Revised

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

NEW WORLD MINING DISTRICT
RESPONSE AND RESTORATION PROJECT

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NEW WORLD MINING DISTRICT
RESPONSE AND RESTORATION PROJECT

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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 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 gate to Yellowstone National Park, has hard rock mining wastes and acid discharges that contain elevated levels of heavy metals. Surface water quality in area streams is degraded by metal contaminants present in these wastes and discharges, and 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 allow 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 second 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 portions 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 WQB-7 (MDEQ, 2004), 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 competed in July 2002, with the Board choosing to take no action at the end of the review process, leaving the temporary standards unchanged.

Support Document and Implementation Plan

A Support Document and Implementation Plan was submitted with the 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 are 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 falls within the Gallatin and Custer National Forests, and abuts 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**).

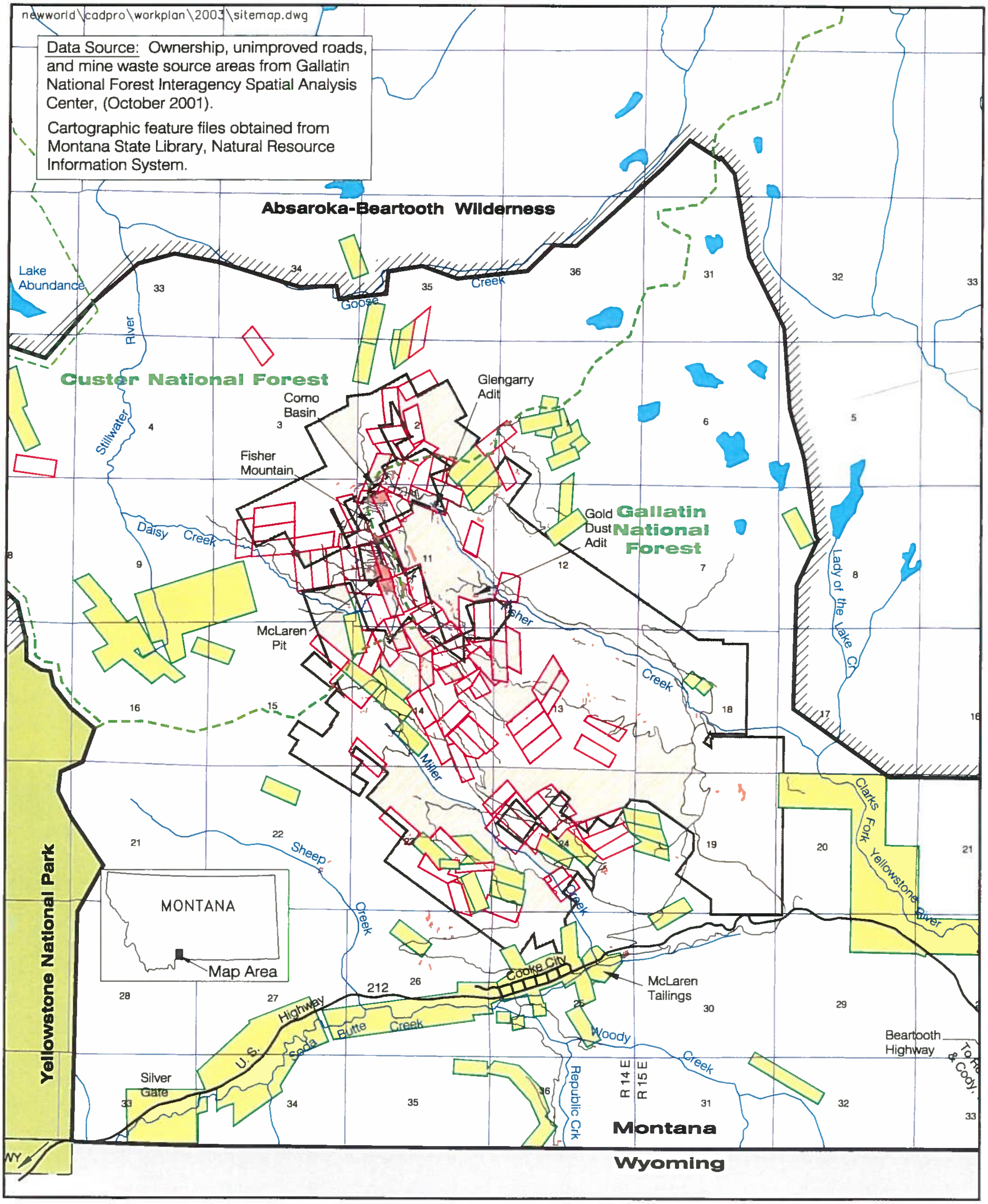
The communities of Cooke City and Silver Gate, Montana are the only population centers near the District. The neighboring communities of Mammoth, Wyoming and Gardiner, Montana are located about 50 miles to the west. Red Lodge, Montana is located about 65 miles to the northeast by way of the Beartooth Highway, 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 Mining, Inc., (CBMI), the former owner of the property, (**Figure 1**). Historic mining disturbances affect about 50 acres located on District Property. Mining disturbances on non-District Property include the McLaren Tailings and McLaren Mill Site, which cover an additional 17 acres, and the Great Republic Smelter, which is located in the town of Cooke City and covers 0.5 acres.

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. Only one route of travel is open on a year-round basis to Cooke City – the highway between Mammoth and Cooke City. The topography of the District is mountainous with dominant glacial features, and is situated at the headwaters of three river systems that all flow into the Yellowstone River. The three tributaries are the Clark's Fork of the Yellowstone, the Stillwater, and the Lamar. The Lamar River flows through Yellowstone Park. The major tributary streams in the District include Daisy, Miller, Fisher, Goose, Sheep, Lady of the Lake, Republic, Woody, and Soda Butte creeks.

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.



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- District Property Boundary
- District Boundary
- Unimproved Road
- National Forest Boundary
- Wilderness Boundary
- Mine Waste Source Area
- District Property (Patented Claims)
- District Property (Unpatented Claims)
- Private Property

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

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 (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 procedures. 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 Decree, work has to be completed on District Property before beginning work on 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 custom-tailored this process to address the specific nature of contaminants in the District and the specific nuances of this project. Cleanup activities conducted by the Forest Service began in 1999.

PROBLEM DESCRIPTION

The Forest Service has developed a conceptual model that describes sources of mine wastes in the District and pathways by which metal contaminants move in 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 the environment are exposed to pollutants.

Major sources of contaminants at the site are acidic, metal-laden mine waste dumps located at mine openings, tailings deposits, and massive sulfide deposits underground that are exposed to the atmosphere by either mine workings or natural fracturing and faulting. These waste sources include over 150 mine dumps on District Property (totaling about 430,000 cubic yards of mine waste), with most contaminants residing at a few large waste sites including the McLaren Pit, Como Basin, and Glengarry Adit. The largest mine waste deposit in the District, the McLaren Tailings, is a non-District Property and is located next to Soda Butte Creek above the town of Cooke City. The Great Republic Smelter, which is also a non-District property, is located on Soda Butte Creek just downstream of town. There are also about 11 mine discharges that produce acidic and/or metal-laden water that exceed aquatic criteria (one of which is on non-District property), as well as numerous acid seeps and springs in the headwaters of Fisher Creek and Daisy Creek.

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

- Erosion
- Contaminants dissolving in rain or snowmelt and infiltrating into the ground or running off into area streams
- Contaminated water moving through underground mine workings and improperly abandoned exploratory borings where sulfide minerals are exposed
- Contaminants in groundwater that discharges into area streams
- Contaminated surface water that recharges 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 done on Fisher Creek showed that 20% of dissolved copper load in the creek comes 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 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 sources and metals that precipitate in streambeds when chemical conditions in streams change. As a result of these secondary sources of contaminants, the upper few miles of Daisy Creek and Fisher Creek are impacted by metals-laden sediment.

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 residents, consumption of groundwater or surface water is not considered a significant exposure pathway for humans. Although the exposure risk of animals to surface water or consumption of surface water has not been quantified and no site-specific risk assessment is planned, other sources of information on wildlife populations do not indicate that animals are at risk from exposure to mine waste contaminants.

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 are 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 like the Glengarry Adit 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 stream sediment, is very difficult to quantify. Metals in stream sediment have complicated chemical reactions with surface water and change markedly with varying flows. However, even for these more distant sources, response and restoration actions should have a positive effect on water and sediment quality and monitoring of these environmental media should show improvements over time.

PROJECT ACTIVITIES

Detailed descriptions 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). 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 slated for clean up.
- Identified unrecorded cultural features.
- Improved portions of the Daisy Pass and Lulu Pass roads to accommodate construction traffic.
- 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 a Selective Source Response Action Engineering Evaluation and Cost Analysis (EE/CA). In accordance with the preferred alternative identified in this document, removed about 32,700 cubic yards of waste rock and mill tailings (nine percent of the total District waste) from eight mine waste areas and disposed these wastes in an engineered repository. About 4.6 acres of the former waste areas were revegetated in 2001 as part of this response action.
- Prepared a McLaren Pit Response Action EE/CA. In accordance with the preferred alternative identified in this document, consolidated waste rock dumps from the Daisy Creek headwaters area into the McLaren 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 Glengarry Adit and Como Raise to more fully characterize underground sources of water within the mine. Prepared a Como Basin/Glengarry Adit/Fisher Creek Response Action EE/CA using the findings found during the reopening work. In an effort to eliminate the discharge from the adit, the Como Raise was backfilled and plugged, a fracture in the underground workings was grouted closed, several watertight plugs in the workings were installed, and portions of the

workings were backfilled with rock and cement. Construction of this work was begun in 2003 and will be completed in 2005.

- Reopened the McLaren Adit and, as a result of the evaluation of the underground mine workings and water sources within, grouted closed in 2003 a borehole leaking metals-laden water into the underground workings.
- Prepared the Miller Creek Response Action EE/CA and, 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.
- Monitored revegetation at reclaimed sites.
- Initiated preparation of an EE/CA for remaining adit discharges on District Property. The result of the EE/CA, which is expected to be completed in 2005, will be a preferred alternative to address source control/treatment of this contaminant source.

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 three information repositories that have been established for the project. Information repositories are located in Cooke City at the Chamber of Commerce office, in Gardiner at the Forest Service's Gardiner Ranger District office, and in Bozeman at the Gallatin National Forest Supervisor's Office.

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
- Spalding Tunnels
- Como Basin
- Gold Dust

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 folded into primarily watershed-based units.

By following the Non-Time-Critical Removal Action process, the Response and Restoration Project utilizes the EE/CA procedure 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 comments. 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 four EE/CAs written for the project to date, with another EE/CA in progress. Four decision documents have been written and signed, and construction initiated or completed on 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 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 collecting data 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 waste affecting 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 leaks into the repository, saturated soil conditions that occur during spring runoff cause water to enter the repository each year. Water that accumulates in the sump is actively managed, with accumulated waster currently being disposed at the Cody, Wyoming, sewage treatment lagoon (about 120,000 gallons since 2002). With the permanent closure of the repository in 2005/2006, water that accumulates in the sump is expected to diminish to near zero as moisture in the repository waste reaches equilibrium.

Water quality improvements have been realized in tributaries draining the former waste areas, although these improvements when measured in Fisher Creek and Soda Butte Creek are relatively minor compared to the cleanup work that has been completed or proposed for the major source areas in these two drainages.

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 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 covers about 10 acres and accounts for about 67% of the total waste rock volume on District Property. Waste dumps consolidated into the pit included the McLaren Pit spoils (wastes located below the county road and west of the pit) and the multicolor dump. About 24,000 cubic yards of waste rock are contained in the two dumps, which cover about 3.5 acres of disturbance.

An engineering design and construction package for the McLaren Pit response action was completed in March 2002, and a construction contractor, URS, 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 in 2004 indicate that improvements in surface water quality resulting from capping could be measured during high flows experienced during the snowmelt period, although these improvements in water quality did not persist into winter or fall low flow periods. Monitoring of groundwater downgradient of the capped area indicated that groundwater conditions in 2004 were similar to those present before the cap was constructed. However, it is hypothesized that the cap did eliminate the annual flushing of metal salts from the waste rock, and that this change should reduce metal loads and concentrations downgradient of the pit in the near future.

GLENGARRY/COMO BASIN/FISHER CREEK RESPONSE ACTION

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

The Glengarry Mine consists of 3,060 feet of drifting and two nearly vertical raises. One of the raises extends 425 feet upward and surfaces in the Como Basin at the foot of the north flank of Fisher Mountain. The top of this raise passes 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 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 at the top of the raise 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 comes from essentially three point sources and one diffuse source. The point sources are the Como Raise, the first raise, and a roof leak located 1,050 feet from the adit portal. Diffuse roof leaks were observed primarily in the first 1,200 feet in porphyritic rock. Load 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 was selected 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. For the soil cover over the impermeable liner, soil will be salvaged from the capped area and amended with lime to make the soil suitable for 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 alternative 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. Plugging and backfilling the Glengarry will be completed in 2005. Construction of the cap in the Como Basin, removing the Glengarry and Gold Dust dumps, and expansion of the repository will begin in 2005 and is expected to be completed by 2006. Implementing runon and runoff controls at selected dumps in Fisher Creek was completed as a separate project in 2004. Water quality improvements that result from these response actions should be seen as early as 2005 when the Glengarry closure is complete, but the full impact of these actions on water quality will not be evident for several years following capping of the Como Basin.

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 dumps planned for removal in the Miller Creek Response Action are the Black Warrior and Little Daisy. The Black Warrior dump was the only mine waste deposit in the Miller Creek drainage that presented a human health risk, and contains about 22% of the total mine waste on District Property in the drainage. At the Little Daisy Mine, waste rock sits at the mouth of the adit, and discharge from the adit flows through the dump. While impacts to groundwater or surface water from this dump could not be demonstrated, removal of the Little Daisy dump is prudent because infiltration of water through waste materials is identified as a major pathway for contaminant movement in the conceptual model developed for the site. Removing these two dumps from the watershed eliminates 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 will improve water quality. About 28 miles of road will be treated as a part of the Miller Creek Response Action, including reconstruction of the Lake Abundance road, which provides access to the lake from Daisy Creek.

ADIT DISCHARGE RESPONSE ACTION

Response Actions associated with adit discharges in the District will be evaluated in a separate EE/CA in 2005. There are 24 discharging adits in the District, of which about 11 produce acidic and/or metal-laden water that exceed aquatic criteria. The likely response actions that would treat or eliminate these discharges are similar. The EE/CA will address risks to water quality from adit discharges by analyzing potential treatment scenarios and resulting load reductions that might be realized. The result of the EE/CA will be a preferred alternative(s) to address impacts from these discharges to water quality.

The Forest Service initially examined feasible water quality treatment alternatives for adit discharges in 1999, identifying one potential passive treatment approach that may be applicable to these mine discharge sources. This approach involves building a treatment cell filled with organic and nutrient substrates, burying the cell to eliminate oxygen, and routing mine drainage through the buried cell. The USDA Forest Service is also evaluating grouting technologies in two adits, the McLaren and the Gold Dust, as a means of source control similar to the Glengarry closure. Both of these adits contain exploratory boreholes that discharge water to the underground workings. At the McLaren Adit, one borehole located about 366 feet in from the portal contributed more than 70% of the copper load measured in the discharge at the portal. This borehole was grouted in 2003, completely eliminating flow from the borehole. Several boreholes present in the Gold Dust workings will be grouted in 2005 to determine how effective this technology might be in reducing the adit flow and associated metals loading.

CLEANUP SCHEDULE

Table 1 shows the cleanup schedule for past work and work planned for the remaining years of the project. The first year of actual cleanup work was 2001. As shown in the table, project work on District Property is expected to be completed by 2006 with monitoring continuing in 2007 and subsequent years. 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. A delay on one project in one year may also lead to delays in other projects shown in **Table 1**, as most of the cleanup activities planned for future years are either contingent upon the completion of other cleanup activities or have to be done in conjunction with other cleanup activities.

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
2002	McLaren initial year	Waste rock consolidation and construction of drainage controls
	Monitoring and Maintenance	Surface water, groundwater, revegetation; Selective Source Repository sump repair
2003	McLaren second year	Complete waste regrading; construct capping system
	Glengarry Adit initial year	Grout Como Raise; prepare Glengarry tunnel for grouting and backfilling
	Monitoring and Maintenance	Surface water, groundwater, revegetation; as necessary maintenance
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
	Monitoring and Maintenance	Surface water, groundwater, revegetation; as necessary maintenance
2005/2006	Glengarry Adit third year	Install remaining plugs and cement backfill
	Como Basin Cap and Cover	Cap and cover disturbed and metals-enriched soil materials in-situ
	Lulu Pass Road Reclamation	To be done 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 Removal	National Forest System Land only (cleanup funds outside Consent Decree)
	Republic Smelter Removal	National Forest System Land only (cleanup funds outside Consent Decree)
	Selective Source Repository Expansion	Fisher and Miller Creek dump removals
	District-Wide Monitoring and Maintenance	Surface water, groundwater, revegetation; as necessary maintenance
2007	Restoration, Road Work in Miller Creek	Preferred alternative from Miller Creek EE/CA
	Adit Discharge Response Action	Preferred Removal Alternative for 24 remaining discharging adits in the District
	District-Wide Monitoring and Maintenance	Surface water, groundwater, revegetation; as necessary maintenance
Contingent on Completion of District Property Work	Remaining Non-District Property	Response Actions following Certificate of Completion

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 (CFY-2 on Fisher Creek, DC-5 on Daisy Creek, and SW-7 on the Stillwater River) in the rule adopted by the Board. All data collected from 1989 through 1998 were used in the calculation. **Figure 2** 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** compared to the most recent water quality data measured in October 2004. In general, concentrations measured in October 2004 (low flow conditions) were considerably lower than the temporary standard. More discussion on water quality conditions compared to standards is presented in this section.

