	0.02		0.001	0.0005	<	0.005	0.005		0.04	0.04	
SW-4	28-Jun-06	Tetra Tech	33.1		7.3	0.19	0.19					0.0001	0.00005	<				0.064	0.064		0.21	0.21		0.001	0.0005	<	0.034	0.034		0.01	0.005	<
SW-4	26-Sep-06	Tetra Tech	0.66		6.9	0.08	0.08					0.0002	0.0002					0.034	0.034		0.01	0.01		0.001	0.0005	<	0.026	0.026		0.18	0.18	
SW-4	11-Apr-07	Tetra Tech	0.582		6.4	0.05	0.025	<				0.0002	0.0002					0.038	0.038		0.02	0.02		0.001	0.0005	<	0.014	0.014		0.04	0.04	
SW-4	12-Jun-07	Tetra Tech	46.7		7.3	0.3	0.3					0.0001	0.00005	<				0.069	0.069		0.27	0.27		0.001	0.0005	<	0.02	0.02		0.01	0.005	<
SW-4	17-Sep-07	Tetra Tech	0.88		7.0	0.07	0.07					0.0002	0.0002					0.044	0.044		0.05	0.05		0.001	0.0005	<	0.033	0.033		0.02	0.02	
SW-4	17-Apr-08	Tetra Tech	0.448		7	0.05	0.025	<				0.0002	0.0002					0.044	0.044		0.02	0.02		0.001	0.0005	<	0.011	0.011		0.04	0.04	
SW-4	14-Jul-08	Tetra Tech	46.54		7.3	0.13	0.13					0.0001	0.00005	<				0.049	0.049		0.18	0.18		0.001	0.0005	<	0.022	0.022		0.01	0.005	<
SW-4	22-Sep-08	Tetra Tech	1.462		7.1	0.11	0.11					0.0002	0.0002					0.065	0.065		0.02	0.02		0.001	0.001	JF%<	0.046	0.046		0.03	0.03	
SW-4	08-Apr-09	Tetra Tech	0.312		6.4	0.011	0.011					0.00025	0.00025					0.037	0.037		0.025	0.0125	<	0.00005	0.000025	<	0.0075	0.0075		0.045	0.045	
SW-4	23-Jun-09	Tetra Tech	57.7		7	0.15	0.15					0.000061	0.000061	J				0.044	0.044		0.13	0.13		0.00021	0.00021		0.018	0.018		0.011	0.011	
SW-4	29-Sep-09	Tetra Tech	0.699		6.8	0.051	0.051					0.00014	0.00014					0.025	0.025		0.025	0.0125	<	0.00005	0.000025	<	0.0077	0.0077		0.023	0.023	
SW-4	06-Apr-10	Tetra Tech	0.272		7.1	0.018	0.018					0.00016	0.00016					0.018	0.018		0.05	0.025	<	0.0001	0.00005	<	0.0016	0.0016		0.036	0.036	
SW-4	27-Sep-10	Tetra Tech	1.36		7.1	0.065	0.065					0.00015	0.00015					0.04	0.04		0.17	0.17		0.0001	0.00005	<	0.031	0.031		0.021	0.021	

Notes:
mg/l = milligrams/liter;
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NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2011

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Flow Flag	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al(calc)	Al Flag	Arsenic Total Rec. (mg/l)	As(calc)	As Flag	Cadmium Total Rec. (mg/l)	Cd(calc)	Cd Flag	Chromium Total Rec. (mg/l)	Cr(calc)	Cr Flag	Copper Total Rec. (mg/l)	Cu(calc)	Cu Flag	Iron Total Rec. (mg/l)	Fe(calc)	Fe Flag	Lead Total Rec. (mg/l)	Pb(calc)	Pb Flag	Manganese Total Rec. (mg/l)	Mn(calc)	Mn Flag	Zinc Total Rec. (mg/l)	Zn(calc)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)						0.087			0.15			0.00016			0.049			0.0073			1			0.0013			NA			0.067		
Acute Standard (for Hardness = 50 mg/l)						0.75			0.34			0.001			1.02			0.0052			NA			0.034			NA			0.067		
Chronic Standard (for Hardness = 100 mg/l)						0.087			0.15			0.0027			0.086			0.0093			1			0.0032			NA			0.12		
Acute Standard (for Hardness = 100 mg/l)						0.75			0.34			0.0021			1.8			0.0140			NA			0.082			NA			0.12		
Station SW-4: Pre-1999 Samples (n)			45		68	36			24			33			23			42			42			33			33			42		
Minimum			0.400		5.100	0.050			0.001			0.00005			0.001			0.025			0.015			0.000			0.005			0.005		
Maximum			112.400		8.100	1.700			0.003			0.00200			0.020			0.290			3.550			0.010			0.160			1.950		
Mean			27.691		6.616	0.349			0.002			0.00033			0.007			0.101			0.592			0.002			0.072			0.091		
Standard Deviation (SD)			30.755		0.463	0.324			0.001			0.00037			0.005			0.048			0.785			0.002			0.047			0.300		
Mean + (2 x SD); for pH: Mean - (2 x SD)			89.202		5.691	0.996			0.0037			0.00107			0.0170			0.196			2.162			0.007			0.166			0.691		
Station SW-4: 1989-2010 Samples (n)			78		106	74			25			71			23			80			80			71			71			80		
Minimum			0.272		5.100	0.011			0.001			0.00005			0.00050			0.01800			0.005			0.000			0.002			0.005		
Maximum			112.400		8.100	1.700			0.003			0.00200			0.02000			0.29000			3.550			0.010			0.160			1.950		
Mean			22.391		6.724	0.237			0.002			0.00025			0.00654			0.08065			0.385			0.001			0.050			0.069		
Standard Deviation (SD)			27.963		0.448	0.272			0.001			0.00027			0.00520			0.04347			0.631			0.002			0.042			0.219		
Mean + (2 x SD); for pH: Mean - (2 x SD)			78.316		5.827	0.780			0.004			0.00080			0.017			0.168			1.647			0.005			0.133			0.507		
Station SW-4: 1999-2010 Samples (n)			33		38	38			1			38			0			38			38			38			38			38		
Minimum			0.272		6.000	0.011			0.002			0.00005			0.000			0.01800			0.00500			0.00003			0.00160			0.00500		
Maximum			70.910		7.400	0.800			0.002			0.00040			0.000			0.12000			1.48000			0.00300			0.08800			0.18000		
Mean			15.163		6.916	0.131			0.002			0.00018						0.05858			0.15474			0.00054			0.03015			0.04542		
Standard Deviation (SD)			22.079		0.351	0.151						0.00011						0.02316			0.25534			0.00045			0.02322			0.03821		
Mean + (2 x SD); for pH: Mean - (2 x SD)			59.321		6.214	0.434						0.00040						0.105			0.665			0.001			0.077			0.122		
Narrative Standard - SW-4					**5.24**	**0.74**			**NA**			**0.001**			**NA**			**0.172**			**1.726**			**0.005**			**0.79**			**0.66**		

Notes:
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NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2011

