LEFTHAND WATERSHED TASK FORCE

Final Report

to

the Boulder County Board of Health

March 11, 2002

Task Force Membership

Task Force Member	Representing
Sarah DiGiacomo	Future Generations
Steve Edelstein	Jamestown
Ken Fucik	Technical Expert
Mark Gershman	Future Generations
Pete Gleickman	Ward
Kathy Peterson	Lefthand Water District
Sue Schauffler	Rowena

Task Force Facilitator: Bruce Swinehart, Mesa Consulting

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E. NY Times Article (2/24/02): “Bush Proposing Policy Changes on Toxic Sites: Taxpayers Would Bear Most Cleanup Costs”
F. Supplementary Data Tables and Maps

LEFTHAND WATERSHED TASK FORCE

Final Report to Boulder County Board of Health

(March 4, 2002)

I. EXECUTIVE SUMMARY

This report documents the work of the Lefthand Watershed Task Force since its inception in August, 2001 and includes the following findings and recommendations per its original charge from the Boulder County Board of Health *(see Appendix A: "Resolution #2001-4")*:

A. "The task force shall… assess existing environmental and health data related to the Lefthand Watershed."

The Task Force examined data from several sources and concluded the following *(see Section IV. "Data Assessment and Findings")*:

1. The quality of the treated water delivered by the Left Hand Water District and municipal water systems in Ward and Jamestown meets all government-mandated standards relative to heavy metals and pH.

2. Available data suggests that there are problems with water quality in some areas of the watershed that represent current and/or potential risks to environmental health and potential risks to human health. Current risks to environmental health are evidenced by the absence of aquatic life in short stream segments along Little James Creek and in the California Gulch area. Potential risks to human and environmental health include the possibility that toxic materials could be released into streams and/or moved downstream in the event of a catastrophic storm or similar event. This could threaten the primary source water supply of the Left Hand Water District, although the District may be able to mitigate some of this risk by shutting off its intake in such an event.

3. Although there are known problems with a few residential wells in the watershed, the quality of private well water being used in the watershed is largely unknown.

4. There has been no comprehensive, systematic study of the entire watershed that can conclusively establish:
    - the exact extent of potential risks to aquatic life and human health;
    - the potential effects on water quality of a catastrophic storm or similar event;
    - the source(s) of contaminants;
    - appropriate remediation to remove contaminants.

B. "Based on the assessment, the task force will determine if a cleanup action is necessary."

The Task Force determined the following *(see Section IV.D. "Determination of Need for Cleanup")*:

1. Where there are known problems with water quality that represent current or potential risks to human and environmental health they should be remediated as soon as feasible.

2. In other areas where available data are inconclusive or nonexistent, further study is needed in order to determine an appropriate course of action.

C. "The Task Force shall… evaluate cleanup options"

The Task Force evaluated three cleanup options according to their responsiveness to community/stakeholder concerns and other criteria *(see Section V. "Criteria Used for Analysis of Cleanup Options" and Section VI. "Cleanup Options Evaluated")*:

1. Do nothing.
2. Proceed with further analysis and cleanup via the NPL/Superfund process.
3. Proceed with further analysis and cleanup using resources other than Superfund, including:
    a. voluntary cleanup by responsible parties
    b. a "stakeholder-run initiative"
    c. other resources

D. "The Task Force shall… recommend a preferred option to the Board of Health."

The Task Force recommends combining certain features of Options #2 and #3 as follows *(see Section VII. "Recommendations to the Board of Health")*:

1. The County should empanel a Watershed Oversight Group (WOG) to serve as a hub for communications and information throughout the Lefthand Watershed. WOG would represent the entire range of community and other stakeholder interests in all aspects of watershed activities, including ensuring that assessment and remediation operations conducted via Superfund or other alternatives are well-coordinated with one another and are responsive to the concerns of community members and other stakeholders.

2. Working closely with the Watershed Oversight Group proposed above, the County should conduct and/or coordinate a comprehensive, systematic characterization of the entire watershed that includes specific goals and benchmarks for water quality against which any potential cleanup can be

measured. Resources for this effort may be available from a variety of sources *(see Section VI. "Evaluation of Cleanup Options").*

3. The County should support NPL/Superfund listing for the California Gulch area of upper Lefthand Creek, including the Black Jack Mill, Big Five Tunnel, White Raven Mine, and the Loader Smelter.

4. The County should endorse Jamestown's desired approach to its Elysian Park *(see Appendix B. "Jamestown/CAGE Letter to EPA").*

5. The Task Force was not able to reach a consensus on a recommendation regarding the group of sites along Little James Creek known collectively as the Golden Age Mining District, which include the following:
   - the Burlington Mine
   - the Emmit mine
   - the Argo mine
   - the Streamside Tailings

   a) Four Task Force members (Edelstein, Gleichman, Gershman, Schauffler) support the following recommendation:

   The County should support further assessment and remediation of these areas using alternatives to Superfund, with the provision that NPL listing should be pursued if sufficient progress toward cleanup has not occurred within a reasonable period of time. With regard to the Burlington Mine, the County should support the Honeywell Corporation's proposed voluntary cleanup, but should proceed with NPL listing for that site if a plan for cleanup has not been submitted for approval to CDPHE within six months.

   b) Three Task Force members (DiGiacomo, Fucik, Peterson) support the following recommendation:

   The County should support listing these sites, including the Burlington Mine, on the NPL while alternative resources are being pursued by a local stakeholders group.

6. The Task Force strongly recommends that, regardless of the cleanup option, the County should develop clear agreements with all parties including EPA, CDPHE, and stakeholders, that clearly define how local residents and other stakeholders will be involved in the study and remediation processes, and how community and stakeholder concerns will be addressed *(see Section V. "Criteria Used for Analysis of Cleanup Options").* This process should proceed through WOG where appropriate.

   Features of such a Memorandum of Understanding should include:

- Establishment of a clear mechanism for resolving disputes and concerns that may arise, so that citizens will know who to contact if a problem arises, and issues can be worked out before they escalate into disputes. This mechanism could be one of the functions of WOG.
- Assurance that the boundary of any designated Superfund sites will not include any area within the Towns of Ward and Jamestown (other than any parts of the Streamside Tailings that are in Jamestown). If testing within these Towns is conducted as part of the RI/FS process and a problem is identified as a result, these Towns should have the opportunity to address the problem via non-Superfund methods if they so choose, rather than expanding the boundary of the designated Superfund site.
- Residents should be assured of courteous and respectful treatment by agency officials and their subcontractors.
- Residents will be guaranteed that potential health-and-environmental-affecting side affects will be absolutely minimized such as airborne dust and pollutants, further contamination in streams, and noise pollution.
- Cleanup-related traffic should not pass through established communities if at all possible.
- Every reasonable effort should be made to preserve historical features within cleanup areas.
- Cleanup activities should be well-coordinated with the Left Hand Water District to ensure that their operations are not compromised by accidental releases of pollutants into streams during cleanup operations.
- Assurance that the boundary of any designated Superfund sites that contain non-contiguous mining related activities that will be included in remediation will not include properties between the non-contiguous sites. For example, if the County chose to support listing the Little James Creek area and the Castle Gulch/Golden Age Mine area on the NPL that the Superfund boundary would include only those areas and not the property between the two areas.

7. Before it endorses any particular approach to further assessment and/or remediation, the County should recognize that there is significant uncertainty about the availability of future funding from the Superfund program as well as from possible alternative sources. The County should seek a reasonably clear understanding of the likelihood of funding from these sources and weigh the potential impacts of a lack of funding from them before taking action. In particular, concern has been expressed about the possibility of sites in the Lefthand watershed remaining on the NPL indefinitely once they have been listed due to a lack of available funds in the Superfund program. On the other hand, concern has also been expressed that if the County decided to forego Superfund in favor of an alternative approach, a lack of funding from such sources could forestall needed cleanup operations.

8. Regardless of whether NPL listing goes forward, the County should continue to explore other potential funding sources in the event that Superfund monies are not available, and/or to support further assessment and ongoing monitoring activities.

9. The County should educate users of private wells in the Lefthand watershed about the importance of testing the quality of water drawn from these sources, and about methods for mitigating identified water quality problems.

LEFTHAND WATERSHED TASK FORCE

Final Report to the Boulder County Board of Health

(March 4, 2002)

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F. Supplementary Data Tables and Maps

LEFTHAND WATERSHED TASK FORCE

Final Report to Boulder County Board of Health – DRAFT

(February 20, 2002)

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II. BACKGROUND

A. Establishment of the Lefthand Watershed Task Force

The Lefthand Watershed Task Force was established by the Boulder County Board of Health in response to community concerns about the impacts on water quality of historic mining activity in the area, and about possible ramifications of a cleanup operation under the auspices of EPA's Superfund program.

The Board of Health established the Task Force in July 2001 by adopting Resolution #2001-4 (see Appendix A), which identified its purpose and duties as follows:

- The Task Force shall act under the authority of the Boulder County Board of Health to assess existing environmental and health data related to Lefthand Watershed.
- Based on the assessment, the task force will determine if a cleanup action is necessary, evaluate cleanup options, and recommend a preferred cleanup option to the Boulder County Board of Health.
- The Task Force will also collect and disseminate to all stakeholders, any pertinent information related to the watershed.

The seven-member Task Force membership was to include:

- a stakeholder from each of the following communities: Jamestown, Ward, Rowena, and Lefthand Water District;
- a person with technical expertise that can review and interpret technical data
- two people with technical expertise at large that can represent future generations of this community.

The following people were appointed to the Task Force per the established criteria:

- Steve Edelstein (Jamestown)
- Pete Gleichman (Ward)
- Sue Schauffler (Rowena)
- Kathy Peterson (Lefthand Water District)
- Ken Fucik (technical expertise)
- Mark Gershman (future generations)
- Sarah DiGiacomo (future generations)

Mark Williams and Jeff Zayach were the Health Department staff assigned to support the Task Force. Bruce Swinehart was contracted to be the group's facilitator.

B. Task Force Accomplishments

The Task Force met 15 times between August 16, 2001 and February 20, 2002, and made interim reports to the Board of Health in November and January. During this time the Task Force accomplished the following:

- Established "ground rules" for Task Force meetings.
- Established criteria for assessing existing data to help determine whether a cleanup action is necessary.
- Completed an inventory of relevant data.
- Met twice with EPA and CDPHE officials to better understand:
    - how their initial investigation was conducted and how to interpret the results;
    - how the Superfund process works; and
    - the role of the EPA Enforcement Division.
- Gathered and summarized "community and stakeholder concerns."
- Established other criteria by which cleanup options would be evaluated.
- Solicited information from other communities in the region that have had experience with Superfund and/or have engaged in a cleanup operation via a "stakeholder-run" initiative.
- Developed options and made recommendations to the Board of Health.

Per the Board of Health's instructions, all meetings were publicly noticed and a 15-minute public comment period was provided at each meeting. Meeting notices and minutes were posted on the Task Force's web site.

III. HISTORICAL CONTEXT

A. History of Mining in LHWS

Precious metal mining began in the Lefthand Creek watershed soon after initial Euro-American settlement of Boulder County in 1858. The Gold Hill Mining District was organized in July 1859. Mining was well underway in the Ward District and Central District (encompassing the James Creek mines, originally named Utilla District) by the mid-1860s.

Mining continued with booms and busts through the first decades of the 20th century. The Switzerland Trail (Colorado & Northwestern RR) was constructed to haul ore from the mines and mills of Boulder County, arriving in 1898 and further stimulating growth of mining.

Fluorspar mining began near Jamestown in 1916. While mining tapered off significantly in the second half of the 20th century some mining and milling occurred until quite recently.

Harrison Cobb, miner and historian, has pointed out that Lefthand Creek has always been the principal millstream of Boulder County. He has documented the dozens of mills in the Lefthand watershed in his book "Prospecting the Past", 1988.

Diversion of water from Lefthand Creek for agricultural irrigation began with the construction of the Cochran Ditch and appropriation of water on September 1, 1860. The productive soils of eastern Boulder County were well suited to agriculture, which developed rapidly, in part to serve the demands for produce and hay in the mining camps.

The use of Lefthand Creek both as a millstream and as a source of irrigation/domestic water has led to a history of concern over adverse impacts to water quality from mining and milling. This concern dates to the 1860s, and is ongoing.

Lefthand Creek was a dead creek through the 1930s, polluted to the point of not supporting fish. The attenuation of mining by the 1930s allowed the creek to begin to cleanse itself. By the end of World War II the creek supported fish along much of its length. However, problems with pollution remain in several segments of the stream.

B. Recent History of Water Quality Concerns and EPA Investigation

The first documented complaints about the water quality in the Lefthand Watershed came in the mid 1960's when the Boulder County Health Department (BCHD) found water samples from near the Burlington mine to be high in sulfate, total solids, and some metals. In the following years many small steps including investigations, sampling, and structural changes (such as the building of settling ponds) were taken in order to stop contamination from the mines: although no major steps took place.

Over the last 2-3 years the EPA and the Colorado Department of Public Health and Environment have gathered sufficient information to show that some of the mining sites in the Lefthand Watershed warrant consideration for listing as Superfund National Priority List sites. In March of 2000 the BCHD agreed, jointly with the EPA and State, to assume a leadership role in substantively involving the community in further investigations, cleanup and related activities. The BCHD held informational briefings in the towns of Ward and Jamestown in April of 2000 to talk about the problem of heavy metals and other toxic elements present in the mountain streams. The education and outreach efforts were intended to let people in these areas know about the extent and history of the problem, as well as options available for cleaning up the contaminates. There was a continued effort to keep the community involved and informed of proceedings. Town meetings again occurred in Ward and Jamestown in February of 2001. Site field trips were arranged, including a press tour of the Lefthand Watershed on April 25, 2001.

The Colorado Department of Public Health and Environment (CDPHE) provided pass-through funding to Boulder County's Environmental Health Program to carry out the community and partnership efforts involving the Lefthand Watershed. The Technical Outreach Services to Communities (TOSC) provided an independent summary of several studies to identify the size and levels of impacts, and possible pros and cons of cleanup by the Superfund Program. This information was made available to be useful to persons providing public comment on the potential listing of the area as a Superfund site.

IV. DATA ASSESSMENT AND FINDINGS

A. INTRODUCTION

The first charge to the Task Force was to assess existing environmental and health data related to the Lefthand Watershed. Measurements from four EPA Site Inspection Reports, a report by the Colorado Water Quality Control Commission, sampling by the Colorado Riverwatch Project, a report by the Colorado Geological Survey and sampling by the Left Hand Water District were compared with a variety of criteria to aid the Task Force in determining if a problem exists with metals contamination in the Lefthand/James Creek watershed. We created a series of tables and maps to aid us in our determination. These tables and maps are included in this report. All tables are in Appendix F.

The measurements we considered were from surface water and sediments. Very few measurements were made of groundwater from wells. Clearly, additional studies will be required to evaluate metals concentrations and their sources in groundwater.

B. SUMMARY OF FINDINGS

The Board of Health charged the Task Force with assessing existing environmental and health data related to the Lefthand Watershed to determine if a cleanup action is necessary.

The data indicate that historic mining in the Lefthand Creek Watershed has created environmental degradation and potential risks to public health.

The data also indicate that drinking water provided by the Left Hand Water District has shown no indication of metal contamination or reduced pH since 1980.

The current state of environmental degradation in the watershed is characterized by:

- Contamination of surface waters and sediments by metals in some areas
- Extremely low pH values of surface waters in some areas
- Elimination or modification of aquatic plant and animal communities in Little James Creek and in limited portions of Lefthand Creek. Aquatic life is present in the remaining portions of Lefthand Creek and James Creek.

Although degradation and risk exist in the watershed, the existing data are insufficient to fully characterize the severity or scope of these threats to human and environmental health. The data suggest that significant degradation and risks may be concentrated—but this may be an artifact of concentrated sampling. There has been no systematic survey of environmental quality or health risk to support (or refute) the conclusion that the impacts of mining are isolated.

The most significant *risks* to public health are associated with the potential for metals to enter drinking water supplies. This is a concern for both surface water and groundwater.

The impacts on surface water are associated with the risk of contaminated sediment moving downstream gradually over time or instantaneously during periods of high discharge or flood. The primary concern is that high water could lead to the release and mobilization of metals currently trapped in creek bottom, bank and shoreline sediments. Lefthand Creek is the primary source of drinking the water for over 14,000 customers of the Left Hand Water District. An additional concern is that there has not been a systematic spatial and temporal evaluation of the concentrations of dissolved metals in Lefthand Creek. Our comparisons of measurements from the EPA reports with Drinking Water Criteria showed about one half of the samples exceeded the DWC for iron and about one third exceeded the DWC for manganese. Most of the other metals that exceeded the DWC were from samples near the mining sources. Our comparisons to the DWC suggest that further evaluation and monitoring of metals in Lefthand Creek should be undertaken to ensure that the Left Hand Water District is informed and can take the necessary steps to comply with the Drinking Water Criteria.

The impacts on groundwater are associated with the risk of contaminated water entering the groundwater system. Fracture systems in the bedrock are the primary mechanism for groundwater transport. The primary concern is that contaminated water from runoff, surface water, or mine drainage could enter a fracture system and contaminate the groundwater within that system. If so, then water quality in the area is a potential health risk. The Task Force was unable to assess metals impacts on groundwater because of limited sampling.

C. SOURCES OF INFORMATION

This section describes the existing environmental and health data related to the Lefthand Watershed that the Task Force examined. Map 1 includes the entire watershed. Detailed maps of the sampling locations for each report are included in the descriptions below. For this report, we chose to focus on the surface water and sediment data to examine impacts to the stream systems.

1) EPA

The results from four EPA Expanded Site Inspection (ESI) reports were examined by the Task Force. The reports were as follows:

Analytical Results Report for Expanded Site Inspection (ESI)
Captain Jack Mill
Ward, Colorado
EPA Contract NO 68-W5-0031
TDD No. 9609-0008
September, 1998 (Sampling conducted June, 1997)

Analytical Results Report for Expanded Site Inspection (ESI)
Golden Age Mine
Jamestown, Colorado

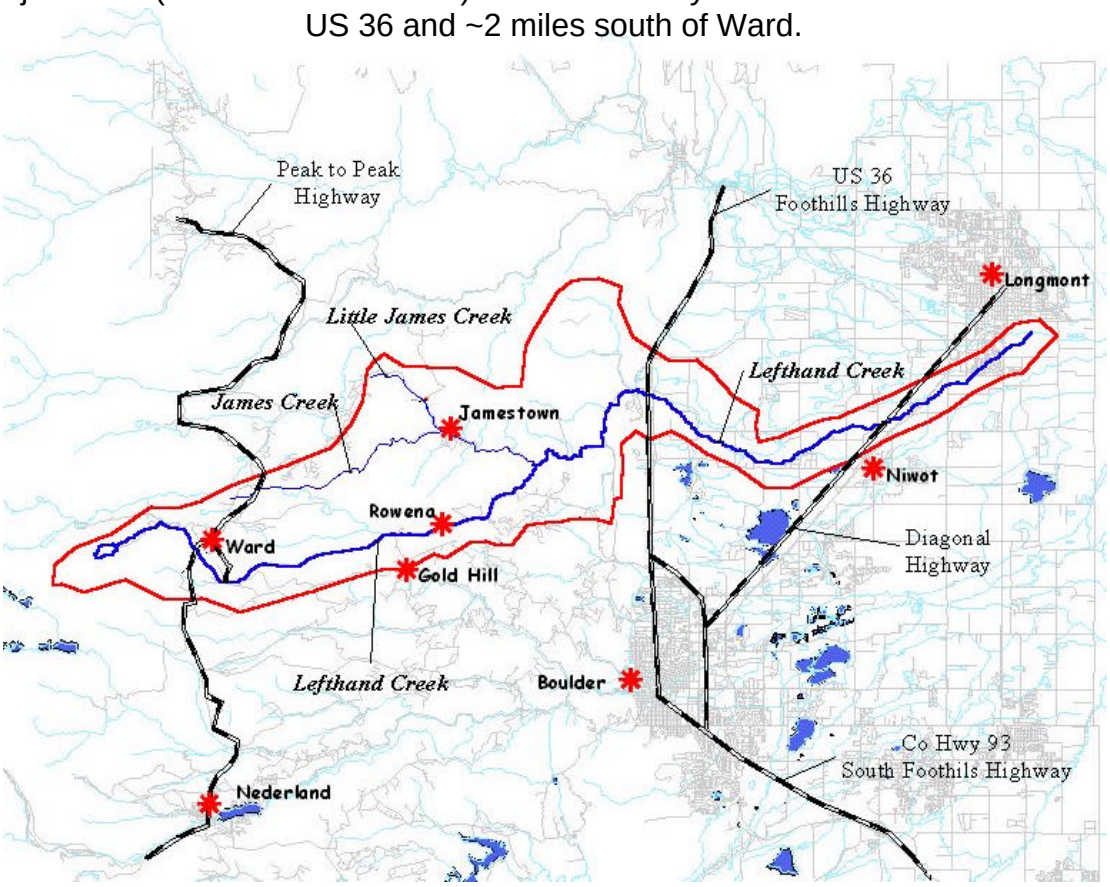
EPA Contract NO 68-W5-0031
TDD No. 9704-0017
March, 1998 (Sampling conducted Sept/Oct, 1997)

Analytical Results Report #2 for Expanded Site Inspection (ESI)
Golden Age Mine
Jamestown, Colorado
EPA Contract NO 68-W5-0031
TDD No. 9704-0017
October, 1998 (Sampling conducted June, 1998)

Field Sampling Plan for Site Inspection
Captain Jack/Left Hand Creek Watershed
Boulder County, Colorado
EPA Contract No. 68-W5-0031
TDD No. 9906-0007
June 9, 2000 (Sampling conducted June, 2000)

In the EPA ESI reports, concentrations of 23 metals are reported: silver, aluminum, arsenic, barium, beryllium, calcium, cadmium, cobalt, chromium, copper, iron. mercury, potassium, magnesium, manganese, sodium, lead, nickel, antimony, selenium, thallium, vanadium and zinc.

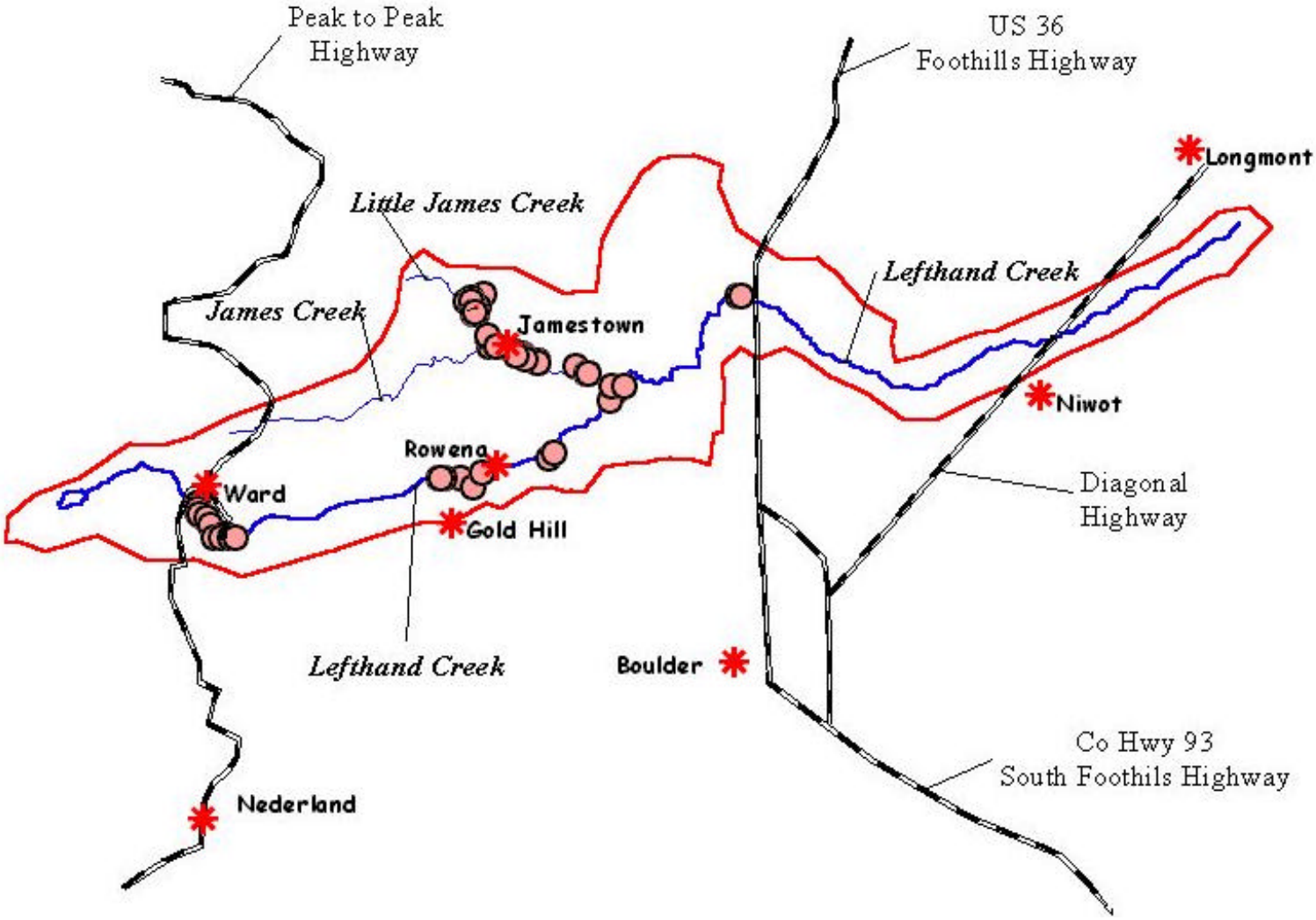
Map 1. Lefthand Watershed Boundary (shown in red outline), communities (red stars), streams (blue lines) and major roads (black and white lines). Lefthand Canyon road follows Lefthand Creek between US 36 and ~2 miles south of Ward.