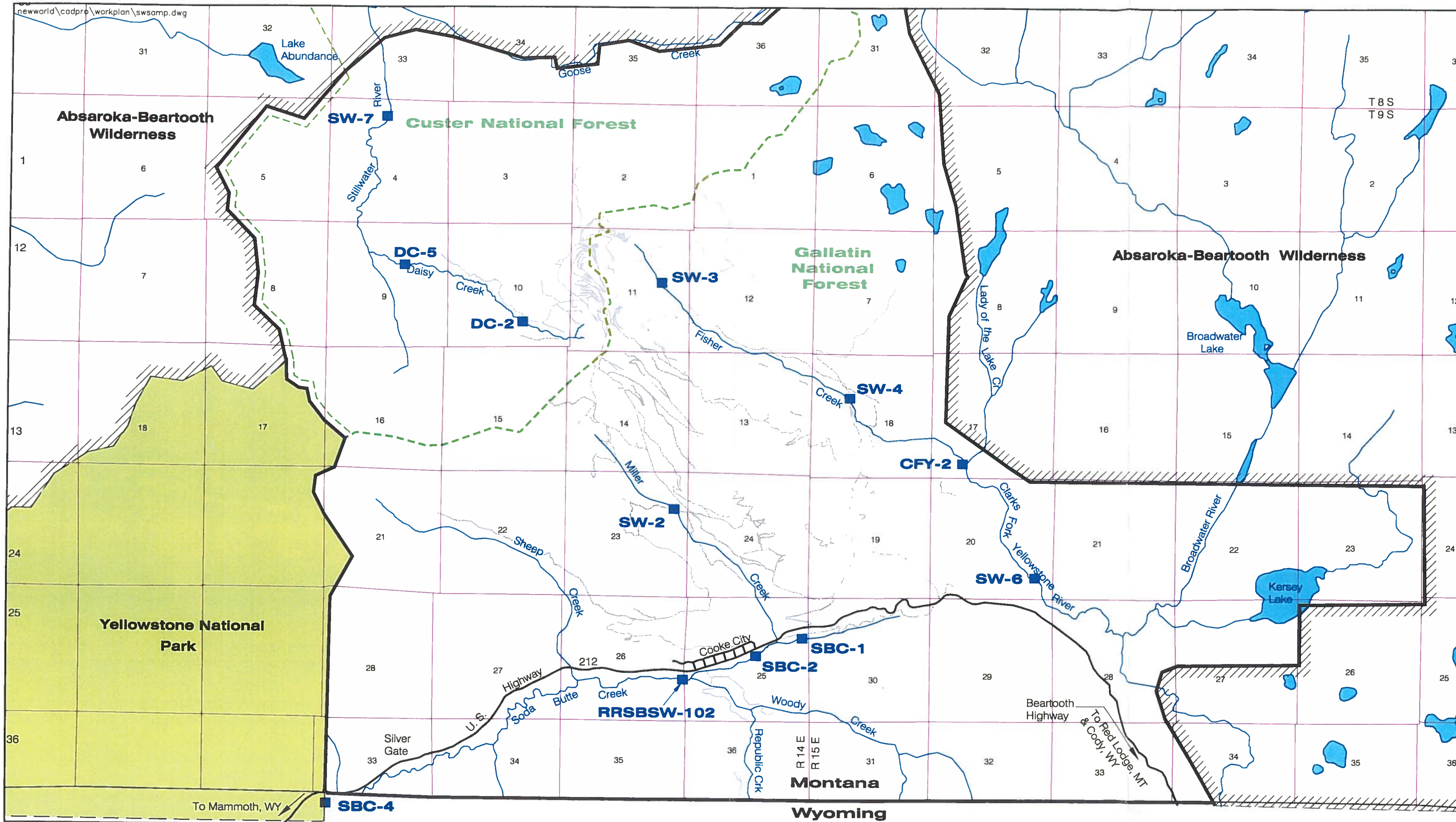
TABLE 2
2004 DATA COMPARED TO TEMPORARY STANDARDS FOR FISHER CREEK, DAISY CREEK, AND PORTIONS OF THE STILLWATER RIVER
New World Mining District Response and Restoration Project

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. Standard	Oct. 2004	Temp. Standard	Oct. 2004	Temp. Standard	Oct. 2004
Aluminum	87**	470	80	9,510	1,900	670	80
Cadmium	0.16	--	0.1	4	0.7	--	< 0.1
Copper	5.16	110	20	3,530	510	200	20
Iron	1,000	750	40	6,830	2,130	1,320	170
Lead	1.3	2	< 1	--	< 1	13	< 1
Manganese	--	82	10	1,710	330	86	38
Zinc	67	44	30	540	110	49	< 10
pH (s.u.)***	--	> 5.7	7.3	> 4.6	7.7	> 5.5	7.7

Notes: * indicates standard adjusted for hardness of 50 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
*** s.u. = 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 2004; gray color band); and, 1999 to 2004 (light blue color band). For these summary statistics, parameters that were not detected above the practical quantitation limit (PQL) or method detection limit (MDL) were estimated by dividing the PQL or MDL in half. Narrative standards apply at the other long-term stations monitored in the



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
District Boundary
Unimproved Road
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 2

three stream segments where temporary standards apply (DC-2 in Daisy Creek, SW-3 and SW-4 in Fisher Creek, and SW-6 in the Clarks Fork of the Yellowstone River), and are calculated in the same manner as the numeric temporary standards.

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 band). This general observation indicates that both the range in contaminant concentration and contaminant concentrations 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. A statistical evaluation of these and future monitoring data using non-parametric methods and accounting for seasonality is planned for the near future to determine if statistically significant improvement in water quality has occurred since cleanup began.

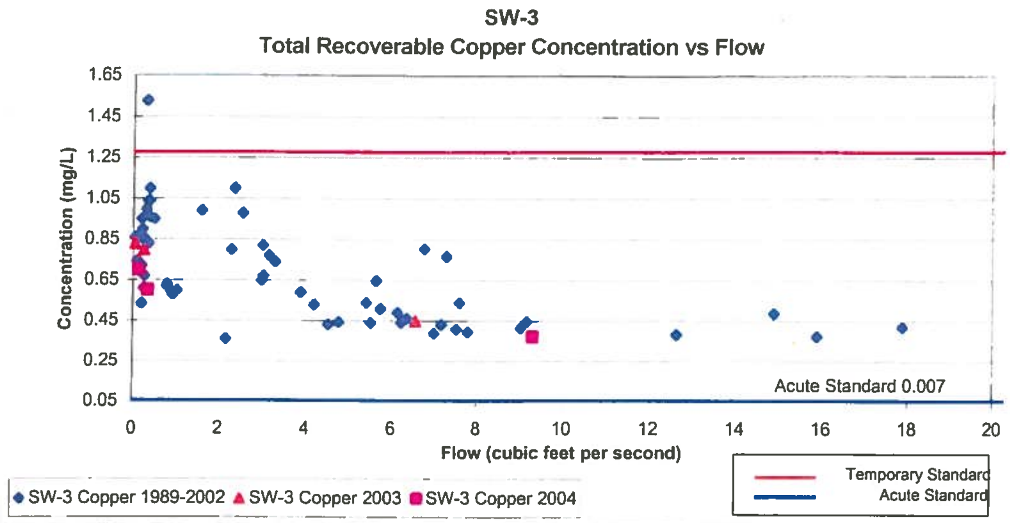
A discussion of water quality data for each of the stream segments is presented in the following sections. Water quality data presented in **Table A-1** is shown graphically on **Figures 3 through 9** for copper, iron, and zinc. These three metals were selected for graphical presentation in this progress report as these metals represent the most robust of the parameters in depicting changes in water quality. The scatter plot graphs are similar for all stations with the concentration of the 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 may be logarithmic or linear, depending on which scale best exhibits 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.

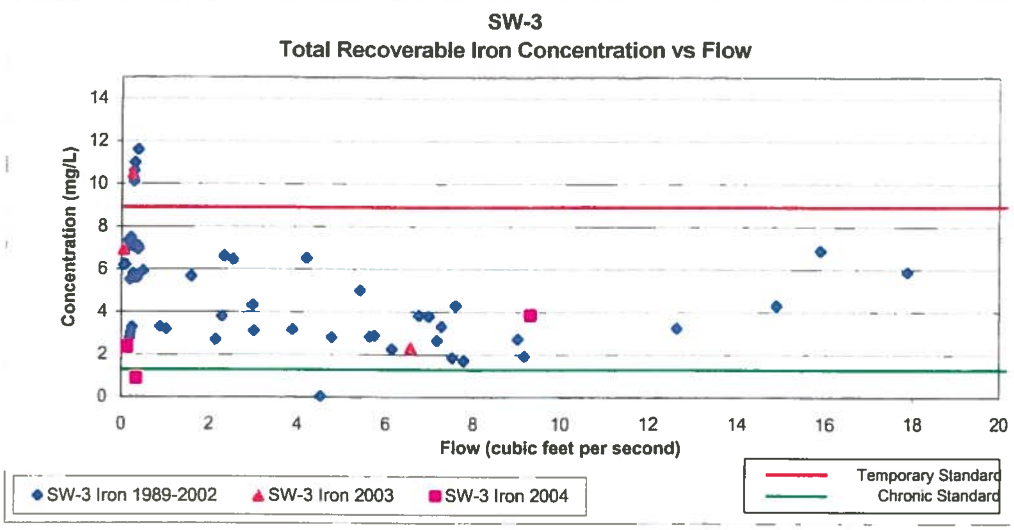
FISHER CREEK WATER QUALITY

Figures 3, 4, 5, and 6 show copper, iron, and zinc concentrations for each of the Fisher Creek long-term monitoring stations. For the Fisher Creek graphs, three different data sets are plotted: 1989 to 2002; 2003; and 2004. The 2003 and 2004 data are shown separately so that these data can be easily compared to data collected during the previous years of the project when little if any cleanup work had been done. Although several waste dumps were removed from the Fisher Creek drainage in 2001, the most important cleanup work in Fisher Creek, closure of the Glengarry Adit and capping of soil in the Como Basin, wasn't begun until 2003 and won't be completed until 2006.

At Station SW-3, the graphs show that metals concentrations are higher during the lowest flows measured and are much lower during higher flow events (**Figure 3**). The lowest concentrations of copper measured at this station since 1989 were in May 1998 (0.361 mg/L) and June 2004 (0.37 mg/L). When compared to equivalent flow periods, 2004 concentrations of copper were all lower than 2003 concentrations. However, water at SW-3 far exceeds even the acute water quality standard for copper at all times, and exceeds the zinc acute/chronic aquatic standard during low flow periods, which occur the majority of the year. Referring to **Table A-1**, aluminum, cadmium, and lead also exceeded acute or chronic aquatic life standards at Station SW-3 during 2004 sampling events.

At Station SW-4, water quality changes remarkably from Station SW-3, with the pH increasing from very acidic at Station SW-3 to neutral at Station SW-4 (**Table A-1**). Copper and zinc concentrations do not vary as much with flow at this station, but iron concentrations increase significantly as flow increases (**Figure 4**). Aquatic standards for iron and zinc are being met at this station some of the time,