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Flow Flag	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al(calc)	Al Flag	Arsenic Total Rec. (mg/l)	As(calc)	As Flag	Cadmium Total Rec. (mg/l)	Cd(calc)	Cd Flag	Chromium Total Rec. (mg/l)	Cr(calc)	Cr Flag	Copper Total Rec. (mg/l)	Cu(calc)	Cu Flag	Iron Total Rec. (mg/l)	Fe(calc)	Fe Flag	Lead Total Rec. (mg/l)	Pb(calc)	Pb Flag	Manganese Total Rec. (mg/l)	Mn(calc)	Mn Flag	Zinc Total Rec. (mg/l)	Zn(calc)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)						0.087			0.15			0.00016			0.049			0.0073			1			0.0013			NA			0.067		
Acute Standard (for Hardness = 50 mg/l)						0.75			0.34			0.001			1.02			0.0052			NA			0.034			NA			0.067		
Chronic Standard (for Hardness = 100 mg/l)						0.087			0.15			0.0027			0.086			0.0093			1			0.0032			NA			0.12		
Acute Standard (for Hardness = 100 mg/l)						0.75			0.34			0.0021			1.8			0.0140			NA			0.082			NA			0.12		
SW-6	2-Oct-89	Hydrometrics Data	4		6.7				0.0050	0.0025	<	0.00100	0.0005	<				0.01	0.005	<	0.03	0.015	<				0.02	0.01	<	0.01	0.01	
SW-6	20-Oct-89	Hydrometrics Data	4.52		7.2	0.1	0.05	<	0.0050	0.0025	<	0.00100	0.0005	<				0.01	0.005	<	0.03	0.015	<	0.01	0.005	<	0.02	0.01	<	0.01	0.01	
SW-6	29-May-90	Hydrometrics Data	102.1		7.2	0.2	0.2		0.0050	0.0025	<	0.00010	0.00005	<	0.0200	0.01	<	0.035	0.035		0.23	0.23		0.002	0.001	<	0.02	0.02		0.02	0.02	
SW-6	6-Jun-90	Hydrometrics Data	123.2		6.5	0.1	0.1					0.00200	0.002		0.0200	0.01	<	0.02	0.02		0.13	0.13		0.01	0.01		0.02	0.01	<	0.01	0.01	
SW-6	7-Jun-90	Hydrometrics Data	138.6																													
SW-6	13-Jun-90	Hydrometrics Data	116.97		6.7	0.1	0.05	<				0.08000	0.08		0.0200	0.01	<	0.01	0.005	<	0.06	0.06		0.01	0.005	<	0.02	0.01	<	0.01	0.01	
SW-6	14-Jun-90	Hydrometrics Data	86																													
SW-6	20-Jun-90	Hydrometrics Data	167.97		7.1	0.2	0.2					0.00100	0.001		0.0200	0.01	<	0.03	0.03		0.26	0.26		0.01	0.005	<	0.02	0.02		0.15	0.15	
SW-6	22-Jun-90	Hydrometrics Data	273.3																													
SW-6	26-Jun-90	Hydrometrics Data	251.5		6.6	0.2	0.2		0.0050	0.0025	<	0.00010	0.00005	<	0.0200	0.01	<	0.037	0.037		0.4	0.4		0.002	0.001	<	0.02	0.02		0.02	0.02	
SW-6	29-Jun-90	Hydrometrics Data	218.48																													
SW-6	2-Jul-90	Hydrometrics Data	210.6		7	0.2	0.2					0.00100	0.0005	<	0.0200	0.01	<	0.039	0.039		0.35	0.35		0.01	0.005	<	0.02	0.02		0.04	0.04	
SW-6	4-Jul-90	Hydrometrics Data	165.4																													
SW-6	9-Jul-90	Hydrometrics Data	89.9		7.3	0.1	0.1					0.00100	0.0005	<	0.0200	0.01	<	0.03	0.03		0.14	0.14		0.01	0.005	<	0.02	0.01	<	0.02	0.02	
SW-6	11-Jul-90	Hydrometrics Data	72		6.8																											
SW-6	17-Jul-90	Hydrometrics Data	35.4		7.4	0.2	0.2											0.07	0.07		0.3	0.3								0.03	0.015	<
SW-6	19-Jul-90	Hydrometrics Data	26.4		6.8																											
SW-6	27-Jul-90	Hydrometrics Data	18.9		7.3	0.1	0.05	<	0.0050	0.0025	<	0.00010	0.00005	<	0.0200	0.01	<	0.03	0.03		0.1	0.1		0.002	0.001	<	0.02	0.01	<	0.03	0.015	<
SW-6	23-Aug-90	Hydrometrics Data	10.1		6.6																											
SW-6	25-Sep-90	Hydrometrics Data	3.3		6.9	0.1	0.05	<	0.0050	0.0025	<	0.00010	0.00005	<	0.0200	0.01	<	0.007	0.007		0.03	0.015	<	0.002	0.001	<	0.02	0.01	<	0.04	0.04	
SW-6	15-Mar-91	Hydrometrics Data	1		6.8	0.1	0.05	<	0.0050	0.0025	<	0.00100	0.0005	<	0.0200	0.01	<	0.01	0.005	<	0.06	0.06		0.01	0.005	<	0.02	0.01	<	0.02	0.02	
SW-6	5-Jun-91	Hydrometrics Data	201.7		7	0.2	0.2		0.0010	0.0005	<	0.00010	0.00005	<	0.0200	0.01	<	0.017	0.0085	<	0.18	0.18		0.002	0.001	<	0.02	0.01	<	0.01	0.005	<
SW-6	9-Jul-91	Hydrometrics Data	51.2		7.1	0.1	0.1		0.0050	0.0025	<	0.00010	0.0001		0.0200	0.01	<	0.033	0.033		0.14	0.14		0	0	J	0.02	0.01	<	0.03	0.03	
SW-6	14-Aug-91	Hydrometrics Data	3.9		7.3	0.1	0.05	<	0.0050	0.0025	<	0.00010	0.00005	<	0.0200	0.01	<	0.011	0.011		0.06	0.06		0.002	0.001	<	0.02	0.01	<	0.02	0.02	
SW-6	24-Sep-91	Hydrometrics Data	2.5		7	0.1	0.05	<	0.0050	0.0025	<	0.00010	0.00005	<	0.0200	0.01	<	0.013	0.0065	<	0.03	0.015	<	0.002	0.001	<	0.02	0.01	<	0.01	0.005	<
SW-6	19-Jul-92	Hydrometrics Data	30.67		7.4	1.6	1.6		0.0050	0.0025	<	0.00010	0.00005	<	0.0100	0.005	<	0.11	0.11		2.88	2.88		0.002	0.001	<	0.05	0.05		0.13	0.13	
SW-6	23-Sep-92	Hydrometrics Data	3.54		7.4	0.1	0.05	<	0.0050	0.0025	<	0.00010	0.0001		0.0100	0.005	<	0.016	0.016		0.2	0.2		0.002	0.001	<	0.02	0.02		0.05	0.05	
SW-6	21-Jul-93	Hydrometrics Data	38.11		7.1	0.2	0.2		0.0010	0.0005	<	0.00010	0.0001		0.0010	0.0005	<	0.062	0.062		0.24	0.24		0.002	0.001	<	0.03	0.03		0.01	0.01	J
SW-6	22-Sep-93	Hydrometrics Data	4.2		7.4	0.1	0.05	<	0.0010	0.0005	<	0.00010	0.0001		0.0010	0.0005	<	0.019	0.019		0.03	0.03		0.002	0.001	<	0.03	0.03		0.018	0.009	<
SW-6	14-Apr-94	Hydrometrics Data	19.2		8.1				0.0010	0.0005	<	0.00010	0.00005	<				0.001	0.0005	<												
SW-6	15-Jun-94	Hydrometrics Data	87.64		7	0.1	0.1		0.0010	0.0005	<	0.00010	0.00005	<	0.0010	0.0005	<	0.016	0.016	J	0.11	0.11		0.002	0.001	<	0.01	0.01		0.005	0.005	J
SW-6	21-May-96	Hydrometrics Data	45.62		4.6	0.1	0.1					0.00010	0.00005	<				0.021	0.021		0.15	0.15		0.003	0.0015	<	0.012	0.012		0.04	0.02	<
SW-6	10-Jul-96	Hydrometrics Data	149.2		5.9	0.1	0.05	<				0.00010	0.0001					0.024	0.024		0.01	0.01		0.003	0.0015	<	0.013	0.013		0.01	0.005	<
SW-6	11-Sep-96	Hydrometrics Data	2.91		6.1	0.1	0.05	<				0.00010	0.00005	<				0.011	0.011		0.02	0.02		0.003	0.0015	<	0.007	0.007		0.01	0.005	<
SW-6	6-May-99	Maxim	13.65		7.3	0.1	0.1					0.00010	0.00005	<				0.01	0.01		0.13	0.13		0.001	0.0005	<	0.008	0.008		0.01	0.005	<
SW-6	7-Jul-99	Maxim	148.39		7.6	0.2	0.2					0.00010	0.00005	<				0.034	0.034		0.27	0.27		0.001	0.0005	<	0.014	0.014		0.02	0.02	
SW-6	29-Sep-99	Maxim	3.727		7	0.1	0.05	<				0.00010	0.00005	<				0.016	0.016		0.06	0.06		0.001	0.0005	<	0.007	0.007		0.02	0.02	J
SW-6	13-Apr-00	Maxim	2.55		6.9	0.05	0.025	<				0.00010	0.00005	<				0.004	0.004		0.05	0.025	<	0.001	0.0005	<	0.005	0.0025	<	0.02	0.01	<
SW-6	8-Jul-00	Maxim	36.08		6.8	0.1	0.1	J				0.00010	0.00005	<				0.032	0.032	J	0.14	0.14	J	0.001	0.0005	<	0.018	0.018	J	0.01	0.01	J
SW-6	19-Oct-00	Maxim	3.34		7.1	0.1	0.05	<				0.00010	0.00005	<				0.005	0.005		0.05	0.025	<	0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<
SW-6	21-Apr-01	Maxim	2.67		7.6	0.1	0.05	<				0.00010	0.00005	<				0.004	0.004		0.02	0.02		0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<
SW-6	26-Jun-01	Maxim	60.42		7.6	0.1	0.05	<				0.00010	0.00005	<				0.027	0.027		0.12	0.12		0.001	0.0005	<	0.008	0.008		0.01	0.005	<
SW-6	11-Oct-01	Maxim	1.17		7	0.1	0.05	<	0.0030	0.0015	<	0.00010	0.00005	<				0.004	0.004		0.1	0.1		0.001	0.0005	<	0.008	0.008		0.03	0.03	J
SW-6	23-Apr-02	Maxim	0.64		7.8	0.1	0.05	<				0.0001	0.00005	<				0.004	0.004		0.06	0.06		0.001	0.0005	<	0.003	0.003		0.01	0.005	<
SW-6	1-Jul-02	Maxim	110		7.6	0.1	0.1	J				0.0002	0.0002					0.032	0.032		0.14	0.14		0.001	0.001		0.008	0.008		0.01	0.01	J
SW-6	8-Oct-02	Maxim	3.36		7.4	0.1	0.05	<				0.0001	0.0001					0.014	0.014		0.01	0.01		0.001	0.0005	<	0.006	0.006		0.05	0.05	J
SW-6	22-Apr-03	Maxim	4.13		7.2	0.05	0.025	<				0.0001	0.00005	<				0.005	0.005		0.12	0.12		0.001	0.0005	<	0.007	0.007		0.01	0.005	<
SW-6	1-Jul-03	Maxim	120.5		7.6	0.12	0.12					0.0001	0.00005	<				0.021	0.021		0.12	0.12		0.001	0.001		0.014	0.014		0.01	0.005	<
SW-6	30-Sep-03	Maxim	1.21		7.2	0.05	0.025	<				0.0001	0.00005	<				0.003	0.003		0.01	0.005	<	0.001	0.0005	<	0.02	0.02		0.03	0.03	
SW-6	6-Apr-04	Maxim	7.119		7.5	0.05	0.025	<				0.0001	0.00005	<				0.014	0.014		0.04	0.04		0.001	0.0005	<	0.005	0.0025	<	0.05	0.05	JF%
SW-6	28-Jun-04	Maxim	107.21		7.7	0.06	0.06					0.0001	0.00005	<				0.025	0.025		0.18	0.18		0.001	0.0005	<	0.008	0.008		0.03	0.03	
SW-6	5-Oct-04	Maxim	24.85		7.4	0.09	0.09					0.0001	0.00005	<				0.007	0.007	B	0.02	0.02		0.001	0.0005	<	0.003	0.0015	<	0.01	0.01	
SW-6	5-Apr-05	Maxim	2.3		7.5	0.05	0.025	<			--	0.0001	0.00005	<			--	0.001	0.0005	<	0.01	0.01		0.001	0.0005	<	0.003	0.0015	<	0.01	0.01	JF%
SW-6	28-Jun-05	Maxim	120.34		7.6	0.1	0.1				--	0.0001	0.00005	<			--	0.019	0.019		0.08	0.08		0.001	0.0005	<	0.01	0.01		0.01	0.01	
SW-6	11-Oct-05	Maxim	2.37		7	0.05	0.025	<			--	0.0001	0.00005	<			--	0.005	0.005		0.01	0.005	<	0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<

Notes:
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NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2011