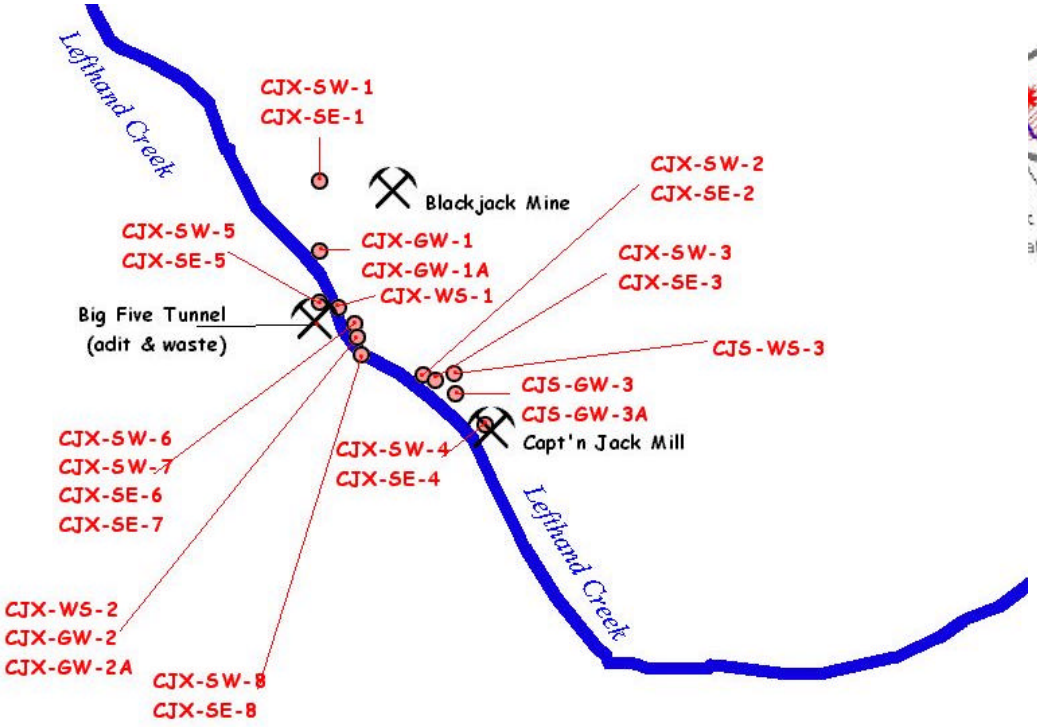
Map 2 shows the locations of the EPA sampling sites. Map 3 shows the locations of the EPA sampling sites in the Captain Jack report. Sample sites are identified using the designation CJX followed by a two letter designation indicating whether the sample was surface water (SW), sediment (SE), waste source, i.e. settling pond or lagoon (WS), or ground water (GW). The site, which is located in California Gulch about 1.5 miles south of Ward, includes: 1) the Big Five Mine adit (several gallons per minute) which flows over tailings into a settling pond, through a marsh, and into Lefthand creek; 2) The Captain Jack Mill site which contains two lagoons, one lined and one unlined; and 3) the Black Jack Mine adit. At times in the past, the Big Five Mine adit discharge has flowed across the access road directly into Lefthand Creek. Aquatic life in Lefthand Creek may be severely impacted downstream of the Big Five Mine adit drainage under conditions where the adit drainage flows directly into the creek.

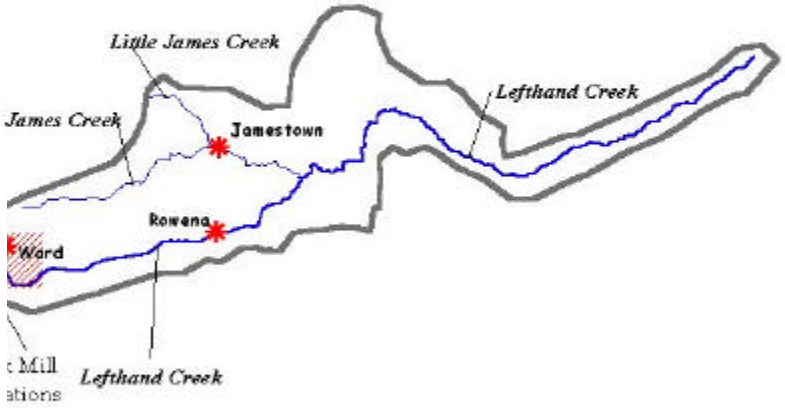
Maps 4a and 4b shows the locations of the sampling sites in the two Golden Age reports. Sample sites are identified using similar designations as above except GA is used instead of CJX and an additional pair of letters are added to indicate the specific mine or area sampled. The mines along Little James Creek (LJ) included the Argo Mine (AR), the Burlington Mine (BA), and the Emmit Mine (EM). The Argo and Emmit Mines are located along the creek and the Burlington Mine is located along Balarat Gulch. Streamside tailings along Little James Creek were also examined. A number of samples were collected along James Creek (JC) and included samples at or in Hill Gulch (HI), Jenks Gulch, (JE), Gillespie Gulch, (GI), and Castle Gulch (CA). The Golden Age Mine and Grand Central Mine are located along Castle Gulch. There are mine shafts and/or adits along Jenks Gulch, McCorkle Gulch, and Buffalo Gulch. The latter two flow into James Creek between Gillespie Gulch and Jenks Gulch. Samples were also collected in Lefthand Creek (LHC) upstream and downstream of the confluence with James Creek. The municipal town park (Elysian Park) is also shown on the map and was sampled for soil analysis. Little James Creek is generally a low flow environment where there is always flow and always surface expressions of that flow, however, there are variable intermittent segments where the flow is below the surface of the creek bed. Aquatic life is found upstream of the confluence of Little James Creek and Balarat Gulch. No visible aquatic life is found between Balarat Gulch and the confluence of Little James Creek and James Creek. Aquatic life is found along all segments of James Creek.

Maps 5a, 5b, and 5c show the locations of the sampling sites in the Captain Jack/Left Hand Creek Watershed report. Again, sample sites are identified using the same designations as above using LH as the primary designation. Twenty sediment and eleven surface water samples were collected along Lefthand Creek between the Captain Jack Mill site and just below the Haldi intake. Sampled areas included Captain Jack Mill area, a tailings pile 1.5 miles downstream of the Captain Jack Mill, Lickskillet Gulch, Slide Mine, Glendale Gulch, the James Creek confluence, and the Haldi intake. Information from local residents was used evaluate the qualitiative status of aquatic life. Aquatic life is found along all segments of Lefthand Creek below California Gulch.

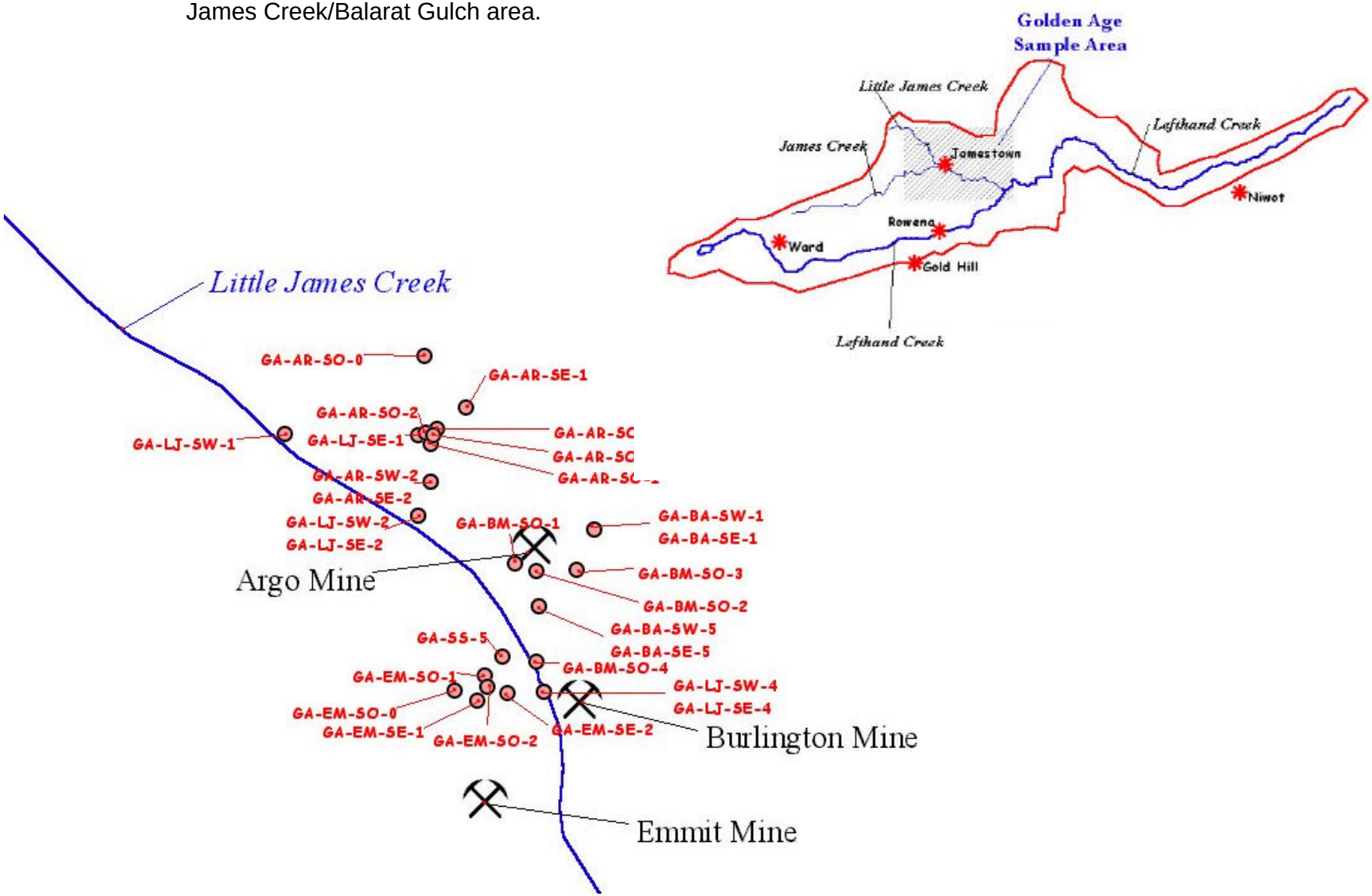

Peak to Peak
Highway
US 36
Foothills Highway
Longmont
Little James Creek
Lefthand Creek
James Creek
Jamestown
Niwot
Rowena
Ward
Gold Hill
Diagonal
Highway
Lefthand Creek
Boulder
Co Hwy 93
South Foothils Highway
Nederland

Map 3. Locations of EPA sampling sites from the Captain Jack Mill Report.



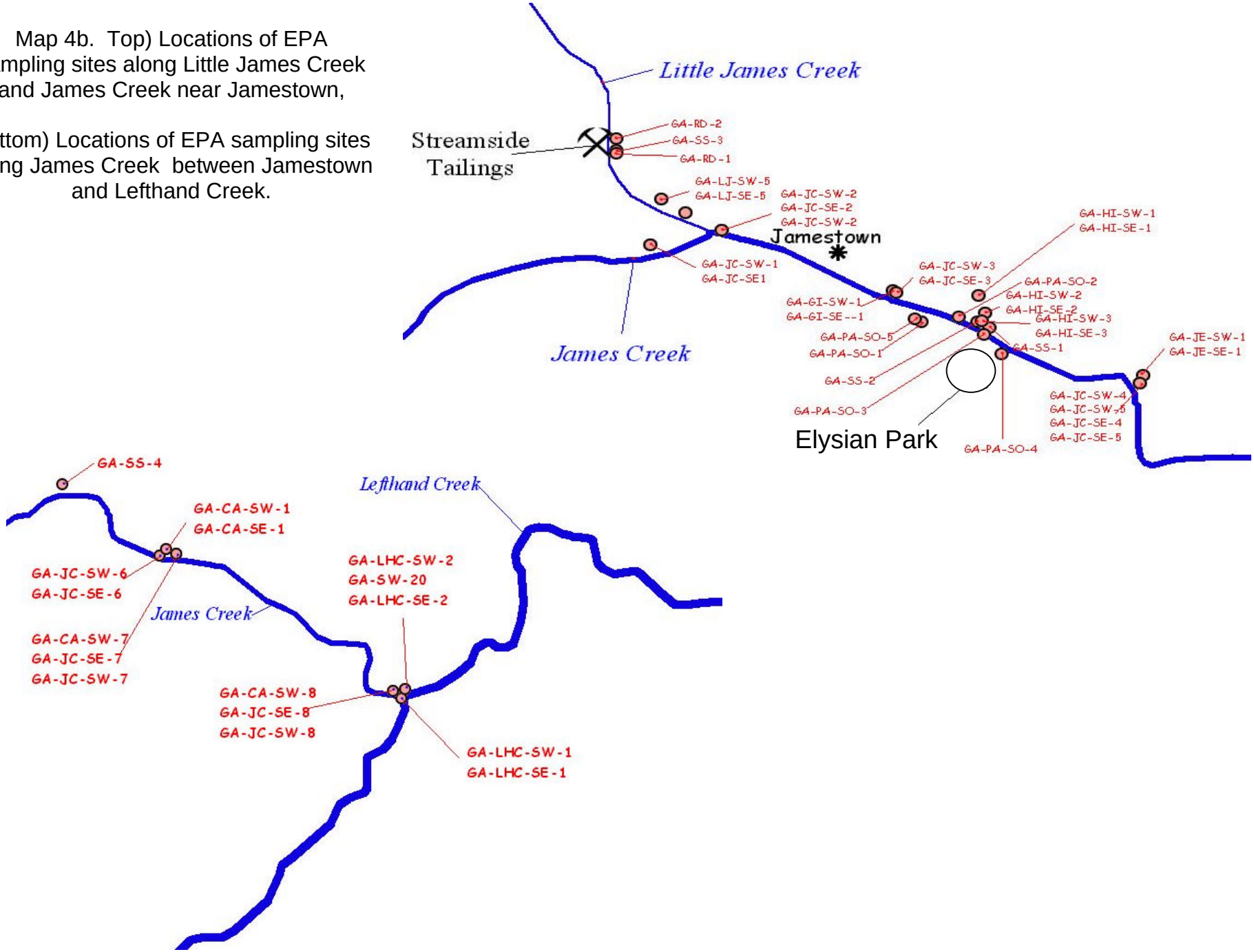


Map 4a. Top) Sampling area from the EPA Golden Age Reports and
Bottom) Locations of EPA sampling sites from the Little James Creek/Balarat Gulch area.



Map 4b. Top) Locations of EPA sampling sites along Little James Creek and James Creek near Jamestown,

Bottom) Locations of EPA sampling sites along James Creek between Jamestown and Lefthand Creek.



2) Colorado River Watch Project

River Watch Network 2000 Watershed Report Series
#12 Boulder and St. Vrain Creeks WSR12BSTV00
Kathleen C. Stewart and Barbara J. Horn (Colorado Division of Wildlife-CDOW)
published by Ann Seiler (CDOW) May, 2000
and
Compiled data downloaded (http://wildlife.state.co.us/riverwatch/) for Lefthand Creek, James Creek and Little James creeks. The data represented sampling from January, 1993 through December, 2000.

For River Watch Project samples, concentrations may be provided for the following metals: aluminum, arsenic, calcium, cadmium. copper, iron, magnesium, manganese, lead, selenium, zinc

River Watch sampling locations are shown in Map 6.

3) Left Hand Water District

Annual Reports from the Inorganic Chemistry Laboratory of water samples provided by the Left Hand Water District to the Colorado Department of Health (later Colorado Department of Public Health and the Environment). These samples were collected as effluent from the Left Hand Water District's Spurgeon water treatment plant.

Sample Date	Report Date	Sample Number
6/15/1992	07/27/1992	922877
08/03/1993	8/26/1993	934544
08/01/1994	10/28?/1994	946668
08/02/1995	09/18/1995	953621
07/08/1996	08/12/96	962377
No data provided for 1997		
07/08/1998	02/01/99	98-3648
8/18/99	9/8/99	99-A17805
09/06/2000	09/26/00	00-a-16706
7/23/01	8/27/01	01-A14478 046465

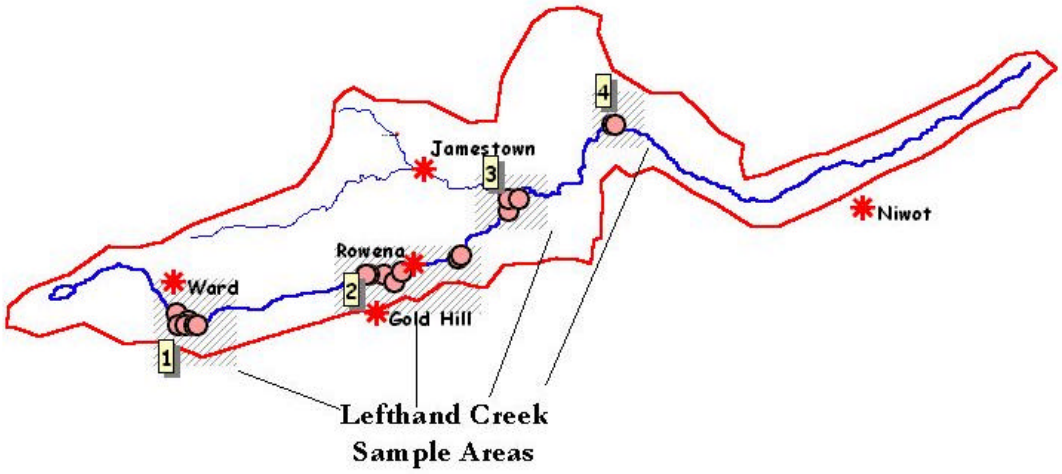
Results of metal sampling in treated effluent were also provided in a summarized spreadsheet. This spreadsheet, provided by Hank Schmidt, water treatment manager of the Left Hand Water District, reports the results of inorganic sampling from 1980-2001 (Table 9 in Appendix F.). The metals reported were: Antimony, Arsenic, Barium, Beryllium*, Cadmium, Chromium, Copper, Lead, Mercury, Nickel*, Selenium, Sodium, Silver and Thallium*. Measurements of starred (*) metals were reported beginning in 1993. Testing for silver was discontinued in 1993. Testing for copper or lead was not reported in 2000 or 2001.

4) Colorado Water Quality Control Commission – Nonpoint Source Study
Colorado Water Quality Control Division. 1991. Little James Creek and James Creek Nonpoint Source Study. 30 pp (+ 1pg of CDH laboratory detection limits)

This data in this report were referred to in several of the EPA reports referenced above. The report was conducted to follow up upon earlier indications of contamination in the Lefthand Creekwatershed and specifically sought to 1) identify the sources of contaminants in the watershed, 2) determine whether contaminant transport is driven by inputs from numerous diffuse areas and 3) evaluating the potential for remedial action. Water quality sampling was conducted twice. First sampling was conducted at 29 locations during spring snowmelt runoff to measure the impact of tailing inputs or suspension of streambed materials upon total loadings. The second sampling was conduted in 18 of the 29 original sampling locations during the fall, when low flow could be expected to result in high instream metal concentrations. In addition, fish populations were also sampled and laboratory acute toxicity tests were conducted.

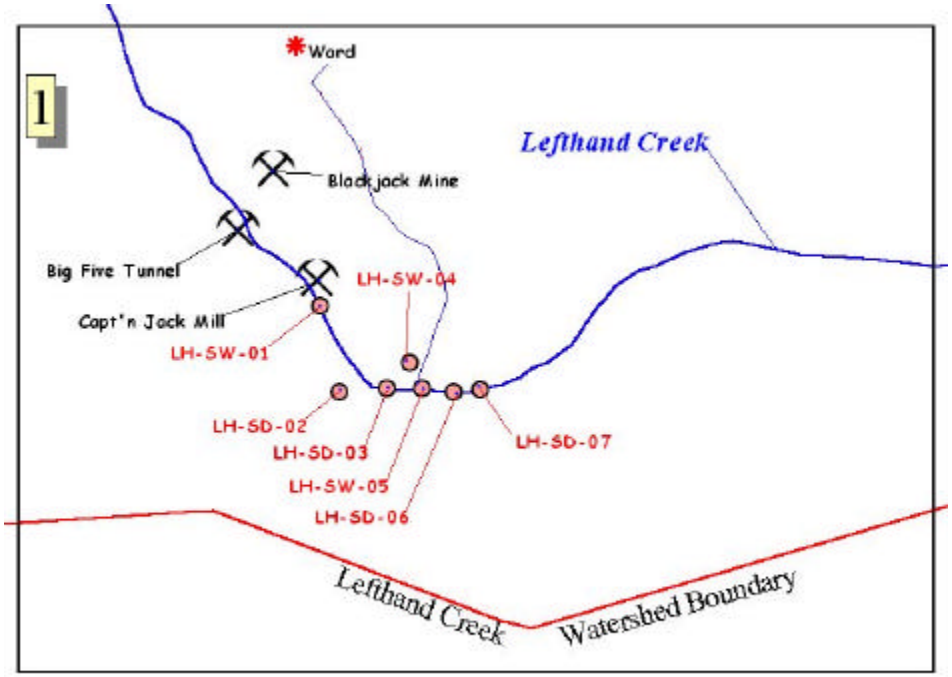
The locations of the sampling are provided on Map 7.

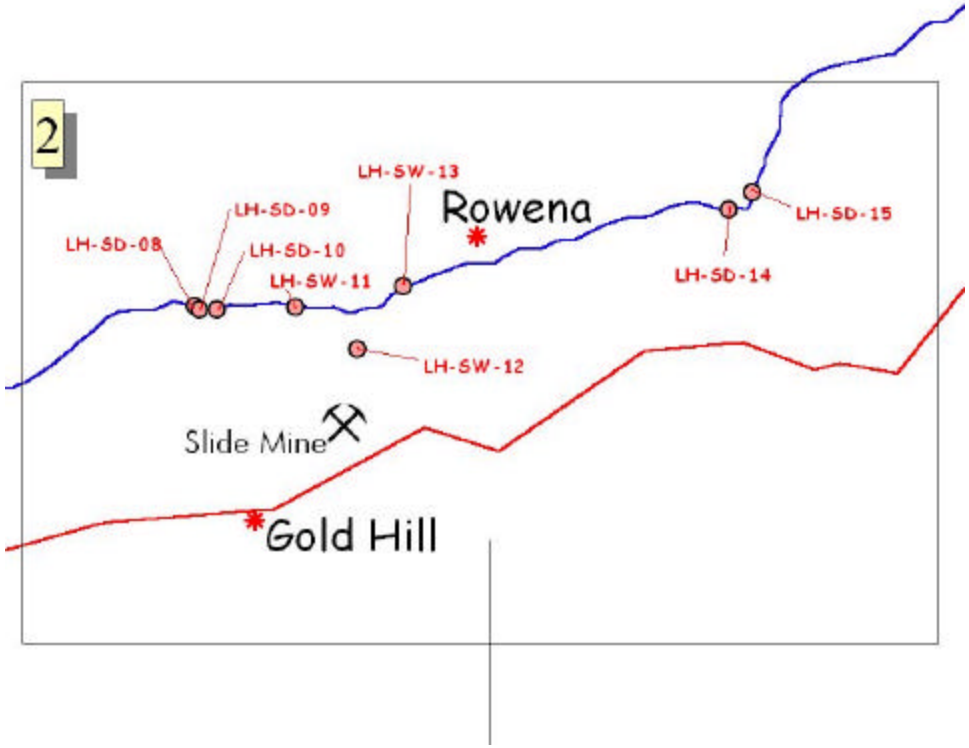
Map 5a. Locations of EPA sampling sites from the Captain Jack/Lefthand Creek Report. Detail of sections 1 and 2 are Map 5b. Detail of sections 3 and 4 are in Map 5c.