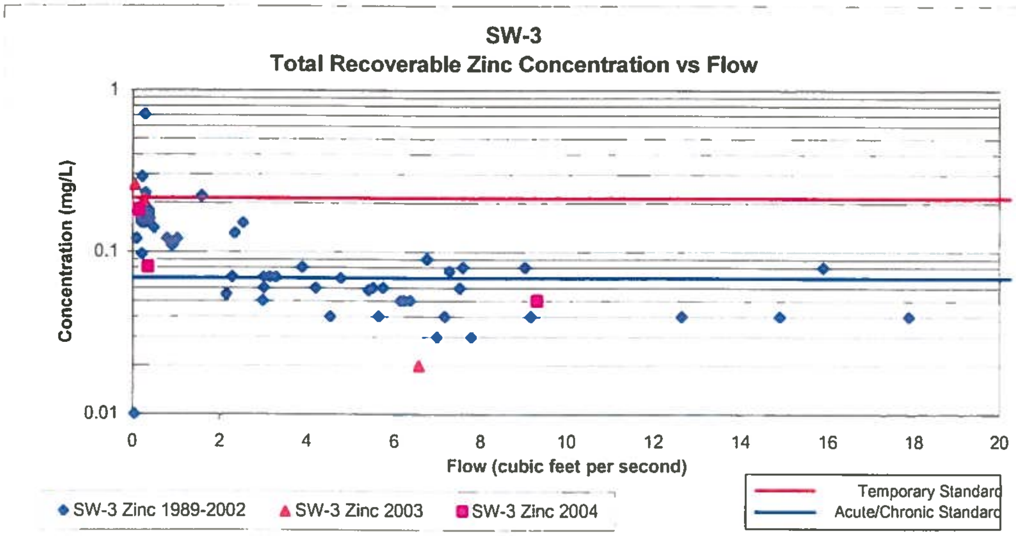


Figure 3 - Concentration vs. Flow Graphs for Station SW-3

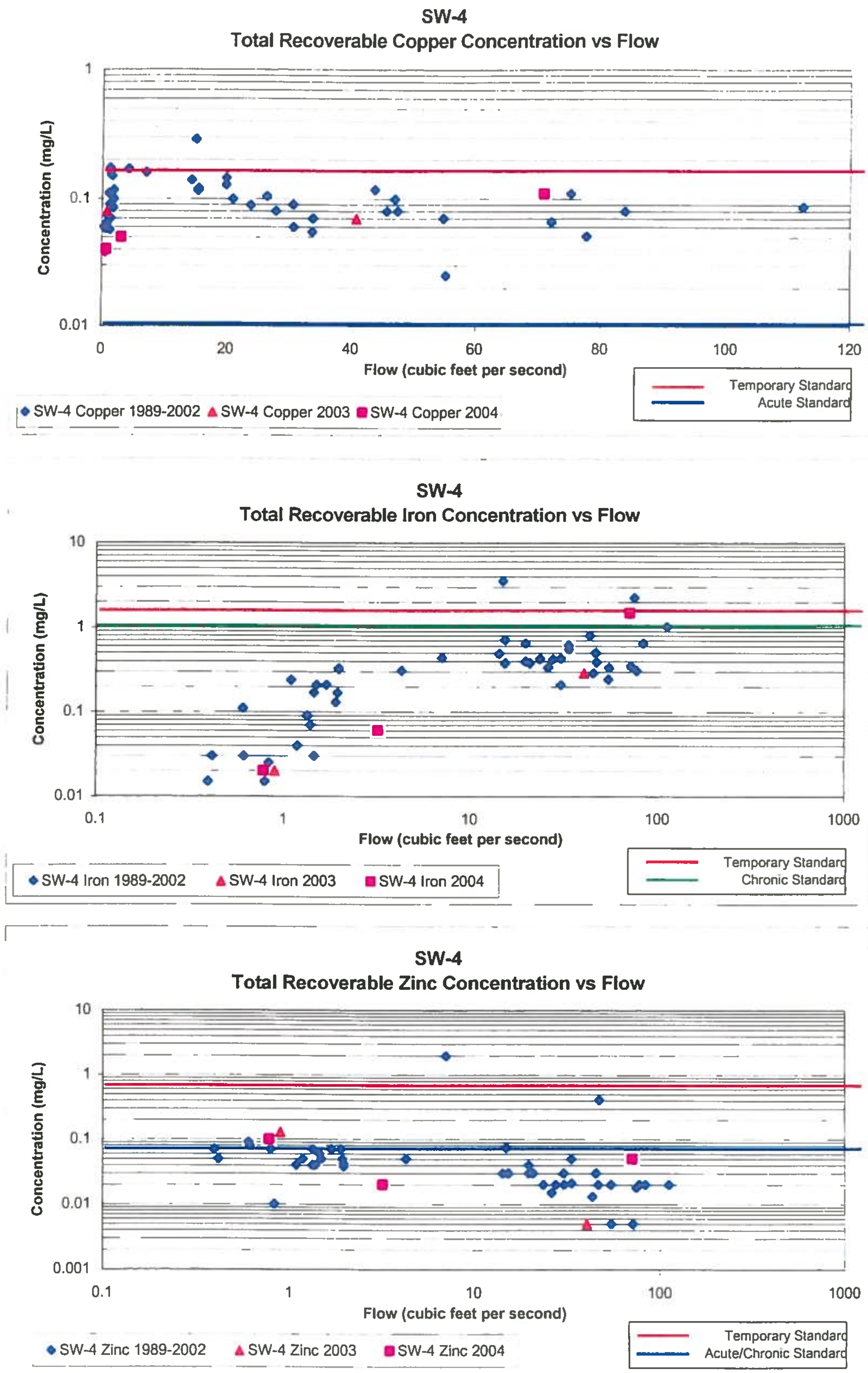
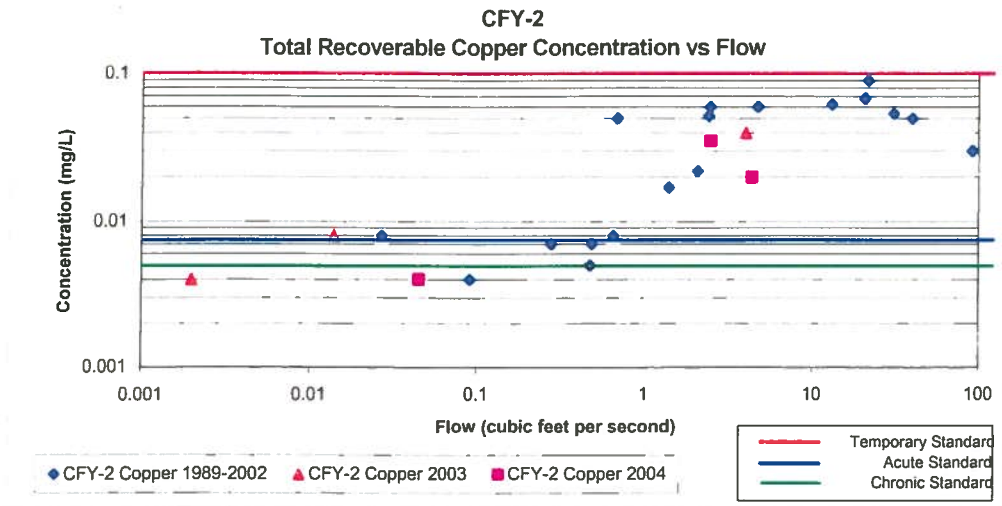
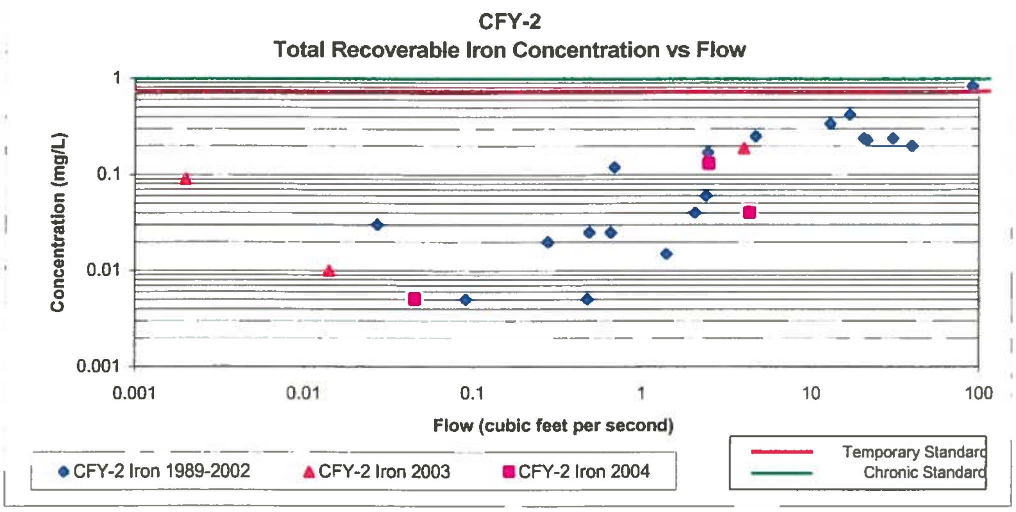


Figure 4 - Concentration vs. Flow Graphs for Station SW-4





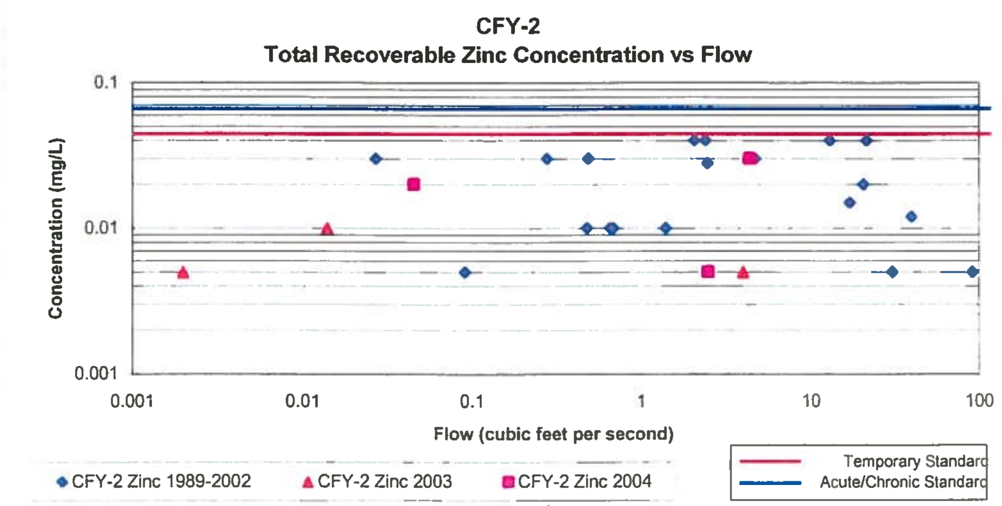
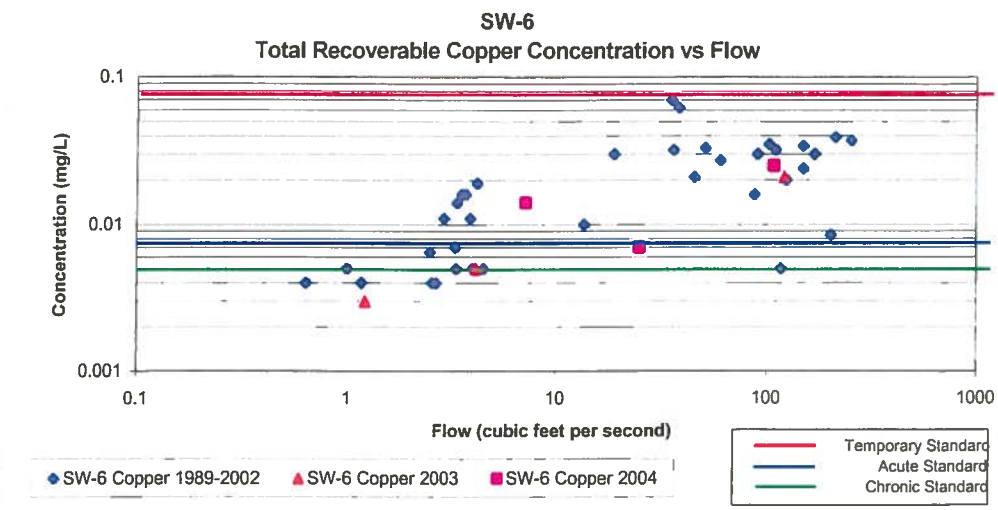
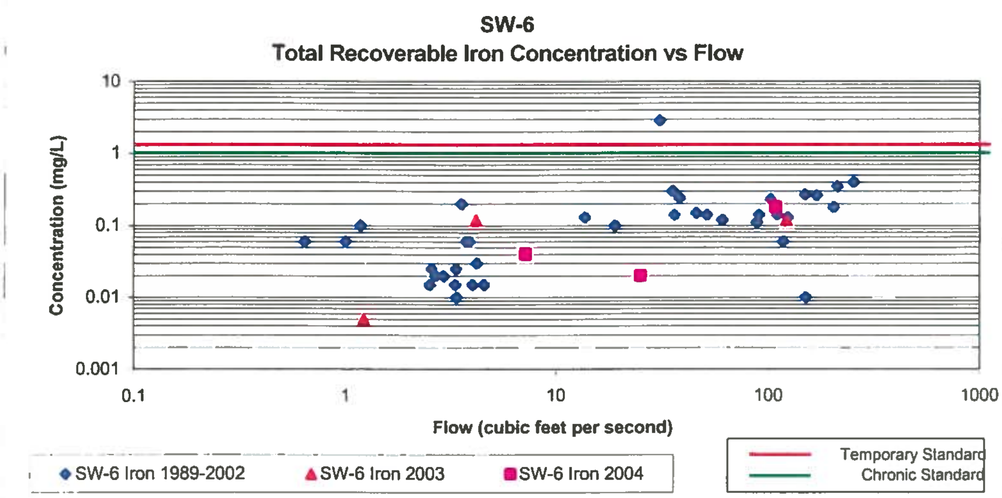


Figure 5 - Concentration vs. Flow Graphs for Station CFY-2





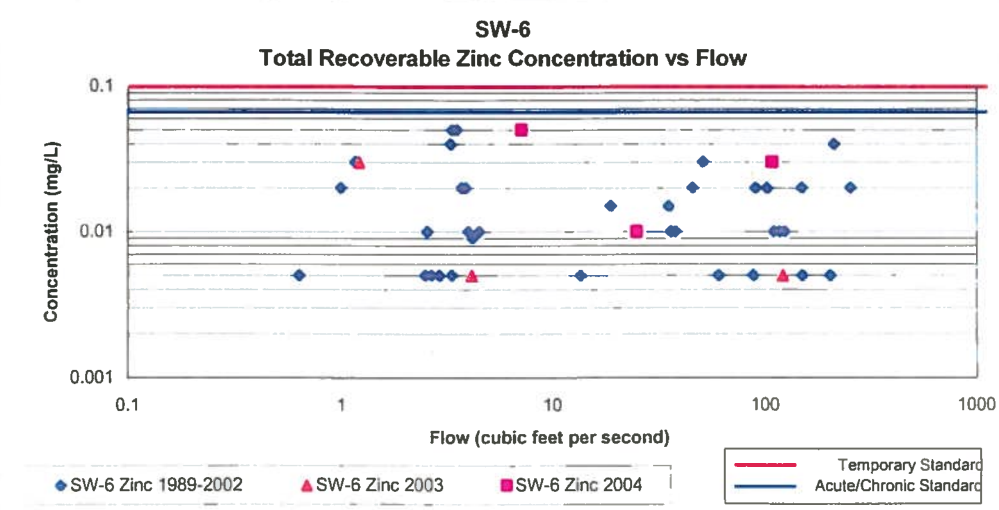


Figure 6 - Concentration vs. Flow Graphs for Station SW-6

although copper concentrations were as much as 10 times higher than the acute aquatic standard in both 2003 and 2004. **Table A-1** shows that aluminum, cadmium, and lead also exceeded acute or chronic aquatic life standards in at least one of the three 2004 monitoring events.

Water quality in Fisher Creek improves markedly at downstream stations CFY-2 (**Figure 5**) and SW-6 (**Figure 6**). In 2003 and 2004, iron and zinc concentrations were lower than the aquatic standards at both stations, and copper concentrations were lower than the chronic aquatic standard at Station CFY-2 in April. For iron and copper, concentrations tend to increase as flow increases at both stations. At stations CFY-2 and SW-6, aluminum also exceeded the chronic aquatic life standard during one of the three 2004 monitoring events (**Table A-1**), and copper exceeded the acute standard at both stations during two of the three 2004 events.

DAISY CREEK WATER QUALITY

For the Daisy Creek graphs (**Figures 7 and 8**), two different data sets are plotted: 1989 to 2003 and 2004. The 2004 data are shown separately so that these data can be compared to data collected before the McLaren Pit cap was constructed. Copper, iron, and zinc concentrations measured in samples collected from the two Daisy Creek stations (Stations DC-2 and DC-5) in 2004 were below both temporary and narrative water quality standards (**Figures 7 and 8**). However, the acute and/or chronic standards for copper, iron, and zinc were exceeded at both stations in 2004.

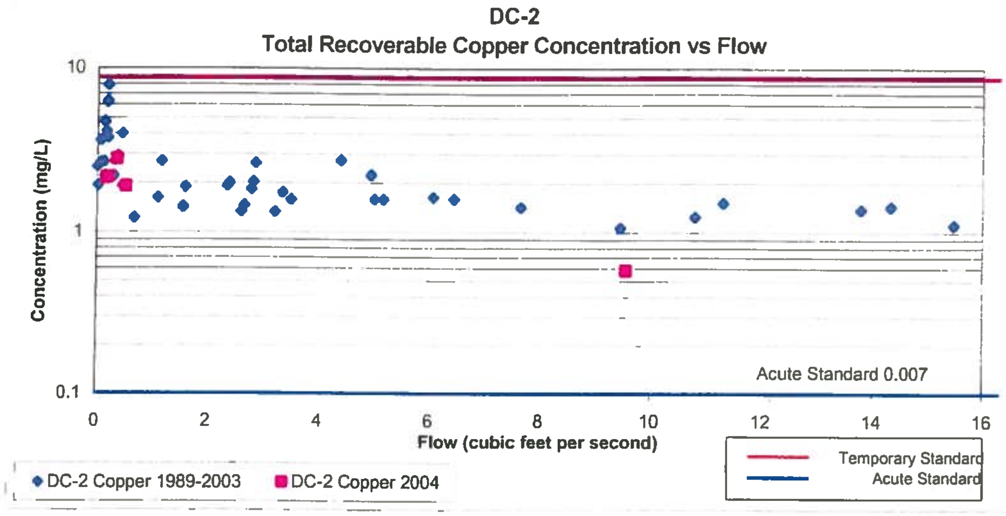
At station DC-2, water quality is poor and strongly acidic in April and October. In June, however, the pH of water sampled at this station was near-neutral (**Table A-1**), and the concentrations of copper, iron, and zinc were the lowest measured at this station during the period of record. This condition is attributed to the emplacement of the McLaren Pit cap, which was completed in October 2003. It is hypothesized that by emplacing the cap, snowmelt could no longer infiltrate through the waste, and instead ran off of the cap in a very short period of time. This flow diluted the concentrations measured at Station DC-2. Also, the cap and cover system also served to prevent erosion of waste rock from the pit, as occurred in previous years. The substantial reduction in concentration observed in June is especially notable for copper, where the measured concentration of 0.58 mg/L was 34% lower than the lowest concentration previously measured of 0.876 mg/L in July 1997 (**Table A-1**).

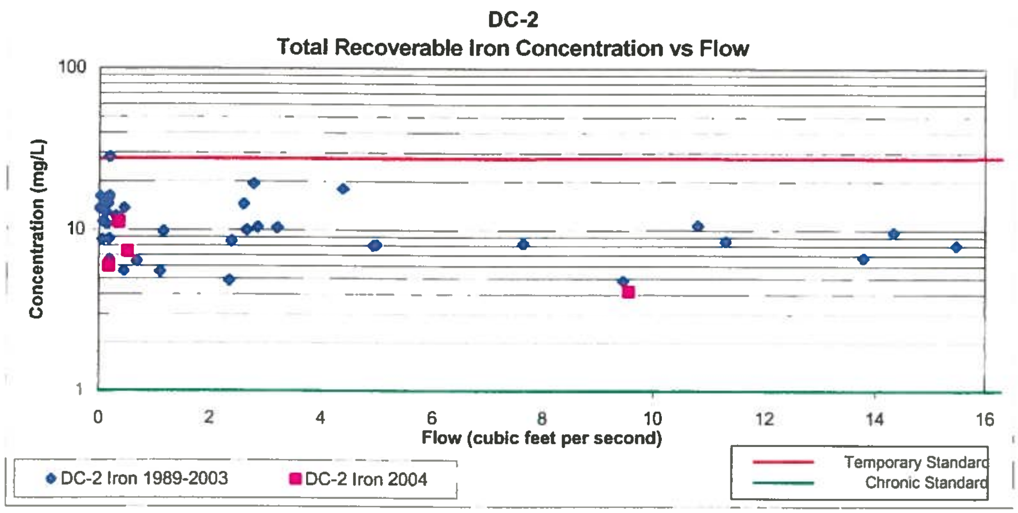
Water quality at Station DC-2 exceeded standards for the following constituents: aluminum, cadmium, and copper exceeded acute or chronic aquatic life standards in all three 2004 monitoring events; lead exceeded the chronic aquatic life standard in April 2004; zinc exceeded the acute aquatic life standard in April and October 2004; and, human health criteria for copper, iron, and manganese were exceeded for most samples collected in 2004.

At station DC-5, pH of the water increases notably from that measured at station DC-2, and total recoverable trace metal concentrations are considerably lower. However, as at station DC-2, aluminum and copper exceeded acute or chronic aquatic life standards in all three 2004 monitoring events at station DC-5. In addition, cadmium exceeded the chronic aquatic life standard in April and October 2004, and zinc exceeded the acute aquatic life standard in April. Iron and manganese also exceeded human health guidelines in all three 2004 monitoring events.