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Flow Flag	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al(calc)	Al Flag	Arsenic Total Rec. (mg/l)	As(calc)	As Flag	Cadmium Total Rec. (mg/l)	Cd(calc)	Cd Flag	Chromium Total Rec. (mg/l)	Cr(calc)	Cr Flag	Copper Total Rec. (mg/l)	Cu(calc)	Cu Flag	Iron Total Rec. (mg/l)	Fe(calc)	Fe Flag	Lead Total Rec. (mg/l)	Pb(calc)	Pb Flag	Manganese Total Rec. (mg/l)	Mn(calc)	Mn Flag	Zinc Total Rec. (mg/l)	Zn(calc)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)						0.087			0.15			0.00016			0.049			0.0073			1			0.0013			NA			0.067		
Acute Standard (for Hardness = 50 mg/l)						0.75			0.34			0.001			1.02			0.0052			NA			0.034			NA			0.067		
Chronic Standard (for Hardness = 100 mg/l)						0.087			0.15			0.0027			0.086			0.0093			1			0.0032			NA			0.12		
Acute Standard (for Hardness = 100 mg/l)						0.75			0.34			0.0021			1.8			0.0140			NA			0.082			NA			0.12		
SW-6	26-Apr-06	Tetra Tech	5.58		7.1	0.05	0.025	<				0.0001	0.00005	<				0.003	0.003		0.01	0.01		0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<
SW-6	28-Jun-06	Tetra Tech	72.63		7.4	0.07	0.07					0.0001	0.00005	<				0.024	0.024		0.12	0.12		0.001	0.0005	<	0.015	0.015		0.01	0.005	<
SW-6	26-Sep-06	Tetra Tech	2.13		7.6	0.05	0.025	<				0.0001	0.00005	<				0.004	0.004		0.01	0.005	<	0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<
SW-6	11-Apr-07	Tetra Tech	4.04		6.7	0.05	0.025	<				0.0001	0.00005	<				0.002	0.002		0.01	0.005	<	0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<
SW-6	12-Jun-07	Tetra Tech	101		7.5	0.07	0.07					0.0001	0.00005	<				0.018	0.018		0.08	0.08		0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<
SW-6	17-Sep-07	Tetra Tech	1.9		7.5	0.05	0.025	<				0.0001	0.00005	<				0.003	0.003		0.01	0.005	<	0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<
SW-6	17-Apr-08	Tetra Tech	1.93		7.4	0.05	0.025	<				0.0001	0.00005	<				0.005	0.005		0.07	0.07		0.001	0.0005	<	0.003	0.0015	<	0.01	0.005	<
SW-6	14-Jul-08	Tetra Tech	99.53		7.3	0.05	0.025	<				0.0001	0.00005	<				0.016	0.016		0	0		0.001	0.0005	<	0.008	0.008		0.01	0.005	<
SW-6	22-Sep-08	Tetra Tech	3.09		7.5	0.05	0.025	<				0.0001	0.00005	<				0.004	0.004		0.01	0.005	<	0.001	0.001	JF%<	0.003	0.0015	<	0.01	0.005	<
SW-6	09-Apr-09	Tetra Tech	2.69		7.5	0.0064	0.0064					0.00004	0.00005	<				0.0024	0.0024		0.025	0.0125	<	0.00005	0.000025	<	0.001	0.001		0.0055	0.0055	
SW-6	23-Jun-09	Tetra Tech	177.5		7.1	0.11	0.11					0.00004	0.00005	<				0.015	0.015		0.11	0.11		0.00021	0.00021		0.0096	0.0096		0.0053	0.0053	
SW-6	29-Sep-09	Tetra Tech	1.74		7.3	0.071	0.071					0.00004	0.00005	<				0.0049	0.0049		0.04	0.04	J	0.00013	0.00013		0.0044	0.0044		0.0047	0.0047	J
SW-6	06-Apr-10	Tetra Tech	3.59		7.7	0.036	0.036					0.00008	0.00005	<				0.002	0.002		0.05	0.025	<	0.0001	0.00005	<	0.0016	0.0016		0.054	0.054	
SW-6	27-Sep-10	Tetra Tech	4.57		6.9	0.02	0.02					0.00008	0.00005	<				0.0043	0.0043		0.05	0.025	<	0.0001	0.00005	<	0.0014	0.0014		0.0055	0.0055	
Station SW-6: Pre-1999 Samples (n)			34		29	24			17			25			19			26			25			23			24			25		
Minimum			1.000		4.600	0.050			0.0005			0.00005			0.0005			0.001			0.010			0.000			0.007			0.005		
Maximum			273.300		8.100	1.600			0.0025			0.08000			0.0100			0.110			2.880			0.010			0.050			0.150		
Mean			81.177		6.907	0.169			0.0019			0.00346			0.0080			0.025			0.244			0.002			0.016			0.027		
Standard Deviation (SD)			81.893		0.616	0.312			0.0009			0.01595			0.0037			0.024			0.560			0.002			0.010			0.036		
Mean + (2 x SD); for pH: Mean - (2 x SD)			244.963		5.674	0.792			0.0038			0.03537			0.0153			0.074			1.365			0.007			0.035			0.099		
Station SW-6: 1989-2010 Samples (n)			69		64	59			18			60			19			61			60			58			59			60		
Minimum			0.640		4.600	0.006			0.001			0.0001			0.0005			0.0005			0.0000			0.0000			0.0010			0.0047		
Maximum			273.300		8.100	1.600			0.003			0.0800			0.0100			0.1100			2.8800			0.0100			0.0500			0.1500		
Mean			58.232		7.144	0.101			0.002			0.0015			0.0080			0.0172			0.1384			0.0013			0.0097			0.0187		
Standard Deviation (SD)			71.630		0.510	0.206			0.001			0.0103			0.0037			0.0188			0.3718			0.0018			0.0088			0.0264		
Mean + (2 x SD); for pH: Mean - (2 x SD)			201.491		6.124	0.514			0.0037			0.02210			0.0153			0.055			0.882			0.005			0.027			0.071		
Station SW-6: 1999-2010 Samples (n)			35		35	35			1			35			0			35			35			35			35			35		
Minimum			0.640		6.700	0.006			0.002			0.00005			0.000			0.00050			0.0000			0.00003			0.0010			0.005		
Maximum			177.500		7.800	0.200			0.002			0.00020			0.000			0.03400			0.2700			0.00100			0.0200			0.054		
Mean			35.941		7.340	0.055			0.002			0.00006						0.01123			0.0626			0.00048			0.0058			0.013		
Standard Deviation (SD)			52.101		0.285	0.040						0.00003						0.01000			0.0632			0.00022			0.0053			0.014		
Mean + (2 x SD); for pH: Mean - (2 x SD)			140.143		6.770	0.135						0.00011						0.031			0.189			0.001			0.016			0.041		
Narrative Standard - SW-6					5.7	0.763			NA			0.03472			NA			0.076			1.132			NA			0.034			0.110		