Map 5b. Top) Locations of EPA sampling sites in the Captain Jack Mill area from the Captain Jack/Lefthand Creek report.

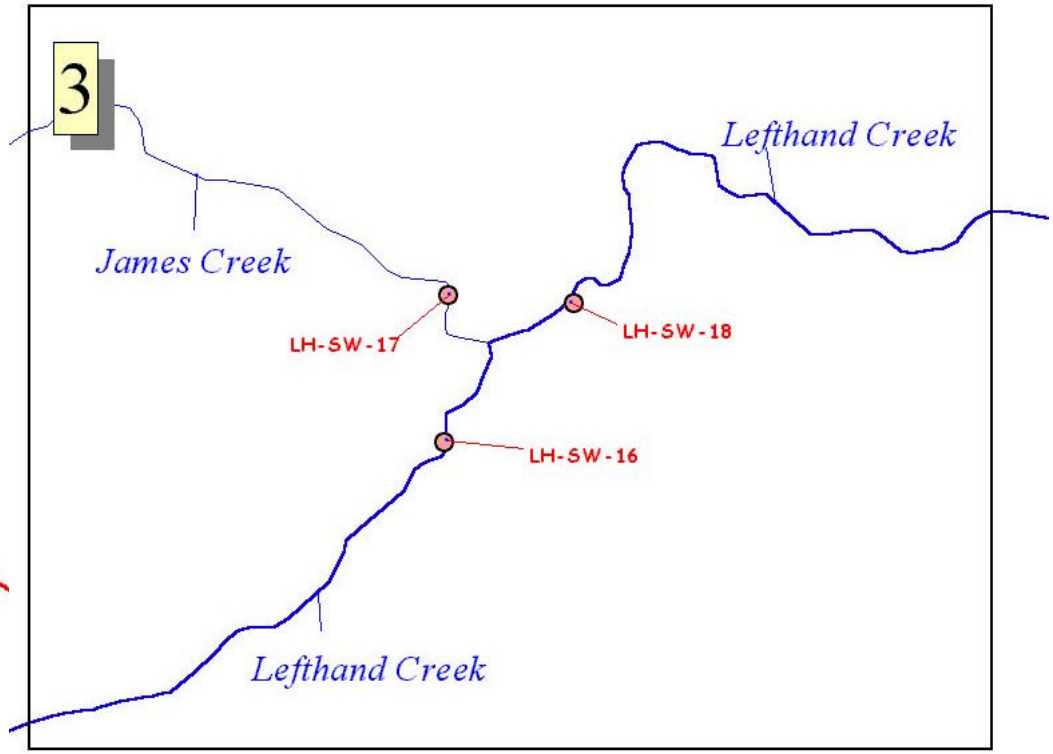
Bottom) Locations of EPA sampling sites in the Rowena area from the Captain Jack/Lefthand Creek report.

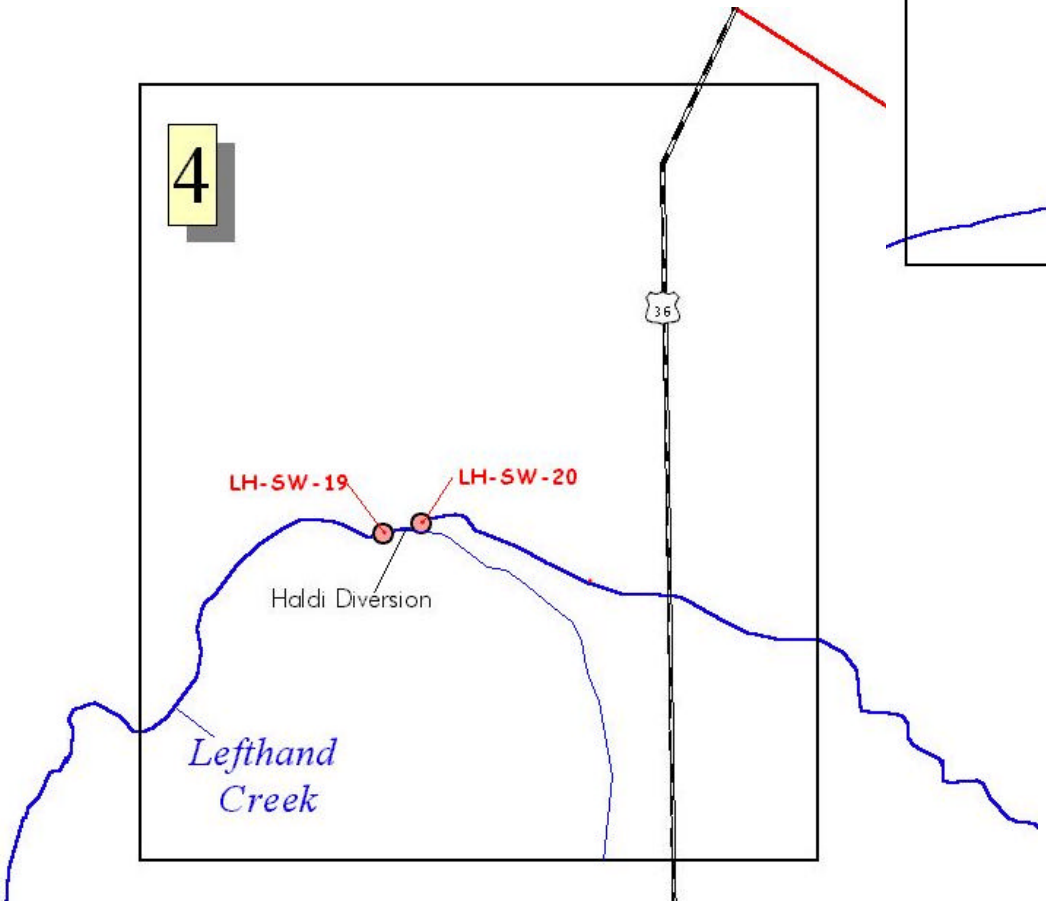


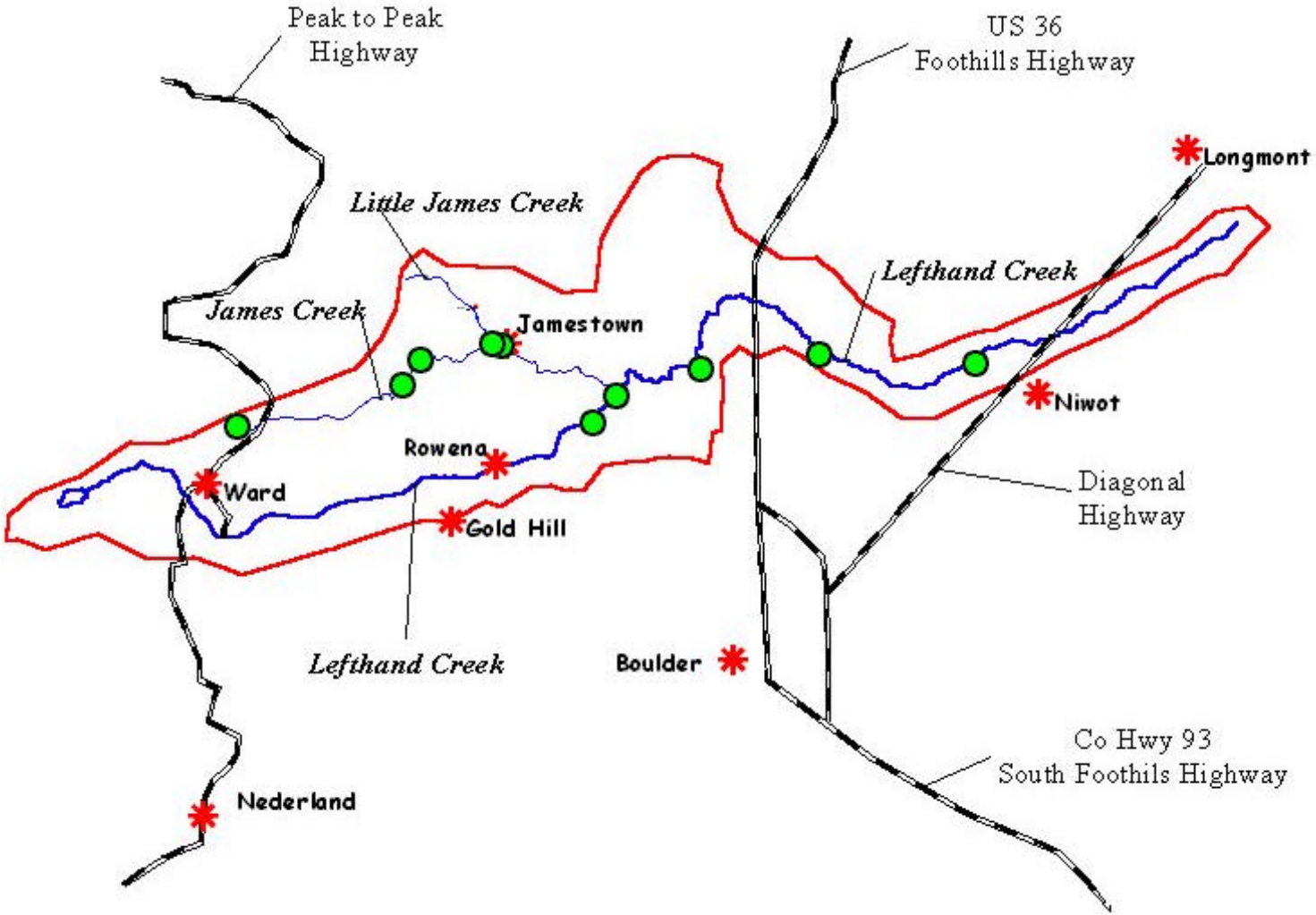


Map 5c. Top) Locations of EPA sampling sites in the James Creek confluence with Lefthand Creek area from the Captain Jack/Lefthand Creek report.

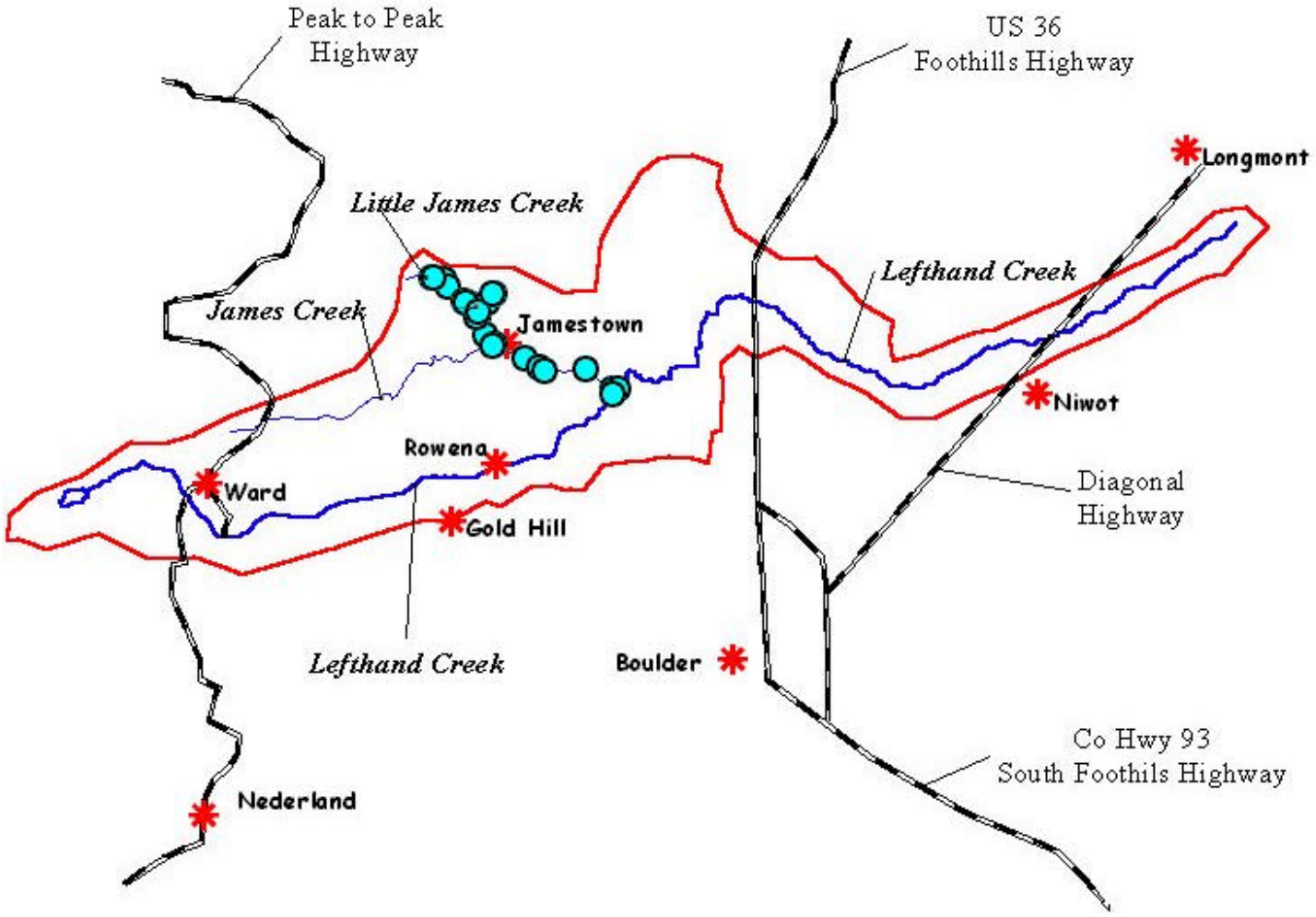
Bottom) Locations of EPA sampling sites in the Haldi Diversion area from the Captain Jack/Lefthand Creek report.






Peak to Peak
Highway
US 36
Foothills Highway
Longmont
Little James Creek
Lefthand Creek
James Creek
Jamestown
Niwot
Rowena
Ward
Diagonal
Highway
Gold Hill
Lefthand Creek
Boulder
Co Hwy 93
South Foothils Highway
Nederland

Map 7. Locations of the Non Point Source Study sampling locations.



5) Colorado Geological Survey

Sares, M. and J Lovekin. 1993. USFS [United States Forest Service]-Abandoned Mine Land Inventory Project. Final summary report. For the Boulder Ranger District. Colorado Geological Survey. 40 pp.

This report provides a summary of a Forest Service sponsored project to identify mine sites of concern in the Boulder ranger district. Sites of concern fall into two general categories; areas of environmental degradation and physical hazards. Almost 900 mine openings were inventoried. A description of the Physical Hazards is in Appendix F. Environmental degradation ratings are described as "somewhat subjective". Ratings were usually based on combinations of listed characteristics, but occasionally one aspect of a feature fully justified a rating.

General guidelines used by Colorado Geological Survey in assigning Environmental Degradation Ratings to mine openings, mine tailing piles and mine inventory areas.

Rating (EDR)	Feature usually displays one or more of the following characteristics:
1=Extreme	• Contamination offsite is severe. • Receiving stream is "dead" or sterile at the mine and downstream. • Effluent has extremely low pH (<4). • Effluent has extremely high conductivity (>1500 µS; >1000 µS in alpine areas). • High flows of poor-quality water, relative to the receiving stream. • Abundant precipitate at the mine and in the receiving stream. • Very large dumps or tailings piles with evidence of severe erosion, especially if they have abundant sulfides.
2=Significant	• Receiving stream is significantly or obviously adversely affected, but not "dead" or sterile. • Effluent has low pH (<5). • Effluent has high conductivity (>1000 µS; >500 µS in alpine areas). • Moderate flows of poor-quality water, relative to the receiving stream. • High flows of moderate-quality water, relative to the receiving stream. • Moderate to abundant precipitate at the mine and/or in the receiving stream. • Large sulfide-rich dumps or tailings piles with evidence of moderate erosion • Large dumps with sparse or no sulfides, but evidence of significant erosion.
3=Potentially Significant	• Evidence of degraded water quality, but serious effects are not obvious or detected. • ?Effluent has low pH (<5.5). • Effluent has moderate conductivity (>800 µS; >150 ? S in alpine areas). • Poor-quality water with low or no flow (standing water). • Moderate to low flows of moderate-quality water, relative to the receiving stream. • Minor amounts of precipitate.

Rating (EDR)	Feature usually displays one or more of the following characteristics:
	• Very large dumps with little or no evidence of erosion and sparse or no sulfides. • Small and moderate-sized sulfide-rich dumps or tailings piles with evidence of moderate erosion.
4=Slight	• Effluent with slightly acidic pH (<6.5). • Effluent with slightly elevated conductivity (600-800 µS; 100-150 µS in alpine areas). • Low flow volume with sparse or no precipitate. • Small to moderate-sized sulfide-rich dumps or tailings piles with little evidence of erosion.
5=None	• ?No effluent. • Effluent of high quality water. • Small dumps distant from surface water with little or no evidence of erosion.

Mine Openings: 230 mine openings on US Forest Service land were identified by the CGS study within the mapped boundaries of the Left Hand Creek watershed. 221 of these were given an EDR. The vast majority (n = 212) were rated "slight" (n=6) or "none"(n=206). Nine of the 16 mine openings identified by CGS as the "most important environmental degradation sites in the entire Boulder Ranger District are located in the Lefthand Creek Watershed.

- The Golden Age Mine in upper Castle Gulch was given an EDR of "Extreme". This mine was identified as the number one priority site for remediation in the review of the entire Boulder Ranger District (approximately equal to the upper elevations of the St. Vrain watershed).
- Three mine openings were given EDR's of "significant"* or "potentially significant":
    - Black Rose Mine*
    - East Bueno Mountain Gulch*
    - Gully West of Nugget Gulch*
    - Upper Hill Gulch
    - Lower Hill Gulch
    - Northwest Golden Age Hill
    - Upper Castle Gulch (2 mine openings)

Map 8 shows the locations of the mine openings by EDR.

Tailings Piles

Tailings piles, dumps and spoil banks were examined and rated on the basis of the criteria in the table above. Specific measurements were made at each tailing pile for the following characteristics:

- Steepest slope angle
- Size of materiasls (fine, gravel, cobbles, boulders)
- Stability
- Water erosion (rills/gullies, absence of fine materials)

CGS identified 186 tailings piles identified on US Forest Service Land in the mapped limits of the Lefthand Creek Watershed. EDR's were attributed to 176 of these. The vast majority (n=174) were rated as "slight" (n=8) or "none" (n=176). A tailings pile in upper Gillipsie Gulch was rated as "significant" and one in upper Castle Gulch was rated as "potentially significant". (See map 9)

Mine Inventory Areas

Seventy-one mine inventory areas were identified on US Forest Service lands within the mapped boundaries of the Lefthand Creek watershed. The inventory area boundaries were based upon the occurrence of mine openings, adits, shafts, tailing piles dumps and spoil banks. EDR's were applied to 66 of the mine inventory areas. The vast majority of these (59) were rated as "slight" (9) or "none" (50).

The Upper Castle Gulch/Golden Age Mine area was was rated as "extreme". Three sites were rated as "significant":

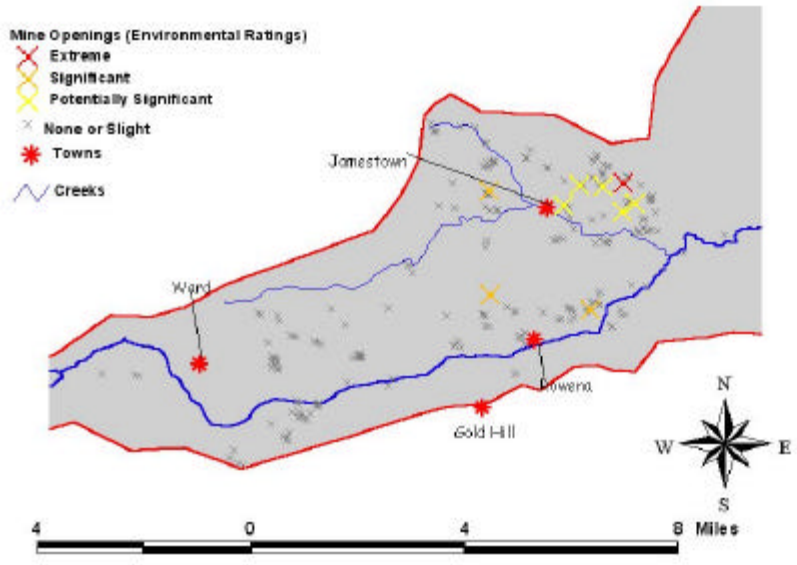
- East Bueno Mountain Gulch
- Black Rose Mine
- Gully West Of Nugget Gulch

Four areas were rated as "potentially significant":

- Northwest Golden Age Hill
- Hill Gulch
- Buffalo Gulch And Lower Hill Gulch
- Balarat Hill Gulch

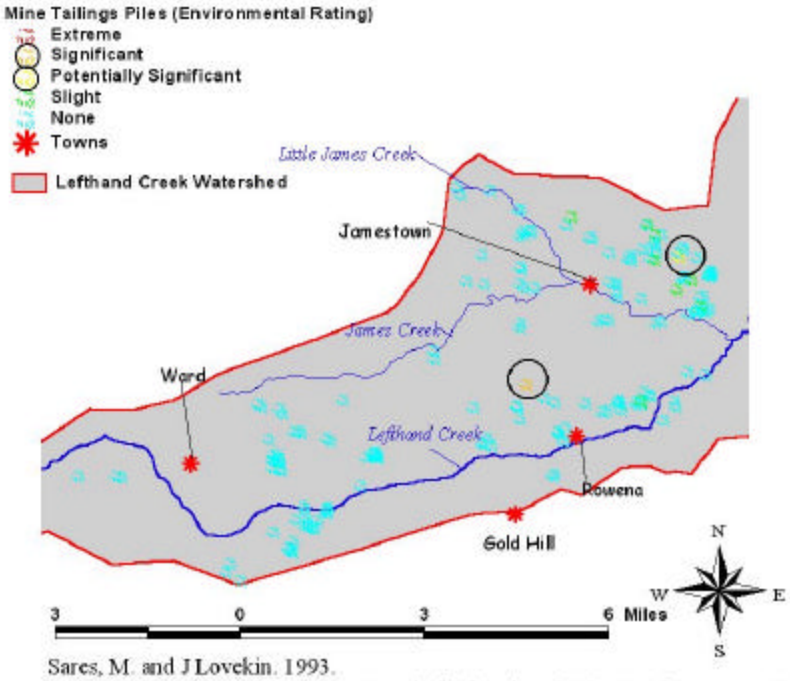
These areas are shown in map 10.

Map 8. Environmental Ratings on mine openings in the Lefthand Creek Watershed from the USFS Report.



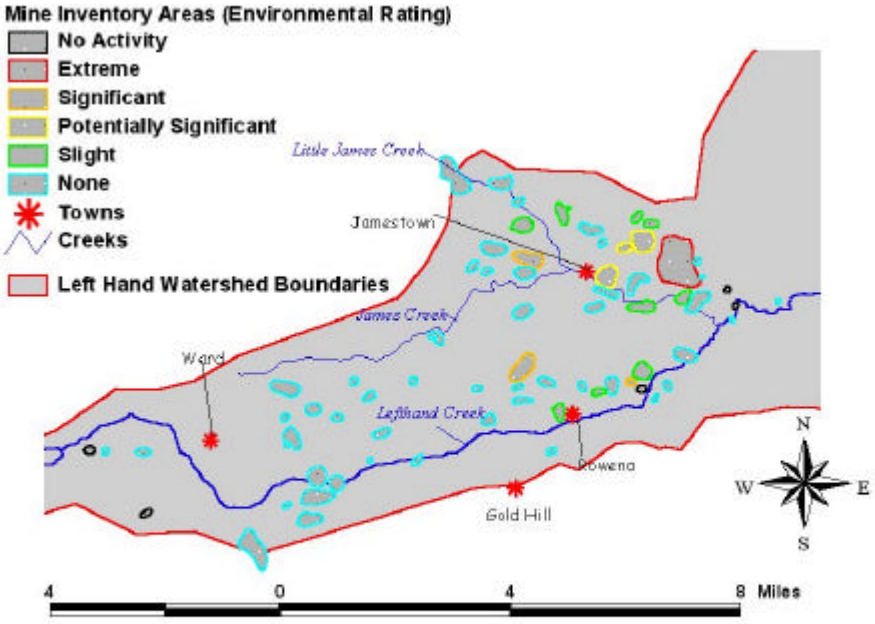
From Sares, M. and J Lovekin. 1993. USFS [United States Forest Service]-
Abandoned Mine Land Inventory Project.
Final summary report. For the Boulder Ranger District. Colorado Geological Survey. 40 pp.

Map 9. Environmental Ratings on mine tailings piles in the Lefthand Creek Watershed from the USFS Report.



Sares, M. and J Lovekin. 1993.
From: USFS [United States Forest Service]-Abandoned Mine Land Inventory Project.
Final summary report. For the Boulder Ranger District.
Colorado Geological Survey. 40 pp.