STILLWATER RIVER WATER QUALITY

As for the Daisy Creek graphs, two different data sets are plotted in **Figure 9** for data collected at Station SW-7 on the Stillwater River: 1989 to 2003 and 2004. Station SW-7 is located about 3.7 miles





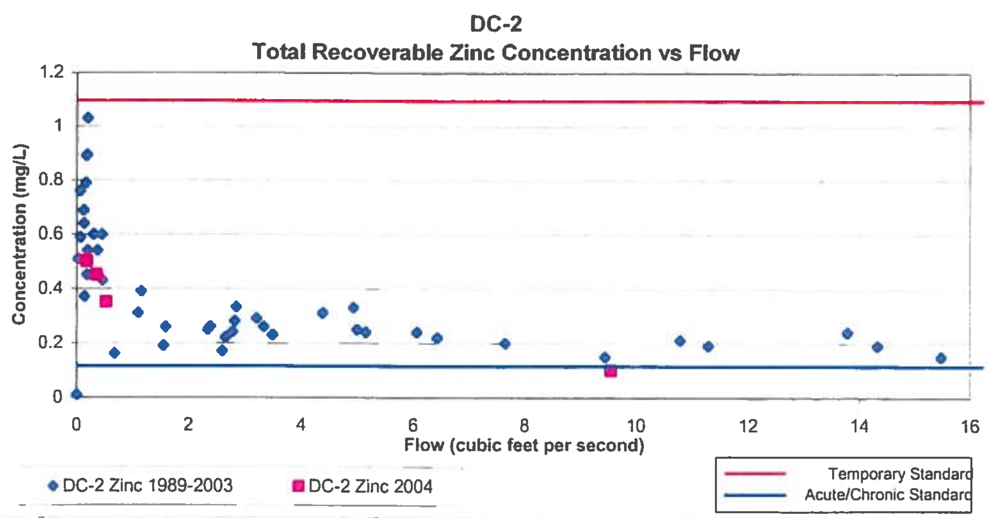
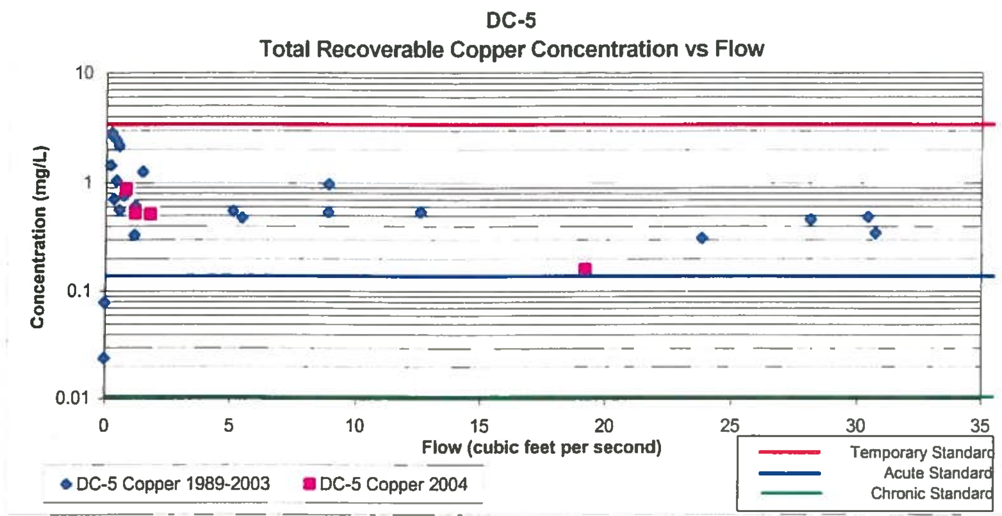
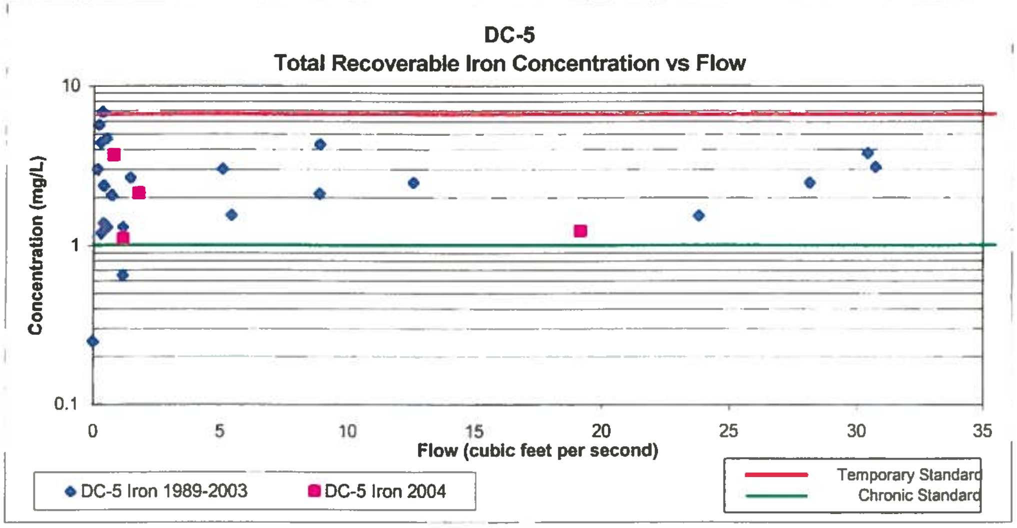


Figure 7 - Concentration vs Flow Graphs for Station DC-2





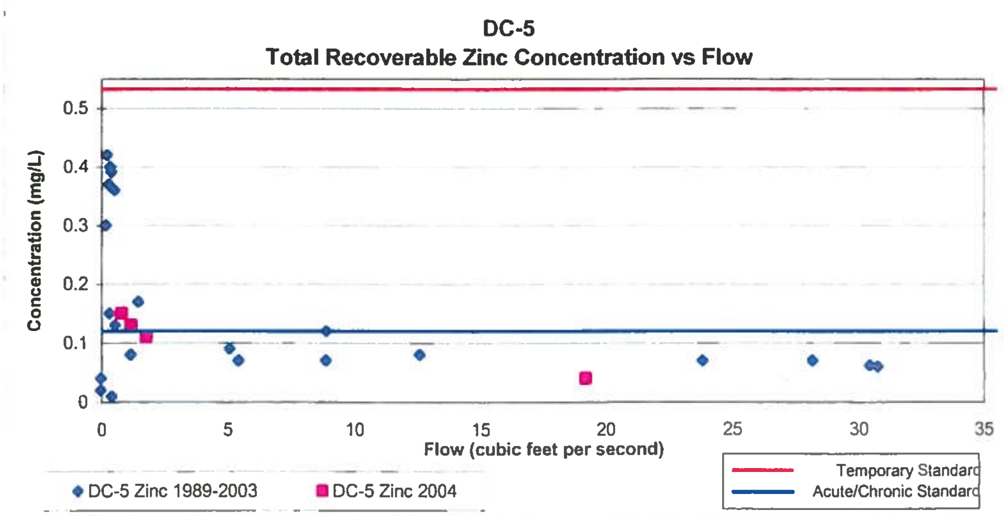
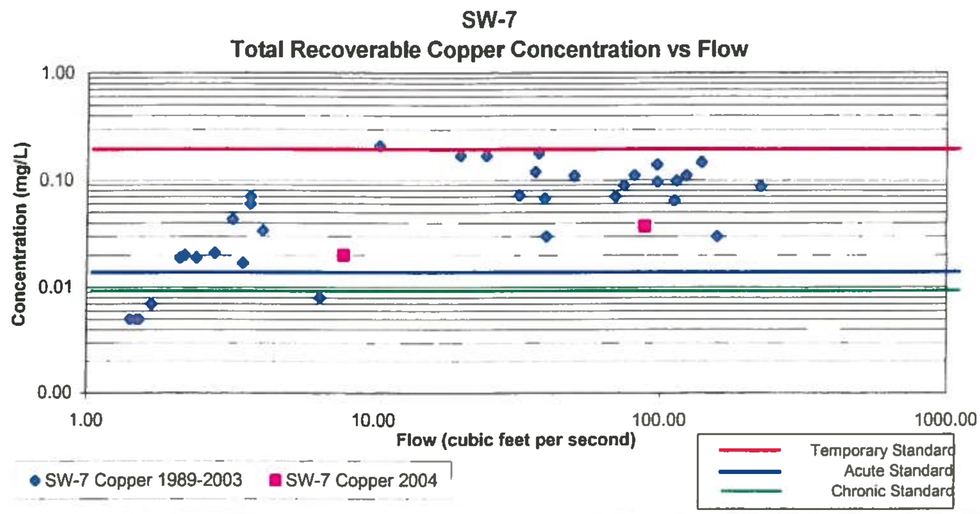
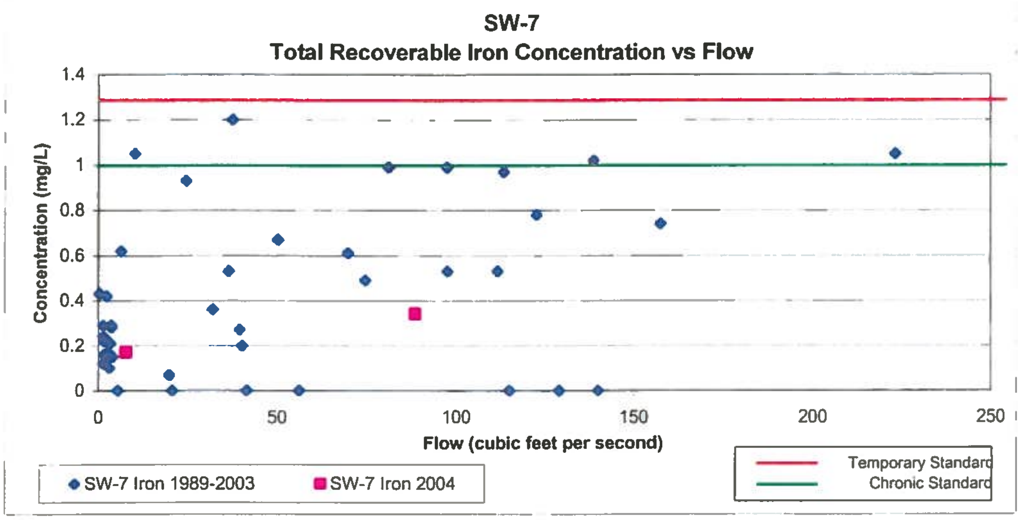


Figure 8 - Concentration vs. Flow Graphs for Station DC-5





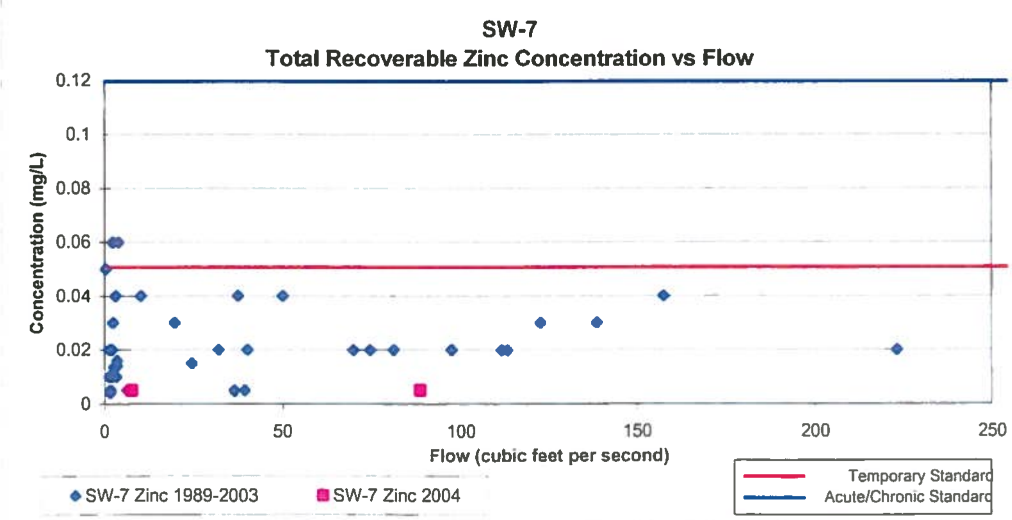


Figure 9 - Concentration vs. Flow Graphs for Station SW-7

downstream of the McLaren Pit (**Figure 2**). No temporary standards have been exceeded at this station since the standards became effective in 1999. Zinc concentrations have been lower than the acute/chronic aquatic standard at Station SW-7 since monitoring began in 1990, and iron concentrations have been lower than the chronic aquatic standard since the early '90s (**Table A-1**).

While all parameter concentrations are below standards during some flow events at Station SW-7, including, most recently, in April 2004, exceedances of total recoverable concentrations of aluminum and copper are still measured each year (**Table A-1**). In an effort to determine whether these exceedances were related to suspended or dissolved solids, dissolved analysis were conducted on water samples collected in 2004 by filtering the samples through a 0.45 micron filter. For all trace metals analyzed, dissolved constituent concentrations were below acute and/or chronic aquatic standards for all three 2004 sampling events. This result indicates that exceedances of aluminum and copper standards in the total recoverable analyses are likely caused by suspended solids (sediment) present in the water samples.

SUMMARY

The USDA Forest Service believes that the temporary standards are an important element in proceeding with cleanup of historic mining impacts in the District; therefore, no adjustment in the temporary standards is proposed or recommended as a result of this 3-Year review of the temporary water quality standards. 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 several cleanup actions are scheduled for the next two years. Water quality improvements are beginning to be realized at the farthest downstream stations on the three stream segments, and additional water quality improvements are expected to be measured in the near future.

Biological impairment of Fisher Creek, Daisy Creek, and the headwaters of the Stillwater River are not believed to have changed since the filing of the Support Document and Implementation Plan. Biological monitoring (macroinvertebrate and fisheries) will be done in the near future following completion of the Glengarry Adit/Como Basin/Fisher Creek Response Action and after post-construction conditions in the McLaren Pit area have a chance to equilibrate with the new hydrologic regime imposed by the impermeable cap. Biological monitoring will be used in addition to water quality data to determine if response action cleanups have improved conditions for aquatic life populations.

There are no known or simple solutions to the water quality problems at the New World site. Potential improvements from standard of practice reclamation techniques such as revegetation, capping, water diversion, erosion control, and portal plugging will take several years to complete and at least several years of operation before achieving the maximum effect. Potential water treatment technologies that may be implemented following a detailed evaluation in the Adit Discharge EE/CA will also require time to both implement and operate before treatment effects will be seen. At this time, it is not certain that any of these actions would by themselves, or in combination with other actions, eliminate all of the existing water quality limiting factors. The existence of natural acid drainage, combined with high levels of mineralization, exacerbates the situation by providing natural water inflow high in metal concentrations to both surface and groundwater. This natural condition may limit water quality, even in the absence of historic mining activities.