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New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Flow Flag	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al(calc)	Al Flag	Arsenic Total Rec. (mg/l)	As(calc)	As Flag	Cadmium Total Rec. (mg/l)	Cd(calc)	Cd Flag	Chromium Total Rec. (mg/l)	Cr(calc)	Cr Flag	Copper Total Rec. (mg/l)	Cu(calc)	Cu Flag	Iron Total Rec. (mg/l)	Fe(calc)	Fe Flag	Lead Total Rec. (mg/l)	Pb(calc)	Pb Flag	Manganese Total Rec. (mg/l)	Mn(calc)	Mn Flag	Zinc Total Rec. (mg/l)	Zn(calc)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)						0.087			0.15			0.00016			0.049			0.0073			1			0.0013			NA			0.067		
Acute Standard (for Hardness = 50 mg/l)						0.75			0.34			0.001			1.02			0.0052			NA			0.034			NA			0.067		
Chronic Standard (for Hardness = 100 mg/l)						0.087			0.15			0.0027			0.086			0.0093			1			0.0032			NA			0.12		
Acute Standard (for Hardness = 100 mg/l)						0.75			0.34			0.0021			1.8			0.0140			NA			0.082			NA			0.12		
DC-2	3-Oct-89	Hydrometrics Data	0.2		2.9				0.0050	0.0025	<	0.00100	0.0005	<				7.89	7.89		28.26	28.26					3.37	3.37		1.03	1.03	
DC-2	12-Jul-90	Hydrometrics Data	4.39		3.6	7.2	7.2		0.0050	0.0025	<	0.00500	0.005					2.74	2.74		17.9	17.9					0.71	0.71		0.31	0.31	
DC-2	15-Jun-94	Hydrometrics Data	2.86		3.7	9	9		0.0010	0.0005	<	0.00210	0.0021		0.0040	0.004		2.64	2.64	J	10.4	10.4		0.003	0.003		1.08	1.08		0.332	0.332	J
DC-2	26-Jul-94	Hydrometrics Data			3.6	16.4	16.4		0.0010	0.0005	<	0.00540	0.0054		0.0050	0.005		5.32	5.32		15.8	15.8		0.009	0.009		2.57	2.57		0.667	0.667	
DC-2	22-Aug-94	Hydrometrics Data			3.1	28.6	28.6		0.0020	0.002		0.00760	0.0076		0.0100	0.01		8.26	8.26		41.8	41.8		0.024	0.024		3.65	3.65		0.904	0.904	
DC-2	23-Aug-94	Hydrometrics Data			3.4	23.9	23.9		0.0010	0.0005	<	0.00740	0.0074		0.0060	0.006		7.27	7.27		20.4	20.4		0.006	0.006		3.43	3.43		0.886	0.886	
DC-2	20-Sep-94	Hydrometrics Data				25	25		0.0010	0.0005	<	0.00760	0.0076		0.0070	0.007		7.44	7.44		23.6	23.6		0.004	0.004		3.59	3.59		1.2	1.2	J
DC-2	13-Oct-94	Hydrometrics Data																														
DC-2	26-Sep-95	Hydrometrics Data	0.194		3.3	22	22		0.0010	0.0005	<	0.00520	0.0052		0.0060	0.006		6.33	6.33		16.2	16.2		0.005	0.005		2.99	2.99		0.894	0.894	
DC-2	21-May-96	Hydrometrics Data	0.467		4	8.3	8.3					0.00270	0.0027					1.91	1.91		5.55	5.55		0.004	0.004		1.12	1.12		0.43	0.43	
DC-2	30-May-96	Hydrometrics Data	1.116		4	6.9	6.9					0.00190	0.0019					1.62	1.62		5.52	5.52		0.004	0.004		0.785	0.785		0.31	0.31	
DC-2	5-Jun-96	Hydrometrics Data	2.79		3.3	7	7					0.00140	0.0014					1.83	1.83		19.3	19.3		0.008	0.008		0.629	0.629		0.24	0.24	
DC-2	12-Jun-96	Hydrometrics Data	10.8		4.1													1.25	1.25		10.7	10.7	J							0.21	0.21	J
DC-2	18-Jun-96	Hydrometrics Data	14.33		4.5	5	5					0.00120	0.0012					1.44	1.44		9.69	9.69		0.003	0.0015	<	0.481	0.481		0.19	0.19	
DC-2	26-Jun-96	Hydrometrics Data	11.3		4.5													1.52	1.52		8.54	8.54								0.19	0.19	
DC-2	2-Jul-96	Hydrometrics Data	13.79		5													1.38	1.38		6.76	6.76								0.24	0.24	J
DC-2	9-Jul-96	Hydrometrics Data	15.48		4.4	4.2	4.2	J				0.00080	0.0008					1.11	1.11		8.05	8.05		0.01	0.01		0.379	0.379		0.15	0.15	
DC-2	18-Jul-96	Hydrometrics Data	4.937		3.9													2.23	2.23		8	8								0.33	0.33	
DC-2	25-Jul-96	Hydrometrics Data	1.175		4.1													2.7	2.7		9.84	9.84								0.39	0.39	
DC-2	21-Aug-96	Hydrometrics Data	0.138		3.3													4.74	4.74		15.4	15.4								0.64	0.64	
DC-2	10-Sep-96	Hydrometrics Data	0.18		3.1	20.2	20.2					0.00580	0.0058					6.22	6.22		15.6	15.6		0.006	0.006		2.72	2.72		0.89	0.89	
DC-2	9-Jul-97	UOS Data				3.27	3.27		0.0100	0.005	<	0.00500	0.0025	<	0.0100	0.005	<	0.876	0.876		5.32	5.32					0.304	0.304		0.129	0.129	
DC-2	30-Mar-98	UOS Data	0.13		4.2	12.3	12.3											2.69	2.69		12.8	12.8					2.14	2.14		0.688	0.688	
DC-2	22-Apr-98	UOS Data	0.072		4.3	12.1	12.1											2.66	2.66		11.2	11.2					1.95	1.95		0.589	0.589	
DC-2	4-May-98	UOS Data	0.699		4	5.4	5.4											1.23	1.23		6.43	6.43					0.574	0.574		0.162	0.162	
DC-2	29-May-98	UOS Data	2.67		3.6	5.34	5.34											1.47	1.47		10	10					0.592	0.592		0.22	0.22	
DC-2	6-May-99	Maxim	0.028		4.5	9.2	9.2					0.00380	0.0038					1.94	1.94		16	16		0.006	0.006		1.61	1.61		0.51	0.51	
DC-2	8-Jul-99	Maxim	9.46		5.2	3.7	3.7					0.00120	0.0012					1.07	1.07		4.83	4.83		0.002	0.002		0.37	0.37		0.15	0.15	
DC-2	29-Sep-99	Maxim	0.464		3.8	12.4	12.4					0.00440	0.0044					3.98	3.98		13.6	13.6		0.002	0.002		1.93	1.93		0.6	0.6	J
DC-2	12-Apr-00	Maxim	0.012		4.5	10.7	10.7					0.00560	0.0056					2.51	2.51		13.5	13.5		0.004	0.004		2.02	2.02		0.02	0.01	<
DC-2	20-May-00	Maxim	1.57		4													1.42	1.42											0.19	0.19	
DC-2	20-May-00	Maxim	1.57		3.9													1.44	1.44											0.19	0.19	
DC-2	20-May-00	Maxim	1.61		4													1.89	1.89											0.26	0.26	
DC-2	20-May-00	Maxim	2.61		3.9	5.5	5.5					0.00110	0.0011					1.34	1.34		14.4	14.4		0.007	0.007		0.6	0.6		0.17	0.17	
DC-2	14-Jun-00	Maxim	5.16		4.4													1.59	1.59											0.24	0.24	
DC-2	14-Jun-00	Maxim	6.07		4.4													1.64	1.64											0.24	0.24	
DC-2	14-Jun-00	Maxim	6.44		4.3													1.61	1.61											0.22	0.22	
DC-2	14-Jun-00	Maxim	7.66		4.2	4.7	4.7					0.00140	0.0014					1.43	1.43		8.26	8.26		0.002	0.002		0.5	0.5		0.2	0.2	
DC-2	9-Jul-00	Maxim	3.5		4.8													1.59	1.59	J										0.23	0.23	J
DC-2	9-Jul-00	Maxim	2.4		4.7	6.1	6.1	J				0.00190	0.0019					2.01	2.01	J	8.55	8.55	J	0.003	0.003		0.72	0.72	J	0.26	0.26	J
DC-2	9-Jul-00	Maxim	2.83		4.6													2.04	2.04	J										0.28	0.28	J
DC-2	9-Jul-00	Maxim	3.35		4.8													1.75	1.75	J										0.26	0.26	J
DC-2	9-Oct-00	Maxim	0.2		4.1	14	14					0.00450	0.0045					3.77	3.77		6.54	6.54	J	0.007	0.007		2.23	2.23		0.54	0.54	
DC-2	20-Apr-01	Maxim	0.15		4.3	11.1	11.1					0.00370	0.0037					2.2	2.2		10.8	10.8		0.004	0.004		1.66	1.66		0.37	0.37	
DC-2	29-Jun-01	Maxim	3.217		5	5.5	5.5					0.00170	0.0017					1.34	1.34		10.3	10.3		0.022	0.022	J	0.63	0.63		0.29	0.29	
DC-2	10-Oct-01	Maxim	0.17		4	17.1	17.1		0.0030	0.0015	<	0.00540	0.0054					4.15	4.15		14.5	14.5		0.007	0.007		2.62	2.62		0.79	0.79	
DC-2	25-Apr-02	Maxim	0.31		4.6	10.8	10.8					0.0038	0.0038					2.2	2.2		12.1	12.1		0.003	0.003		1.91	1.91		0.6	0.6	
DC-2	2-Jul-02	Maxim	5		4.8	6.2	6.2	J				0.0016	0.0016					1.59	1.59		8.1	8.1		0.002	0.002		0.57	0.57		0.25	0.25	J
DC-2	18-Sep-02	Maxim			3.4	17.6	17.6					0.0047	0.0047					4.13	4.13		15.5	15.5		0.006	0.006		2.31	2.31		0.64	0.64	
DC-2	26-Sep-02	Maxim			3.8	14.3	14.3					0.0053	0.0053					4.65	4.65		10.1	10.1		0.005	0.005		2.21	2.21		0.64	0.64	
DC-2	9-Oct-02	Maxim	0.381		4	13.7	13.7					0.0038	0.0038					2.92	2.92		11.8	11.8		0.01	0.01		1.91	1.91		0.54	0.54	J