Map 10. Environmental Ratings on mines in the Lefthand Creek Watershed from the USFS Report.



Sares, M. and J Lovekin. 1993.
USFS [United States Forest Service]-Abandoned Mine Land Inventory Project.
Final summary report. For the Boulder Ranger District.
Colorado Geological Survey. 40 pp.

D. WATER AND SEDIMENT QUALITY CRITERIA

As mentioned above, the Task Force wanted to compare available data to several criteria to aid us in determining if a metals problem exists in the Lefthand Watershed. We considered both qualitative and quantitative criteria.

The qualitative criteria was developed by EPA to evaluate a sampling site relative to undisturbed surrounding areas, i.e. relative to background samples. This criteria was used by EPA in their HRS process to evaluate both water and sediment samples and is referred to as Elevated Contaminant Concentration (ECC) Criteria. This criteria is described in detail in Appendix F.

Quantitative criteria refers to concentrations of a given metal that are acceptable for aquatic life and human consumption. The criteria for a given metal are different for these two regimes. Often the acceptable concentrations for aquatic life are lower than those for human consumption because of the continuous exposure of aquatic life to the metals in the water. We used four criteria to evaluate surface water samples (there are no quantitative criteria for sediments). These criteria are briefly described below and are described in detail in the Appendix F.

- The first was the Ambient Water Quality Criteria (AWQC) developed by EPA for use in evaluating potential NPL sites using the HRS system. This criteria is for 9 metals only; cadmium, copper, iron, lead, nickel, mercury, selenium, silver, and zinc. These are the metals whose criteria were reported in the Golden Age report. These criteria were used to evaluate all surface water measurements from the EPA reports.

- The second was the Chronic Aquatic Life Criteria for Dissolved Metals. Chronic refers to continuous exposure by aquatic life as opposed to a single exposure event. The chronic aquatic dissolved metals criteria were used to evaluate the dissolved metals measurements from the second Golden Age Report and dissolved metals data from the River Watch data.

- The third was the Chronic Aquatic Life Criteria for Total Recoverable Metals. The chronic aquatic total recoverable metals criteria were used to evaluate the total recoverable metals measurements from the Captain Jack Report, the first Golden Age Report, the Lefthand Report and the total recoverable metal data from River Watch sampling.

- The fourth was Drinking Water Criteria. The drinking water criteria are for total recoverable metals and were used to evaluate the total recoverable metals measurements from the Captain Jack Report, the first Golden Age Report, the Lefthand Report and the total recoverable metal data from River Watch sampling.

The current Chronic Aquatic Life Criteria used by the State of Colorado are for dissolved metals, however, a significant number of samples were analyzed for total recoverable metals so we included both criteria.

For several metals we only found one criteria and decided to use what we could find. For aluminum the only criteria we found was for Chronic Aquatic Life, dissolved. For silver we had no conversion from total to dissolved so we used the chronic dissolved criteria for trout, as recommended in Regulation 38. For antimony, barium, beryllium, and manganese the only criteria we found was for drinking water. These criteria were used to evaluate all surface water measurements from the EPA reports.

We found **no** criteria for calcium, cobalt, potassium, magnesium, sodium, and vanadium.

E. WATER AND SEDIMENT RESULTS

In the following discussion, the maps presented represent the number of metals per sampling site that exceeded the various criteria. Details of which metals were exceeded in a given sample are found in Tables in the Appendix F. and are identified by Table number in the sections below.

1) Results based on Elevated Contaminant Concentration (ECC) Criteria

Tables 1 and 2 in Appendix F. list the ECC results from all of the EPA reports. Table 1 lists all sample sites and all metals and shows which metals at each site received the ECC designation. Table 2 lists the sum of ECC designations for each sampling site, i.e., how many metals exceeded the ECC criteria in each sample.

Map 14 shows the results in Table 2 from the Captain Jack Mill Report. All sediment and water samples from the Big Five Mine adit drainage and downstream of the drainage inflow into Lefthand Creek contained elevated metals concentrations. The surface water sample with the highest number of metals exceeding the criteria was at the Big Five Mine adit opening. The sediment samples with the highest number of metals exceeding the criteria was in the adit drainage downstream of the settling pond and in Lefthand Creek downstream of the adit drainage input.

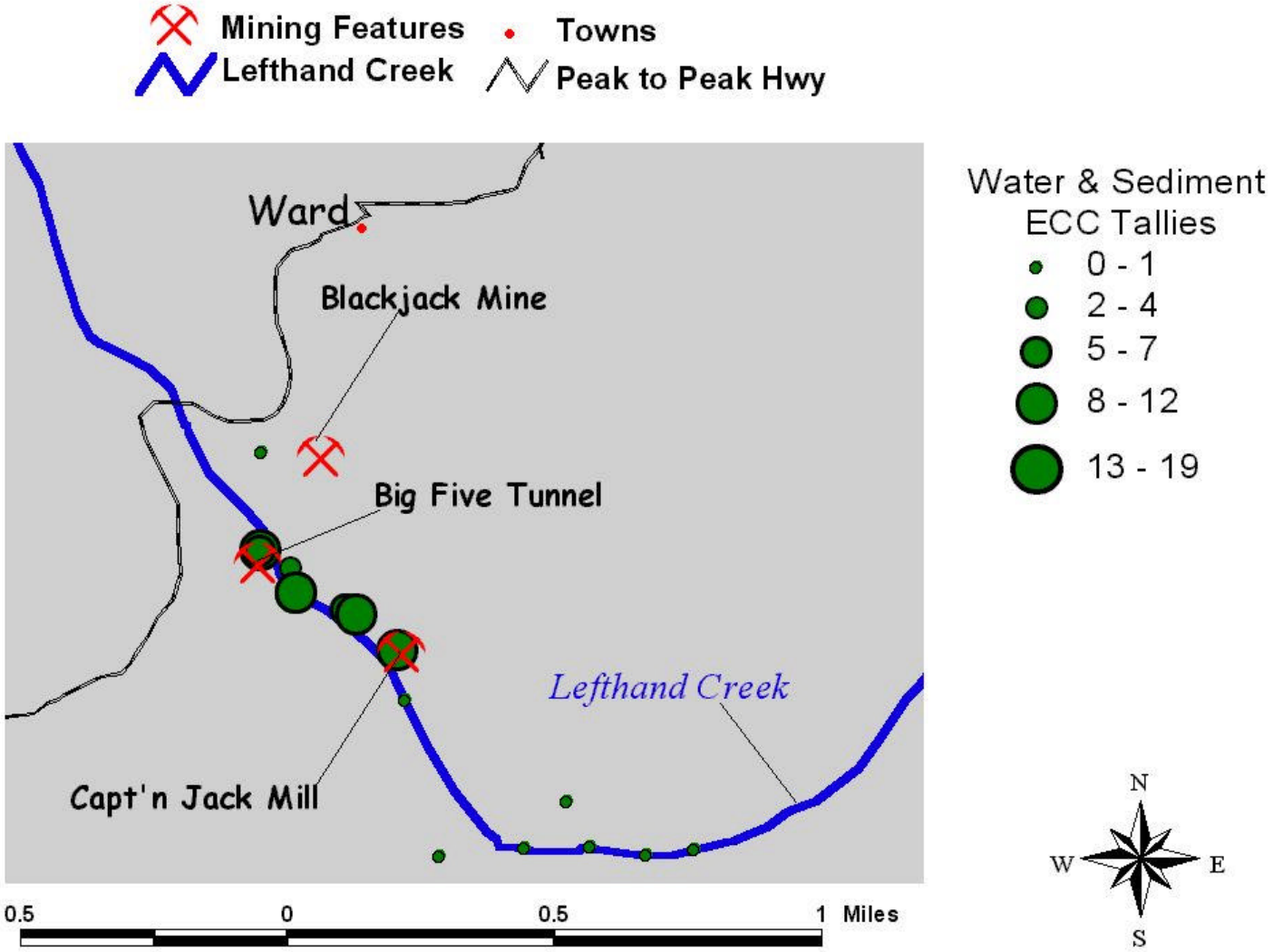
Map 15 shows the results in Table 2 from the Little James Creek portion of the Golden Age Reports. All samples downstream of the Burlington Mine in Balarat Gulch and Little James Creek showed elevated levels of metals concentrations. Surface water samples with the highest number of metals exceeding the criteria were just downstream of Balarat Gulch and at the east end of the streamside tailings. The sediment sample with the highest number of metals exceeding the criteria was at the east end of the streamside tailings. The surface water sample downstream of the Argo Mine showed no elevated levels of metals, however, a corresponding sediment sample did show elevated levels of several metals. The elevated metals coresponded to elevated levels in soil samples from the Argo Mine, which suggested that the source of metals in the sediments downstream of the Argo Mine were from the mine.

Map 16 shows the results in Table 2 from the James Creek portion of the Golden Age Reports. Elevated levels of metals were found in both surface water and sediment samples from James Creek between the confluence of Little James Creek and just downstream of the confluence with Lefthand Creek. The James Creek samples together with samples from several gulches feeding into James Creek suggest Hill Gulch, Jenks Gulch, and Castle Gulch may be sources of metals

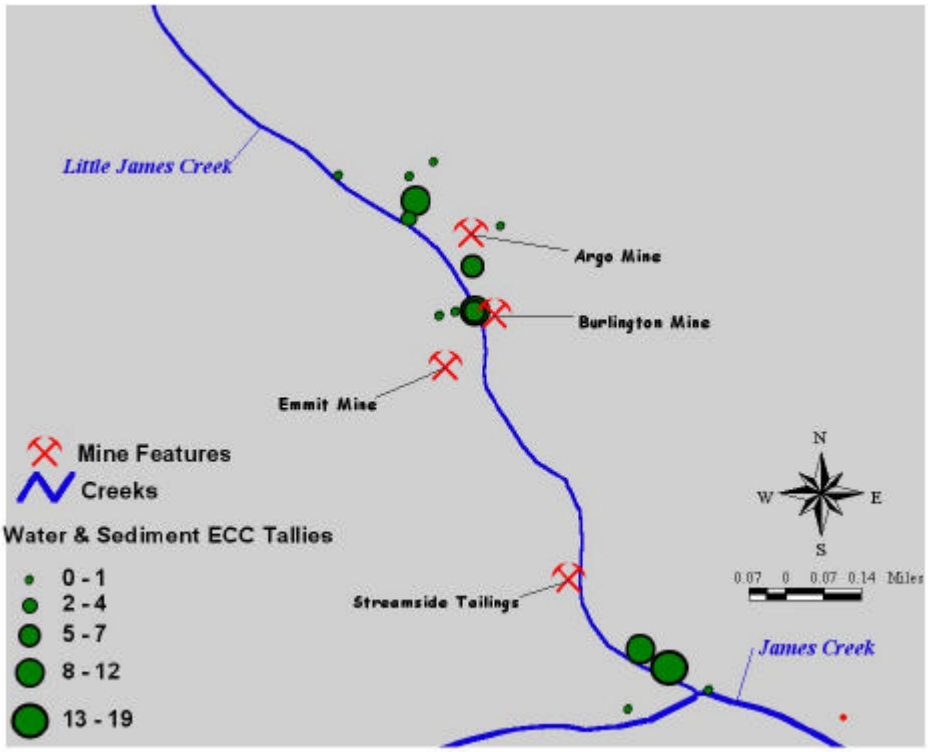
found in James Creek. A previous EPA study (dated 1995) found elevated metals in surface water and sediment samples from the Golden Age mine adit, Castle Gulch, and James Creek downstream of Castle Gulch. The data from the EPA 1995 Golden Age report were received by the Task Force after preparation of Table 2 and were therfore not included.

There were no samples that exceeded the ECC criteria in the Captain Jack/Lefthand Creek Report.

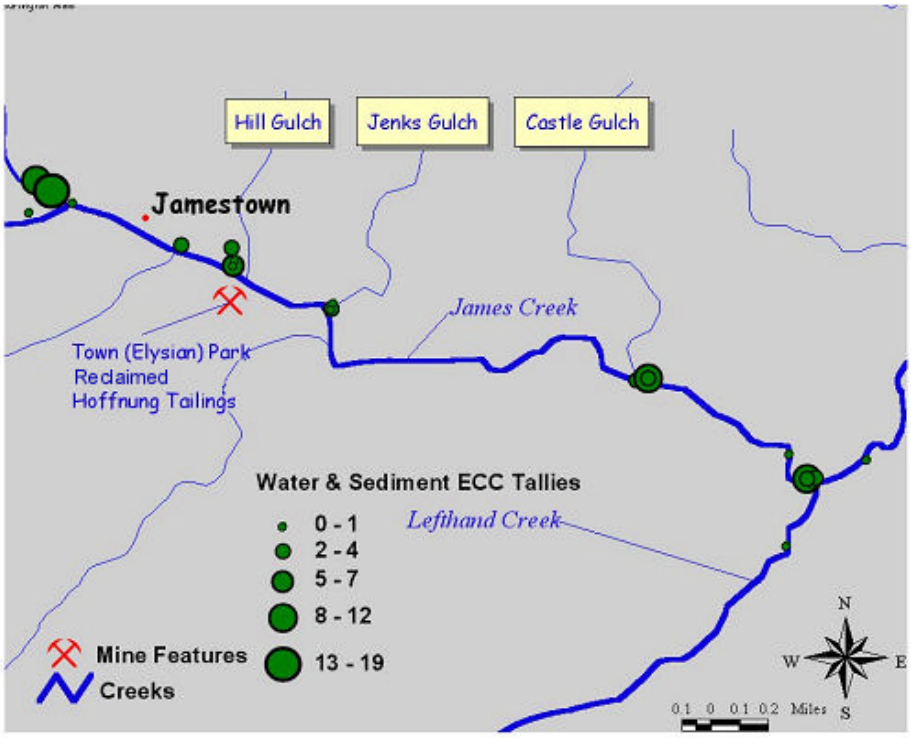
Map 14. Number of times the concentration of any metal from the EPA sampling sites in the Captain Jack Mill area exceeded the Elevated Contaminant Concentration Criteria (ECC).



Map 15. Number of times the concentration of any metal from the EPA sampling sites in the Little James Creek area exceeded the Elevated Contaminant Concentration Criteria (ECC).



Map 16. Number of times the concentration of any metal from the EPA sampling sites in the James Creek area exceeded the Elevated Contaminant Concentration Criteria (ECC).



2) Results based on the Ambient Water Quality Criteria

Tables 3 and 4 lists the results from comparing the EPA surface water samples with AWQC. Table 3 lists all sampling sites and metals for which we have AWQC and Table 4 lists the sum of metals that exceeded the AWQC criteria in a given sample. All surface water samples exceeded the AWQC for mercury (0.012 ug/l).

Map 17 shows the results from Table 4 from all the EPA reports. In California Gulch, all surface water samples from the Big Five Mine adit drainage and downstream of the drainage inflow into Lefthand Creek contained metals concentrations that exceeded the AWQC. All surface water samples from the Little James Creek area and James Creek from the confluence with Little James Creek to just below the confluence with Lefthand Creek also contained metals concentrations that exceeded the AWQC. Surface water samples from the Captain Jack/Lefthand Creek report were not analyzed for all the metals for which we have AWQC. However, based on the metals that were measured, all samples except just upstream of the Lefthand Creek and James Creek confluence and just downstream of the Haldi intake showed metals concentrations that exceeded the AWQC.

3) Results based on Chronic Aquatic Life Criteria for both Dissolved and Total Metals (ALC)

Tables 5 and 6 list the results from comparing the EPA surface water samples with the ALC. Table 4 lists all metals and samples and Table 5 lists the sum of all metals that exceeded the ALC in a given sample.

Map 18a shows the results from Table 6 for all samples from the EPA reports. Map 18b shows the results from Table 14 for samples from the Riverwatch report. Map 18c shows the results from Table 13 for samples from the nonpoint source report. All surface water samples from all of the reports contained metals concentrations that exceeded the ALC.

4) Results based on Drinking Water Criteria (DWC)

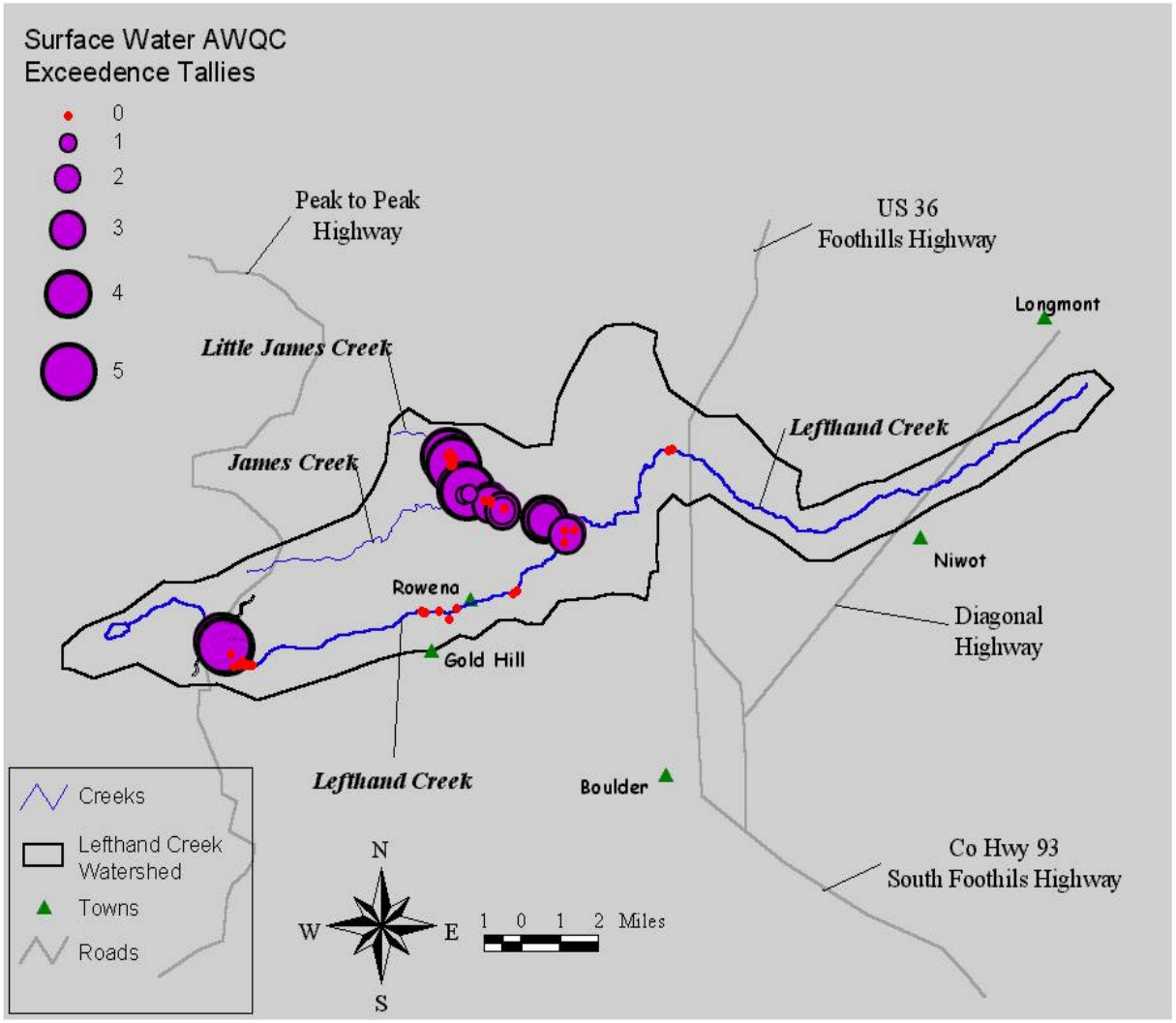
Table 7 lists all metals for which we have DWC and all sample sites. Table 8 lists the sum of all metals that exceeded the DWC in a given sample.

Map 19 shows the results from Table 8 for all surface water samples from the EPA reports. The following metals did not exceed the DWC in any samples: silver, arsenic, chromium, barium, selenium, and zinc. Mercury exceeded the DWC in only one sample, just upstream of the Haldi intake. The DWC for thallium was exceeded in all samples which included thallium analysis. Approximately half of the samples exceeded the DWC for iron and about a third exeeded the DWC for manganese. The samples that exceeded the DWC for antimony, lead, cadmium, were in the Little James Creek area or the Big Five Mine adit. The samples that exceeded the DWC for berylium were all in the Little James Creek area except for one sample in Hills Gulch.

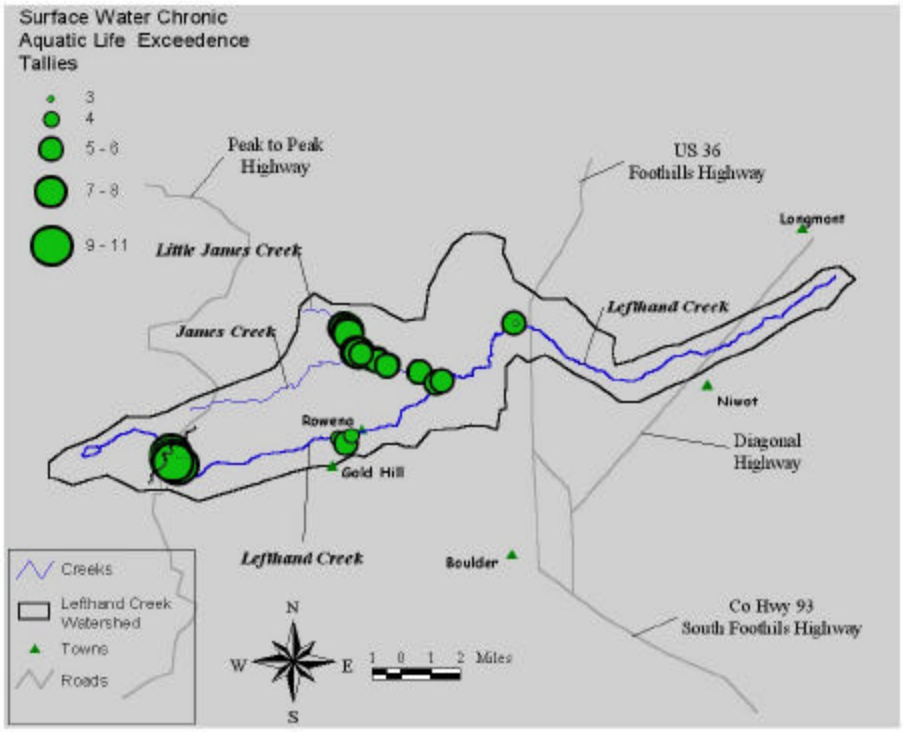
5) Combined results from all criteria

Map 20 shows the combined results from comparisons with all criteria as listed in Table 15.

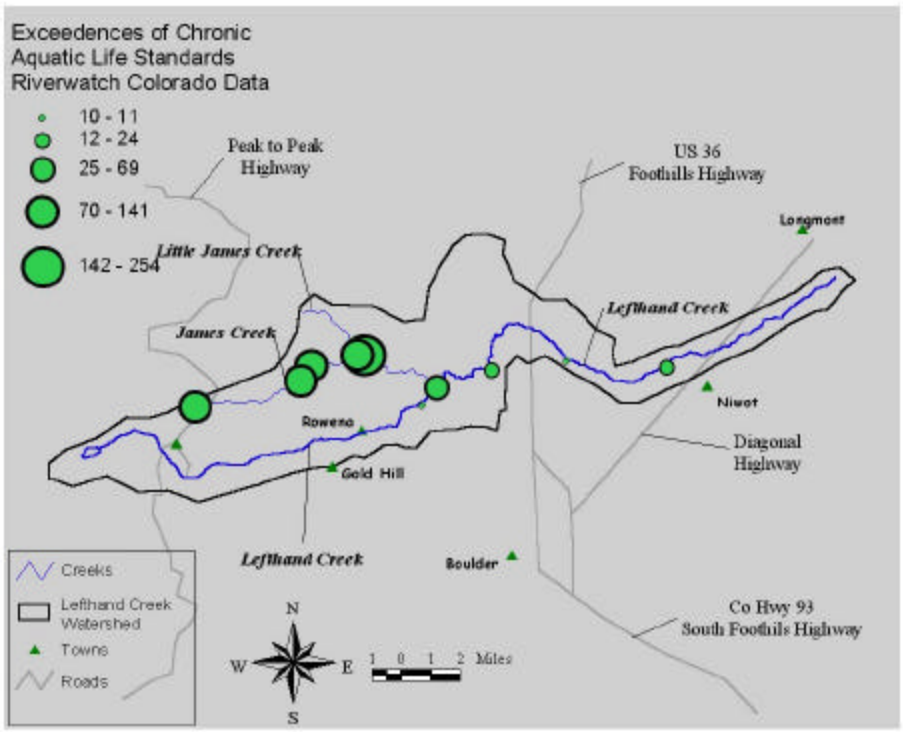
Map 17. Number of times the concentration of any metal from the EPA sampling sites exceeded the Ambient Water Quality Criteria (AWQC).