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APPENDIX A

TABLE A-1

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

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2004

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00208		0.984		0.0073		NA		0.014		NA		0.067	
CFY-2	08/09/90	Hydrometrics Data	0.69	6.8	0.1		0.0050	<	0.00100	<	0.0200	<	0.05		0.12		0.01	<	0.04		0.02	<
CFY-2	06/05/91	Hydrometrics Data	91.6	6.9	0.5		0.0010	<	0.00010	<	0.0200	<	0.06	<	0.83		0.002		0.03		0.01	<
CFY-2	07/09/91	Hydrometrics Data	4.7	7.1	0.1	<	0.0050	<	0.00020		0.0200	<	0.06		0.25			J	0.03		0.03	
CFY-2	08/13/91	Hydrometrics Data	2.4	7.6	0.1		0.0050	<	0.00020		0.0200	<	0.052		0.06		0.002	<	0.04		0.04	
CFY-2	09/24/91	Hydrometrics Data	1.4	7	0.1	<	0.0050	<	0.00010	<	0.0200	<	0.017		0.03	<	0.002	<	0.02	<	0.01	
CFY-2	07/23/93	Hydrometrics Data	17.03	7.1	0.3		0.0010	<	0.00010		0.0010	<	0.11		0.42		0.002	<	0.05		0.03	<
CFY-2	09/21/93	Hydrometrics Data	2.46	7.1	0.1		0.0010	<	0.00020		0.0010	<	0.06		0.17		0.002	<	0.09		0.028	
CFY-2	06/15/94	Hydrometrics Data	39.63	6.9	0.2		0.0010	<	0.00010	<	0.0010	<	0.05	J	0.2		0.002	<	0.03		0.012	J
CFY-2	05/06/99	Maxim	0.091	7.1	0.1	<			0.00010	<			0.004		0.01	<	0.001	<	0.005	<	0.01	<
CFY-2	07/09/99	Maxim	21.46	7.2	0.2				0.00010				0.09		0.23		0.001	<	0.019		0.04	
CFY-2	09/29/99	Maxim	2.071	6.9	0.1	<			0.00020				0.022		0.04		0.001	<	0.017		0.04	J
CFY-2	04/13/00	Maxim	0.658	6.9	0.05	<			0.00010	<			0.008		0.05	<	0.001	<	0.005	<	0.02	<
CFY-2	07/08/00	Maxim	20.55	6.8	0.2	J			0.00010	<			0.068	J	0.24	J	0.001	<	0.035	J	0.02	J
CFY-2	09/22/00	Maxim		7.1	0.1	<			0.00010	<			0.004		0.01		0.001	<	0.003	<	0.01	<
CFY-2	09/28/00	Maxim		7.1	0.1	<			0.00010	<			0.01		0.03		0.001	<	0.004		0.01	<
CFY-2	10/10/00	Maxim		7.3	0.1	<			0.00010	<			0.01		0.05	<	0.003	<	0.005	<	0.02	<
CFY-2	10/19/00	Maxim		6.8	0.1	<			0.00010	<			0.008		0.05	<	0.001	<	0.004		0.01	
CFY-2	04/21/01	Maxim	0.48	7.4	0.1	<			0.00010	<			0.005		0.01	<	0.001	<	0.003	<	0.01	
CFY-2	06/26/01	Maxim	30.66	7.5	0.1	<			0.00010				0.054		0.24		0.002	J	0.024		0.01	<
CFY-2	10/11/01	Maxim	0.49	7	0.1	<	0.0030	<	0.00010	<			0.007		0.05	<	0.001	<	0.003	<	0.03	J
CFY-2	04/26/02	Maxim	0.28	7	0.1	<			0.0001	<			0.007		0.02		0.001	<	0.005		0.03	
CFY-2	07/01/02	Maxim	13	7	0.3	J			0.0001	<			0.062		0.34		0.001		0.03		0.04	J
CFY-2	10/08/02	Maxim	0.027	6.9	0.1	<			0.0002				0.008		0.03		0.001	<	0.003	<	0.03	J
CFY-2	22-Apr-03	Maxim	0.002	7	0.05	<			0.0001	<			0.004		0.09		0.001	<	0.003	<	0.01	<
CFY-2	01-Jul-03	Maxim	4	7.6	0.17				0.0001	<			0.04		0.19		0.001	<	0.024		0.01	<
CFY-2	30-Sep-03	Maxim	0.014	7.2	0.05	<			0.0001	<			0.008		0.01		0.001	<	0.003	<	0.01	
CFY-2	06-Apr-04	Maxim	0.045	7.5	0.05	<			0.0001	<			0.004		0.01	<	0.001	<	0.005	<	0.02	JF%
CFY-2	28-Jun-04	Maxim	2.48	7.5	0.09				0.0001	<			0.035		0.13		0.001	<	0.013		0.01	<
CFY-2	05-Oct-04	Maxim	4.33	7.3	0.08				0.0001				0.02		0.04		0.001	<	0.01		0.03	
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		0.000		0.001		0.017		0.015		0.001		0.010		0.005	
Maximum			91.600	7.600	0.500		0.003		0.001		0.010		0.110		0.830		0.005		0.090		0.040	
Mean			19.989	7.063	0.175		0.002		0.000		0.006		0.054		0.258		0.002		0.040		0.019	
Standard Deviation (SD)			31.828	0.245	0.156		0.001		0.000		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: 1989-2004 Samples (n)			25	29	29		9		29		8		29		29		28		29		29	
Minimum			0.002	6.800	0.025		0.001		0.000		0.001		0.004		0.005		0.001		0.002		0.005	
Maximum			91.600	7.600	0.500		0.003		0.001		0.010		0.110		0.830		0.005		0.090		0.040	
Mean			10.422	7.124	0.107		0.002		0.000		0.006		0.031		0.132		0.001		0.018		0.018	
Standard Deviation (SD)			20.011	0.244	0.108		0.001		0.000		0.005		0.029		0.176		0.001		0.020		0.013	
Mean + (2 x SD); for pH: Mean - (2 x SD)			50.443	6.635	0.323		0.004		0.000		0.016		0.089		0.483		0.003		0.058		0.043	
Station CFY-2: 1999-2004 Samples (n)			17	21	21		1		21		0		21		21		21		21		21	
Minimum			0.002	6.800	0.025		0.002		0.000		0.000		0.004		0.005		0.001		0.002		0.005	
Maximum			30.660	7.600	0.300		0.002		0.000		0.000		0.090		0.340		0.002		0.035		0.040	
Mean			5.920	7.148	0.080		0.002		0.000				0.023		0.084		0.001		0.010		0.017	
Standard Deviation (SD)			9.494	0.246	0.073				0.000				0.025		0.102		0.000		0.011		0.013	
Mean + (2 x SD); for pH: Mean - (2 x SD)			24.909	6.655	0.227				0.000				0.074		0.287		0.001		0.031		0.044	
Temporary Standard - CFY-2				5.7	0.47		NA		NA		NA		0.11		0.75		0.002		0.082		0.044	

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NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2004

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
SW-3	08/02/89	Hydrometrics Data			0.1	<	0.0050	<	0.00100	<			0.03		0.03	<	0.01	<	0.11		0.01	
SW-3	09/15/89	Hydrometrics Data	0.36	3.2	3.7		0.0050	<	0.00100	<			1.04		5.58		0.01	<	1.24		0.18	
SW-3	10/20/89	Hydrometrics Data	0.26	3.5	3.7		0.0050	<	0.00100	<			0.85		5.59		0.01	<	1.23		0.17	
SW-3	03/17/90	Hydrometrics Data	0.25	3.6	2.2		0.0050	<	0.00100	<			0.61		3.27		0.01	<	1		0.15	
SW-3	05/28/90	Hydrometrics Data	0.9	3.7	3		0.0050	<	0.00040		0.0200	<	0.593		3.3		0.003		0.49		0.11	
SW-3	06/05/90	Hydrometrics Data	5.75	3.7	2.1								0.51		2.9						0.06	
SW-3	06/06/90	Hydrometrics Data	4.9																			
SW-3	06/13/90	Hydrometrics Data	4.54	3.8	1.8								0.43		0.04						0.04	
SW-3	06/15/90	Hydrometrics Data	3.4																			
SW-3	06/20/90	Hydrometrics Data	6.15	3.9	1.8				0.00200		0.0200	<	0.49		2.26		0.01	<	0.23		0.05	
SW-3	06/22/90	Hydrometrics Data	13.2																			
SW-3	06/27/90	Hydrometrics Data	17.89	4	1.7		0.0050	<	0.00010		0.0200	<	0.419		5.89		0.004		0.16		0.04	
SW-3	06/28/90	Hydrometrics Data	16.25																			
SW-3	07/03/90	Hydrometrics Data	14.9	3.8	1.6				0.00100	<	0.0200	<	0.486		4.3		0.01	<	0.19		0.04	
SW-3	07/05/90	Hydrometrics Data	9.74																			
SW-3	07/10/90	Hydrometrics Data	3.9	3.7	1.7				0.00100	<	0.0200	<	0.59		3.18		0.01	<	0.27		0.08	
SW-3	07/12/90	Hydrometrics Data	3.2	3.7																		
SW-3	07/17/90	Hydrometrics Data	2.3	3.6	2								0.8		3.79						0.07	
SW-3	07/19/90	Hydrometrics Data	2.3	3.5																		
SW-3	07/26/90	Hydrometrics Data	1.6	3.6	2.6		0.0050	<	0.00040		0.0200	<	0.99		5.66		0.003		0.56		0.22	
SW-3	08/23/90	Hydrometrics Data	0.6	3.5																		
SW-3	09/25/90	Hydrometrics Data	0.4	3.4	3.3		0.0050	<	0.00090		0.0200	<	0.96		6.98		0.007		1.29		0.16	
SW-3	03/15/91	Hydrometrics Data	0.2	2.4	2.7		0.0050	<	0.00100	<	0.0200	<	0.72		2.79		0.01	<	0.89		0.15	
SW-3	06/05/91	Hydrometrics Data	7	3.5	1.1		0.0010	<	0.00010		0.0200	<	0.39		3.78		0.002		0.16		0.03	
SW-3	07/09/91	Hydrometrics Data	3	3.8	1.46		0.0050	<	0.00180	J	0.0200	<	0.65		4.32		0.002	J	0.29		0.05	
SW-3	08/14/91	Hydrometrics Data	0.5	3.5	2.9		0.0050	<	0.00070		0.0200		0.95		5.93		0.004		0.93		0.14	
SW-3	09/24/91	Hydrometrics Data	0.2	3.5	4.3		0.0050	<	0.00220		0.0200	<	0.95		5.51		0.006		1.26		0.16	
SW-3	07/23/93	Hydrometrics Data	2.36		3.3		0.0010		0.00040		0.0030		1.1		6.62		0.002	<	0.56		0.13	
SW-3	09/21/93	Hydrometrics Data	0.38	3.2	3.8		0.0010	<	0.00100		0.0010	<	1.1		11.6		0.009		1.67		0.17	
SW-3	06/14/94	Hydrometrics Data	5.42	3.8	2.6		0.0010	<	0.00030		0.0010	<	0.54	J	5		0.007		0.29		0.058	J
SW-3	07/14/95	Hydrometrics Data	7.29	3.7	2.5		0.0020		0.00040		0.0010		0.766	J	3.32	J	0.008		0.41		0.076	
SW-3	09/27/95	Hydrometrics Data	0.31	3.2	4.8		0.0010	<	0.00090		0.0010		1.53		11		0.008		1.66		0.231	
SW-3	05/21/96	Hydrometrics Data		3.2	4.3				0.00100				0.92		4.8		0.006		0.891		0.22	
SW-3	06/12/96	Hydrometrics Data	9.04	3.6									0.417		2.73	J					0.08	J
SW-3	06/20/96	Hydrometrics Data	7.795	4.1	1.6				0.00020				0.395		1.72		0.003	<	0.167		0.03	
SW-3	06/26/96	Hydrometrics Data	12.65	4									0.381		3.25						0.04	
SW-3	07/02/96	Hydrometrics Data	15.9	4									0.374		6.88						0.08	J
SW-3	07/11/96	Hydrometrics Data	9.18	3.8	1.3	J			0.00010				0.448		1.93		0.003	<	0.163		0.04	
SW-3	07/18/96	Hydrometrics Data	5.644	3.3									0.646		2.84						0.08	<
SW-3	07/25/96	Hydrometrics Data	6.767	3.4									0.803		3.83						0.09	
SW-3	08/21/96	Hydrometrics Data	2.552	3.3									0.98		6.46						0.15	
SW-3	09/11/96	Hydrometrics Data	0.38	3.1	3.5				0.00090	J			1.04		6.91		0.008		1.32		0.18	
SW-3	07/08/97	UOS Data			1.81		0.0100	<	0.00500	<	0.0100	<	0.411		2.6				0.165		0.0368	
SW-3	03/27/98	UOS Data	0.17	3.3	3.15								0.691		7.35				1.31		0.177	
SW-3	04/23/98	UOS Data	0.112	3.5	3.08								0.745		6.92				1.26		0.177	
SW-3	05/05/98	UOS Data	0.217	3.6	2.51								0.535		3.03				0.502		0.0965	
SW-3	05/13/98	UOS Data	4.783	3.7	2.26								0.443		2.82				0.348		0.0689	
SW-3	05/29/98	UOS Data	2.172	3.9	1.77								0.361		2.71				0.231		0.0547	
SW-3	05/06/99	Maxim	0.2244	3.4	3.9				0.00110				0.9		7.49		0.007		1.35		0.29	
SW-3	07/09/99	Maxim	7.53	4.2	1.5				0.00020				0.41		1.85		0.002		0.162		0.06	
SW-3	09/30/99	Maxim	0.306	3.3	3.1				0.00050				1		7.03		0.002		1.3		0.18	J
SW-3	04/13/00	Maxim	0.055	3.4	3.2				0.00140				0.86		6.2		0.008		1.32		0.02	<
SW-3	05/18/00	Maxim	0.935	3.5									0.58								0.11	
SW-3	05/18/00	Maxim	0.797	3.5									0.62								0.12	

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TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2004

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
SW-3	05/18/00	Maxim	1.04	3.5	2.5				0.00040				0.6		3.19		0.003		0.56		0.12	
SW-3	05/18/00	Maxim		3.5									0.62								0.12	
SW-3	05/18/00	Maxim	0.809	3.5									0.63								0.12	
SW-3	06/18/00	Maxim	7.18	3.9	1.8				0.00020				0.43		2.67		0.003		0.18		0.04	
SW-3	06/18/00	Maxim	6.37	3.9									0.46								0.05	
SW-3	06/18/00	Maxim	6.24	3.9									0.44								0.05	
SW-3	06/18/00	Maxim	5.52	3.9									0.44								0.06	
SW-3	07/08/00	Maxim	3.02	3.7									0.82	J							0.07	J
SW-3	07/08/00	Maxim	3.03	3.7	2	J			0.00010	<			0.67	J	3.11	J	0.002		0.37	J	0.06	J
SW-3	07/08/00	Maxim	3.16	3.7									0.77	J							0.07	J
SW-3	07/08/00	Maxim	3.3	3.7									0.74	J							0.07	J
SW-3	08/16/00	Maxim			2.8				0.00110				0.95		5.21		0.007		1.06		0.15	
SW-3	09/01/00	Maxim		3.4	2.8				0.00060				0.82		7.38		0.005		1.11		0.16	
SW-3	09/17/00	Maxim			3.1								0.76		22		0.003		1.5		0.15	
SW-3	10/19/00	Maxim		2.9	2.9				0.00010	<			0.67		7.84	J	0.007		1.29		0.39	
SW-3	12/06/00	Maxim		3.3	3				0.00100				0.72		6.44		0.007		1.25		0.18	
SW-3	04/21/01	Maxim	0.103	3.4	2.6				0.00100				0.74		6.21		0.006		1.12		0.12	
SW-3	06/11/01	Maxim		3.9	1.7		0.0030	<	0.00010	<			0.48		1.92		0.003	<	0.2		0.05	J
SW-3	06/26/01	Maxim	4.208	3.7	2.5				0.00030				0.53		6.53		0.007	J	0.31		0.06	
SW-3	08/31/01	Maxim	0.29	3.3	2.7				0.00560				0.84		10.1		0.012		1.17		0.15	
SW-3	10/11/01	Maxim	0.27	3.5	2.4		0.0030	<	0.00110				0.67		5.79		0.004		0.87		0.15	
SW-3	04/26/02	Maxim	0.37	3.4	3.1				0.001				0.83		7.1		0.006		1.28		0.18	
SW-3	07/01/02	Maxim	7.6	4	1.7	J			0.0003				0.54		4.31		0.003		0.3		0.08	J
SW-3	10/08/02	Maxim	0.29	3.4	3.6				0.001				0.85		10.6		0.009		1.48		0.71	J
SW-3	23-Apr-03	Maxim	0.05	3.1	2.51				0.0012				0.83		6.92		0.008		1.3		0.26	
SW-3	01-Jul-03	Maxim	6.57	4	1.62				0.0002				0.45		2.32		0.002		0.29		0.02	
SW-3	31-Jul-03	Maxim			2.83		0.001	<	0.0005				1.04		5.38		0.005		0.78		0.14	JF%
SW-3	14-Aug-03	Maxim			3.1		0.001	<	0.0005				1.15		6.13		0.01		1.31		0.13	
SW-3	21-Aug-03	Maxim			3				0.0009				1.06		10.9		0.009		1.5		0.14	
SW-3	22-Aug-03	Maxim			3.1				0.0009				0.94		8.58		0.013		1.48		0.19	
SW-3	30-Sep-03	Maxim	0.258	3.5	2.86				0.0008				0.8		10.5		0.009		1.74		0.21	
SW-3	05-Apr-04	Maxim	0.136	3.6	2.2				0.0008				0.7		2.34		0.004		0.9		0.18	JF%
SW-3	28-Jun-04	Maxim	9.32	4.2	2.27				0.0002				0.37		3.84		0.005		0.18		0.05	
SW-3	05-Oct-04	Maxim	0.35	4.1	1.52				0.0005				0.6		0.87		0.002		0.29		0.08	
Station SW-3: Pre-1999 Samples (n)			45	40	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			4.818	3.565	2.529		0.0021		0.00076		0.0078		0.677		4.485		0.005		0.685		0.103	
Standard Deviation (SD)			4.991	0.315	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)			14.800	2.935	4.611		0.0043		0.00207		0.0179		1.258		9.377		0.009		1.700		0.229	
Station SW-3: 1989-2004 Samples (n)			74	74	64		23		55		18		80		70		55		61		80	
Minimum			0.050	2.400	0.050		0.001		0.000		0.001		0.030		0.015		0.001		0.110		0.010	
Maximum			17.890	4.200	4.800		0.005		0.006		0.020		1.530		22.000		0.013		1.740		0.710	
Mean			4.002	3.588	2.561		0.002		0.001		0.008		0.693		5.288		0.005		0.807		0.121	
Standard Deviation (SD)			4.414	0.310	0.864		0.001		0.001		0.005		0.248		3.338		0.003		0.518		0.097	
Mean + (2 x SD); for pH: Mean - (2 x SD)			12.830	2.968	4.289		0.004		0.002		0.018		1.188		11.964		0.011		1.843		0.315	
Station SW-3: 1999-2004 Samples (n)			29	34	30		4		29		0		40		30		30		30		40	
Minimum			0.050	2.900	1.500		0.001		0.000		0.000		0.370		0.870		0.002		0.162		0.010	
Maximum			9.320	4.200	3.900		0.002		0.006		0.000		1.150		22.000		0.013		1.740		0.710	
Mean			2.736	3.615	2.597		0.001		0.001				0.708		6.358		0.006		0.932		0.138	
Standard Deviation (SD)			2.987	0.307	0.622		0.001		0.001				0.198		4.048		0.003		0.508		0.120	
Mean + (2 x SD); for pH: Mean - (2 x SD)			8.710	3.001	3.841		0.002		0.003				1.104		14.455		0.012		1.948		0.379	
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 1989-2004