Notes:
mg/l = milligrams/liter;
su = standard units
n = number of samples

< = less than detection
J = estimated value

NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2011

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Flow Flag	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al(calc)	Al Flag	Arsenic Total Rec. (mg/l)	As(calc)	As Flag	Cadmium Total Rec. (mg/l)	Cd(calc)	Cd Flag	Chromium Total Rec. (mg/l)	Cr(calc)	Cr Flag	Copper Total Rec. (mg/l)	Cu(calc)	Cu Flag	Iron Total Rec. (mg/l)	Fe(calc)	Fe Flag	Lead Total Rec. (mg/l)	Pb(calc)	Pb Flag	Manganese Total Rec. (mg/l)	Mn(calc)	Mn Flag	Zinc Total Rec. (mg/l)	Zn(calc)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)						0.087			0.15			0.00016			0.049			0.0073			1			0.0013			NA			0.067		
Acute Standard (for Hardness = 50 mg/l)						0.75			0.34			0.001			1.02			0.0052			NA			0.034			NA			0.067		
Chronic Standard (for Hardness = 100 mg/l)						0.087			0.15			0.0027			0.086			0.0093			1			0.0032			NA			0.12		
Acute Standard (for Hardness = 100 mg/l)						0.75			0.34			0.0021			1.8			0.0140			NA			0.082			NA			0.12		
DC-2	22-Apr-03	Maxim	0.19		4.5	7.85	7.85					0.0038	0.0038					2.14	2.14		8.79	8.79		0.005	0.005		1.62	1.62		0.45	0.45	
DC-2	11-Jul-03	Maxim	2.36		4.8	6.17	6.17					0.0019	0.0019					1.92	1.92		4.86	4.86		0.003	0.003		0.88	0.88		0.25	0.25	
DC-2	31-Jul-03	Maxim				13.1	13.1		0.001	0.0005	<	0.0032	0.0032					3.57	3.57		12.2	12.2		0.005	0.005		1.83	1.83		0.57	0.57	JF%
DC-2	14-Aug-03	Maxim				15.9	15.9		0.001	0.0005	<	0.0044	0.0044					4.46	4.46		14.4	14.4		0.007	0.007		2.25	2.25		0.63	0.63	
DC-2	21-Aug-03	Maxim				15.3	15.3					0.0048	0.0048					4.37	4.37		13.3	13.3		0.007	0.007		2.29	2.29		0.65	0.65	
DC-2	22-Aug-03	Maxim				19.2	19.2					0.0051	0.0051					4.35	4.35		21.4	21.4		0.008	0.008		2.81	2.81		0.87	0.87	
DC-2	8-Sep-03	Maxim			3.5	18.5	18.5					0.0046	0.0046					5.03	5.03		19.4	19.4		0.013	0.013		2.8	2.8		0.81	0.81	
DC-2	29-Sep-03	Maxim	0.066		4.5	12.5	12.5					0.0043	0.0043					3.63	3.63		8.69	8.69		0.005	0.005		2.5	2.5		0.76	0.76	
DC-2	6-Apr-04	Maxim	0.181		4.4	10.1	10.1					0.0036	0.0036					2.15	2.15		5.94	5.94		0.005	0.005		1.67	1.67		0.5	0.5	JF%
DC-2	29-Jun-04	Maxim	9.56		7.7	2.97	2.97					0.0007	0.0007					0.58	0.58		4.16	4.16		0.003	0.003		0.31	0.31		0.1	0.1	
DC-2	11-Aug-04	Maxim	0.36		4.5	9.38	9.38					0.0032	0.0032					2.79	2.79		11.1	11.1		0.004	0.004		1.44	1.44		0.45	0.45	
DC-2	6-Oct-04	Maxim	0.53		4.8	6.58	6.58					0.0024	0.0024					1.9	1.9		7.36	7.36		0.002	0.002		1.25	1.25		0.35	0.35	
DC-2	6-Apr-05	Maxim	0.05		4.47	11.6	11.6					0.0046	0.0046					2.49	2.49		15.5	15.5		0.003	0.003		2.25	2.25		0.84	0.84	
DC-2	29-Jun-05	Maxim	6.8		6.5	2.37	2.37				--	0.0008	0.0008				--	0.31	0.31		3.42	3.42		0.002	0.002		0.31	0.31		0.14	0.14	
DC-2	27-Sep-05	Maxim	0.19		4.1	13.2	13.2				--	0.0035	0.0035				--	2.57	2.57		12.1	12.1		0.006	0.006		1.82	1.82		0.51	0.51	
DC-2	25-Apr-06	Tetra Tech	0.08		4.5	9.15	9.15					0.003	0.003					1.54	1.54		10.2	10.2		0.002	0.002		1.95	1.95		0.5	0.5	
DC-2	27-Jun-06	Tetra Tech	5.19		7.2	3.12	3.12					0.0005	0.0005					0.69	0.69		3.38	3.38		0.002	0.002		0.34	0.34		0.1	0.1	
DC-2	27-Sep-06	Tetra Tech	0.14		4.0	12.4	12.4					0.0043	0.0043					3.17	3.17		7.78	7.78		0.004	0.004		2.14	2.14		0.55	0.55	
DC-2	11-Apr-07	Tetra Tech	0.05		4.9	8.3	8.3					0.0036	0.0036					1.44	1.44		12	12		0.003	0.003		1.76	1.76		0.46	0.46	
DC-2	13-Jun-07	Tetra Tech	10.2		6.5	3.7	3.7					0.0004	0.0004					0.41	0.41		5.36	5.36		0.009	0.009		0.23	0.23		0.07	0.07	
DC-2	18-Jul-07	Tetra Tech	0.507		4.6	8.9	8.9					0.0023	0.0023					2.2	2.2		10.2	10.2		0.002	0.002		1.12	1.12		0.34	0.34	
DC-2	18-Sep-07	Tetra Tech	0.154		4.1	13.4	13.4					0.00420	0.0042					3.58	3.58		12.9	12.9		0.004	0.004		2.37	2.37		0.61	0.61	
DC-2	17-Apr-08	Tetra Tech	0.022		4.8	8.53	8.53					0.0035	0.0035					1.79	1.79		13.3	13.3		0.003	0.003		1.93	1.93		0.5	0.5	
DC-2	15-Jul-08	Tetra Tech	9.229		6.8	2.3	2.3					0.0005	0.0005					0.52	0.52		2.32	2.32		0.002	0.002		0.29	0.29		0.08	0.08	
DC-2	24-Sep-08	Tetra Tech	0.395		4	14.1	14.1					0.004	0.004					3.54	3.54		10.3	10.3		0.005	0.005	JF%	2.12	2.12		0.56	0.56	
DC-2	08-Apr-09	Tetra Tech	0.0052		4.4	8.9	8.9					0.0036	0.0036					2.5	2.5		12	12		0.0025	0.0025		2.7	2.7		0.67	0.67	
DC-2	24-Jun-09	Tetra Tech	12.5		6.7	2.3	2.3					0.00043	0.00043					0.39	0.39		3.2	3.2		0.0046	0.0046		0.22	0.22		0.069	0.069	
DC-2	06-Jul-09	Tetra Tech	4.14		6	4.9	4.9					0.00077	0.00077					0.85	0.85		7.8	7.8		0.0086	0.0086		0.42	0.42		0.13	0.13	
DC-2	28-Sep-09	Tetra Tech	0.0852		4.6	10.1	10.1					0.0036	0.0036					2.6	2.6		7.4	7.4		0.0036	0.0036		2.1	2.1		0.51	0.51	
DC-2	07-Apr-10	Tetra Tech	0.106		4.9	9.1	9.1					0.0036	0.0036					1.8	1.8		13.7	13.7		0.0024	0.0024		2	2		0.51	0.51	
DC-2	28-Sep-10	Tetra Tech	0.0764		4.5	11.7	11.7					0.0033	0.0033					2.7	2.7		34.3	34.3		0.036	0.036		1.8	1.8		0.42	0.42	
Station DC-2: Pre-1999 Samples (n)			20		23	18			9			15			7			25			25			12			19			25		
Minimum			0.072		2.900	3.270			0.001			0.00050			0.0040			0.876			5.320			0.002			0.304			0.129		
Maximum			15.480		5.000	28.600			0.005			0.00760			0.0100			8.260			41.800			0.024			3.650			1.200		
Mean			4.386		3.822	12.339			0.002			0.00381			0.0061			3.391			13.722			0.007			1.740			0.489		
Standard Deviation (SD)			5.453		0.536	8.194			0.002			0.00259			0.0020			2.458			8.361			0.006			1.252			0.322		
Mean + (2 x SD); for pH: Mean - (2 x SD)			15.292		2.750	28.728			0.0047			0.00898			0.0100			8.307			30.445			0.019			4.244			1.133		
Station DC-2: 1989-2010 Samples (n)			69		75	65			12			62			7			81			72			59			66			81		
Minimum			0.005		2.900	2.300			0.001			0.00040			0.004			0.31			2.32			0.002			0.220			0.010		
Maximum			15.480		7.700	28.600			0.005			0.00760			0.010			8.26			41.80			0.036			3.650			1.200		
Mean			3.117		4.429	10.467			0.001			0.00328			0.006			2.63			11.82			0.006			1.612			0.430		
Standard Deviation (SD)			4.119		0.917	5.855			0.001			0.00184			0.002			1.75			6.73			0.006			0.951			0.260		
Mean + (2 x SD); for pH: Mean - (2 x SD)			11.355		2.595	22.177			0.0042			0.00696			0.0100			6.131			25.268			0.017			3.514			0.950		
Station DC-2: 1999-2010 Samples (n)			49		52	47			3			47			0			56			47			47			47			56		
Minimum			0.005		3.400	2.300			0.001			0.0004			0.000			0.3100			2.320			0.002			0.220			0.010		
Maximum			12.500		7.700	19.200			0.002			0.0056			0.000			5.0300			34.300			0.036			2.810			0.870		
Mean			2.599		4.698	9.749			0.001			0.0031						2.2889			10.801			0.006			1.560			0.404		
Standard Deviation (SD)			3.365		0.925	4.581			0.001			0.0015						1.2006			5.507			0.006			0.809			0.225		
Mean + (2 x SD); for pH: Mean - (2 x SD)			9.328		2.847	18.911			0.002			0.00617						4.690			21.816			0.017			3.179			0.854		
Narrative Standard - DC-2					2.7	28.4			NA			0.009			NA			8.064			29.649			0.018			4.088			1.104		

Notes:
mg/l = milligrams/liter;
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TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2011