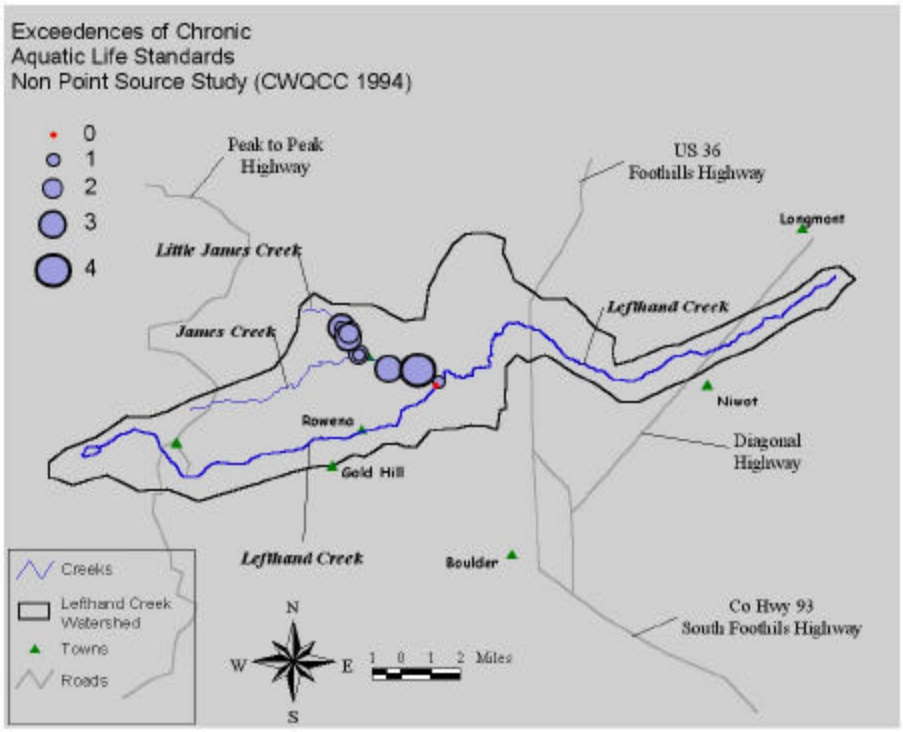
Map 18a. Number of times the concentration of any metal from the EPA sampling sites exceeded the Chronic Aquatic Life Criteria (ALC).



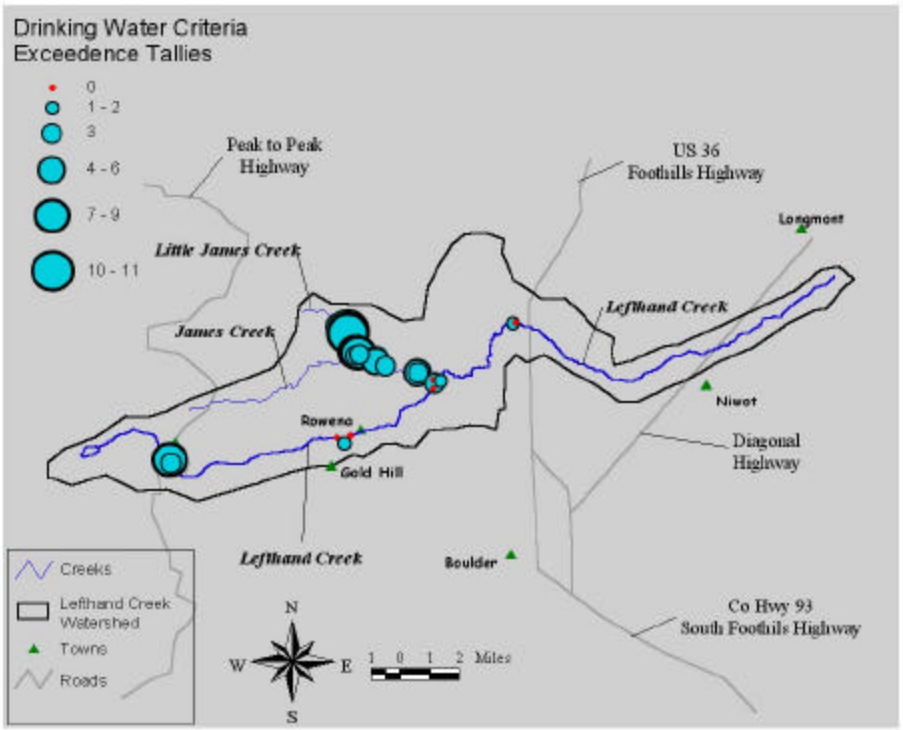
Map 18b. Number of times the concentration of any metal from the Riverwatch sites exceeded the Chronic Aquatic Life Criteria (ALC).



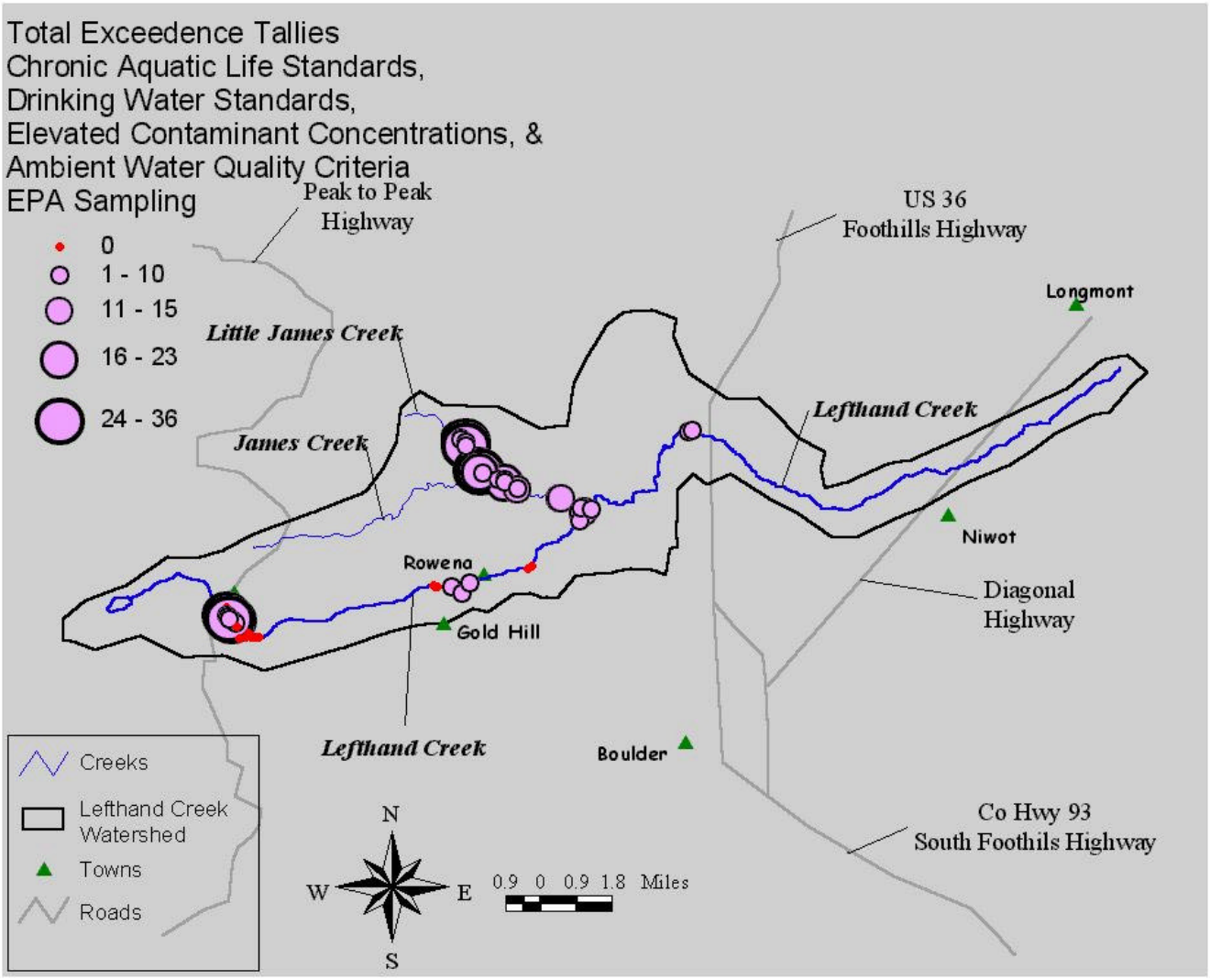
Map 18c. Number of times the concentration of any metal from the Non Point Source sites exceeded the Chronic Aquatic Life Criteria (ALC).



Map 19. Number of times the concentration of any metal from the EPA sampling sites exceeded the Drinking Water Criteria (DWC).



Map 20. Number of times the concentration of any metal from the EPA sampling sites exceeded any of Criteria, i.e., the ECC, AWQC, ALS, and DWC.



F. Assessment of Water and Sediment Results

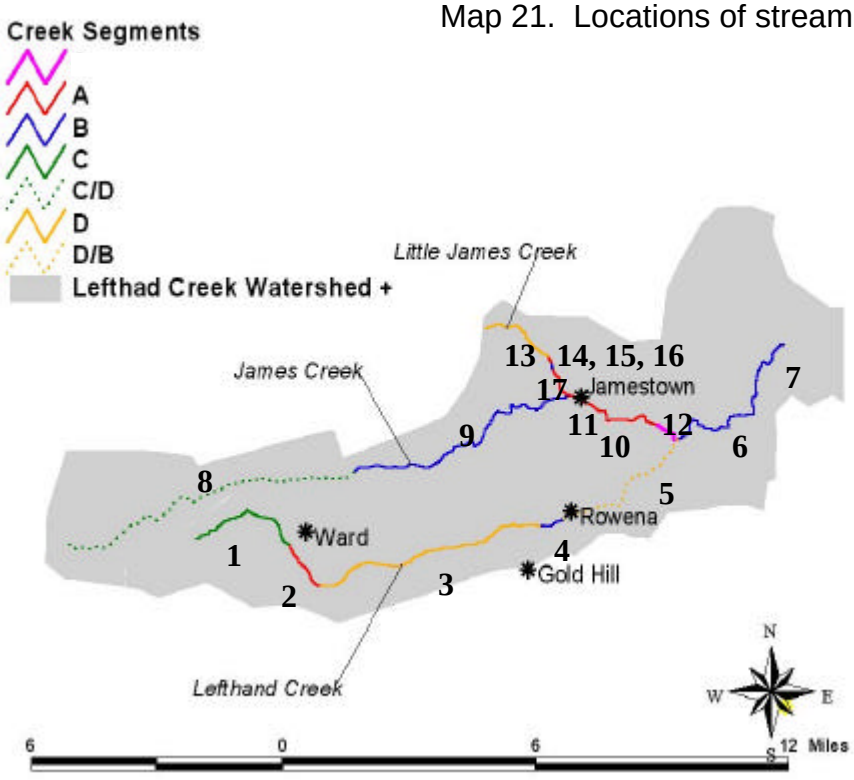
The Task Force is in unanimous agreement that insufficient data exists to fully characterize the impact of metals on the Lefthand Watershed. Most of the sampling has been centered in specific areas to provide initial evaluation of metals contamination. However, significant portions of the Watershed have not been adequately characterized.

Nevertheless, as per our charge, the Task Force used the available information to assess the Watershed. The Task Force unanimously agreed that we should consider the entire Lefthand/James Creek watershed in our report to the Boulder County Board of Health. In order to provide as complete an assessment as possible we divided the watershed into segments (Map 21) and assigned an assessment value to each segment based on the available information (Table 8). The assessment values are as follows:

A = Data strongly suggests that a problem exists
B = Data suggests that a problem MAY exist
C = Data suggests that a problem does NOT exist
D = Insufficient data exists to assess whether a problem exists

Our deliberations of assessment values included discussions of the results presented above as well as local input regarding a specific location. The location of each stream segment, the assessment value (AV), and the rationale for each stream segment AV is explained below.

Map 21. Locations of stream segments.



Segments 1-6 are located on Lefthand Creek, Segments 7-11 are located on James Creek, and Segments 12-? are located on Little James Creek.

Segment 1; AV = C: This segment is located between Lefthand Park Reservoir (which is south of the road to Brainard Lake) and California Gulch. To our knowledge there has been no mining activity along or near this segment. There are no known metals measurements along this segment, however given that there has been no known mining activity in the area, we designated an AV of C. This segment could be useful in the future as a sampling area for background values of metals.

Segment 2; AV = A: This segment is designated California Gulch and includes all mining related sites in California Gulch and downstream to and including the Loader Smelter tailings pile (near the junction of Sawmill and Lefthand Canyon roads). The California Gulch sites include the Captain Jack Mill, the Big Five Mine, the Black Jack Mine, and all associated ponds and drainages. A number of metals in samples from the adits, drainages, surface water, and sediments exceeded various criteria. In addition, an approximately 1/4 mile segment of Lefthand Creek in California Gulch has been impacted to the degree that no aquatic life is present. This segment clearly represents a situation where the available information strongly suggests that a problem exists so we designated an AV of A.

Segment 3; AV = D: This segment is from the California Gulch segment to the Slide Mine. Only one surface water sample and three sediment samples were collected in this segment, therefore, we designated an AV of D.

Segment 4; AV = B: This segment is located at the Slide Mine. Surface water and sediment measurements from the Slide Mine drainage pathway indicated elevated values for some metals. Based on local observations, drainage from the Slide Mine into Lefthand Creek is not continuous. However, an orange colored drainage from the Slide Mine has been observed entering Lefthand Creek. This is a segment where the available information suggests that a problem may exist but requires further study, therefore we designated an AV of B.

Segment 5; AV = D/B: This segment is located between the Slide Mine and James Creek. The samples in this segment included two sediment samples near Glendale Gulch and water samples near James Creek. The samples near James Creek indicated elevated metals however sample coverage of the segment was sparce. For these reasons, we designated an AV of D/B, which means that available information suggests a problem may exist, but adequate segment characterization requires more information.

Segment 6; AV = B: This segment is located between the confluence of James Creek and the Haldi Diversion. Measurements indicate elevated levels near the confluence of JC and LHC and at several stations downstream. Therefore, we designated an AV of B.

Segment 7: AV = D: This segment is the Haldi Diversion. Only two surface water samples have been collected in this area, one upstream and one downstream of the diversion. Therefore we designated an AV of D.

Segment 8; AV = C/D: This segment is located between Lake Isabelle and the South St. Vrain/James Creek Diversion. There are no known measurements in this area and there is no known mining activity. However, measurements in James Creek just below the Diversion suggest a problem may exist. Therefore, we designated an AV of C/D which means that available information regarding mining along this segment suggests that there should not be a problem but measurements just downstream suggest there may be a problem so further study is required.

Segment 9; AV = B: This segment is located between the Diversion and Little James Creek. Measurements suggest elevated levels of metals however sampling is rather sparce in this segment, therefore, we designated an AV of B.

Segment 10; AV = A: This segment is located between the confluence of James Creek and Little James Creek and Castle Gulch. Surface water and sediments samples along this segment showed elevated metals and suggest a problem does exist. We designated an AV of A for this segment.

Segment 11: AV = B. This segment is Elysian Park in Jamestown. Elysian Park was formerly part of a milling operation with a tailings pond at the site. The pond was filled in the mid-70,s to create the park. The project involved the State, County, and Army Core of Engineers with earth moving done by the County. The project used grant money from Colorado Division of Parks and Outdoor Recreation. In previous correspondence from the State, the Director and State Geologist said "we are very familiar with the proposed tailings pond reclamation project by the town of Jamestown. The project as outlined is extremely feasible and deserving of aid under the B.O.R. Community Park Development program. We wholeheartedly endorse the project which is a fine example of reclamation of lands affected by past mining activities." The site was filled in using mountain-side material adjacent to the Park

For many years it was fertilized with fresh horse manure to promote a healthy vegetative cap. Today it is vegetated with wild grass ground cover with the exceptions of the baseball field which is bare dirt, and a few small areas of exposed tailings where the cap has been worn down from natural erosion. Soil samples from the park and surface water samples downstream of the park have been collected but are inconclusive. Therefore we designated an AV of B.

Segment 12; AV = A: This segment is between Castle Gulch and Lefthand Creek and includes Castle Gulch and the associated mines, including the Golden Age Mine. The Golden Age Mine has a draining adit. Surface water and sediment measurements in the Gulch and downstream of the Gulch indicate elevated levels of metals. We designated an AV of A for this segment.

Segment 13; AV = D: This segment is from the headwaters of Little James Creek to the Argo Mine. We have no information on this segment and therefore designated an AV of D.

Segment 14; AV = A: This segment is the Argo Mine. The Argo Mine does not have a draining adit, but does have standing water. Measurements suggest that contamination problems exist at the Argo Mine so we designated an AV of A.

Segment 15; AV = A: This segment is the Burlington Mine. Episodic water flow down Balarat Gulch flows through the mine site. In addition it appears that groundwater may be seeping through the mine and exiting into Balarat Gulch. Measurements suggest that contamination problems exist at the Burlington Mine so we designated an AV of A.

Segment 16; AV = B: This segment is the Emmit Mine. The Emmit Mine has a draining adit with a very low flow that drains into Little James Creek. Measurements suggest that contamination problems may exist but additional information is necessary. Therefore, we designated an AV of B.

Segment 17; AV = 16: This segment in between Balarat Gulch and James Creek. Measurements suggest that contamination problems exist along this segment, which includes the Streamside Tailings, so we designated an AV of A.

V. CRITERIA USED FOR ANALYSIS OF CLEANUP OPTIONS

A. Community/Stakeholder Concerns and Other Criteria

The Task Force reviewed information from community meetings and other sources in order to understand the concerns of local residents and other stakeholders, both about water quality and about possible remediation activities. These concerns were then used to guide the development and evaluation of cleanup options.

Sources of information regarding stakeholder concerns included: notes from community meetings held in Jamestown, Ward, and Boulder in February and May 2001, letters written by groups such as the town Councils of Ward and Jamestown, the Left Hand Water District, and Citizens Advisory Group for the Environment (CAGE), and public participation at Task Force meetings.

The stakeholders identified by the Task Force include the mountain communities of Jamestown, Ward, Rowena, and the other residents and property owners within the watershed. Other stakeholders include the Left Hand Water District whose customers depend on Lefthand Creek for a significant portion of their drinking water, farmers whose irrigation water comes from the Lefthand Ditch Company, and the future generations who will be affected by the decisions regarding cleanup.

Community and stakeholder concerns and criteria are summarized below. The Task Force noted that some of these concerns and criteria are in conflict with each other and attempted to strike a reasonable balance between them in its final recommendations.

1) General Concerns About Watershed Issues

- Where there are known problems with water quality they should be addressed.

- Public officials and community members should neither exaggerate nor minimize potential risks. People should not be scared unnecessarily by misleading information or inaccurate interpretations of data. All actions and communication to the public should be firmly grounded in scientifically valid data.

- There has been uncertainty and concern about liability for costs of cleanup for both residential and non-residential property owners, including Boulder County.

2) Concerns/Criteria Regarding Cleanup Options

- Local community members and stakeholders must have significant input into the process of developing and implementing plans for assessment and/or remediation. Whoever is leading the effort must be held accountable for responding to community and stakeholder concerns.

- Any cleanup effort should minimize disruption of the personal and social life of the affected communities (i.e., traffic, noise, dust, obstruction of public spaces).

- Cleanup activities should not themselves cause secondary problems by releasing toxic materials into the air or water that could threaten the quality of water used by watershed residents and/or customers of the Left Hand Water District.

- If cleanup is necessary, it should be done as quickly and efficiently as possible.

- There should be reasonable certainty that remediation will actually remove identified water quality problems (i.e., that pollutants in the water are not "naturally occurring" in the watershed and will remain once a cleanup operation has been completed).

- Public finances and other resources should be used as efficiently as possible.

- Before beginning cleanup operations, there should be a reasonable level of confidence that sufficient funds are available to complete the project once it has begun.

3) Concerns of Specific Stakeholder Groups

- A significant number of Ward and Jamestown residents expressed a strong preference that no sites within their town boundaries be listed on the NPL, largely due to concerns about the stigma of Superfund (e.g., reduced property values), and a distrust of the administering agencies (EPA and CDPHE) that is based on their history of cleanups in other communities and on interactions with agency representatives over the past 2 years (See Section III. "Historical Context").

- Representatives of the Left Hand Water District have stated that they are more concerned about the long-term negative consequences of delaying or forgoing cleanup than they are about the possible short-term "stigma" of certain sites being listed on the NPL. In other words, in general they would feel comfortable with Surperfund listing if they were assured that this was the most efficient method of removing identified problems.

  The Water District has also expressed a concern that cleanup operations should not release pollutants into their source water that could require them to close their intake for long periods of time.

- Similarly, those representing "future generations" of Boulder County residents identified their strongest concern as getting potential long-term environmental problems cleaned up as quickly and thoroughly as possible, and were less concerned about whether this is done via a Superfund process or an alternative approach.

4) Other Concerns and Criteria Identified by the Lefthand Watershed Task Force

- Regardless of who is conducting them, any further assessment and/or cleanup activities need to be coordinated and integrated into an overall watershed-wide plan. The Task Force is concerned that if multiple sites are being addressed individually by different agencies and funding sources — or even by a single entity — there may by a lack of accountability for improving water quality throughout the watershed. In particular, this challenge could present itself if there were two different lead agencies (EPA and CDPHE) managing two potential Superfund sites (California Gulch and the Golden Age Mining District) as has been suggested by CDPHE and EPA officials.

VI. EVALUATION OF CLEANUP OPTIONS

The Task Force developed and analyzed three options for cleanup based on the concerns and criteria described above. Although they are each described in detail below, the Task Force recognized that these options are not necessarily mutually exclusive. That is, there may be features of each one that taken together may enable a balanced approach that will address as many of the (sometimes competing) concerns and criteria as possible.

A. Option #1: Do Nothing

1) Description

The Lefthand Watershed Task Force has identified certain areas of the watershed that are cause for some concern about potential risks to human and environmental health. In addition, the EPA has determined that some of these areas are eligible for Superfund listing based on their probable HRS score. However, Boulder County still has the option to recommend that nothing be done to address these concerns, and the Task Force felt that it would be worthwhile to assess the consequences of doing nothing.

It should be noted that even if Boulder County decides not to recommend any action to address watershed concerns, this does not mean that the EPA will do nothing -- they have the option under federal law to come in and clean it up anyway.

2) Advantages

- The water in some segments of the watershed is virtually pristine and there is not a known immediate danger to residents of the watershed. In addition the water used by customers of the Lefthand Water District meets all mandated standards.

- It is not presently conclusively known that remediation efforts would remove all of the contaminants found in the watershed. There may be certain "background" levels of pollution that occur naturally in the watershed (it has been pointed out by some who are familiar with the area's mining history that if the land through which Lefthand Creek and its tributaries run were not rich in certain minerals, there would never have been mining activity there in the first place).

- Doing nothing would eliminate the possibility of the negative consequences of a cleanup effort that have been identified by community members and other stakeholders (see Section V.), such as disturbing the land, interfering with the personal and social lives of affected communities, creating a stigma that could threaten property values, etc.

3) Disadvantages

- Known water quality problems will not be corrected, unless natural processes take care of them over an unknown period of years.

- The current condition of the water quality will not be fully understood, the current health risks will not be assessed, the potential health risks will not be known.

- There could be legal liability for the County if it had data that suggested a problem may exist and recommended against addressing them.

- This option would not address the concerns/criteria regarding the imperative to mitigate problems once they are known.

B. Option #2: Proceed with Further Assessment and Remediation Via the Superfund Process

1) Description

Superfund is the EPA's process for responding to and cleaning sites that have been impacted by contamination from historical operations such as landfills, mining, manufacturing, etc. These are typically sites that may or may not have previous owners/operators that are currently associated with the site. Where an owner/operator can be established for a given site (known as a "potentially responsible party" or PRP), the EPA's enforcement division will bring legal actions to recover the cost of cleanup. However, the EPA does have a residential property owner policy where "in the exercise of its enforcement discretion, [EPA] will not take enforcement actions against an owner of residential property to require such owner to undertake response actions or pay response costs, unless the residential homeowner's activities lead to a release or threat of release of hazardous substances, resulting in the taking of a response action at the site."

Where no such PRP can be identified, Superfund monies will pay for site characterization and cleanup. Such funds have generally come from a tax which was established early in the program by Congress to pay for the cleanups. The tax expired in 1995 and current funds for cleanup are coming from the general fund.

Areas which have undergone Superfund cleanups in the past in Colorado have included the Globeville site in North Denver, Rocky Mountain Arsenal, Rocky Flats, Leadville, Aspen, and the Shattuck site in south Denver. Representatives of several of these communities were interviewed by Task Force members (See Appendix C.)

The EPA Superfund process generally entails several phases, as follows.