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
SW-4	08/02/89	Hydrometrics Data			0.1	<	0.005	<	0.001	<			0.03		0.03	<	0.01	<	0.11		0.01	
SW-4	09/15/89	Hydrometrics Data	1.35	6.4	0.2		0.005	<	0.001	<			0.09		0.09		0.01	<	0.07		0.07	
SW-4	10/20/89	Hydrometrics Data	1.19	6.6	0.1		0.005	<	0.001	<			0.07		0.04		0.01	<	0.06		0.05	
SW-4	03/17/90	Hydrometrics Data		6.5	0.1	<	0.005	<	0.001	<			0.04		0.03	<	0.01	<	0.02	<	0.07	
SW-4	05/29/90	Hydrometrics Data	15.4	6.9	0.8		0.005	<	0.0001	<	0.02	<	0.116		0.71		0.002	<	0.05		0.03	
SW-4	06/05/90	Hydrometrics Data	27.84	6.3	0.3								0.08		0.42						0.02	
SW-4	06/13/90	Hydrometrics Data	30.73	6.7	0.2								0.06		0.21						0.02	
SW-4	06/15/90	Hydrometrics Data	21.9																			
SW-4	06/20/90	Hydrometrics Data	47.46	6.9	0.3				0.001	<	0.02	<	0.08		0.39		0.01	<	0.04		0.41	
SW-4	06/22/90	Hydrometrics Data	88.8																			
SW-4	06/26/90	Hydrometrics Data	112.4	6.4	0.5		0.005	<	0.0002		0.02	<	0.087		1.02		0.002	<	0.05		0.02	
SW-4	06/28/90	Hydrometrics Data	100.37																			
SW-4	07/03/90	Hydrometrics Data	83.9	6.5	0.4				0.002		0.02	<	0.08		0.65		0.01		0.04		0.02	
SW-4	07/05/90	Hydrometrics Data	49.4																			
SW-4	07/05/90	Hydrometrics Data		6.6																		
SW-4	07/06/90	Hydrometrics Data		6.7																		
SW-4	07/07/90	Hydrometrics Data		7																		
SW-4	07/08/90	Hydrometrics Data		7																		
SW-4	07/10/90	Hydrometrics Data	30.6	6.6	0.3				0.001	<	0.02	<	0.09		0.43		0.01	<	0.05		0.03	
SW-4	07/10/90	Hydrometrics Data		6.8																		
SW-4	07/11/90	Hydrometrics Data		6.5																		
SW-4	07/12/90	Hydrometrics Data	25	6.8																		
SW-4	07/12/90	Hydrometrics Data		6.5																		
SW-4	07/13/90	Hydrometrics Data		6.5																		
SW-4	07/14/90	Hydrometrics Data		6.5																		
SW-4	07/15/90	Hydrometrics Data		6.4																		
SW-4	07/16/90	Hydrometrics Data		6.5																		
SW-4	07/17/90	Hydrometrics Data	14.4	6.5	0.4								0.14		0.49						0.03	
SW-4	07/17/90	Hydrometrics Data		6.4																		
SW-4	07/18/90	Hydrometrics Data		6.4																		
SW-4	07/19/90	Hydrometrics Data	11.7	6.3																		
SW-4	07/19/90	Hydrometrics Data		6.4																		
SW-4	07/20/90	Hydrometrics Data		6.7																		
SW-4	07/21/90	Hydrometrics Data		6.4																		
SW-4	07/22/90	Hydrometrics Data		6.6																		
SW-4	07/23/90	Hydrometrics Data		6.7																		
SW-4	07/24/90	Hydrometrics Data		6.6																		
SW-4	07/25/90	Hydrometrics Data		6.7																		
SW-4	07/26/90	Hydrometrics Data		6.7																		
SW-4	07/27/90	Hydrometrics Data	7.1	6.7	0.3		0.005	<	0.0004		0.02	<	0.16		0.44		0.002	<	0.1		1.95	J
SW-4	07/27/90	Hydrometrics Data		6.8																		
SW-4	08/14/90	Hydrometrics Data	2.6																			
SW-4	08/15/90	Hydrometrics Data	3.1																			
SW-4	08/23/90	Hydrometrics Data	3.2	6.4																		
SW-4	09/25/90	Hydrometrics Data	1.5	6.5	0.3		0.005	<	0.0003		0.02	<	0.11		0.21		0.002	<	0.13		0.05	
SW-4	03/15/91	Hydrometrics Data	0.8	6.4	0.1	<	0.005	<	0.001		0.02	<	0.06		0.03	<	0.01	<	0.02	<	0.07	
SW-4	06/05/91	Hydrometrics Data	55.3	6.9	0.2	<	0.001	<	0.0001	<	0.02	<	0.05	<	0.67	<	0.002	<	0.03	<	0.01	<
SW-4	07/09/91	Hydrometrics Data	21	6.7	0.1	<	0.005	<	0.0002		0.02		0.1		0.38		0	J	0.05		0.03	
SW-4	08/14/91	Hydrometrics Data	1.7	6.3	0.4		0.005	<	0.0002		0.02	<	0.15		0.21		0.002	<	0.12		0.07	
SW-4	09/24/91	Hydrometrics Data	1.1	6.5	0.3		0.005	<	0.0006		0.02	<	0.11		0.24		0.002	<	0.08		0.04	
SW-4	05/27/92	Hydrometrics Data	77.78	7.4	0.2		0.005	<	0.0001	<	0.01	<	0.051		0.31		0.002	<	0.03		0.02	
SW-4	07/19/92	Hydrometrics Data	15	7.3	3.4	<	0.005	<	0.0002		0.01	<	0.29		7.1	<	0.002	<	0.16		0.15	<
SW-4	07/22/92	Hydrometrics Data		6.8																		
SW-4	08/20/92	Hydrometrics Data		6.6																		

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NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2004

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
SW-4	09/23/92	Hydrometrics Data	1.95	6.8	0.3		0.005	<	0.0004		0.01	<	0.117		0.17		0.002	<	0.13		0.05	
SW-4	07/21/93	Hydrometrics Data	19.92	7.1	0.3		0.001	<	0.0001		0.001	<	0.146		0.65		0.002	<	0.09		0.04	J
SW-4	09/21/93	Hydrometrics Data	1.98	6.9	0.2		0.001	<	0.0002		0.001	<	0.1		0.32		0.002	<	0.16		0.038	
SW-4	09/21/93	Hydrometrics Data	1.98	7.1	0.2		0.001	<	0.0002		0.001	<	0.1		0.33		0.002	<	0.16		0.042	
SW-4	03/02/94	Hydrometrics Data	0.4	6.7	0.1	<	0.001	<	0.0005		0.001	<	0.06		0.03	<	0.002	<	0.01	<	0.07	
SW-4	05/26/94	Hydrometrics Data	75.23		0.8		0.001		0.0001		0.001	<	0.11		2.25		0.003		0.06		0.018	
SW-4	06/15/94	Hydrometrics Data	33.79	6.7	0.5		0.001	<	0.0001		0.001	<	0.07	J	0.55		0.002	<	0.05		0.021	J
SW-4	07/14/95	Hydrometrics Data	43.74	6.1	0.5		0.001	<	0.0001		0.002		0.118	J	0.8	J	0.002	<	0.07		0.026	<
SW-4	09/27/95	Hydrometrics Data	1.34	5.9	0.2		0.001	<	0.0003		0.001	<	0.173		0.09		0.002	<	0.12		0.08	<
SW-4	05/21/96	Hydrometrics Data		6	0.2				0.0001				0.063		0.18		0.003	<	0.03		0.05	<
SW-4	05/29/96	Hydrometrics Data		7	0.4				0.0001	<			0.086		0.44		0.003	<	0.05		0.05	<
SW-4	06/05/96	Hydrometrics Data		5.7	1.1				0.0001				0.139		3.17		0.005		0.067		0.03	<
SW-4	06/12/96	Hydrometrics Data	33.7	6									0.055		0.62	J					0.05	J
SW-4	06/19/96	Hydrometrics Data	72.157	6.6	0.2				0.0001				0.066		0.35		0.003	<	0.031		0.01	<
SW-4	06/26/96	Hydrometrics Data		8.1									0.066		1.14						0.02	
SW-4	07/02/96	Hydrometrics Data		7.7									0.11		2.17						0.08	J
SW-4	07/11/96	Hydrometrics Data	54.84	5.1	0.2	J			0.0001	<			0.07		0.49	<	0.003	<	0.033		0.02	
SW-4	07/18/96	Hydrometrics Data	26.42	6.3									0.105		0.34						0.03	<
SW-4	07/25/96	Hydrometrics Data	19.92	7.8									0.129		0.4						0.03	
SW-4	08/21/96	Hydrometrics Data	4.315	6.3									0.17		0.31						0.05	
SW-4	09/11/96	Hydrometrics Data	1.46	5.6	0.4				0.0003	J			0.154		0.17		0.003	<	0.15		0.06	
SW-4	03/27/98	UOS Data	0.69	7																		
SW-4	04/22/98	UOS Data	0.578	6.5																		
SW-4	05/05/98	UOS Data		6.9																		
SW-4	05/13/98	UOS Data	4.783	6.9																		
SW-4	05/06/99	Maxim	0.42	6.7	0.1	<			0.0004				0.06		0.03		0.001	<	0.021		0.05	
SW-4	07/09/99	Maxim	45.706	7.1	0.3				0.0001				0.08		0.29		0.001	<	0.027		0.03	
SW-4	07/09/99	Maxim		7.1	0.3				0.0001				0.07		0.24		0.001	<	0.028		0.02	
SW-4	09/30/99	Maxim	1.46	7.1	0.1	<			0.0003				0.07		0.03		0.001	<	0.072		0.06	J
SW-4	09/30/99	Maxim		6.9	0.1	<			0.0003				0.08		0.03		0.001	<	0.078		0.11	J
SW-4	04/13/00	Maxim	0.837	6.7	0.05	<			0.0004				0.064		0.05	<	0.001	<	0.014		0.02	<
SW-4	07/08/00	Maxim	15.48	7	0.3	J			0.0001	<			0.12	J	0.38	J	0.001	<	0.064	J	0.03	J
SW-4	10/19/00	Maxim	1.39	6.2	0.1	<			0.0001	<			0.057		0.07	J	0.001	<	0.058		0.04	
SW-4	10/19/00	Maxim		6	0.1	<			0.0001	<			0.067		0.09		0.001	<	0.065		0.04	
SW-4	04/21/01	Maxim	0.62	7	0.1	<			0.0003				0.038		0.03		0.001	<	0.008		0.08	
SW-4	06/26/01	Maxim	23.84	7.3	0.3				0.0002				0.089		0.43		0.001	J	0.048		0.02	
SW-4	10/11/01	Maxim	0.61	6.7	0.2		0.003	<	0.0003				0.058		0.11		0.001	<	0.009		0.09	
SW-4	04/26/02	Maxim		6.7	0.1	<			0.0003				0.03		0.01	<	0.001	<	0.006		0.04	
SW-4	07/01/02	Maxim	47	7.1	0.3	J			0.0001	<			0.1		0.5		0.001	<	0.051		0.02	J
SW-4	10/08/02	Maxim	1.91	7.2	0.1				0.0004				0.085		0.13		0.001	<	0.088		0.07	J
SW-4	23-Apr-03	Maxim		6.3	0.05	<			0.0003				0.049		0.1		0.001	<	0.013		0.08	
SW-4	01-Jul-03	Maxim	40.8	7.4	0.25				0.0001	<			0.07		0.29		0.001	<	0.044		0.01	<
SW-4	30-Sep-03	Maxim	0.903	6.5	0.05	<			0.0002				0.079		0.02		0.001	<	0.055		0.13	
SW-4	05-Apr-04	Maxim	0.784	7	0.05	<			0.0002				0.04		0.02		0.001	<	0.005		0.1	JF%
SW-4	28-Jun-04	Maxim	70.91	7.4	0.8				0.0001	<			0.11		1.48		0.003		0.045		0.05	
SW-4	05-Oct-04	Maxim	3.21	7.4	0.12				0.0002				0.05		0.06		0.001	<	0.029		0.02	

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NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2004

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
Station SW-4: Pre-1999 Samples (n)			47	71	36		24		33		23		42		42		33		33		42	
Minimum			0.400	5.100	0.050		0.001		0.000		0.001		0.025		0.015		0.000		0.005		0.005	
Maximum			112.400	8.100	1.700		0.003		0.002		0.020		0.290		3.550		0.010		0.160		1.950	
Mean			26.634	6.621	0.349		0.002		0.000		0.007		0.101		0.592		0.002		0.072		0.091	
Standard Deviation (SD)			30.503	0.454	0.324		0.001		0.000		0.005		0.048		0.785		0.002		0.047		0.300	
Mean + (2 x SD); for pH: Mean - (2 x SD)			87.641	5.713	0.996		0.0037		0.00107		0.0170		0.196		2.162		0.007		0.166		0.691	
Station SW-4: 1989-2004 Samples (n)			63	92	57		25		54		23		63		63		54		54		63	
Minimum			0.400	5.100	0.025		0.001		0.000		0.001		0.025		0.005		0.000		0.005		0.005	
Maximum			112.400	8.100	1.700		0.003		0.002		0.020		0.290		3.550		0.010		0.160		1.950	
Mean			23.932	6.684	0.280		0.002		0.000		0.007		0.090		0.464		0.002		0.059		0.078	
Standard Deviation (SD)			28.927	0.455	0.293		0.001		0.000		0.005		0.044		0.690		0.002		0.043		0.246	
Mean + (2 x SD); for pH: Mean - (2 x SD)			81.786	5.775	0.866		0.004		0.001		0.017		0.178		1.843		0.006		0.145		0.569	
Station SW-4: 1999-2004 Samples (n)			16	21	21		1		21		0		21		21		21		21		21	
Minimum			0.420	6.000	0.025		0.002		0.000		0.000		0.030		0.005		0.001		0.005		0.005	
Maximum			70.910	7.400	0.800		0.002		0.000		0.000		0.120		1.480		0.003		0.088		0.130	
Mean			15.993	6.895	0.163		0.002		0.000				0.070		0.208		0.001		0.039		0.052	
Standard Deviation (SD)			22.698	0.398	0.184				0.000				0.023		0.328		0.001		0.026		0.035	
Mean + (2 x SD); for pH: Mean - (2 x SD)			61.388	6.099	0.532				0.000				0.116		0.864		0.002		0.091		0.122	
Narrative Standard - SW-4				5.24	0.74		NA		0.001		NA		0.172		1.726		0.005		0.79		0.66	