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Flow Flag	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al(calc)	Al Flag	Arsenic Total Rec. (mg/l)	As(calc)	As Flag	Cadmium Total Rec. (mg/l)	Cd(calc)	Cd Flag	Chromium Total Rec. (mg/l)	Cr(calc)	Cr Flag	Copper Total Rec. (mg/l)	Cu(calc)	Cu Flag	Iron Total Rec. (mg/l)	Fe(calc)	Fe Flag	Lead Total Rec. (mg/l)	Pb(calc)	Pb Flag	Manganese Total Rec. (mg/l)	Mn(calc)	Mn Flag	Zinc Total Rec. (mg/l)	Zn(calc)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)						0.087			0.15			0.00016			0.049			0.0073			1			0.0013			NA			0.067		
Acute Standard (for Hardness = 50 mg/l)						0.75			0.34			0.001			1.02			0.0052			NA			0.034			NA			0.067		
Chronic Standard (for Hardness = 100 mg/l)						0.087			0.15			0.0027			0.086			0.0093			1			0.0032			NA			0.12		
Acute Standard (for Hardness = 100 mg/l)						0.75			0.34			0.0021			1.8			0.0140			NA			0.082			NA			0.12		
DC-5	3-Oct-89	Hydrometrics Data	0.370		5.2				0.0050	0.0025	<	0.00300	0.003					2.54	2.54		6.88	6.88					1.16	1.16		0.4	0.4	
DC-5	12-Jul-90	Hydrometrics Data	8.910		7.2	2.7	2.7		0.0050	0.0025	<	0.00100	0.0005	<				0.97	0.97		4.3	4.3					0.28	0.28		0.12	0.12	
DC-5	28-Jul-93	Hydrometrics Data			7.2	3.2	3.2		0.0020	0.001	<	0.00100	0.0005	<	0.0020	0.002		1.09	1.09		4.19	4.19		0.002	0.002		0.35	0.35		0.12	0.12	
DC-5	23-Sep-93	Hydrometrics Data	0.540		5.8	5.3	5.3		0.0010	0.0005	<	0.00230	0.0023		0.0020	0.002		2.17	2.17		4.68	4.68		0.002	0.002		1.2	1.2		0.36	0.36	
DC-5	25-Aug-94	Hydrometrics Data	0.240		5.6	8.1	8.1	J	0.0010	0.0005	<	0.00270	0.0027		0.0020	0.002		2.85	2.85	J	5.7	5.7	J	0.002	0.002		1.23	1.23		0.42	0.42	
DC-5	13-Jul-95	Hydrometrics Data	30.430		6.5	2	2		0.0010	0.0005	<	0.00050	0.0005		0.0020	0.002		0.485	0.485	J	3.8	3.8	J	0.003	0.003		0.18	0.18		0.062	0.062	
DC-5	27-Sep-95	Hydrometrics Data	0.420		5.4	7.7	7.7		0.0010	0.0005	<	0.00230	0.0023		0.0020	0.002		2.45	2.45		2.38	2.38		0.003	0.003		1.18	1.18		0.391	0.391	
DC-5	18-Jun-96	Hydrometrics Data	30.740		5.8	1.4	1.4					0.00040	0.0004					0.346	0.346		3.12	3.12		0.003	0.0015	<	0.143	0.143		0.06	0.06	
DC-5	9-Jul-96	Hydrometrics Data	28.140		5.8	1.7	1.7	J				0.00040	0.0004					0.46	0.46		2.48	2.48		0.003	0.0015	<	0.166	0.166		0.07	0.07	
DC-5	10-Sep-96	Hydrometrics Data	0.312		5.4	7.2	7.2					0.00230	0.0023					2.62	2.62		4.42	4.42		0.003	0.0015	<	1.08	1.08		0.37	0.37	
DC-5	6-May-99	Maxim	1.180		7.6	1.4	1.4					0.00060	0.0006					0.33	0.33		0.65	0.65		0.001	0.001		0.25	0.25		0.08	0.08	
DC-5	8-Jul-99	Maxim	23.830		7.7	1.2	1.2					0.00040	0.0004					0.31	0.31		1.54	1.54		0.001	0.001		0.124	0.124		0.07	0.07	
DC-5	29-Sep-99	Maxim	1.484		7.5	4	4					0.00120	0.0012					1.26	1.26		2.67	2.67		0.002	0.002		0.5	0.5		0.17	0.17	J
DC-5	12-Apr-00	Maxim	0.429		7.6	2.9	2.9					0.00140	0.0014					1.04	1.04		1.38	1.38		0.004	0.004		0.041	0.041		0.02	0.01	<
DC-5	9-Jul-00	Maxim	8.900		7.2	1.6	1.6	J				0.00050	0.0005					0.54	0.54	J	2.11	2.11	J	0.001	0.0005	<	0.19	0.19	J	0.07	0.07	J
DC-5	9-Jul-00	Maxim			7	2.2	2.2					0.00040	0.0004					0.71	0.71		2.86	2.86		0.001	0.0005	<	0.26	0.26		0.1	0.1	
DC-5	9-Oct-00	Maxim	1.200		7.5	2.7	2.7					0.00460	0.0046					0.61	0.61		1.3	1.3	J	0.003	0.0015	<	0.23	0.23		0.08	0.08	
DC-5	29-Jun-01	Maxim	5.107		7.7	1.8	1.8					0.00060	0.0006					0.55	0.55		3.02	3.02		0.002	0.002	J	0.21	0.21		0.09	0.09	
DC-5	10-Oct-01	Maxim	0.340		7.3	3.5	3.5		0.0030	0.0015	<	0.00100	0.001					0.71	0.71		1.19	1.19		0.003	0.003		0.41	0.41		0.15	0.15	
DC-5	25-Apr-02	Maxim	0.001	ice	7.6	0.1	0.05	<				0.0004	0.0004					0.024	0.024		0.01	0.005	<	0.001	0.0005	<	0.16	0.16		0.04	0.04	
DC-5	2-Jul-02	Maxim	12.600		7.2	1.6	1.6	J				0.0005	0.0005					0.54	0.54		2.48	2.48		0.002	0.002		0.19	0.19		0.08	0.08	J
DC-5	18-Sep-02	Maxim				5.9	5.9					0.0021	0.0021					1.61	1.61		3.66	3.66		0.003	0.003		0.93	0.93		0.21	0.21	
DC-5	26-Sep-02	Maxim	0.001	NM	7.8	0.3	0.3					0.0004	0.0004					0.079	0.079		0.25	0.25		0.001	0.0005	<	0.086	0.086		0.02	0.02	
DC-5	9-Oct-02	Maxim	0.740		6.8	3.7	3.7					0.001	0.001					0.76	0.76		2.07	2.07		0.003	0.003		0.45	0.45		0.15	0.15	J
DC-5	21-Apr-03	Maxim	0.570		7.3	2.07	2.07					0.0009	0.0009					0.56	0.56		1.3	1.3		0.002	0.002		0.35	0.35		0.13	0.13	
DC-5	11-Jul-03	Maxim	5.460		7.4	2.1	2.1					0.0006	0.0006					0.48	0.48		1.55	1.55		0.001	0.001		0.29	0.29		0.07	0.07	
DC-5	8-Sep-03	Maxim			5.9	7.84	7.84					0.0017	0.0017					2.01	2.01		15.7	15.7		0.018	0.018		1.05	1.05		0.38	0.38	
DC-5	29-Sep-03	Maxim	0.185		7.1	5.34	5.34					0.0012	0.0012					1.44	1.44		3	3		0.003	0.003		0.62	0.62		0.3	0.3	
DC-5	7-Apr-04	Maxim	1.197		7.4	2.18	2.18					0.0007	0.0007					0.52	0.52		1.1	1.1		0.001	0.001		0.34	0.34		0.13	0.13	JF%
DC-5	29-Jun-04	Maxim	19.210		7.7	0.73	0.73					0.0002	0.0002					0.16	0.16		1.23	1.23		0.001	0.001		0.1	0.1		0.04	0.04	
DC-5	11-Aug-04	Maxim	0.820		7.4	3.03	3.03					0.0011	0.0011					0.87	0.87		3.69	3.69		0.001	0.001		0.46	0.46		0.15	0.15	
DC-5	6-Oct-04	Maxim	1.800		7.7	1.93	1.93					0.0007	0.0007					0.51	0.51		2.13	2.13		0.001	0.0005	<	0.33	0.33		0.11	0.11	
DC-5	6-Apr-05	Maxim	0.24		7.6	2.43	2.43				--	0.001	0.001				--	0.54	0.54		1.74	1.74		0.001	0.001		0.51	0.51		0.35	0.35	JF%
DC-5	29-Jun-05	Maxim	19.26		7.5	0.7	0.7				--	0.0002	0.0002				--	0.17	0.17		0.98	0.98		0.001	0.001		0.095	0.095		0.1	0.1	
DC-5	27-Sep-05	Maxim	0.43		7.3	3.88	3.88				--	0.0015	0.0015				--	0.97	0.97		2.61	2.61		0.004	0.004		0.73	0.73		0.22	0.22	
DC-5	25-Apr-06	Tetra Tech	0.46		7.3	0.96	0.96					0.0005	0.0005					0.032	0.032		0.64	0.64		0.001	0.0005	<	0.29	0.29		0.06	0.06	
DC-5	27-Jun-06	Tetra Tech	15.78		7.9	1.13	1.13					0.0001	0.00005	<				0.011	0.011		1.13	1.13		0.001	0.0005	<	0.11	0.11		0.04	0.04	
DC-5	27-Sep-06	Tetra Tech	0.28		7.2	2.83	2.83					0.0014	0.0014					0.049	0.049		0.91	0.91		0.001	0.001		0.66	0.66		0.17	0.17	
DC-5	11-Apr-07	Tetra Tech	0.432		7.8	1.23	1.23					0.0007	0.0007					0.25	0.25		1.03	1.03		0.001	0.0005	<	0.32	0.32		0.09	0.09	
DC-5	13-Jun-07	Tetra Tech	30.7		7.9	1.39	1.39					0.0002	0.0002					0.019	0.019		1.73	1.73		0.003	0.003		0.099	0.099		0.02	0.02	
DC-5	18-Sep-07	Tetra Tech	0.418		7.6	4.23	4.23					0.0014	0.0014					1.16	1.16		5.04	5.04		0.002	0.002		0.74	0.74		0.22	0.22	
DC-5	17-Apr-08	Tetra Tech	0.25		7.7	1.19	1.19					0.0007	0.0007					0.31	0.31		1.3	1.3		0.001	0.0005	<	0.37	0.37		0.09	0.09	
DC-5	15-Jul-08	Tetra Tech	17.66		7.8	0.89	0.89					0.0002	0.0002					0.18	0.18		0.98	0.98		0.002	0.002		0.11	0.11		0.03	0.03	
DC-5	24-Sep-08	Tetra Tech	0.641		7.4	6.53	6.53					0.0013	0.0013					1.48	1.48		5.34	5.34		0.005	0.005	JF%	0.71	0.71		0.21	0.21	
DC-5	08-Apr-09	Tetra Tech	0.0522		7.4	2.3	2.3					0.00095	0.00095					0.7	0.7		1.3	1.3		0.0011	0.0011		0.43	0.43		0.15	0.15	
DC-5	24-Jun-09	Tetra Tech	27.9		7.9	0.81	0.81					0.00015	0.00015					0.14	0.14		1	1		0.0019	0.0019		0.077	0.077		0.026	0.026	
DC-5	28-Sep-09	Tetra Tech	0.294		7.5	3.5	3.5					0.001	0.001					1	1		2.9	2.9		0.0019	0.0019		0.42	0.42		0.18	0.18	
DC-5	07-Apr-10	Tetra Tech	0.0684		7.7	1.6	1.6					0.00081	0.00081					0.39	0.39		1	1		0.0007	0.0007		0.42	0.42		0.12	0.12	
DC-5	28-Sep-10	Tetra Tech	0.435		7.4	2.4	2.4					0.001	0.001					0.8	0.8		2.5	2.5		0.00085	0.00085		0.52	0.52		0.14	0.14	
Station DC-5: Pre-1999 Samples (n)			9		10	9			7			10			5			10			10			8			10			10		
Minimum			0.240		5.200	1.400			0.0005			0.00040			0.0020			0.346			2.380			0.002			0.143			0.060		
Maximum			30.740		7.200	8.100			0.0025			0.00300			0.0020			2.850			6.880			0.003			1.230			0.420		
Mean			11.122		5.990	4.367			0.0011			0.00149			0.0020			1.598			4.195			0.002			0.697			0.237		
Standard Deviation (SD)			14.272		0.728	2.729			0.0009			0.00111			0.0000			1.017			1.387			0.001			0.504			0.161		
Mean + (2 x SD); for pH: Mean - (2 x SD)			39.667		4.534	9.826			0.0030			0.00370			0.0020			3.632			6.969			0.003			1.704			0.560		
Station DC-5: 1989-2010 Samples (n)			45		48	48			8			49			5			49			49			47			49			49		
Minimum			0.001		5.200	0.050			0.001			0.0001			0.002			0.0110			0.005			0.001			0.041			0.010		
Maximum			30.740		7.900	8.100			0.003			0.0046			0.002			2.8500			15.700			0.018			1.230			0.420		
Mean			6.677		7.150	2.820			0.001			0.0010			0.002			0.8123			2.632			0.002			0.432			0.147		
Standard Deviation (SD)			10.262		0.753	2.062			0.001			0.0009			0.000			0.7373			2.446			0.003			0.337			0.114		
Mean + (2 x SD); for pH: Mean - (2 x SD)			27.201		5.643	6.944			0.0030			0.00276			0.0020			2.287			7.524			0.007			1.105			0.375		
Station DC-5: 1999-2010 Samples (n)			36		38	39			1			39			0			39			39			39			39			39		
Minimum			0.001		5.900	0.050			0.002			0.000			0.000			0.011			0.005			0.001			0.041			0.010		
Maximum			30.700		7.900	7.840			0.002			0.005			0.000			2.010			15.700			0.018			1.050			0.380		
Mean			5.565		7.455	2.463			0.002			0.001						0.611			2.231			0.002			0.364			0.124		
Standard Deviation (SD)			8.915		0.364	1.730						0.001						0.487			2.509			0.003			0.245			0.087		
Mean + (2 x SD); for pH: Mean - (2 x SD)			23.395		6.726	5.923						0.00244						1.586			7.249			0.008			0.853			0.299		
Temporary Standard - DC-5					4.6	9.51			NA			0.004			NA			3.53			6.83			NA			1.71			0.54		