1. Preliminary Investigation Using the "Hazard Ranking System" (HRS)

In the first phase, a site is designated for possible Superfund status based on the results of a screening investigation. In this step, a site will be ranked according to a Hazard Ranking System (HRS) which scores a site based on potential negative environmental and human health effects. In the present case, an HRS score

sufficient for possible Superfund ranking was achieved based upon impacts to the aquatic environment of some areas of the Lefthand Watershed as well as for potential threats to users of the Lefthand Water District in the event of a catastrophic storm or similar event.

2. Listing on the National Priorities List (NPL)

In the second phase, a site is proposed for Superfund eligibility by being entered onto the National Priorities List (NPL). Sites listed on the NPL are periodically reviewed by EPA officials and prioritized according to their urgency for cleanup.

3. Approval of Superfund Eligibility

A select number of proposed sites are approved each fiscal year to receive Superfund monies for further assessment and remediation of identified problems.

4. Completion of the "Remedial Investigation/Feasibility Study" (RI/FS)

Once a site is approved for Superfund monies a Remedial Investigation/Feasibility Study (RI/FS) is conducted. The purpose of the RI/FS is to fully characterize the extent of contamination, identify sites having the greatest impact in an area, and develop acceptable and feasible means of treatment, mitigation, and cleanup. The remedial design usually includes engineering reviews to insure proper design and construction requirements are met. The RI/FS can take up to two or more years to complete and can cost from a few to several hundred thousand dollars depending on the sites, types of contamination, and areas of impact.

5. Identification of "Potentially Responsible Parties" (PRP's) and Cost Recovery

Upon completion of the RI/FS, EPA's enforcement division will initiate actions to notify and collect funds from "responsible parties" to cover costs of the cleanup actions, based on their assessment of the extent to which a PRP may have contributed to the problem being remediated. Litigation can and is used in recovering these costs.

6. Cleanup

Cleanup begins after the RI/FS is completed and a remedial design is prepared. This is generally the most expensive phase of the project because of the labor and equipment required. Both onsite and offsite disposal options are generally considered when developing cleanup alternatives.

7. Removal from NPL

Once the EPA certifies that a cleanup operation has effectively removed the source of contamination, the site is removed from the NPL.

2) Advantages

- ***Potential for Funding*** – Proper cleanup activities at sites such as those in the Lefthand Watershed can require sustained levels of funding over many years. Superfund is the only source of funding that has the potential to provide all of the required funds for cleanup over the required period of time (although some concern has recently been raised about Superfund's ongoing capacity to provide these funds – see below).

- ***Technical Expertise*** – Because of the liability issues involved, site characterizations and cleanup actions require participation of a large number of skilled scientists, analysts, laboratories and engineers. Utilization of inexperienced or untrained workers in these operations can lengthen the cleanup, increase costs and potential liabilities, and lead to increased health and safety risks. The Superfund process will insure that experts trained in Superfund-type cleanups are used in the various phases of the operation.

- ***Coordination/Management*** – Environmental cleanups of the type being considered for sites within the Lefthand Watershed require multidisciplinary teams to perform the necessary field investigations, laboratory analyses, engineering design, and construction activities. Coordination of all of these activities require at a minimum a full-time project manager who will ensure that the various project elements proceed on schedule, that contractors are qualified to do the needed work, that work proceeds according to accepted scientific standards to meet legal requirements, and that all health and safety procedures are implemented. Superfund would provide qualified and dedicated management personnel for this purpose.

- ***Legal Costs Covered*** – Superfund actions are based on established law that provides for cost recovery, transfer and acceptance of liability, and legal justification for each required action. Legal requirements in any type of remedial action can represent a substantial cost, especially as they relate to gaining concurrence between regulators and PRP's regarding acceptable cleanup standards and proposed methodologies. Superfund will cover these legal costs.

- ***Liability Assumed*** – Persons, entities, etc. involved in cleanup activities at potential Superfund sites can assume liabilities under such actions that make them liable for an entire cleanup. Any non-Superfund cleanup action which results in secondary releases of contamination can transfer liability to those parties directing or conducting the cleanup. Under Superfund, all liabilities for such cleanups will be assumed by the State and Federal agencies involved in directing the cleanups.

- ***Includes Cost Recovery Mechanisms*** – Superfund provides a legal basis for recovering costs of cleanup actions from "responsible parties". Such responsible parties include those who owned or operated a site, those who generated wastes/contamination, and/or transporters of waste. Identifying these responsible parties can involve extensive preliminary activities to confirm prior ownership, connect contamination to owners and operators, etc. Superfund will provide and fund the legal teams that will perform these activities. This will insure that as much of the cost for cleanup as possible is assumed by those responsible for the contamination as opposed to the taxpayer.

- ***Provides for Community Involvement*** – The Superfund program includes support for local stakeholder involvement throughout all phases of assessment and cleanup via Technical Assistance Grants of up to $50,000 per year.

3) Disadvantages

- ***Stigma*** – Concern has been raised concerning the stigma attached to a community under a Superfund designation. In particular, residents are concerned that such a stigma could reduce property values or make real estate difficult to sell. According to the EPA, drops in real estate values of up to 8% have occurred during cleanup in some communities.

- ***Uncertain Length of Time on the NPL*** – The perceived stigma of being listed as a Superfund site can be compounded by the lack of certainty regarding how long a site might remain on the NPL. Historically, the length of time between listing and removal has ranged from eighteen months to twenty years (i.e., since the program's inception).

- ***EPA/State Interactions*** – Concern has been expressed concerning the difficulties of working with state and federal regulators in conducting Superfund actions, and a certain level of distrust exists between agency representatives and local community members. Some residents are not confident that these agencies will operate according to the best interests of the affected communities, and have felt that agency representatives have not always operated in good faith or been as forthcoming as they could have or should have been with important information.

- ***Lack of Local Control*** – Concern has been expressed about the degree to which local community members would be able to influence the development and implementation of the RI/FS and cleanup phases once the Superfund process is underway. One example of this is the concern that the boundaries of Superfund sites might "creep" once they have initially been established, as was the case in the Leadville Superfund operation.

- ***Uncertain Funding Availability*** – Currently, the EPA is unsure as to when funds could be made available to proceed with the Superfund process in the Lefthand Watershed. There is concern about the possibility that sites in the watershed may

remain on the NPL list indefinitely without any action being taken due to a lack of funds.

NOTE: It has recently been widely reported in the national press that the Superfund trust fund is running out of money and the Bush administration's proposed budget does not include reauthorization of Superfund taxes (See Appendix E. New York Times Article of 2/24/02). These reports describe how the lack of money is forcing EPA officials to rethink their priorities. For example, in the last two years, the EPA has cut the overall number of sites it has designated for cleanup and completed cleanup at fewer sites than it selected. This year, the EPA has considered the addition of only two sites, both of them large old mines, one in Montana and one in Nebraska. According to Rep. Frank Palone of New Jersey, "the amount of money available for [Superfund] will be dramatically less." He predicted that ultimately, fewer sites would be cleaned up because the administration would not reinstitute the tax and would not allocate more taxpayer money from general revenues.

- ***Higher Costs*** – In the past, some Superfund actions have resulted in excessive costs due to legal actions, lawyers' fees, and EPA/State agency administrative fees (costs which are borne by Superfund). High legal costs are incurred when responsible parties challenge the proposed cleanup actions through litigation. Some of these costs can be avoided when voluntary cleanups are performed by responsible parties who chose not to make court challenges regarding required cleanup actions.

B. Option #3: Pursue Further Assessment and Remediation Using Alternatives to Superfund

1) Description

a. Stakeholder-Run Initiative

A stakeholder-run initiative is a community-based effort in which stakeholders in the affected community assume the responsibility of assessing, planning, and implementing the needed cleanup activities. This group would work closely with the EPA and Colorado Department of Public Health and Environment (CDPHE) during the various phases of cleanup activities.

Task Force members interviewed representatives of several other communities in which this approach is being used, including (See Appendix C.):

- Willow Creek Reclamation Committee in Creede, CO
- Animas River Stakeholders Group in Silverton, CO
- Snake River Task Force in Summit County, CO

Typically, a stakeholder group brings together a variety of resources and methodologies, such as promoting voluntary cleanups by land owners, using State and Federal grants from various governmental entities, cash contributions from various parties (including affected industries) and in-kind matching contributions.

It is important to understand that communities have chosen the stakeholder-run approach not to avoid cleanup, but rather to do it in way that that best meets the overall needs of the community including diverse stakeholder groups which often seem to have opposing interests. It is also true that the stakeholder-driven approach does not remove the possibility of becoming a Superfund listing. The EPA can still step in and designate a site as Superfund-eligible if cleanup is not done adequately or in a timely manner. Knowing this provides stakeholder groups with an incentive to get cleanup done.

b. Voluntary Cleanup

At least one of these components is already in place in the Lefthand watershed, as the Honeywell Corporation has stepped forth and is in the process of applying to do a voluntary cleanup at the Burlington Mine. In addition, the US Forest Service may be willing to take a lead role in cleanup of the Golden Age mine (over which they have statutory authority through CERCLA), and Boulder County may want to oversee cleanup at the Argo mine, which it recently purchased through its Open Space program.

c. Other Resources

The Task Force reviewed several other possible sources of funding and technical assistance that could potentially be used to support further assessment and possible remediation, including:

- US Environmental Protection Agency (other than Superfund)
- US Geological Survey
- US Forest Service
- US Office of Surface Mining
- US Army Corps of Engineers
- Colorado Division of Minerals and Geology
- Colorado Department of Local Affairs
- University of Colorado

2) Advantages

- ***Feasibility*** **--** As already discussed, other communities in Colorado have stakeholder-run initiatives that can serve as models and allies. In addition, citizens in the Lefthand watershed have already shown a willingness and an ability to effectively address environmental issues in the region. Examples include the James Creek Watershed Initiative, Citizens Advisory Group for the Environment (CAGE), and Mountain Open Space Team (MOST).

- ***Reduces and/or Eliminates Community Concerns Related to Superfund Listing*** **–** Concerns related to the stigma and fear of Superfund, such as fear of potential impact on property values, would be eliminated. The community would maintain local control and not be forced to adopt a federally mandated, one-size-fits-all approach. This will enable flexible, creative local solutions to be developed and applied to local problems.

- ***Reduces Reliance On A Single Source Of Funding*** – Although the Superfund program is intended to provide "one-stop-shopping" for all of the funds required to clean up a given site, there is some uncertainty as to the financial future of the program and its ongoing capacity to provide this kind of support. A stakeholder-driven effort, on the other hand, would use a variety of approaches and seek a variety of resources to accomplish a cleanup, which would mean that no single source would have to be relied upon to provide all the necessary funds.

- ***Customized to local needs*** – As mentioned above, a stakeholder-run initiative can be tailored to the values of the community and can be more flexible, personalized, and caring of the potentially affected citizens, particularly for those who live near the problem sites than a large federal program such as Superfund.

- ***Promotes proactive vs. reactive approaches*** **--** In contrast to a Superfund approach, the community can be proactive in stakeholder-driven approach. Instead of merely reacting defensively to issues and proposals raised by the EPA in their Technical Assistance program, the community will be able to take the initiative, propose solutions, and not be prohibited in following certain paths because of the constraints of a Technical Assistance Grants (TAG).

- ***Efficient Use of Public Funds*** -- With Superfund projects, a substantial amount of the budgeted money can go to legal and consultant's fees rather than to actual cleanup. In addition the actual costs of cleanup can also be higher under Superfund because of federal work rules and other requirements. In contrast, stakeholder-run initiatives are succeeding in applying most of the money to resolving the actual issues. Not only does this substantially lower the overall cost of cleanup but it saves taxpayers' money. There is also less likelihood of costly legal battles with PRP's if cleanup activities are approached more collaboratively than confrontationally.

- ***Does Not Eliminate Accountability to EPA/CDPHE*** – Even if the County supported a local stakeholder-run initiative, EPA and/or CDPHE would still need to sign off on plans for assessment and remediation, and could still eventually decide to list the sites on the NPL if an alternative approach did not effectively remove the sources of contamination.

3) Disadvantages

- ***Requires Significant Commitment of Time and Resources*** -- A stakeholder-driven approach takes a strong commitment from the community backed up by a

lot of work over possibly many years. This includes getting organized, writing grants, managing projects, and meeting regularly. In addition, turnover by the participants can add to the stress of sustaining an on-going effort. A strong commitment from both the Board of Health and the County Commissioners would also be required.

- ***Funding Challenges*** **--** While a variety of potential grant sources exist, no single source could provide all of the necessary funds outside of Superfund. In addition, grants can take a couple of years to secure, and they may not continue for the duration of the entire cleanup introducing variability from year to year. While Honeywell has stepped forward with a plan for voluntary cleanup at the Burlington mine, no other entity appears to be willing and/or able to provide private funding for cleanup at this time.

- ***Less Leverage Over PRPs*** -- Without the legal and financial leverage that Superfund can apply, some PRPs may be less willing to negotiate voluntary cleanups. A stakeholder-run initiative also would not have access to Superfund's legal resources and expertise for recovering cleanup costs from PRP's.

- ***Raises Liability Issues*** -- A liability issue exists today for those sites that cannot be cleaned up through voluntary effort of the owner or former operator of a mine. It would be nice to think that for those sites, the umbrella organization would just go in and manage the cleanup. However, under today's environmental laws, the party doing the cleanup may take on the full legal responsibility for the environmental cleanliness of the site. This has been, and continues to be a big deterrent to voluntary cleanups throughout the country.

- ***Does Not Eliminate the Need for Interaction with EPA/CDPHE Superfund Program*** – As noted above, Superfund representatives would still be involved if a local stakeholder initiative undertook an assessment and cleanup operation. This means that community concerns expressed about interacting with these agencies might still exist.

- ***Potential Conflict of Interest for Boulder County*** – Because of its ownership of the Argo mine, one of the sites being investigated, Boulder County may be in an awkward legal position as both a partner in a stakeholder-run cleanup initiative and as a PRP.

VII. RECOMMENDATIONS TO THE BOARD OF HEALTH

In the Data Assessment and Findings section, the Task Force considered the entire Lefthand Watershed. We also consider the entire watershed in this Recommendations section.

In consideration of the Data Assessment and Findings, information from the EPA, CDPHE, and other communities, the concerns of the stakeholders of this community and other criteria, the Task Force makes the following recommendations to the Board of Health.

The County should empanel a Watershed Oversight Group (WOG). The purpose of this group would be to serve as a hub for communications and information from throughout the Lefthand Watershed. WOG would represent community and other stakeholder interests in all aspects of Watershed activities, including the Superfund process and a Stakeholder-Run Initiative. WOG would also facilitate the process of evaluating and determining options for Watershed characterization studies. Members of WOG would include representatives from various stakeholder groups, including the County and State Health Departments, communities in the Watershed, the Left Hand Water District, mine owners, technical experts, and other stakeholder groups who express interest. WOG members would be volunteers. However, the Task Force recommends the County hire a WOG coordinator. WOG would work closely with a Stakeholder-Run Initiative group and may help facilitate various studies as needed. A key role of WOG would be to ensure that all investigation and remediation activities at all sites in the watershed are well-coordinated. If the effort is successful in the Lefthand Watershed the role of WOG could be expanded to include other Watersheds in Boulder County.

There is a substantial lack of information regarding metals concentrations and impacts in much of the Watershed and the taskforce believes that a means must be found for obtaining an overall assessment of the condition of the watershed and *all* the potential problem areas. WOG would play a central role in facilitating the process of determining the optimal approach to achieve this goal.

The Task Force strongly recommends that, regardless of the cleanup option, the County should develop clear agreements with all parties including EPA, CDPHE, and stakeholders, that clearly define how local residents and other stakeholders will be involved in the study and remediation processes, and how community and stakeholder concerns will be addressed *(see Section V. "Criteria Used for Analysis of Cleanup Options").* This process should proceed through WOG where appropriate.

Features of such a Memorandum of Understanding should include:

- Establishment of a clear mechanism for resolving disputes and concerns that may arise, so that citizens will know who to contact if a problem arises, and issues can be worked out before they escalate into disputes. This mechanism could be one of the functions of WOG.

- Assurance that the boundary of any designated Superfund sites will not include any area within the Towns of Ward and Jamestown. If testing within these Towns is conducted as part of the RI/FS process and a problem is identified as a result, these Towns should have the opportunity to address the problem via non-Superfund methods if they so choose, rather than expanding the boundary of the designated Superfund site.
- Residents should be assured of courteous and respectful treatment by agency officials and their subcontractors.
- Residents will be guaranteed that potential health-and-environmental-affecting side affects will be absolutely minimized such as airborne dust and pollutants, further contamination in streams, and noise pollution.
- Cleanup-related traffic should not pass through established communities if at all possible.
- Every reasonable effort should be made to preserve historical features within cleanup areas.
- Cleanup activities should be well-coordinated with the Left Hand Water District to ensure that their operations are not compromised by accidental releases of pollutants into streams during cleanup operations.
- Assurance that the boundary of any designated Superfund sites that contain non-contiguous mining related activities that will be included in remediation will not include properties between the non-contiguous sites. For example, if the County chose to support listing the Little James Creek area and the Castle Gulch/Golden Age Mine area that the Superfund boundary would include only those areas and not the property between the two areas.

Regardless of whether NPL listing goes forward, the Task Force recommends that the County continue to explore other potential funding sources in the event that Superfund monies are not available, and/or to support further assessment and ongoing monitoring activities. The availability of Superfund money for RI/FS and for remediation is currently uncertain given recent activities by the current administration in Washington D.C. The Task Force recommends that the County consult with EPA and Congressional representatives regarding the current status and potential future of Superfund monies and include that information in their final decision regarding Superfund listing of any area.

The Task Force recognizes the difficulty of evaluating the current status of all private wells in the Watershed. However, we feel that at a minimum, the County should educate users of private wells in the Lefthand watershed about the importance of testing the quality of water drawn from these sources, and about methods for mitigating identified water quality problems.

The specific recommendations listed below are based upon the Task Force's interpretation of available data. A comprehensive, systematic characterization of the watershed could very likely affect our understanding about the sites for which NPL listing, voluntary clean up, emergency response, or some other approach has been

suggested. New information could make remediation strategies other than those recommended here preferable.

The Task Force reviewed its assessment of each stream segment within the watershed and made a recommendation for each one, as shown below. For each segment, the following information is given:

- **Segment # –** The Task Force numbered each segment for easy identification. Segments 1-7 are on Lefthand Creek. Segments 8-12 are on James Creek (including the portion of South St. Vrain Creek that feeds James Creek). Segments 13-17 are on Little James Creek.
- **Assessment** – The Task Force classified each segment according to the following scheme (see Section IV. "Data Assessment and Findings" for a complete description of data and sources used by the Task Force):
  - A = Data strongly suggests that a problem exists.
  - B = Data suggests that a problem MAY exist, but is inconclusive.
  - C = Data suggests that a problem DOES NOT exist.
  - D = Data is insufficient to assess whether or not a problem exists.
- **EPA "Relative Priority"** – This information was included in a presentation made to the Task Force on October 10,2001 by Kevin Mackey of EPA and Joe Vranka of CDPHE. It was described as a "preliminary estimate of relative priority" in which sites that were the subject of the HRS investigation were ranked in order of their relative urgency for cleanup.
- **Recommendation –** The Options referred to here are more fully described in Section VI. "Evaluation of Cleanup Options"
- **Rationale –** Summary comments regarding sampling data and other relevant information about each segment.

Segment #1: *(Lefthand Creek)* Lefthand Park Reservoir to California Gulch

- **Assessment:** C/D
- **EPA "Relative Priority":** n/a
- **Recommendation:** Option 3.c. Pursue further assessment using alternatives to Superfund: other resources.
- **Rationale:** To our knowledge, no significant mining-related activities have occurred in this segment. This area has not been sampled for metals, however it may be useful to analyze surface water and sediments to use as background information for characterization of other segments in the Watershed.

Segment #2: *(Lefthand Creek)* California Gulch

- **Assessment:** A
- **EPA "Relative Priority":** 1
- **Recommendation:** Option 2. Pursue further assessment and remediation using Superfund (excluding the Town of Ward in the Superfund boundary).

- **Rationale:** This is an area the Task Force considers a high priority for remediation. The current owner of the mining activities in California Gulch is apparently financially unable to contribute to remediation. The remediation required at this site appears to be substantial. This, of course, would be fully defined in the RI/FS process. A Superfund listing is less likely to conflict with community and stakeholder concerns in this area (although additional concerns may be voiced if as a Superfund listing moves forward).

Segment #3: *(Lefthand Creek)* Loader Smelter to Slide Mine

- **Assessment:** C/D
- **EPA "Relative Priority":** n/a
- **Recommendation:** Option 3.c. Pursue further assessment using alternatives to Superfund: other resources.
- **Rationale:** This segment has had minimal sampling and requires further characterization studies. The stream appears "healthy" in that it supports aquatic life.

Segment #4: *(Lefthand Creek)* Slide Mine & Tailings

- **Assessment:** B
- **EPA "Relative Priority":** n/a
- **Recommendation:** Option 3.b. Pursue further assessment using alternatives to Superfund: voluntary cleanup.
- **Rationale:** Initial sampling and observations by local residents suggest that water flow from Slide Mine area may impact Lefthand Creek. Further study is required to fully characterize that impact. The current owner has indicated a willingness to cooperate with efforts to mitigate the impacts of mine drainage, if warranted based on results from further studies. The Task Force has received information that the EPA may engage in further characterization of this site. In addition, the US Forest Service has applied for funding to support further assessment and possible cleanup of a portion of the site.

Segment #5: *(Lefthand Creek)* Slide Mine to Confluence with James Creek

- **Assessment:** B/D
- **EPA "Relative Priority":** n/a
- **Recommendation:** Option 3.c. Pursue further assessment using alternatives to Superfund: other resources.
- **Rationale:** Sampling in the segment suggests a problem may exist regarding metals contamination in sediments and surface water. However, additional sampling is required to fully characterize the segment.

Segment #6: *(Lefthand Creek)* James Creek Confluence to the Haldi Intake.

- **Assessment:** B

- **EPA "Relative Priority":** n/a
- **Recommendation:** Option 3.c. Pursue further assessment using alternatives to Superfund: other resources.
- **Rationale:** Sampling in the segment suggests a problem may exist regarding metals contamination in sediments and surface water. However, additional sampling is required to fully characterize the segment.

Segment #7: *(Lefthand Creek)* Haldi Intake (Left Hand Water District intake)

- **Assessment:** D
- **EPA "Relative Priority":** n/a
- **Recommendation:** Option 3.c. Pursue further assessment using alternatives to Superfund: other resources.
- **Rationale:** This segment is the Haldi Diversion. It provides all of the source water for the Left Hand Water District from November through March, and about 50% of its source water annually. This segment has had minimal sampling and requires further characterization studies. The Task Force recommends development of a sampling scheme to evaluate temporal variations of metals in the surface water at the Haldi Intake. Current legal requirements are for sampling once a year of the treated water. Given the observed variations in metals concentrations in surface water at high and low flow in other parts of the Watershed, we feel it would be prudent of the Health Department to ensure the metals concentrations are within state/federal drinking water standards throughout the year.

Segment #8: *(James Creek)* Lake Isabelle to the South St. Vrain/James Creek Diversion

- **Assessment:** C/D
- **EPA "Relative Priority":** n/a
- **Recommendation:** Option 3.c. Pursue further assessment using alternatives to Superfund: other resources.
- **Rationale:** To our knowledge, no significant mining-related activities have occurred in this segment. This area has not been sampled for metals, however it may be useful to analyze surface water and sediments to use as background information for characterization of other segments in the watershed.

Segment #9: *(James Creek)* South St. Vrain/James Creek Diversion to Confluence with Little James Creek

- **Assessment:** B/D
- **EPA "Relative Priority":** n/a
- **Recommendation:** Option 3.c. Pursue further assessment using alternatives to Superfund: other resources.
- **Rationale:** Sampling in this segment was rather sparse however the current information suggests a problem may exist regarding metals contamination in

sediments and surface water. The U.S. Forest Service may be considering applying for monies to support remediation of the Faraday Mine and meadow in this segment that have been impacted by off-road vehicles, and of mining areas that are considered physical hazards; this may also include cleanup of mine tailings.

Segment #10: *(James Creek)* Confluence with Little James Creek to Castle Gulch (incl. Rife/Columbine Mine)

- **Assessment:** A
- **EPA "Relative Priority":** n/a
- **Recommendation:** Option 3.c. Pursue further assessment using alternatives to Superfund: other resources.
- **Rationale:** Sampling along this segment suggests a problem with metals contamination exists but requires further characterization. Characterization of this area could also be included in a Stakeholder-Run Initiative, along with Elysian Park (Segment 11), the Argo Mine (Segment 14), and the Emmit Mine (Segment 16). Such an initiative is described further in the Segment 11 discussion below.