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New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
SW-6	10/02/89	Hydrometrics Data	4	6.7			0.0050	<	0.00100	<			0.01	<	0.03	<			0.02	<	0.01	
SW-6	10/20/89	Hydrometrics Data	4.52	7.2	0.1	<	0.0050	<	0.00100	<			0.01	<	0.03	<	0.01	<	0.02	<	0.01	
SW-6	05/29/90	Hydrometrics Data	102.1	7.2	0.2		0.0050	<	0.00010	<	0.0200	<	0.035		0.23		0.002	<	0.02		0.02	
SW-6	06/06/90	Hydrometrics Data	123.2	6.5	0.1				0.00200		0.0200	<	0.02		0.13		0.01		0.02	<	0.01	
SW-6	06/07/90	Hydrometrics Data	138.6																			
SW-6	06/13/90	Hydrometrics Data	116.97	6.7	0.1	<			0.08000		0.0200	<	0.01	<	0.06		0.01	<	0.02	<	0.01	
SW-6	06/14/90	Hydrometrics Data	86																			
SW-6	06/20/90	Hydrometrics Data	167.97	7.1	0.2				0.00100		0.0200	<	0.03		0.26		0.01	<	0.02		0.15	
SW-6	06/22/90	Hydrometrics Data	273.3																			
SW-6	06/26/90	Hydrometrics Data	251.5	6.6	0.2		0.0050	<	0.00010	<	0.0200	<	0.037		0.4		0.002	<	0.02		0.02	
SW-6	06/29/90	Hydrometrics Data	218.48																			
SW-6	07/02/90	Hydrometrics Data	210.6	7	0.2				0.00100	<	0.0200	<	0.039		0.35		0.01	<	0.02		0.04	
SW-6	07/04/90	Hydrometrics Data	165.4																			
SW-6	07/09/90	Hydrometrics Data	89.9	7.3	0.1				0.00100	<	0.0200	<	0.03		0.14		0.01	<	0.02	<	0.02	
SW-6	07/11/90	Hydrometrics Data	72	6.8																		
SW-6	07/17/90	Hydrometrics Data	35.4	7.4	0.2								0.07		0.3						0.03	<
SW-6	07/19/90	Hydrometrics Data	26.4	6.8																		
SW-6	07/27/90	Hydrometrics Data	18.9	7.3	0.1	<	0.0050	<	0.00010	<	0.0200	<	0.03		0.1		0.002	<	0.02	<	0.03	<
SW-6	08/23/90	Hydrometrics Data	10.1	6.6																		
SW-6	09/25/90	Hydrometrics Data	3.3	6.9	0.1	<	0.0050	<	0.00010	<	0.0200	<	0.007		0.03	<	0.002	<	0.02	<	0.04	
SW-6	03/15/91	Hydrometrics Data	1	6.8	0.1	<	0.0050	<	0.00100	<	0.0200	<	0.01	<	0.06		0.01	<	0.02	<	0.02	
SW-6	06/05/91	Hydrometrics Data	201.7	7	0.2		0.0010	<	0.00010	<	0.0200	<	0.017	<	0.18		0.002	<	0.02	<	0.01	<
SW-6	07/09/91	Hydrometrics Data	51.2	7.1	0.1		0.0050	<	0.00010		0.0200	<	0.033		0.14		0	J	0.02	<	0.03	
SW-6	08/14/91	Hydrometrics Data	3.9	7.3	0.1	<	0.0050	<	0.00010	<	0.0200	<	0.011		0.06		0.002	<	0.02	<	0.02	
SW-6	09/24/91	Hydrometrics Data	2.5	7	0.1	<	0.0050	<	0.00010	<	0.0200	<	0.013	<	0.03	<	0.002	<	0.02	<	0.01	<
SW-6	07/19/92	Hydrometrics Data	30.67	7.4	1.6		0.0050	<	0.00010	<	0.0100	<	0.11		2.88		0.002	<	0.05		0.13	
SW-6	09/23/92	Hydrometrics Data	3.54	7.4	0.1	<	0.0050	<	0.00010		0.0100	<	0.016		0.2		0.002	<	0.02		0.05	
SW-6	07/21/93	Hydrometrics Data	38.11	7.1	0.2		0.0010	<	0.00010		0.0010	<	0.062		0.24		0.002	<	0.03		0.01	J
SW-6	09/22/93	Hydrometrics Data	4.2	7.4	0.1	<	0.0010	<	0.00010		0.0010	<	0.019		0.03		0.002	<	0.03		0.018	<
SW-6	04/14/94	Hydrometrics Data	19.2	8.1			0.0010	<	0.00010	<			0.001	<								
SW-6	06/15/94	Hydrometrics Data	87.64	7	0.1		0.0010	<	0.00010	<	0.0010	<	0.016	J	0.11		0.002	<	0.01		0.005	J
SW-6	05/21/96	Hydrometrics Data	45.62	4.6	0.1				0.00010	<			0.021		0.15		0.003	<	0.012		0.04	<
SW-6	07/10/96	Hydrometrics Data	149.2	5.9	0.1	<			0.00010				0.024		0.01		0.003	<	0.013		0.01	<
SW-6	09/11/96	Hydrometrics Data	2.91	6.1	0.1	<			0.00010	<			0.011		0.02		0.003	<	0.007		0.01	<
SW-6	05/06/99	Maxim	13.65	7.3	0.1				0.00010	<			0.01		0.13		0.001	<	0.008		0.01	<
SW-6	07/07/99	Maxim	148.39	7.6	0.2				0.00010	<			0.034		0.27		0.001	<	0.014		0.02	
SW-6	09/29/99	Maxim	3.727	7	0.1	<			0.00010	<			0.016		0.06		0.001	<	0.007		0.02	J
SW-6	04/13/00	Maxim	2.55	6.9	0.05	<			0.00010	<			0.004		0.05	<	0.001	<	0.005	<	0.02	<
SW-6	07/08/00	Maxim	36.08	6.8	0.1	J			0.00010	<			0.032	J	0.14	J	0.001	<	0.018	J	0.01	J
SW-6	10/19/00	Maxim	3.34	7.1	0.1	<			0.00010	<			0.005		0.05	<	0.001	<	0.003	<	0.01	<
SW-6	04/21/01	Maxim	2.67	7.6	0.1	<			0.00010	<			0.004		0.02		0.001	<	0.003	<	0.01	<
SW-6	06/26/01	Maxim	60.42	7.6	0.1	<			0.00010	<			0.027		0.12		0.001	<	0.008		0.01	<
SW-6	10/11/01	Maxim	1.17	7	0.1	<	0.0030	<	0.00010	<			0.004		0.1		0.001	<	0.008		0.03	J
SW-6	04/23/02	Maxim	0.64	7.8	0.1	<			0.0001	<			0.004		0.06		0.001	<	0.003		0.01	<
SW-6	07/01/02	Maxim	110	7.6	0.1	J			0.0002				0.032		0.14		0.001		0.008		0.01	J
SW-6	10/08/02	Maxim	3.36	7.4	0.1	<			0.0001				0.014		0.01		0.001	<	0.006		0.05	J
SW-6	22-Apr-03	Maxim	4.13	7.2	0.05	<			0.0001	<			0.005		0.12		0.001	<	0.007		0.01	<
SW-6	01-Jul-03	Maxim	120.5	7.6	0.12				0.0001	<			0.021		0.12		0.001		0.014		0.01	<
SW-6	30-Sep-03	Maxim	1.21	7.2	0.05	<			0.0001	<			0.003		0.01	<	0.001	<	0.02		0.03	
SW-6	06-Apr-04	Maxim	7.119	7.5	0.05	<			0.0001	<			0.014		0.04		0.001	<	0.005	<	0.05	JF%
SW-6	28-Jun-04	Maxim	107.21	7.7	0.06				0.0001	<			0.025		0.18		0.001	<	0.008		0.03	
SW-6	05-Oct-04	Maxim	24.85	7.4	0.09				0.0001	<			0.007	B	0.02		0.001	<	0.003	<	0.01	

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NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2004

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
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: 1989-2004 Samples (n)			52	47	42		18		43		19		44		43		41		42		43	
Minimum			0.640	4.600	0.025		0.001		0.000		0.001		0.001		0.005		0.000		0.002		0.005	
Maximum			273.300	8.100	1.600		0.003		0.080		0.010		0.110		2.880		0.010		0.050		0.150	
Mean			65.597	7.077	0.125		0.002		0.002		0.008		0.021		0.179		0.002		0.012		0.023	
Standard Deviation (SD)			75.098	0.558	0.241		0.001		0.012		0.004		0.021		0.433		0.002		0.009		0.029	
Mean + (2 x SD); for pH: Mean - (2 x SD)			215.792	5.960	0.607		0.0037		0.0284		0.0153		0.062		1.045		0.006		0.030		0.082	
Station SW-6: 1999-2004 Samples (n)			18	18	18		1		18		0		18		18		18		18		18	
Minimum			0.640	6.800	0.025		0.002		0.000		0.000		0.003		0.005		0.001		0.002		0.005	
Maximum			148.390	7.800	0.200		0.002		0.000		0.000		0.034		0.270		0.001		0.020		0.050	
Mean			36.168	7.350	0.068		0.002		0.000				0.015		0.088		0.001		0.008		0.017	
Standard Deviation (SD)			49.980	0.300	0.044				0.000				0.011		0.071		0.000		0.006		0.015	
Mean + (2 x SD); for pH: Mean - (2 x SD)			136.127	6.751	0.156				0.00013				0.037		0.230		0.001		0.019		0.047	
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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TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2004
New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
DC-2	10/03/89	Hydrometrics Data	0.2	2.9			0.0050	<	0.00100	<			7.89		28.26				3.37		1.03	
DC-2	07/12/90	Hydrometrics Data	4.39	3.6	7.2		0.0050	<	0.00500				2.74		17.9				0.71		0.31	
DC-2	06/15/94	Hydrometrics Data	2.86	3.7	9		0.0010	<	0.00210		0.0040		2.64	J	10.4		0.003		1.08		0.332	J
DC-2	07/26/94	Hydrometrics Data		3.6	16.4		0.0010	<	0.00540		0.0050		5.32		15.8		0.009		2.57		0.667	
DC-2	08/22/94	Hydrometrics Data		3.1	28.6		0.0020		0.00760		0.0100		8.26		41.8		0.024		3.65		0.904	
DC-2	08/23/94	Hydrometrics Data		3.4	23.9		0.0010	<	0.00740		0.0060		7.27		20.4		0.006		3.43		0.886	
DC-2	09/20/94	Hydrometrics Data			25		0.0010	<	0.00760		0.0070		7.44		23.6		0.004		3.59		1.2	J
DC-2	10/13/94	Hydrometrics Data																				
DC-2	09/26/95	Hydrometrics Data	0.194	3.3	22		0.0010	<	0.00520		0.0060		6.33		16.2		0.005		2.99		0.894	
DC-2	05/21/96	Hydrometrics Data	0.467	4	8.3				0.00270				1.91		5.55		0.004		1.12		0.43	
DC-2	05/30/96	Hydrometrics Data	1.116	4	6.9				0.00190				1.62		5.52		0.004		0.785		0.31	
DC-2	06/05/96	Hydrometrics Data	2.79	3.3	7				0.00140				1.83		19.3		0.008		0.629		0.24	
DC-2	06/12/96	Hydrometrics Data	10.8	4.1									1.25		10.7	J					0.21	J
DC-2	06/18/96	Hydrometrics Data	14.33	4.5	5				0.00120				1.44		9.69		0.003	<	0.481		0.19	
DC-2	06/26/96	Hydrometrics Data	11.3	4.5									1.52		8.54						0.19	
DC-2	07/02/96	Hydrometrics Data	13.79	5									1.38		6.76						0.24	J
DC-2	07/09/96	Hydrometrics Data	15.48	4.4	4.2	J			0.00080				1.11		8.05		0.01		0.379		0.15	
DC-2	07/18/96	Hydrometrics Data	4.937	3.9									2.23		8						0.33	
DC-2	07/25/96	Hydrometrics Data	1.175	4.1									2.7		9.84						0.39	
DC-2	08/21/96	Hydrometrics Data	0.138	3.3									4.74		15.4						0.64	
DC-2	09/10/96	Hydrometrics Data	0.18	3.1	20.2				0.00580				6.22		15.6		0.006		2.72		0.89	
DC-2	07/09/97	UOS Data			3.27		0.0100	<	0.00500	<	0.0100	<	0.876		5.32				0.304		0.129	
DC-2	03/30/98	UOS Data	0.13	4.2	12.3								2.69		12.8				2.14		0.688	
DC-2	04/22/98	UOS Data	0.072	4.3	12.1								2.66		11.2				1.95		0.589	
DC-2	05/04/98	UOS Data	0.699	4	5.4								1.23		6.43				0.574		0.162	
DC-2	05/29/98	UOS Data	2.67	3.6	5.34								1.47		10				0.592		0.22	
DC-2	05/06/99	Maxim	0.028	4.5	9.2				0.00380				1.94		16		0.006		1.61		0.51	
DC-2	07/08/99	Maxim	9.46	5.2	3.7				0.00120				1.07		4.83		0.002		0.37		0.15	
DC-2	09/29/99	Maxim	0.464	3.8	12.4				0.00440				3.98		13.6		0.002		1.93		0.6	J
DC-2	04/12/00	Maxim	0.012	4.5	10.7				0.00560				2.51		13.5		0.004		2.02		0.02	<
DC-2	05/20/00	Maxim	1.57	4									1.42								0.19	
DC-2	05/20/00	Maxim	1.57	3.9									1.44								0.19	
DC-2	05/20/00	Maxim	1.61	4									1.89								0.26	
DC-2	05/20/00	Maxim	2.61	3.9	5.5				0.00110				1.34		14.4		0.007		0.6		0.17	
DC-2	06/14/00	Maxim	5.16	4.4									1.59								0.24	
DC-2	06/14/00	Maxim	6.07	4.4									1.64								0.24	
DC-2	06/14/00	Maxim	6.44	4.3									1.61								0.22	
DC-2	06/14/00	Maxim	7.66	4.2	4.7				0.00140				1.43		8.26		0.002		0.5		0.2	
DC-2	07/09/00	Maxim	3.5	4.8									1.59	J							0.23	J
DC-2	07/09/00	Maxim	2.4	4.7	6.1	J			0.00190				2.01	J	8.55	J	0.003		0.72	J	0.26	J
DC-2	07/09/00	Maxim	2.83	4.6									2.04	J							0.28	J
DC-2	07/09/00	Maxim	3.35	4.8									1.75	J							0.26	J
DC-2	10/09/00	Maxim	0.2	4.1	14				0.00450				3.77		6.54	J	0.007		2.23		0.54	
DC-2	04/20/01	Maxim	0.15	4.3	11.1				0.00370				2.2		10.8		0.004		1.66		0.37	
DC-2	06/29/01	Maxim	3.217	5	5.5				0.00170				1.34		10.3		0.022	J	0.63		0.29	
DC-2	10/10/01	Maxim	0.17	4	17.1		0.0030	<	0.00540				4.15		14.5		0.007		2.62		0.79	
DC-2	04/25/02	Maxim	0.31	4.6	10.8				0.0038				2.2		12.1		0.003		1.91		0.6	
DC-2	07/02/02	Maxim	5	4.8	6.2	J			0.0016				1.59		8.1		0.002		0.57		0.25	J
DC-2	09/18/02	Maxim		3.4	17.6				0.0047				4.13		15.5		0.006		2.31		0.64	
DC-2	09/26/02	Maxim		3.8	14.3				0.0053				4.65		10.1		0.005		2.21		0.64	
DC-2	10/09/02	Maxim	0.381	4	13.7				0.0038				2.92		11.8		0.01		1.91		0.54	J
DC-2	22-Apr-03	Maxim	0.19	4.5	7.85				0.0038				2.14		8.79		0.005		1.62		0.45	
DC-2	11-Jul-03	Maxim	2.36	4.8	6.17				0.0019				1.92		4.86		0.003		0.88		0.25	
DC-2	31-Jul-03	Maxim			13.1		0.001	<	0.0032				3.57		12.2		0.005		1.83		0.57	JF%

Notes: *mg/l = milligrams/liter; su = standard units*
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TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2004

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
DC-2	14-Aug-03	Maxim			15.9		0.001	<	0.0044				4.46		14.4		0.007		2.25		0.63	
DC-2	21-Aug-03	Maxim			15.3				0.0048				4.37		13.3		0.007		2.29		0.65	
DC-2	22-Aug-03	Maxim			19.2				0.0051				4.35		21.4		0.008		2.81		0.87	
DC-2	08-Sep-03	Maxim		3.5	18.5				0.0046				5.03		19.4		0.013		2.8		0.81	
DC-2	29-Sep-03	Maxim	0.066	4.5	12.5				0.0043				3.63		8.69		0.005		2.5		0.76	
DC-2	06-Apr-04	Maxim	0.181	4.4	10.1				0.0036				2.15		5.94		0.005		1.67		0.5	JF%
DC-2	29-Jun-04	Maxim	9.56	7.7	2.97				0.0007				0.58		4.16		0.003		0.31		0.1	
DC-2	11-Aug-04	Maxim	0.36	4.5	9.38				0.0032				2.79		11.1		0.004		1.44		0.45	
DC-2	06-Oct-04	Maxim	0.53	4.8	6.58				0.0024				1.9		7.36		0.002		1.25		0.35	
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: 1989-2004 Samples (n)			50	56	46		12		43		7		62		53		40		47		62	
Minimum			0.012	2.900	2.970		0.001		0.001		0.004		0.580		4.160		0.002		0.304		0.010	
Maximum			15.480	7.700	28.600		0.005		0.008		0.010		8.260		41.800		0.024		3.650		1.200	
Mean			3.303	4.189	11.353		0.001		0.004		0.006		2.869		12.331		0.006		1.671		0.440	
Standard Deviation (SD)			4.146	0.717	6.281		0.001		0.002		0.002		1.850		6.600		0.005		0.985		0.268	
Mean + (2 x SD); for pH: Mean - (2 x SD)			11.595	2.756	23.915		0.0042		0.0074		0.0100		6.569		25.531		0.015		3.641		0.977	
Station DC-2: 1999-2004 Samples (n)			30	33	28		3		28		0		37		28		28		28		37	
Minimum			0.012	3.400	2.970		0.001		0.001		0.000		0.580		4.160		0.002		0.310		0.010	
Maximum			9.560	7.700	19.200		0.002		0.006		0.000		5.030		21.400		0.022		2.810		0.870	
Mean			2.580	4.445	10.720		0.001		0.003				2.516		11.089		0.006		1.623		0.407	
Standard Deviation (SD)			2.867	0.722	4.734		0.001		0.001				1.206		4.284		0.004		0.777		0.224	
Mean + (2 x SD); for pH: Mean - (2 x SD)			8.313	3.002	20.187		0.002		0.00636				4.928		19.656		0.014		3.176		0.855	
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; su = standard units
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NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2004