Notes:
mg/l = milligrams/liter;
su = standard units
n = number of samples

< = less than detection
J = estimated value

NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2011
New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Flow Flag	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al(calc)	Al Flag	Arsenic Total Rec. (mg/l)	As(calc)	As Flag	Cadmium Total Rec. (mg/l)	Cd(calc)	Cd Flag	Chromium Total Rec. (mg/l)	Cr(calc)	Cr Flag	Copper Total Rec. (mg/l)	Cu(calc)	Cu Flag	Iron Total Rec. (mg/l)	Fe(calc)	Fe Flag	Lead Total Rec. (mg/l)	Pb(calc)	Pb Flag	Manganese Total Rec. (mg/l)	Mn(calc)	Mn Flag	Zinc Total Rec. (mg/l)	Zn(calc)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)						0.087			0.15			0.00016			0.049			0.0073			1			0.0013			NA			0.067		
Acute Standard (for Hardness = 50 mg/l)						0.75			0.34			0.001			1.02			0.0052			NA			0.034			NA			0.067		
Chronic Standard (for Hardness = 100 mg/l)						0.087			0.15			0.0027			0.086			0.0093			1			0.0032			NA			0.12		
Acute Standard (for Hardness = 100 mg/l)						0.75			0.34			0.0021			1.8			0.0140			NA			0.082			NA			0.12		
SW-7	28-May-90	Hydrometrics Data	40.30		7.5	0.1	0.1		0.0050	0.0025	<	0.00010	0.00005	<	0.0200	0.01	<	0.03	0.03		0.2	0.2		0.002	0.001	<	0.02	0.01	<	0.02	0.02	
SW-7	5-Jun-90	Hydrometrics Data	81.11		7.6	0.4	0.4											0.11	0.11		0.99	0.99								0.02	0.02	
SW-7	6-Jun-90	Hydrometrics Data	115.10																													
SW-7	13-Jun-90	Hydrometrics Data	69.81		7.4	0.26	0.26											0.07	0.07		0.61	0.61								0.02	0.02	
SW-7	15-Jun-90	Hydrometrics Data	56.30																													
SW-7	20-Jun-90	Hydrometrics Data	97.51		7.9	0.5	0.5											0.14	0.14		0.99	0.99								0.02	0.02	
SW-7	22-Jun-90	Hydrometrics Data	129.15																													
SW-7	27-Jun-90	Hydrometrics Data	138.80		7.5	0.6	0.6		0.0050	0.0025	<	0.00020	0.0002		0.0200	0.01	<	0.147	0.147		1.02	1.02		0.002	0.001	<	0.05	0.05		0.03	0.03	
SW-7	28-Jun-90	Hydrometrics Data	140.13																													
SW-7	3-Jul-90	Hydrometrics Data	122.90		7.3	0.4	0.4											0.11	0.11		0.78	0.78					0.05	0.05		0.03	0.03	
SW-7	10-Jul-90	Hydrometrics Data	50.20		7.2	0.3	0.3					0.00100	0.0005	<	0.0200	0.01	<	0.11	0.11		0.67	0.67		0.01	0.005	<	0.04	0.04		0.04	0.04	
SW-7	12-Jul-90	Hydrometrics Data	41.70		7.2																											
SW-7	17-Jul-90	Hydrometrics Data	24.70		7.1	0.5	0.5											0.17	0.17		0.93	0.93								0.03	0.015	<
SW-7	19-Jul-90	Hydrometrics Data	20.90		7.2																											
SW-7	26-Jul-90	Hydrometrics Data	10.40		8	0.5	0.5		0.0050	0.0025	<	0.00020	0.0002		0.0200	0.01	<	0.21	0.21		1.05	1.05		0.003	0.003		0.07	0.07		0.04	0.04	
SW-7	22-Aug-90	Hydrometrics Data	5.60		7.2																											
SW-7	25-Sep-90	Hydrometrics Data	2.20		8.2	0.1	0.05	<	0.0050	0.0025	<	0.00010	0.00005	<	0.0200	0.01	<	0.02	0.02		0.14	0.14		0.002	0.001	<	0.05	0.05		0.02	0.02	
SW-7	15-Mar-91	Hydrometrics Data	1.50		7	0.1	0.05	<	0.0050	0.0025	<	0.00100	0.0005	<	0.0200	0.01	<	0.01	0.005	<	0.24	0.24		0.01	0.005	<	0.04	0.04		0.01	0.01	
SW-7	6-Jun-91	Hydrometrics Data	157.60		5.9	0.3	0.3		0.0050	0.0025	<	0.00010	0.00005	<	0.0200	0.01	<	0.06	0.03	<	0.74	0.74		0.002	0.002	J	0.03	0.03		0.04	0.04	
SW-7	10-Jul-91	Hydrometrics Data	37.70		7.4	0.4	0.4		0.0050	0.0025	<	0.00010	0.0001		0.0200	0.01	<	0.18	0.18		1.2	1.2		0.024	0.024	J	0.05	0.05		0.04	0.04	
SW-7	13-Aug-91	Hydrometrics Data	4.10		7.7	0.1	0.1		0.0050	0.0025	<	0.00020	0.0002		0.0200	0.02		0.034	0.034		0.15	0.15		0.002	0.001	<	0.07	0.07		0.06	0.06	
SW-7	24-Sep-91	Hydrometrics Data	3.50		7.7	0.1	0.05	<	0.0050	0.0025	<	0.00010	0.0001		0.0200	0.01	<	0.017	0.017		0.21	0.21		0.002	0.001	<	0.06	0.06		0.01	0.01	
SW-7	19-Jul-92	Hydrometrics Data	20.00		8	0.5	0.5		0.0050	0.0025	<	0.00010	0.00005	<	0.0100	0.005	<	0.17	0.17		0.07	0.07		0.002	0.001	<	0.07	0.07		0.03	0.03	
SW-7	22-Sep-92	Hydrometrics Data	3.23		7.8	0.1	0.1		0.0050	0.0025	<	0.00020	0.0002		0.0100	0.005	<	0.087	0.0435	<	0.2	0.1	<	0.002	0.001	<	0.08	0.08		0.04	0.04	
SW-7	23-Sep-93	Hydrometrics Data	3.71		8	0.2	0.2		0.0010	0.0005	<	0.00020	0.0002		0.0010	0.0005	<	0.07	0.07		0.28	0.28		0.002	0.001	<	0.07	0.07		0.014	0.014	
SW-7	23-Sep-93	Hydrometrics Data	3.71		8	0.2	0.2		0.0010	0.0005	<	0.00010	0.0001		0.0010	0.0005	<	0.06	0.06		0.29	0.29		0.002	0.001	<	0.07	0.07		0.016	0.016	
SW-7	25-Aug-94	Hydrometrics Data	1.69		7.6	0.02	0.02	J	0.0010	0.0005	<	0.00010	0.00005	<	0.0010	0.0005	<	0.007	0.007	J	0.16	0.16	J	0.002	0.001	<	0.027	0.027		0.008	0.004	<
SW-7	13-Jul-95	Hydrometrics Data	113.48		7	0.6	0.6		0.0010	0.0005	<	0.00010	0.0001		0.0030	0.003		0.098	0.098	J	0.97	0.97	J	0.002	0.001	<	0.05	0.05		0.02	0.02	
SW-7	27-Sep-95	Hydrometrics Data	2.80		6.8	0.1	0.05	<	0.0010	0.0005	<	0.00010	0.00005	<	0.0010	0.0005	<	0.021	0.021		0.17	0.17		0.002	0.001	<	0.03	0.03		0.027	0.0135	<
SW-7	18-Jun-96	Hydrometrics Data	223.08		7.2	0.5	0.5					0.00020	0.0002					0.087	0.087		1.05	1.05		0.003	0.0015	<	0.046	0.046		0.02	0.02	
SW-7	9-Jul-96	Hydrometrics Data	97.63		6.9	0.3	0.3	J				0.00010	0.0001					0.096	0.096		0.53	0.53		0.003	0.0015	<	0.038	0.038		0.02	0.02	
SW-7	10-Sep-96	Hydrometrics Data	2.12		6.4	0.1	0.05	<				0.00010	0.00005	<				0.019	0.019		0.13	0.13		0.003	0.0015	<	0.025	0.025		0.01	0.01	
SW-7	6-May-99	Maxim	6.48		7.1	0.4	0.4					0.00010	0.00005	<				0.008	0.008		0.62	0.62		0.001	0.0005	<	0.036	0.036		0.01	0.005	<
SW-7	8-Jul-99	Maxim	111.83		7.9	0.4	0.4					0.00010	0.0001					0.064	0.064		0.53	0.53		0.001	0.0005	<	0.027	0.027		0.02	0.02	
SW-7	29-Sep-99	Maxim	2.49		7.5	0.1	0.05	<				0.00010	0.00005	<				0.001	0.0005	<	0.42	0.42		0.001	0.0005	<	0.023	0.023		0.03	0.03	J
SW-7	12-Apr-00	Maxim	0.41		7.2	0.05	0.025	<				0.00010	0.00005	<				0.004	0.004		0.43	0.43		0.001	0.0005	<	0.066	0.066		0.05	0.05	
SW-7	12-Apr-00	Maxim			7.2	0.05	0.025	<				0.00010	0.00005	<				0.004	0.004		0.51	0.51		0.001	0.0005	<	0.072	0.072		0.02	0.01	<
SW-7	9-Jul-00	Maxim	32.25		7.3	0.3	0.3	J				0.00010	0.00005	<				0.072	0.072	J	0.36	0.36	J	0.001	0.0005	<	0.029	0.029	J	0.02	0.02	J
SW-7	9-Oct-00	Maxim	1.81		7.7	0.01	0.005	<				0.00010	0.00005	<				0.001	0.0005	<	0.22	0.22	J	0.003	0.0015	<	0.02	0.01	<	0.01	0.005	<
SW-7	29-Jun-01	Maxim	36.63		7.9	0.2	0.2					0.00080	0.0008					0.12	0.12		0.53	0.53		0.004	0.004	J	0.035	0.035		0.01	0.005	<
SW-7	10-Oct-01	Maxim	1.53		7.5	0.1	0.05	<	0.0030	0.0015	<	0.00010	0.00005	<				0.005	0.005		0.12	0.12		0.001	0.001		0.015	0.015		0.02	0.02	J
SW-7	25-Apr-02	Maxim			7.4	0.1	0.05	<				0.0001	0.00005	<				0.003	0.003		0.26	0.26		0.001	0.0005	<	0.028	0.028		0.01	0.005	<
SW-7	2-Jul-02	Maxim	74.60		7.8	0.3	0.3	J				0.0001	0.00005	<				0.089	0.089		0.49	0.49		0.001	0.0005	<	0.024	0.024		0.02	0.02	J
SW-7	9-Oct-02	Maxim	2.42		7.7	0.1	0.1					0.0001	0.0001					0.019	0.019		0.23	0.23		0.001	0.0005	<	0.038	0.038		0.06	0.06	J
SW-7	21-Apr-03	Maxim			6.8	0.05	0.025	<				0.0001	0.0001					0.007	0.007		0.31	0.31		0.001	0.0005	<	0.018	0.018		0.01	0.01	
SW-7	11-Jul-03	Maxim	39.60		7.7	0.31	0.31					0.0001	0.0001					0.067	0.067		0.27	0.27		0.001	0.0005	<	0.02	0.01	<	0.01	0.005	<
SW-7	29-Sep-03	Maxim	1.42		7.8	0.05	0.025	<				0.0001	0.00005	<				0.005	0.005		0.29	0.29		0.001	0.001		0.023	0.023		0.01	0.01	
SW-7	6-Apr-04	Maxim			7.3	0.05	0.025	<				0.0001	0.00005	<				0.003	0.003		0.46	0.46		0.001	0.0005	<	0.046	0.046		0.02	0.02	JF%
SW-7	29-Jun-04	Maxim	88.54		7.8	0.2	0.2					0.0001	0.00005	<				0.037	0.037		0.34	0.34		0.001	0.0005	<	0.02	0.02		0.01	0.005	<
SW-7	6-Oct-04	Maxim	7.83		7.7	0.08	0.08					0.0001	0.00005	<				0.02	0.02		0.17	0.17		0.001	0.0005	<	0.038	0.038		0.01	0.005	<
SW-7	6-Apr-05	Maxim	1.22		7.3	0.05	0.025	<			--	0.0001	0.00005	<			--	0.001	0.001		0.47	0.47		0.001	0.0005	<	0.037	0.037		0.01	0.01	JF%
SW-7	29-Jun-05	Maxim	81.8		7.5	0.15	0.15				--	0.0001	0.00005	<			--	0.026	0.026		0.2	0.2		0.001	0.0005	<	0.016	0.016		0.01	0.005	<
SW-7	27-Sep-05	Maxim	3.18		7.7	0.05	0.025	<			--	0.0001	0.00005	<			--	0.015	0.015		0.18	0.18		0.001	0.0005	<	0.037	0.037		0.04	0.04	