Segment #11: *(James Creek)* Elysian Park (Jamestown)

- **Assessment:** B
- **EPA "Relative Priority":** 7
- **Recommendation:** Option 3.a. Pursue further assessment using alternatives to Superfund: stakeholder-run initiative.
- **Rationale:** Elysian Park has undergone previous remediation including capping. Jamestown and the EPA have been working closely on current issues regarding Elysian Park as described in the "Summary of Recent Experiences with CDPHE and EPA Superfund Program Representatives in Jamestown" in Appendix D. Working with the EPA and CDPHE, Jamestown has concluded that the potential surface lead problem originally cited by the EPA is in fact not a significant risk to human health. With regard to the potential for metals seeping into James Creek along the park's boundary, the data is inconclusive. Jamestown has recommended waiting until more conclusive evidence is gathered. The Task Force recommends that the County endorse Jamestown's desired approach to Elysian park (see Apendix C. "Letter From Jamestown/CAGE to EPA"), which includes characterizing the seepage from the park and allowing Jamestown to continue their collaboration with EPA and CDPHE regarding surface lead issues. This process could initially continue under the current system with CAGE representing the Jamestown interests. A Stakeholder-Run Initiative should be formed to facilitate further characterization of the seepage and evaluate remediation options if remediation is required. This Stakeholder-Run Initiative could also include Segment 10, the Argo Mine (Segment 14), and the Emmit Mine (Segment 16).

Segment #12: *(James Creek)* Castle Gulch and Castle Gulch to Confluence with Lefthand Creek (incl. Golden Age Mine)

- **Assessment:** A
- **EPA "Relative Priority":** 4
- **Recommendation:** Option 3.b. Pursue further assessment using alternatives to Superfund: voluntary cleanup.
- **Rationale:** The Golden Age Mine is located in Castle Gulch. Sampling in Castle Gulch indicates a metals contamination problem exists and that contamination is also present in James Creek downstream of Castle Gulch. The Golden Age Mine is on U.S. Forest Service property. A USFS representative recently informed a Task Force Member that they have included remediation funds for the Golden Age Mine in their 2003 Budget Request. Also included in their Budget Request are funds for a new manager to oversee mining related issues in the Boulder County region. As they have stated in the past, remediation of the Golden Age Mine is a priority for them. Indications from USFS and EPA suggest that the allocation of funds to the Golden Age is given increased priority when there is a Superfund proposal. We recommend the County consult with USFS regarding this issue to determine if USFS would prefer for the County to proceed with Superfund Listing in order to aid them in obtaining funds for remediation.

Segment #13: *(Little James Creek)* Little James Creek headwaters to the Argo Mine

- **Assessment:** C/D
- **EPA "Relative Priority":** n/a
- **Recommendation:** Option 3.c. Pursue further assessment using alternatives to Superfund: other resources.
- **Rationale:** To our knowledge, no significant mining-related activities have occurred in this segment. This area has not been sampled for metals, however it may be useful to analyze surface water and sediments to use as background information for characterization of other segments in the watershed.

Segments #14-17: *(Little James Creek)* Golden Age Mining District

NOTE: The Task Force was not able to reach a consensus on a recommendation regarding Segments #14-17, a group of sites known collectively as the Golden Age Mining District and including the Burlington, Emmit and Argo mines, as well as the Streamside Tailings.

Four Task Force members (Edelstein, Gleichman, Gershman, Schauffler) support the following recommendation:

The County should support further assessment and remediation of these areas using alternatives to Superfund (described in detail below for each segment), with the provision that NPL listing should be pursued if sufficient progress toward cleanup has not occurred within a reasonable period of time. With regard to the Burlington Mine, the County should support the Honeywell Corporation's proposed voluntary cleanup, but should

proceed with NPL listing for that site if a plan for cleanup has not been submitted for approval to CDPHE within six months.

Three Task Force members (DiGiacomo, Fucik, Peterson) support the following recommendation:

The County should support listing these sites, including the Burlington Mine, on the NPL while alternative resources are being pursued by a local stakeholders group.

The individual segments are discussed below. For further background on the rationale for either approach, please see Section VI. "Evaluation of Cleanup Options."

Segment #14: *(Little James Creek)* Argo Mine.

- **Assessment:** A
- **EPA "Relative Priority":** 5
- **Recommendation A. (see sidebar Note above):** Option 3.b. Pursue further assessment using alternatives to Superfund: voluntary cleanup.
- **Rationale:** Sampling of the Argo Mine area suggests a problem with metals contamination may exist but requires further characterization. Characterization of this segment could be included under a Stakeholder-Run Initiative, which could also include Segment 10, Elysian Park (Segment 11), and the Emmit Mine (Segment 16). The County owns the Argo Mine and would presumably take the lead on characterization studies if the Argo were not included in a Stakeholder-Run Initiative. The County would also presumably investigate the Voluntary Clean Up Option if warranted by the characterization studies.
- **Recommendation B. (see sidebar Note above)**: Option 2. pursue further assessment and remediation via Superfund.
- **Rationale:** In aggregate, the Argo, Emmitt and Burlington Mines and the Streamside Tailings may provide an HRS score making the site eligible for Superfund listing. By proposing listing of these sites in the NPL, the County would be able to avail itself of whatever technical, legal, and financial resources are available through Superfund to clean up these high-priority sites. In the meantime, other sources of funding should also be pursued.

Segment #15: *(Little James Creek)* Burlington Mine

- **Assessment:** A
- **EPA "Relative Priority":** 2
- **Recommendation A. (see sidebar Note above):** Option 3.b. Pursue further assessment using alternatives to Superfund: voluntary cleanup.
- **Rationale:** Sampling of the Burlington Mine suggests a problem with metals contamination does exist. The current owner, Honeywell Corporation, is currently preparing an application under Colorado's Voluntary Cleanup Program. Therefore, the should allow the Voluntary Clean Up process initiated by Honeywell Corporation to proceed. If the Voluntary Clean Up by Honeywell

does not go forward – specifically, if a plan for clean up is not submitted for approval to the state within the next six months - then Superfund listing should be pursued.

- **Recommendation B. (see sidebar Note above)**: Option 2. pursue further assessment and remediation via Superfund.
- **Rationale:** In aggregate, the Argo, Emmitt and Burlington Mines and the Streamside Tailings may provide an HRS score making the site eligible for Superfund listing. In the case of the Burlington, proposing NPL listing would provide additional incentive for Honeywell to proceed aggressively with planning, initiating, and completing its voluntary cleanup as quickly as possible.

Segment #16: *(Little James Creek)* Emmit Mine

- **Assessment:** A
- **EPA "Relative Priority":** 6
- **Recommendation A. (see sidebar Note above):** Option 3.c. Pursue further assessment using alternatives to Superfund: other resources.
- **Rationale:** As with the Argo Mine, sampling suggests a problem with metals contamination may exist but requires further characterization. Characterization of this segment could be included under a Stakeholder-Run Initiative, which could also include Segment 10, Elysian Park (Segment 11), and the Argo Mine (Segment 14).
- **Recommendation B. (see sidebar Note above)**: Option 2. pursue further assessment and remediation via Superfund.
- **Rationale:** In aggregate, the Argo, Emmitt and Burlington Mines and the Streamside Tailings may provide an HRS score making the site eligible for Superfund listing. If the aggregated site is listed, Superfund may be able to provide the resources necessary to clean up the Emmitt.

Segment #17: Balarat Gulch to James Creek (includes the Streamside Tailings)

- **Assessment:** A
- **EPA "Relative Priority":** 3
- **Recommendation A. (see sidebar Note above):** Option 3.c. Pursue further assessment using alternatives to Superfund: other resources.
- **Rationale:** Sampling of this segment indicates that a problem with metals contamination exists. The County should pursue remediation options as soon as possible. Further study of this segment should focus on remediation rather than characterization of contamination as it's rather clear that tailings within the creek have a high probability of impacting surface water. A possible mechanism for remediation is the EPA Emergency Response Program. The Task Force has had conflicting information from EPA on this option. We suggest that the County actively engage EPA in discussions regarding the Emergency Fund option. An important aspect of those discussions should include community concerns for this segment. It appears that at least some of the Streamside Tailings are in

Jamestown, probably on private land. Therefore, Jamestown considers it essential that there be complete indemnification of the town by the EPA in the event that the Emergency Response Program is used for remediation. This is also a consideration in recommending against Superfund listing, as concerns have been expressed about the possibility that the boundary of the designated Superfund site could "creep" into the town itself.

- **Recommendation B. (see sidebar Note above)**: Option 2. pursue further assessment and remediation via Superfund.
- **Rationale:** In aggregate, the Argo, Emmitt and Burlington Mines and the Streamside Tailings may provide an HRS score making the site eligible for Superfund listing. The Tailings are a very high priority for remediation, and EPA officials have indicated that they would be a primary focus for assessment and cleanup operations once listing occurred.

I. APPENDIX

A. Board of Health Resolution #2001-4
B. Letter from Jamestown/CAGE to EPA re: Elysian Park
C. Notes From Interviews with Other Communities
D. Summary of Recent Experiences with EPA and CDPHE Superfund Program Representatives in Jamestown
E. NY Times Article (2/24/02): "Bush Proposing Policy Changes on Toxic Sites: Taxpayers Would Bear Most Cleanup Costs"
F. Supplementary Data Tables and Maps

APPENDIX A. BOARD OF HEALTH RESOLUTION #2001-4

A Resolution to Establish a
Lefthand Watershed Task Force

July 10, 2001

WHEREAS: it is the mission of the Boulder County Health Department to protect, promote, and enhance the health and well-being of the public and the environment; and,

WHEREAS: it is important to facilitate communications between the stakeholders of the Lefthand Watershed and the Boulder County Health Department; and,

WHEREAS: stakeholders of Lefthand Watershed have expressed concern over potential environmental and health impacts related to mining which affect water quality in the Lefthand Watershed of Boulder County; and,

WHEREAS: stakeholders of Lefthand Watershed have expressed concern regarding the ramifications of utilizing Superfund resources to address water quality issues; and,

WHEREAS: Lefthand Watershed stakeholders have shown a desire to directly involve themselves in environmental health planning processes, to protect and preserve environmental quality in the Lefthand Watershed, and to evaluate and recommend resources available for cleanup ;

NOW THEREFORE BE IT RESOLVED: That the Board of Health establish a task force which shall be known as the Lefthand Watershed Task Force. This task force shall operate according to the following provisions.

PURPOSE & DUTIES:
The task force shall act under the authority of the Boulder County Board of Health to assess existing environmental and health data related to Lefthand Watershed, based on the assessment determine if a cleanup action is necessary, evaluate cleanup options, and recommend a preferred cleanup option to the Boulder County Board of Health. The Task Force will also collect and disseminate, to all stakeholders, any pertinent information related to the watershed. The task force shall meet regularly two times per month, or more as deemed necessary, for the term of the task force. All meetings will be publicly advertised, and each meeting shall include a public comment period not less than 15 minutes.

APPOINTMENT OF THE TASK FORCE:
The Board of Health shall appoint seven members to the task force. The term of appointment shall be from August 1, 2001 to November 31, 2001.

QUALIFICATIONS FOR APPOINTMENT:
The criteria for membership include: a stakeholder from; Jamestown, Ward, Rowina, and Lefthand Watershed District that have attended at least one of the previous meetings and have background knowledge of the issues; a person with technical expertise that can review and interpret existing or new technical data, and two people with technical expertise at large that represent future generations of this community. All members must be able to work collaboratively.

STAFFING & ORGANIZATION:
The task force shall be staffed by the Health Department. The task force shall elect from its membership a Chair to the Committee who shall be available to receive official communications and notices and serve as spokesperson for the Committee.

APPENDIX B. LETTER FROM JAMESTOWN/CAGE TO EPA

January 25, 2002

On October 17, 2001 members of CAGE and met with Victor Ketellapper, the EPA Superfund Project Manager to discuss a method for coming to agreement on the scope of the proposed Superfund listing for the Golden Age Mining District. The attendees reached a verbal understanding that Elysian Park in Jamestown could be addressed with minor maintenance until major contamination sources in the area were cleaned up. At that time, any residual contributions from the park could be more accurately assessed through a carefully designed measurement plan. In the mean time, the park would not be included in a Superfund listing. Our mutual desire was to come to an agreement in writing.

To reach an agreement, we agreed on a process in which CAGE would write a first draft of a letter that would then be fine tuned in cooperation with the EPA. We anticipated that the draft would go through several back-and-forth iterations to reach a final form that all parties could feel comfortable agreeing to. Once the final content was nailed down, CAGE, with the endorsement of the Town Board would send an “official” copy to the EPA. At that point the EPA would endorse the letter which contains what we had collaboratively agreed to.

The letter below was the first draft. It took a fair amount of time and effort for the volunteers to write the letter and participate in the meetings that led up to it. When the draft was sent we were very optimistic that we were on a path that would provide some degree of closure to an issue that had been very upsetting to the community for the last year. However, about a month after Victor received the draft, he indicated that he did not have the concurrence of others in the EPA and State on the process we had agreed to. Instead, we heard back that the EPA wanted to wait until the taskforce had made its recommendations. No further action has been taken on the letter as of now.

Steve Edelstein

DRAFT

November 19, 2001

Victor Ketellapper
Environmental Engineer
EPA, Region 8
999 18th Street, Suite 500
Denver, CO 80202-2466

Dear Mr. Ketellapper:

As you are aware, the Jamestown Citizens Advisory Group for the Environment (CAGE) has been working closely with the EPA for many months regarding the proposed Golden Age Mining District (GAMD) Superfund Site. During that time CAGE has reviewed and analyzed the available data. EPA has also supported our efforts by performing a site-specific risk assessment for lead contamination in Jamestown's Elysian Park.

As a result, we have drawn a number of conclusions, and based on our conclusions we have several requests of the EPA as described below. Our purpose in making these requests is to satisfactorily resolve the issues raised by the EPA, which have been the cause of substantial concern and anxiety for many of our citizens. At the same time, we wish to continue to be supportive of the preservation and restoration of the environment.

Accordingly, we make the following requests:

1. Do not include Elysian Park in a Superfund listing.
We respectfully make this request as a direct result of a memorandum, Appendix A, written by Susan Griffin, Regional Toxicologist for the EPA. In the memorandum, Ms. Griffin describes the results of the site-specific risk assessment she performed using available information regarding park usage. The park usage is an indicator of lead exposure for the citizens of Jamestown. In the memorandum, the Preliminary Remediation Goal set for the park is in the range of 3,520 to 5,542 ppm for lead in soil. Soil sampling showed the highest lead level within the park to be around 2,000 ppm. Given this information, we feel that lead risk exposure is not at a level that warrants a Superfund listing.

<Note (not in the original draft)>
The EPA took five samples as follows:

Location	ppm
Municipal town park, baseball diamond infield	2,030
Municipal town park, northeast end	806
East of Municipal town park, (former) upper settling pond	1,700
East of Municipal town park, (former) lower settling pond	1,470
Municpal town park, Near 3rd base at 13-ft depth	1,730

Average: 1,572 ppm
<End Note>

We still want to make sure the community is protected from possible risks associated with inappropriate usage of the park. Therefore, in lieu of the park being listed, the following measures will be taken:

- *Conducting lead exposure education of our citizens, especially the young children*—a letter to all residents plus giving talks the Jamestown elementary school on issues such as washing hands after park usage and not ingesting dirt from park with examples of how that can occur.
- *Passing a town ordinance that prohibits future residential development in Elysian Park.*
- *Passing a town ordinance that will require, with approval by the Town Board, that construction-site-specific environmental protections be included for any projects that may disturb the topsoil*—examples include recreational enhancements to the park, such as protective barriers between the soil and children's play equipment, any digging, construction, beautification or other improvements.
- *Funding permitting, the completion of several maintenance items to re-cover exposed tailings*—these items may include removal of Wyoming Ground Squirrels whose burrowing bring tailings to the surface, covering with fresh topsoil the small areas around the park where tailings have been exposed, and covering the baseball field with fresh topsoil and the planting of grass. Jamestown does not have the financial resources at this time to undertake these projects. However, we will seek outside resources to complete projects as resources become available. We would also appreciate any aid the EPA can provide in this regard.

EPA has also raised a concern about possible metals loading of James Creek from Elysian Park. However, the data is inconclusive and there are far more serious contributors to contamination of James Creek. For example, the March 12, 2001 independent analysis from Kansas State University observed that the water in the vicinity of Elysian Park generally meets drinking water source and agricultural/livestock use standards. In addition, they noted that there was little stress to aquatic organisms and native fish populations. **We don't wish to see a major disruption of the community based on such marginal evidence**.

We therefore request that Elysian Park not be listed and that the EPA wait until such time that the problem mines in the GAMD are cleaned up. We then would support a post-cleanup revisit of the issues to see if there are significant residual effects to James Creek from Elysian Park. Any subsequent analysis must distinguish potential loading from Elysian Park directly and from adjacent pathways. If there are residual problems that are significant, then they would be addressed by appropriate means.

2. **Include the Burlington Mine in a Superfund listing if Honeywell is not able to perform a voluntary cleanup.** It is in everyone's interest to have the Burlington mine cleaned up as soon as possible. Right now, it appears that Honeywell's proposed voluntary cleanup is the most effective way to do that and we would like to see a voluntary cleanup occur. However,

if for some reason that cleanup does not occur, or if it is insufficient, then a cleanup under a Superfund listing would make sense.

3. **Work with Jamestown to identify a viable non-Superfund source of cleanup funds for the streamside tailings along the Little Jim Creek**. As with the Burlington, it is in everyone's interest to clean up the streamside tailings as soon as possible. We hope to identify an alternative that could get the job done in a much more timely and cost-effective way than is possible through Superfund. We seek to work closely with the EPA to make this happen. If in the end, there are no alternatives for that cleanup, then Superfund would be the backup mechanism. In that event, we seek indemnification on behalf of the community and residential property owners.

4. **Clean up the remaining mine sites within the GAMD with Superfund if no other parties volunteer to do the cleanups.** The specific mines that have been identified by the EPA are the Argo, Golden Age, and Emmett mines. As stated above, our first preference is to see those mines addressed by voluntary cleanups. However, if no parties step forward to do that, then they should be cleaned up under Superfund.

We would appreciate it if you would indicate in writing your acceptance of these requests on behalf of the EPA.

Sincerely yours on behalf of CAGE,

Steve Edelstein
CAGE Spokesperson

APPENDIX C. NOTES FROM INTERVIEWS WITH OTHER COMMUNITIES

Appendix C.1.: Willow Creek

From: Steve Edelstein
To: County Taskforce
Subject: Conversation between Steve Edelstein and Zeke Ward, Temporary Coordinator, Willow Creek Reclamation Project
Date: January 8, 2001

I spoke top Zeke to learn about the experiences of Willow Creek regarding mine reclamation. The purpose of the conversation was to learn about alternatives to Superfund but the conversation was far ranging and included much more. The following are the points that Zeke made in the conversation.

- The Willow Creek Reclamation Committee consists of a local initiative that involves the environmental restoration and cultural preservation of the entire thirty five square miles of the Willow Creek Drainage. This drainage is in the central mountain region of the southern part of the State of Colorado. The watershed spans an area from the Continental Divide on the north with elevations near 14,000 feet down to the Willow Creek & Rio Grande River confluence about a mile and a half below the town of Creede at about the 8,700 foot level.
- The last mining activity ended in about 1985 by Homestate Mining.
- There are abandoned mine sites for mines that operated through the 1970's.
- The EPA showed up in 1997 and completed a preliminary HRS in 1998. Initially it came as a surprise because the EPA did not let people know they were working in the area.
- The Willow Creek Reclamation Committee was founded as a citizens group in late 1997.
- Citizens saw that they had two choices with regard to dealing with mine reclamation:

  1. Superfund
  2. Stakeholder run initiative

  Zeke recommends that these are the fundamental choices facing any area in which the EPA is proposing a Superfund initiative.

- Creede decided to go the Stakeholder route. Regardless, "you have to deal with the EPA on a daily basis."
- Zeke's basic guidelines for making the choice—go the Superfund route if the problems are so large they can't be handled any other way, and/or the stakeholders, mine owners, and landowners are not able to work cooperatively in a consensus building manner. Go the Stakeholder route if the people can work cooperatively and taking care of community control and addressing community concerns is a priority. If you go the Stakeholder route, be committed to getting the job done. Don't do it as a stalling tactic.

- Cost recovery is not just from people who caused the problems. Zeke says that Superfund looks to recover funds wherever it can. He stated that the EPA makes Superfund decisions in part based on their predicted ability to recover the money they invest in cleanup—they give high priority to projects that have high return on cost-recovery.
- The Willow Creek folks looked to the experiences of places like Leadville in making their decisions. Initially there were specific sites identified. That was followed by three expansions of the site boundary which eventually included all residential properties, and city and county land being on the PRP list. People couldn't sell their homes, couldn't refinance. It took a court injunction to prevent even further expansion.
- Once a site is on the NPL, there's no way to know when or if the EPA will show up to do the work.
- Willow Creek stakeholders wanted someone dedicated to the best interests of the community. That wasn't the EPA.
- Zeke suggested also looking at Mintern, CO which completed a Superfund process 2 to 3 years ago. He says "they were very disappointed."
- There is a memorandum of understanding between the EPA and Colorado that says once a Superfund site is declared, the state will not get in the way—it is EPA jurisdiction. This does not preclude the state from acting as a contractor to the EPA, carrying out the wishes of the EPA.
- The Committee is working with a variety of other parties who have been very cooperative. Some that he mentioned are:

    - Homestate Mining which is just finishing a reclamation project
    - U.S. Forest Service. They have their own CIRCLA authority and prefer to do the work rather than having the EPA do it and recovering costs from them.
    - National Resource Conservation Service (NRCS)
    - Colorado Department of Public Health and Environment (CDPHE) including Mark Walker in the voluntary cleanup program and Jim Lewis in the hazardous materials division.
    - Non-point source grants from the CDPHE
    - EPA's Community-Based Environmental Protection, Karon Hamilton at Region 8 headquarters in Denver. He strongly recommends talking to her—"she will be very helpful and talk honestly."
    - Voluntary initiatives such as land in Creede being donated for a nursing home which will be built including reclamation of the land. Other examples are land being reclaimed by private parties so that they can build a badly needed industrial park.

- If the Forest Service or BLM does reclamation be aware that they also have CIRCLA authority and responsibility separate from EPA, including cost recovery authority. The Forest Service is also under an executive order to comply with the Clean Water Act.
- Zeke estimates that 70% of Colorado communities faced with similar issues are pursuing the Stakeholder route. Some others that he mentioned are:

- Animus stakeholder group
- Pagosa Springs
- Alimosa River Group
- a group in Pueblo
- a group in Colorado Springs
- Lake City
- many others that are receiving money from the non point source Board

- The CDPHE 319 non-point source board can provide a list of other Stakeholder groups.

The EPA is not advertising that these efforts are under way.

- A Stakeholder initiative takes commitment and work by the community. But so does Superfund unless you want to let the EPA do whatever they want.
- At its start, Willow Creek did not have a paid Watershed Coordinator. But once they did, things began to happen in leaps and bounds. The Forest Service has funded a portion of the coordinators salary.
- You can't just set up a committee as a stalling tactic. Zeke believes that if you demonstrate that you're serious and making progress, EPA Superfund will let you alone. Problems created over many years of abuse may take 10 years more or less to resolve, but we (in Creede) will resolve them.
- Willow Creek is finishing up the 3rd year of a 3 year plan to characterize the entire watershed.
- From that report (due in August) they will develop a Watershed Management Plan. Then they will move to reclamation.
- It is also important to do visible projects from the outset so that the community can see progress. One example of that is the voluntary cleanup by Homestate Mining.
- The committee is finding that there are many citizen volunteers that know much more about the science and technology of the problems that anyone the EPA sent in.
- Zeke thinks that Boulder is ideally situated to tap the expertise in our area such as the Colorado School of Mines, CU, and others.
- The Willow Creek Committee offers to help in any way that it can.

Appendix C.2.: Animas River

(Submitted by Sue Schauffler)

On Wednesday, 1/16/02 I had a talk with Bill Simon, Coordinator of the Animas River Stakeholders Group in Silverton.

Their watershed is 186 square miles with over 1500 mining sites. EPA wanted to list the entire watershed.

The Animas group decided against listing for three reasons. First was because most of the property is privately owned without homes on the land. The current owners did not cause the problems. The Animas group was afraid that the EPA enforcement process could get out of hand and the property owners and their heirs would be hurt. Second, they decided against listing because the community loses control of the situation when EPA takes over. Third, they didn't want an entire watershed listing because of the effect on property values. Apparently the Leadville experience weighed heavily into their decision.

Therefore, they decided to take it on themselves. The mining companies are cleaning up their property but the remaining areas needed to be characterized. EPA was fine with not listing as long as the Animas group was making progress.

The Animas group has characterized 200 mine waste piles and 200 draining adits. Of those, they've selected 34 waste piles and 33 draining adits for remediation.