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
DC-5	10/03/89	Hydrometrics Data	0.370	5.2			0.0050	<	0.00300				2.54		6.88				1.16		0.4	
DC-5	07/12/90	Hydrometrics Data	8.910	7.2	2.7		0.0050	<	0.00100	<			0.97		4.3				0.28		0.12	
DC-5	07/28/93	Hydrometrics Data		7.2	3.2		0.0020	<	0.00100	<	0.0020		1.09		4.19		0.002		0.35		0.12	
DC-5	09/23/93	Hydrometrics Data	0.540	5.8	5.3		0.0010	<	0.00230		0.0020		2.17		4.68		0.002		1.2		0.36	
DC-5	08/25/94	Hydrometrics Data	0.240	5.6	8.1	J	0.0010	<	0.00270		0.0020		2.85	J	5.7	J	0.002		1.23		0.42	
DC-5	07/13/95	Hydrometrics Data	30.430	6.5	2		0.0010	<	0.00050		0.0020		0.485	J	3.8	J	0.003		0.18		0.062	
DC-5	09/27/95	Hydrometrics Data	0.420	5.4	7.7		0.0010	<	0.00230		0.0020		2.45		2.38		0.003		1.18		0.391	
DC-5	06/18/96	Hydrometrics Data	30.740	5.8	1.4				0.00040				0.346		3.12		0.003	<	0.143		0.06	
DC-5	07/09/96	Hydrometrics Data	28.140	5.8	1.7	J			0.00040				0.46		2.48		0.003	<	0.166		0.07	
DC-5	09/10/96	Hydrometrics Data	0.312	5.4	7.2				0.00230				2.62		4.42		0.003	<	1.08		0.37	
DC-5	05/06/99	Maxim	1.180	7.6	1.4				0.00060				0.33		0.65		0.001		0.25		0.08	
DC-5	07/08/99	Maxim	23.830	7.7	1.2				0.00040				0.31		1.54		0.001		0.124		0.07	
DC-5	09/29/99	Maxim	1.484	7.5	4				0.00120				1.26		2.67		0.002		0.5		0.17	J
DC-5	04/12/00	Maxim	0.429	7.6	2.9				0.00140				1.04		1.38		0.004		0.041		0.02	<
DC-5	07/09/00	Maxim	8.900	7.2	1.6	J			0.00050				0.54	J	2.11	J	0.001	<	0.19	J	0.07	J
DC-5	07/09/00	Maxim		7	2.2				0.00040				0.71		2.86		0.001	<	0.26		0.1	
DC-5	10/09/00	Maxim	1.200	7.5	2.7				0.00460				0.61		1.3	J	0.003	<	0.23		0.08	
DC-5	06/29/01	Maxim	5.107	7.7	1.8				0.00060				0.55		3.02		0.002	J	0.21		0.09	
DC-5	10/10/01	Maxim	0.340	7.3	3.5		0.0030	<	0.00100				0.71		1.19		0.003		0.41		0.15	
DC-5	04/25/02	Maxim	0.001	7.6	0.1	<			0.0004				0.024		0.01	<	0.001	<	0.16		0.04	
DC-5	07/02/02	Maxim	12.600	7.2	1.6	J			0.0005				0.54		2.48		0.002		0.19		0.08	J
DC-5	09/18/02	Maxim			5.9				0.0021				1.61		3.66		0.003		0.93		0.21	
DC-5	09/26/02	Maxim	0.001	7.8	0.3				0.0004				0.079		0.25		0.001	<	0.086		0.02	
DC-5	10/09/02	Maxim	0.740	6.8	3.7				0.001				0.76		2.07		0.003		0.45		0.15	J
DC-5	21-Apr-03	Maxim	0.570	7.3	2.07				0.0009				0.56		1.3		0.002		0.35		0.13	
DC-5	11-Jul-03	Maxim	5.460	7.4	2.1				0.0006				0.48		1.55		0.001		0.29		0.07	
DC-5	08-Sep-03	Maxim		5.9	7.84				0.0017				2.01		15.7		0.018		1.05		0.38	
DC-5	29-Sep-03	Maxim	0.185	7.1	5.34				0.0012				1.44		3		0.003		0.62		0.3	
DC-5	07-Apr-04	Maxim	1.197	7.4	2.18				0.0007				0.52		1.1		0.001		0.34		0.13	JF%
DC-5	29-Jun-04	Maxim	19.210	7.7	0.73				0.0002				0.16		1.23		0.001		0.1		0.04	
DC-5	11-Aug-04	Maxim	0.820	7.4	3.03				0.0011				0.87		3.69		0.001		0.46		0.15	
DC-5	06-Oct-04	Maxim	1.800	7.7	1.93				0.0007				0.51		2.13		0.001	<	0.33		0.11	
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: 1989-2004 Samples (n)			28	31	31		8		32		5		32		32		30		32		32	
Minimum			0.001	5.200	0.050		0.001		0.000		0.002		0.024		0.005		0.001		0.041		0.010	
Maximum			30.740	7.800	8.100		0.003		0.005		0.002		2.850		15.700		0.018		1.230		0.420	
Mean			6.613	6.913	3.141		0.001		0.001		0.002		0.988		3.026		0.002		0.454		0.156	
Standard Deviation (SD)			10.112	0.835	2.246		0.001		0.001		0.000		0.802		2.790		0.003		0.381		0.126	
Mean + (2 x SD); for pH: Mean - (2 x SD)			26.837	5.243	7.634		0.0030		0.0032		0.0020		2.591		8.606		0.009		1.217		0.408	
Station DC-5: 1999-2004 Samples (n)			19	21	22		1		22		0		22		22		22		22		22	
Minimum			0.001	5.900	0.050		0.002		0.000		0.000		0.024		0.005		0.001		0.041		0.010	
Maximum			23.830	7.800	7.840		0.002		0.005		0.000		2.010		15.700		0.018		1.050		0.380	
Mean			4.477	7.352	2.640		0.002		0.001				0.710		2.495		0.002		0.344		0.120	
Standard Deviation (SD)			6.919	0.423	1.861				0.001				0.497		3.118		0.004		0.255		0.088	
Mean + (2 x SD); for pH: Mean - (2 x SD)			18.314	6.507	6.362				0.00287				1.705		8.730		0.010		0.855		0.295	
Temporary Standard - DC-5				4.6	9.51		NA		0.004		NA		3.53		6.83		NA		1.71		0.54	

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NA - not applicable

TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2004

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
SW-7	05/28/90	Hydrometrics Data	40.30	7.5	0.1		0.0050	<	0.00010	<	0.0200	<	0.03		0.2		0.002	<	0.02	<	0.02	
SW-7	06/05/90	Hydrometrics Data	81.11	7.6	0.4								0.11		0.99						0.02	
SW-7	06/06/90	Hydrometrics Data	115.10																			
SW-7	06/13/90	Hydrometrics Data	69.81	7.4	0.26								0.07		0.61						0.02	
SW-7	06/15/90	Hydrometrics Data	56.30																			
SW-7	06/20/90	Hydrometrics Data	97.51	7.9	0.5								0.14		0.99						0.02	
SW-7	06/22/90	Hydrometrics Data	129.15																			
SW-7	06/27/90	Hydrometrics Data	138.80	7.5	0.6		0.0050	<	0.00020		0.0200	<	0.147		1.02		0.002	<	0.05		0.03	
SW-7	06/28/90	Hydrometrics Data	140.13																			
SW-7	07/03/90	Hydrometrics Data	122.90	7.3	0.4								0.11		0.78				0.05		0.03	
SW-7	07/10/90	Hydrometrics Data	50.20	7.2	0.3				0.00100	<	0.0200	<	0.11		0.67		0.01	<	0.04		0.04	
SW-7	07/12/90	Hydrometrics Data	41.70	7.2																		
SW-7	07/17/90	Hydrometrics Data	24.70	7.1	0.5								0.17		0.93						0.03	<
SW-7	07/19/90	Hydrometrics Data	20.90	7.2																		
SW-7	07/26/90	Hydrometrics Data	10.40	8	0.5		0.0050	<	0.00020		0.0200	<	0.21		1.05		0.003		0.07		0.04	
SW-7	08/22/90	Hydrometrics Data	5.60	7.2																		
SW-7	09/25/90	Hydrometrics Data	2.20	8.2	0.1	<	0.0050	<	0.00010	<	0.0200	<	0.02		0.14		0.002	<	0.05		0.02	
SW-7	03/15/91	Hydrometrics Data	1.50	7	0.1	<	0.0050	<	0.00100	<	0.0200	<	0.01	<	0.24		0.01	<	0.04		0.01	
SW-7	06/06/91	Hydrometrics Data	157.60	5.9	0.3		0.0050	<	0.00010	<	0.0200	<	0.06	<	0.74		0.002	J	0.03		0.04	
SW-7	07/10/91	Hydrometrics Data	37.70	7.4	0.4		0.0050	<	0.00010		0.0200	<	0.18		1.2		0.024	J	0.05		0.04	
SW-7	08/13/91	Hydrometrics Data	4.10	7.7	0.1		0.0050	<	0.00020		0.0200		0.034		0.15		0.002	<	0.07		0.06	
SW-7	09/24/91	Hydrometrics Data	3.50	7.7	0.1	<	0.0050	<	0.00010		0.0200	<	0.017		0.21		0.002	<	0.06		0.01	
SW-7	07/19/92	Hydrometrics Data	20.00	8	0.5		0.0050	<	0.00010	<	0.0100	<	0.17		0.07		0.002	<	0.07		0.03	
SW-7	09/22/92	Hydrometrics Data	3.23	7.8	0.1		0.0050	<	0.00020		0.0100	<	0.087	<	0.2	<	0.002	<	0.08		0.04	
SW-7	09/23/93	Hydrometrics Data	3.71	8	0.2		0.0010	<	0.00020		0.0010	<	0.07		0.28		0.002	<	0.07		0.014	
SW-7	09/23/93	Hydrometrics Data	3.71	8	0.2		0.0010	<	0.00010		0.0010	<	0.06		0.29		0.002	<	0.07		0.016	
SW-7	08/25/94	Hydrometrics Data	1.69	7.6	0.02	J	0.0010	<	0.00010	<	0.0010	<	0.007	J	0.16	J	0.002	<	0.027		0.008	<
SW-7	07/13/95	Hydrometrics Data	113.48	7	0.6		0.0010	<	0.00010		0.0030		0.098	J	0.97	J	0.002	<	0.05		0.02	
SW-7	09/27/95	Hydrometrics Data	2.80	6.8	0.1	<	0.0010	<	0.00010	<	0.0010	<	0.021		0.17		0.002	<	0.03		0.027	<
SW-7	06/18/96	Hydrometrics Data	223.08	7.2	0.5				0.00020				0.087		1.05		0.003	<	0.046		0.02	
SW-7	07/09/96	Hydrometrics Data	97.63	6.9	0.3	J			0.00010				0.096		0.53		0.003	<	0.038		0.02	
SW-7	09/10/96	Hydrometrics Data	2.12	6.4	0.1	<			0.00010	<			0.019		0.13		0.003	<	0.025		0.01	
SW-7	05/06/99	Maxim	6.48	7.1	0.4				0.00010	<			0.008		0.62		0.001	<	0.036		0.01	<
SW-7	07/08/99	Maxim	111.83	7.9	0.4				0.00010				0.064		0.53		0.001	<	0.027		0.02	
SW-7	09/29/99	Maxim	2.49	7.5	0.1	<			0.00010	<			0.001	<	0.42		0.001	<	0.023		0.03	J
SW-7	04/12/00	Maxim	0.41	7.2	0.05	<			0.00010	<			0.004		0.43		0.001	<	0.066		0.05	
SW-7	04/12/00	Maxim		7.2	0.05	<			0.00010	<			0.004		0.51		0.001	<	0.072		0.02	<
SW-7	07/09/00	Maxim	32.25	7.3	0.3	J			0.00010	<			0.072	J	0.36	J	0.001	<	0.029	J	0.02	J
SW-7	10/09/00	Maxim	1.81	7.7	0.01	<			0.00010	<			0.001	<	0.22	J	0.003	<	0.02	<	0.01	<
SW-7	06/29/01	Maxim	36.63	7.9	0.2				0.00080				0.12		0.53		0.004	J	0.035		0.01	<
SW-7	10/10/01	Maxim	1.53	7.5	0.1	<	0.0030	<	0.00010	<			0.005		0.12		0.001		0.015		0.02	J
SW-7	04/25/02	Maxim		7.4	0.1	<			0.0001	<			0.003		0.26		0.001	<	0.028		0.01	<
SW-7	07/02/02	Maxim	74.60	7.8	0.3	J			0.0001	<			0.089		0.49		0.001	<	0.024		0.02	J
SW-7	10/09/02	Maxim	2.42	7.7	0.1				0.0001				0.019		0.23		0.001	<	0.038		0.06	J
SW-7	21-Apr-03	Maxim		6.8	0.05	<			0.0001				0.007		0.31		0.001	<	0.018		0.01	
SW-7	11-Jul-03	Maxim	39.60	7.7	0.31				0.0001				0.067		0.27		0.001	<	0.02	<	0.01	<
SW-7	29-Sep-03	Maxim	1.42	7.8	0.05	<			0.0001	<			0.005		0.29		0.001		0.023		0.01	
SW-7	06-Apr-04	Maxim		7.3	0.05	<			0.0001	<			0.003		0.46		0.001	<	0.046		0.02	JF%
SW-7	29-Jun-04	Maxim	88.54	7.8	0.2				0.0001	<			0.037		0.34		0.001	<	0.02		0.01	<
SW-7	06-Oct-04	Maxim	7.83	7.7	0.08				0.0001	<			0.02		0.17		0.001	<	0.038		0.01	<

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TABLE A-1 - STATISTICAL SUMMARY OF WATER QUALITY DATA 1989-2004

New World Mining District Response and Restoration Project

Sample Station	Sample Date	Data Source	Flow (cfs)	Lab pH (su)	Aluminum Total Rec. (mg/l)	Al Flag	Arsenic Total Rec. (mg/l)	As Flag	Cadmium Total Rec. (mg/l)	Cd Flag	Chromium Total Rec. (mg/l)	Cr Flag	Copper Total Rec. (mg/l)	Cu Flag	Iron Total Rec. (mg/l)	Fe Flag	Lead Total Rec. (mg/l)	Pb Flag	Manganese Total Rec. (mg/l)	Mn Flag	Zinc Total Rec. (mg/l)	Zn Flag
Chronic Standard (for Hardness = 50 mg/l)					0.087		0.15		0.00142		0.117		0.0052		1		0.0005		NA		0.067	
Acute Standard (for Hardness = 50 mg/l)					0.75		0.34		0.00206		0.984		0.0073		NA		0.014		NA		0.067	
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: 1989-2004 Samples (n)			46	46	43		17		38		17		43		43		38		39		43	
Minimum			0.405	5.900	0.005		0.001		0.000		0.001		0.001		0.070		0.001		0.010		0.004	
Maximum			223.080	8.200	0.600		0.003		0.001		0.020		0.210		1.200		0.024		0.080		0.060	
Mean			48.489	7.435	0.223		0.002		0.000		0.007		0.060		0.470		0.002		0.041		0.021	
Standard Deviation (SD)			54.951	0.450	0.187		0.001		0.000		0.005		0.058		0.322		0.004		0.020		0.015	
Mean + (2 x SD); for pH: Mean - (2 x SD)			158.392	6.535	0.597		0.0037		0.0004		0.0179		0.1761		1.114		0.010		0.080		0.050	
Station SW-7: 1999-2004 Samples (n)			14	18	18		1		18		0		18		18		18		18		18	
Minimum			0.405	6.800	0.005		0.002		0.000		0.000		0.001		0.120		0.001		0.010		0.005	
Maximum			111.830	7.900	0.400		0.002		0.001		0.000		0.120		0.620		0.004		0.072		0.060	
Mean			29.131	7.517	0.143		0.002		0.000				0.029		0.364		0.001		0.031		0.017	
Standard Deviation (SD)			37.316	0.313	0.141				0.000				0.037		0.141		0.001		0.017		0.016	
Mean + (2 x SD); for pH: Mean - (2 x SD)			103.764	6.891	0.424				0.00045				0.103		0.647		0.002		0.065		0.049	
Temporary Standard - SW-7				5.5	0.67		NA		NA		NA		0.2		1.32		0.013		0.086		0.049	

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

< = less than detection
J = estimated value

NA - not applicable