Notes:
mg/l = milligrams/liter;
su = standard units
n = number of samples

< = less than detection
J = estimated value

NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2011

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Flow Flag	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al(calc)	Al Flag	Arsenic Total Rec. (mg/l)	As(calc)	As Flag	Cadmium Total Rec. (mg/l)	Cd(calc)	Cd Flag	Chromium Total Rec. (mg/l)	Cr(calc)	Cr Flag	Copper Total Rec. (mg/l)	Cu(calc)	Cu Flag	Iron Total Rec. (mg/l)	Fe(calc)	Fe Flag	Lead Total Rec. (mg/l)	Pb(calc)	Pb Flag	Manganese Total Rec. (mg/l)	Mn(calc)	Mn Flag	Zinc Total Rec. (mg/l)	Zn(calc)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)						0.087			0.15			0.00016			0.049			0.0073			1			0.0013			NA			0.067		
Acute Standard (for Hardness = 50 mg/l)						0.75			0.34			0.001			1.02			0.0052			NA			0.034			NA			0.067		
Chronic Standard (for Hardness = 100 mg/l)						0.087			0.15			0.0027			0.086			0.0093			1			0.0032			NA			0.12		
Acute Standard (for Hardness = 100 mg/l)						0.75			0.34			0.0021			1.8			0.0140			NA			0.082			NA			0.12		
SW-7	25-Apr-06	Tetra Tech	2.04		7.2	0.11	0.11					0.0001	0.00005	<				0.003	0.003		0.49	0.49		0.001	0.0005	<	0.051	0.051		0.01	0.005	<
SW-7	27-Jun-06	Tetra Tech	68.62		8.0	0.14	0.14					0.0001	0.00005	<				0.028	0.028		0.26	0.26		0.001	0.0005	<	0.02	0.02		0.01	0.005	<
SW-7	27-Sep-06	Tetra Tech	1.95		8.0	0.05	0.025	<				0.0001	0.00005	<				0.003	0.003		0.13	0.13		0.001	0.0005	<	0.008	0.008		0.01	0.005	<
SW-7	11-Apr-07	Tetra Tech	1.89		7.6	0.05	0.025	<				0.0001	0.00005	<				0.002	0.002		0.19	0.19		0.001	0.0005	<	0.018	0.018		0.01	0.005	<
SW-7	13-Jun-07	Tetra Tech	81		7.9	0.25	0.25					0.0001	0.00005	<				0.041	0.041		0.31	0.31		0.001	0.0005	<	0.012	0.012		0.01	0.005	<
SW-7	18-Sep-07	Tetra Tech	2.51		7.9	0.11	0.11					0.0001	0.00005	<				0.007	0.007		0.16	0.16		0.001	0.0005	<	0.024	0.024		0.01	0.005	<
SW-7	17-Apr-08	Tetra Tech	0.62		7.6	0.05	0.025	<				0.0001	0.00005	<				0.003	0.003		0.16	0.16		0.002	0.002		0.022	0.022		0.01	0.005	<
SW-7	15-Jul-08	Tetra Tech	72.1		7.8	0.2	0.2					0.0001	0.00005	<				0.036	0.036		0.3	0.3		0.001	0.0005	<	0.026	0.026		0.01	0.005	<
SW-7	24-Sep-08	Tetra Tech	2.58		7.8	0.05	0.025	<				0.0001	0.00005	<				0.009	0.009		0.19	0.19		0.001	0.001	JF%<	0.018	0.018		0.01	0.005	<
SW-7	08-Apr-09	Tetra Tech			7.2	0.0046	0.0046					0.00004	0.00002	<				0.002	0.002		0.19	0.19		0.00005	0.000025	<	0.029	0.029		0.0039	0.0039	J
SW-7	24-Jun-09	Tetra Tech	101.1		7.1	0.19	0.19					0.00004	0.00002	<				0.029	0.029		0.26	0.26		0.00037	0.00037		0.017	0.017		0.0061	0.0061	
SW-7	28-Sep-09	Tetra Tech	0.818		7.8	0.18	0.18					0.000057	0.000057	J				0.013	0.013		0.38	0.38		0.00066	0.00066		0.037	0.037		0.0061	0.0061	
SW-7	07-Apr-10	Tetra Tech	0.205		7.4	0.037	0.037					0.00008	0.00004	<				0.0023	0.0023		0.13	0.13		0.0001	0.00005	<	0.029	0.029		0.059	0.059	
SW-7	28-Sep-10	Tetra Tech	2.6		7.7	0.048	0.048					0.00008	0.00004	<				0.0068	0.0068		0.19	0.19		0.00043	0.00043		0.028	0.028		0.005	0.0025	<
Station SW-7: Pre-1999 Samples (n)			32		28	25			16			20			17			25			25			20			21			25		
Minimum			1.500		5.900	0.020			0.0005			0.00005			0.0005			0.005			0.070			0.001			0.010			0.004		
Maximum			223.080		8.200	0.600			0.0025			0.00050			0.0200			0.210			1.200			0.024			0.080			0.060		
Mean			56.958		7.382	0.281			0.0019			0.00015			0.0074			0.082			0.547			0.003			0.049			0.024		
Standard Deviation (SD)			59.633		0.518	0.197			0.0010			0.00013			0.0052			0.061			0.391			0.005			0.019			0.013		
Mean + (2 x SD); for pH: Mean - (2 x SD)			176.225		6.346	0.676			0.0038			0.00042			0.0179			0.204			1.329			0.013			0.086			0.050		
Station SW-7: 1989-2010 Samples (n)			62		63	60			17			55			17			60			60			55			56			60		
Minimum			0.205		5.900	0.005			0.001			0.00002			0.001			0.001			0.070			0.000			0.008			0.003		
Maximum			223.080		8.200	0.600			0.003			0.00080			0.020			0.210			1.200			0.024			0.080			0.060		
Mean			42.818		7.484	0.186			0.002			0.00010			0.007			0.047			0.407			0.001			0.036			0.018		
Standard Deviation (SD)			51.818		0.419	0.174			0.001			0.00013			0.005			0.054			0.296			0.003			0.019			0.015		
Mean + (2 x SD); for pH: Mean - (2 x SD)			146.455		6.647	0.533			0.0037			0.00037			0.0179			0.1544			0.999			0.008			0.074			0.049		
Station SW-7: 1999-2010 Samples (n)			30		35	35			1			35			0			35			35			35			35			35		
Minimum			0.205		6.800	0.005			0.002			0.00004			0.000			0.001			0.120			0.000			0.008			0.004		
Maximum			111.830		8.000	0.400			0.002			0.00080			0.000			0.120			0.620			0.004			0.072			0.060		
Mean			27.736		7.566	0.131			0.002			0.00011						0.022			0.307			0.001			0.029			0.017		
Standard Deviation (SD)			37.292		0.302	0.108						0.00012						0.029			0.139			0.001			0.014			0.014		
Mean + (2 x SD); for pH: Mean - (2 x SD)			102.320		6.962	0.346						0.00035						0.079			0.585			0.002			0.057			0.045		
Temporary Standard - SW-7					5.5	0.67			NA			NA			NA			0.2			1.32			0.013			0.086			0.049		

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