They have done the most thorough examination of the problem than anywhere else in the state. They conducted enough studies to be able to recommend to the state a set of stream standards that would be appropriate for their area as well as TMDL's. They spent a considerable amount of time determining natural vs mine sources. They have elevated levels of aluminum and iron that come mostly from natural sources. The cadmium, copper, zinc, and manganese are all from veins exposed through mining. They finished a use attainability analysis last spring, which is contained in a quite large report. They recommended their own numeric standards for 20 year attainable goals to the State Water Quality Commission.

Based on their work, he feels there are only two sites that would qualify for Superfund listing. They feel they can always go that route if they decide clean up would be too expensive for those sites. Incidentally, their HRS ranking was 87, which was the highest score ever for mining. He feels that was way to high for the entire watershed since they found only two sites that would likely qualify.

So far the stakeholders, including the mining companies, have spent about 18 million dollars on clean up. The companies have also cleaned up some of the abandoned sites that were not on their property. They have had a small amount of money from EPA for some initial work. They started cleanup on the non prp sites last summer and have completed three and expect to complete three more by next summer. They plan to do about 3 a year and expect to be done in about 20 years. At this point they're not working directly on the mine adits because of liability issues. Their current approach is to do infiltration controls where they stop water from going in but don't touch the water going out. They're still working on the Good Samaritan law with federal legislators to try and reduce liability for their situation.

He said in the past there was Superfund money available for unlisted sites but not anymore. This was based on information from two years ago, but he thought it was still true. This is

contradictory to what Vic Anderson told me, but maybe Montana and Colorado have different rules even though they're both in Region 8. It would be helpful to find out about this.

He also mentioned BLM and Forest Service if their land is involved. He said they've been working for 6 years to get these groups to follow their own policies regarding investigating sites. BLM had done or is doing prp review. He said the Forest Service is no longer participating in a project where there is no prp.

Regarding prp's he said EPA told him they won't sue a "Mom and Pop' if the costs are less than $100,000. Forest Service told him they would go after anything over $20,000. In another conversation with the Forest Service they told him if an individual was worth over $100,000, they would go after them. I don't know when he had these conversations with EPA and the Forest Service.

He said their stakeholders group is very active and includes representatives from all groups impacted including the mining companies and local citizens. They meet once a month from 8am to 10pm (and we thought our meetings were long!). He said their group has been helping other community groups in Colorado with organizing and providing information. He mentioned Creed as an example. They are definitely willing to help out and share their knowledge.

Appendix C.3.: Summit County

(Submitted by Sue Schauffler)

On Friday 1/11/02 I talked with Sarah Stokes from the Snake River Task Force in Summit county.

Snake river is not a Superfund site because they did not have enough points for listing.

The Task Force is mostly an information exchange resource. They put together information about previous studies, look at current liability issues, and coordinate strategy for site evaluation and further work. The county and CU are involved in research to determine sources and remediation options.

It looks like they're in the characterization stage and are using grant money, including EPA Brownsfield money, to characterize the area.

Appendix C.4.: Leadville

From: Steve Edelstein
To: County Taskforce
Subject: Conversation between Steve Edelstein and Bob Elder regarding Leadville Superfund Experience
Date: January 18, 2001

I spoke to Bob to learn about the experiences of Leadville regarding their Superfund experience. I was referred to Bob by Joe Vranka of the State department of health after I asked Joe for a contact who could describe first-hand experiences with the EPA and Superfund. The following are the points that Bob made in the conversation.

- Leadville was named a Superfund site in 1983. They were given no choice—the EPA showed up and did the NPL listing without public input.
- Bob participated on an environmental taskforce for about seven years starting in 1986, after the Superfund project was started. Bob was also named as a PRP which is described in greater detail below.
- The overall process has been very protracted and its still not done. A few areas on the periphery of the Superfund site has been de-listed but most have not. Bob thinks it will be a generation before de-listing is complete as monitoring takes place. "We've been at it for 19 years and the end isn't in site."
- The first 10 years were spend in dispute between the EPA. The County Commissioners played a major role. Finally, after 10 years, the courts forced a consent decree which placed certain strictures on the EPA and the county (we didn't go into the details). During those 10 years, there was no remediation work don except for the water treatment plants described below.
- Based on my description of Bob of how the EPA has been seeking public input in Boulder County, he said that it sounds like the EPA has improved their public process. "We had no choice."
- Another possible difference was that Bob said the community had no input into the actual remedies. (I say possible because work in our area has not gotten that far, although the EPA gives $50 Technical Assistance Grants for community involvement in the design process). The taskforce got to see designs. But under the grant that they got from the EPA, the taskforce's role was to interpret the documents for citizens, but, they could not take a position on the design.
- Bob was one of the thirteen original PRPs. He had inherited some mining property from his father and grandfather. Bob indicated that the decision to name him was an arbitrary one by the EPA, and was not based on any science. It turned out the bulk of the property was south of the actual mining district. It took from 1986 to 1993 for his property to be removed on a diminimus settlement in which he gave the EPA access to his property. By the end of that time, his personal legal costs were in excess of $50,000.
- Bob claims that the cost of getting things done through the EPA is substantially higher that if done through other means. He points to the water treatment plant for the Yak tunnel, a major drainage tunnel that discharges into California Gulch. It cost about $14 million to construct between 1989 and 1992. In contrast, another comparable plant was built at about the same time by the Bureau of Reclamation for $4M.
- Bob claims that if the Yak tunnel plant had not been built under the EPA it also would have been about $4 million. He claims that EPA's work rules results in much

higher costs. In part, this is due to wage rates dictated under the "Davis Bacon Rule" that can set wage rates much higher that competitive commercial rates.

- We discussed the Superfund boundaries. Bob said that at the start there were no defined boundaries—"the EPA just drew lines on a map." When further expansion was considered by the EPA, the County Commissioner's resisted. Eventually, the informal boundaries became established boundaries. After that there were minor adjustments. As part of the process, the EPA considered a "reverse class action suit" naming everyone in town. However, County government put there foot down, resisted, and eventually the above mentioned consent decree was established. Now, there are lots of rules with complicated requirements being established that affect land use. They are still in draft form but nearing completion. Note: We did not discuss the actual boundary but I have the sense that all of the town and a good deal of the county is listed in the Superfund site.
- Bob said that lead has been an issue. The community has a trust fund to help with residential cleanups from such problems as lead paint and leaded plumbing. The fund was established by an old smelting company that used to be in town.
- The following are the lead level standards that have been established:
  - Residential yards: < 3, 500 ppm
  - Commercial areas: < 6,700 ppm
  - Recreational areas (hiking, camping, etc.) < 16,000 ppm
- Bob said that the economic impact of the Superfund listing is masked by the downsizing of the Climax molybdenum mine during the same timeframe including the plant being removed from the tax roles. However, Bob believes that Superfund has had a multiplier effect because people and companys may be reluctant to come in where they could become a PRP. "Why should they come here when they can go to Boulder and not have that kind of problem."
- In terms of what was accomplished, Bob points to the water treatment plant and the associated reduction in acid mine drainage, and the capping of tailings which used to generate a lot of dust. "The work has been positive but at a high cost. The money was not spent wisely and was not put to good use." He estimates that out of the $100 million plus spent, not much over 10% has gone to actual cleanup. The rest went to lawyers and consultants. "Then when the EPA does the work, they back-charge the PRPs."
- Regarding other ways of working, Bob said that if the Federal government caused the mining (such as in WW II when metals were mined for the war effort), a judge might order the EPA to pay for cleanup. He also pointed to a voluntary cleanup in the Sugarloaf Mining District that BLM is doing. He also that an site is technically not eligible for Brownfields grants once it is a Superfund site.

Appendix C.5.: Montana State University

(Submitted by Sue Schauffler)

On Wednesday 1/16/02 I talked with Stuart Jennings from Montana State University in Bozeman. He's a professor in the Reclamation Research Unit of the Department of Land Resources and Environmental Science. (www.montana.edu/reclamation).

He said there are exceptional risks and concerns to listing. The strength of Superfund is the ability to go after prp's. EPA generally bills for more than the cost of cleanup. I'm assuming this is to cover their lawyer fees and to have some extra to cover locations where there are no prp's worth going after.

He mentioned the use of the Mine Reclamation money and said Vic Anderson was the expert on that process.

Montana has several CERCLA sites, but only in the last two years have they listed small abandoned mine sites up in the mountains. The three watershed level listings he mentioned were Basin Mining Area, Ten Mile, and Baker-Hughesville.

The EPA mantra for years was that EPA can't list watersheds, but they still listed them.

One advantage to the watershed approach is that mine waste repositories can be shared among sites. As I understand it, a common approach to dealing with tailings is to create a repository nearby that is a lined basin. The tailings are put there and covered with soil and seeded. Tailings, etc., from anywhere in the Superfund area could be combined in one of these to reduce costs.

He didn't know about the effect of the watershed listings on local property values. He said that property values in their area are low anyway and most people probably feel they can't get much worse so why not go ahead and clean things up.

He said the Superfund process is slowed down considerably if EPA has identified prp's to go after. If there are no prp's the cleanup goes a lot faster. Another factor in how fast things move is whether there is a direct immediate impact or risk to human health. Sometimes, if there is, it speeds up the process, but in other cases it slows the process down. For example, if they have to remove soil in residents yards the cleanup is slower because the process is longer to convince the residents to approve remediation.

He said relationships between EPA and the state and counties can be good or bad. Same with counties, cities, and individuals. It generally depends on personalities, how entrenched people are in their positions, and their motivations for being involved in the first place. He gave Bunker Hill, Idaho as a place where current relationships with EPA are bad. Apparently residents have signs in their yards saying "EPA GO HOME". He didn't have details other than the EPA proposed actions didn't make sense to the local community. They're not in Region 8. He also said EPA and Montana DEQ don't get along very well. He didn't give an example of good relations between EPA and other groups. (FYI, I didn't ask for either type of example. I'm just giving you the unsolicited info he gave me).

He said there's generally a large amount of litigation money involved with Superfund, mostly for identifying prp's. His opinion is that most agencies are not enthusiastic about EPA because of the bureaucracy involved and that someone else is in charge.

The main reason for choosing the listing option is that EPA has money.

Appendix C.6.: Jefferson County, Montana

(Submitted by Mark Williams)

Interview with Sam Samson
Jefferson County Commissioner
Jefferson County, Montana
December 26, 2001

Introduction

Sam's contact information (406-225-4028) was found on www.basinou1.org web site and is included in the Community Relations plan for the Town of Basin operable unit. He was sought out for his perspective on EPA's ability to work with the community. The listing on the NPL has been within the last few years and the project is in the Remedial Design and Remedial Action phase. Sam is a fifth generation Montanan, born and raised in the area. The Town of Basin is unincorporated, and therefore is under county jurisdiction.

Community Involvement

Part of the local remediation includes the removal of soils in individual yards and so has the potential to be quite invasive, yet Sam couldn't think of anything negative to say about EPA's involvement in the community. EPA has made great strides in community involvement. "EPA has done really well", he specifically commended the efforts of EPA Community Involvement persons Paul Peronard and Steve Way. The community has softened since the listing…many individuals have been able "to extend their vision past the end of their nose". The Citizens Against Virtually Everything (CAVE's) that were vocal in early meetings have lost interest. There are enough meetings to keep everybody adequately informed, and EPA regularly calls the county to see if any complaints have been lodged. EPA takes good care of the roads. EPA hires local contractors for a great deal of the work.

Local Liability

Sam knows of no individual property owners who have had to contribute to clean-up costs. There are quite a number of owners of former mining property where work is being done that seem to recognize that the value of their property will increase. He suggests that we call Mike Bishop of EPA at 406-441-1150, extn 248 to find out more about PRP status. The county has not had to pay a dime, and in his opinion the work has benefited the county immensely.

Speed of the Effort

Sam says that EPA has moved quite quickly since the site was listed.

Hazard Ranking Score

Sam believes that most of the HRS was based on impacts to ecosystems and fisheries. It didn't sound like there was any demonstrated impact to the community's water supply wells, which are very pure and require no chlorination.

Future Follow-up Questions

1)Does the county own any property in the listed area?
2) Did any entity receive a TAG grant from EPA?

Appendix C.7.: Pitkin County

(Submitted by Sue Schauffler)

On Thursday /17/02 I spoke with Tom Dunlop who was with the Pitkin County Health Department until recently. He was the county representative during the Smuggler Mine Superfund process.

It took 16 years for them to go through the entire process of first contact with EPA to delisting the site. They got involved when Superfund was only three years old and EPA was exceptionally heavy handed in their approach to the county and other prp's, so their experience was rather negative to say the least. Tom recognizes that things have changed. The problem at the Smuggler Mine was lead contamination in the soil and groundwater and potential impacts to the health of children.

He said points to consider regarding listing or not are the liability process and health of citizens. The discovery period for prp identification can throw things into the legal arena so heavily that it overwhelms the clean up process. The immediate impact to human health dictates the urgency of cleanup.

The whole process for them started in 1983 when EPA came to Tom with a list of what they were going to do and the timeline without having any local input. The county went through a long process to make EPA justify their estimation of the magnitude of the problem. Their initial HRS ranking was 49. Tom reviewed the scoring in intimate detail and eventually the score was revised to 31, lower, but still high enough for listing. In 1985 or 1986 they presented EPA with an alternative plan where the county would do the cleanup using local money and that they would meet the EPA required criteria. Their estimated cost for cleanup was $750,000. He said at the time there was no reversing the process once they had a HRS high enough to list.

They were officially listed in 1986. After they were listed property values at the site dropped considerably, for example from 1 million to 1000 dollars or less. This was because the banks were afraid that if they had to foreclose on a house the bank would then be liable under CERCLA. He didn't say if property values remained low throughout the entire process.

EPA sued Pitkin county and the other prp's in 1989. The county and prp's made a business decision to settle with EPA since they all felt they would lose in court. Each prp had their own

settlement agreements and obligations. The process for determining these was several years and involved scientists, politicians, lawyers, etc. Apparently it was a rather grueling process. The county finally signed a consent decree in 1995. The county ended up doing about $500,000 worth of cleanup and had to agree to manage the site forever. Part of the settlement included the requirement that the county set up institutional controls on all property within the Superfund boundary. The boundary wasn't officially defined until 1996. All cleanup work was completed in September of 1996. The site was delisted three years later in September of 1999. By this time the county and EPA had a better relationship and the delisting happened only after the Region 8 representatives pressured the national office to delist the Smuggler Mine.

He said there is another site in Pitkin county where the owners used their own money to clean up a site under the Volunteer Cleanup Program administered by the state. He mentioned this as a process for cleanup that doesn't involve the EPA bureaucracy and was completed much faster.

He is currently doing consulting work for other groups regarding Superfund issues and would be willing to meet with us as a private contractor to further discuss our situation.

APPENDIX D. SUMMARY OF RECENT EXPERIENCES WITH CDPHE AND EPA SUPERFUND PROGRAM REPRESENTATIVES IN JAMESTOWN

(Submitted by Steve Edelstein, Lefthand Watershed Task Force member and CAGE spokesperson)

The EPA and CDPHE have been working with the residents of the Lefthand watershed for over a year regarding their Superfund proposal. This has included a variety of public meetings in Jamestown and Ward. While this work was not done under a Superfund project per se, the activities do provide a basis for assessing what it could be like to work with these organizations under a Superfund initiative. Therefore, the positive and negative aspects of this interaction are being summarized so that they can be factored into the decision process.

The first contact with the EPA/CDPHE was in the summer of 2000, where Jamestown Citizens got the first inkling that that a Superfund site was even a possibility. At that time, the EPA and CDPHE conducted a tour of the Burlington mine for representatives of the County, Lefthand Water District, and members of the Jamestown Town Board and briefly mentioned Superfund. Then in December of 2000, the County started sponsoring a series of community meetings along with the EPA and CDPHE. Those meetings continued on approximately a monthly basis through May 2001. In March 2001, the "Citizen's Advisory Group for the Environment" (CAGE) was formed to work with the EPA, with citizens from Jamestown and others living in James Canyon.

In June 2001, there was a State legislators tour of some of the proposed Superfund mine sites that also included citizens and legislators from Ward and Jamestown. From then through now, there have been a variety of smaller ad hoc meetings and conversations on particular issues with various citizens from Jamestown and the Lefthand Watershed Task Force. This included task-force sponsored meetings with the EPA and CDPHE in Jamestown on September 27, 2001, and on January 24, 2001.

1) Positive Experiences

- EPA and CDPHE personnel have responded to local concerns by agreeing to postpone making a recommendation regarding Superfund/NPL listing pending the outcome of the Lefthand Watershed Taskforce's deliberations, and follow-up action by the Boulder County Board of Health.

- They have made themselves very available both for face-to-face meetings, telephone conversations, and e-mail communications.

- They have come to meetings prepared with a variety of information.

- They generally have been straightforward in their communications. That is, they indicate when they are speaking factually from when they are making assumptions or predicting outcomes.

- As best as possible, they have tried to answer citizens questions with the understanding that many questions can't be answered largely because of how the Superfund process is set up under law.

- They have tried to be accurate when discussing some citizens concerns. For example, at one meeting they were asked about how long it would take for wells near the Burlington mine to clean up after a Burlington cleanup. The answer was, in effect, "to be honest, possibly never." The spokesman went on to explain that wells are often mostly impacted by underground pathways that may not be affected by the types of ground level remediation that was likely to take place.

- They were helpful in obtaining documentation when asked.

- They were helpful in providing names of people we could talk to learn about other communities experiences, even when they knew there was a possibility that the contact might shed a negative light on Superfund (e.g., Leadville -- see Appendix ___).

2) Negative Experiences

- Residents were frustrated by the tendency of EPA and CDPHE personnel to be vague and imprecise when it did not appear to be necessary. This was particularly true when contact first started, through approximately February 2001. They did not state outright that they were intending to recommend a Superfund site in the area. Rather, the conversations were couched in general language of environmental cleanup, desires to explore alternatives, and Superfund was only mentioned in passing. It was not until some citizens understood that the *real* agenda was Superfund, that the issue began to be straightforwardly addressed.
- Contradictory messages were sent to the community. On the one hand, they said that their desire was to listen to the community before acting. On the other hand, we told that a letter was being sent to Governor Owens (originally in February, 2001) asking for his concurrence on a Superfund site, regardless of where the community was in its process. On the other hand, we discovered that they eventually postponed that letter, and in fact never sent it, after there was a strong community response in the form of letters from Jamestown, Ward, and the Lefthand Water District, requesting a delay.
- EPA and CDPHE personnel have contradicted each other. For example, in a public meeting in Ward, an EPA representative said that no site listings would occur until the community was in concurrence. A CDPHE representative indicated that the letter was going to the Governor no matter what.
- The EPA and CDPHE have created confusion about the immediate health risks. They have created the public perception for many that there *is* an immediate health risk. However, when asked directly they say that there is not an immediate health risk and there is no data that indicates there is a risk. In fact, the Lefthand Water District water meets all mandated water quality standards. They have also expressed concerns about potential risks from major flood events, but have not provided known location-specific models supporting that concern.

- Some actions have been very inconsistent and time wasting. For example, after the legislators tour of the sites, a senior CDPHE representatives approached the Jamestown citizens immediately after the tour and asked if the town would be willing to discuss ways to address the EPA's concerns in Elysian Park to keep the park out of the Superfund listing. The answer was "absolutely!"

  Some months later, meetings took place in Jamestown that included an EPA toxicologist, CAGE members, and various EPA and CDPHE project personnel. An approach to measuring the lead levels in the park was agreed to which included an action plan based on the toxicologist's analysis. The EPA's toxicologist issued a memorandum on September 10, 2001 that described a "Preliminary Remediation Goals for Recreational Use at the Jamestown Park." The goal was based on the EPA's measurements and CAGE's estimates of usage of the park. The levels of lead that were determined to be a risk were in the range of 3,520 to 5,542 ppm. In contrast, the actual levels were measured to be in the range of 806 to 2,030 ppm, with an average of 1,572 ppm from five measurements.

  Citizens were comforted to have a better understanding of the risk, and based on the agreements meeting were thinking "at least that issue is resolved." However, in December, 2001, CAGE heard back from the EPA that they did not want to take any action on this right now and the State was not in agreement with the proposed plan. We were given no further explanations, nor were any attempts to provide any further information. The matter remains unresolved.

  The perception left in Jamestown from this experience was. . . "*why is EPA and CDPHE dragging their feet and not working constructively with the community? No data has been shown to prove the necessity for Elysian Park to be added as a Superfund site and repeated efforts at better understanding have been stalled. Measurements indicate no immediate health risks. Besides, the lead- in-soil issue in the park has no bearing on the water supply in North Boulder. And, the data on potential metals loading from the park is minimal and could easily be mistaken for other sources from higher in the watershed. It feels like we are being conned for EPA and CDPHE political gain."*

- Information was withheld. For example, citizens were not told up front that the letter to the Governor mentioned above was going to be sent, or indeed, that it was even part of the Superfund process. It was not until it was mentioned in passing by an EPA representative that their intention became known.

- To many Jamestown citizens, the EPA and CDPHE appear strongly biased advocates of Superfund no matter what, rather than environmental cleanup in the most effective way that serves as many stakeholders as possible. When they first showed up they were the ones talking about alternatives. But then it appeared that their minds were made up. In fact, attempts to try understand the situation and consider alternatives to Superfund has been largely in spite of the EPA and CDPHE, not because of them.

APPENDIX E. NY TIMES ARTICLE OF 2/24/02

imes

Bush Proposing Policy Changes On Toxic Sites

Taxpayers Would Bear Most Cleanup Costs

By KATHARINE Q. SEELYE

WASHINGTON, Feb. 23 — Faced with dwindling reserves in the huge account that gave the Superfund waste cleanup program its name, the Bush administration has decided to designate fewer sites for restoration and to shift the bulk of the costs from industry to taxpayers.

The administration says it is dealing with much bigger and more complex sites, if fewer of them, and that deciding how to pay for the program is up to Congress.

For years Congress has failed to reach agreement on reauthorizing the tax on industry that used to be the source of money for the Superfund, which was founded in 1980 under the slogan "the polluter pays."

The trust fund used the special corporate taxes to clean up contamination at so-called orphan sites, or those where the responsible party could not be identified or could not pay, as well as for recalcitrant companies and emergency actions.

The trust fund has been used to clean up about 30 percent of the 1,551 sites on the Environmental Protection Agency's national priority list, with corporations themselves paying to clean up the other 70 percent. Most companies prefer to pay for their own cleanup because they can do it for less than the government, which is allowed to charge the companies three times the cost, plus penalties.

But the trust fund is running out of money.

Under pressure from the chemical and oil industries, Congress let the corporate taxes expire in 1995. Without them, the trust fund dwindled, from a high of $3.8 billion in 1996 to a projected $28 million next year.

President Bush did not reauthorize the taxes last year in his first budget, and his proposed budget for 2003 explicitly states that he will not do so.

"The budget does not propose reauthorization of Superfund taxes," the administration says in an obscure section of the spending bill for Veterans Affairs, Housing and Urban Development and independent agencies.

Chemical and oil companies and other businesses had long complained that the taxes were burdensome, costing them collectively $4 million a day or more than $1 billion a year. They also complained that the Superfund program was slow, overly stringent and badly managed and had unfair liability rules.

Still, the taxes were reauthorized under President Ronald Reagan and again under Mr. Bush's father. They expired in 1995, and while President Bill Clinton sought to have them reinstated, the House of Representatives, by then under Republican control, refused.

The Bush administration's declaration that it will not reauthorize the

Continued on Page 22

taxes will substantially shift the costs of maintaining the Superfund trust fund to taxpayers.

In 1994, taxpayers paid $256 million for Superfund cleanups, or about 21 percent of the $1.2 billion fund, with corporate taxes paying $958 million, or about 79 percent.

Taxpayers paid $350 million in 1999, and since then have paid about 50 percent of the cost. Mr. Bush proposes that taxpayers pay $700 million, or more than 50 percent of the $1.3 billion fund, in 2003.

The fund itself will provide about $600 million in 2003. Even though the tax has not been collected since 1995, the fund has reserves because the Environmental Protection Agency has recovered costs from corporations and collected interest. Run that amount is vanishing. By 2004, all the money will come from taxpayers.

"This is shifting the burden to taxpayers, and it is dramatically realigning the purpose of the program, which was to ensure that polluters pay," said Grant Cope, a lawyer with the U.S. Public Interest Research Group. "Taxpayers are paying more, and fewer sites are being cleaned up."

The lack of money is forcing agency officials to rethink their priorities. In the last two years, the agency has cut the overall number of sites it has designated for cleanup and completed cleanup at fewer sites than it selected.

More than 80 were cleaned up in each of the last four years of the Clinton administration, compared with 47 in 2001, Mr. Bush's first year in office, and 48 are projected to be cleaned up this year and 40 next. The administration had initially projected that it would finish 63 sites in 2001.

Marianne Horinko, assistant administrator of the agency's Office of Solid Waste and Emergency Response, said that fewer sites were being added, and fewer completed, because the agency had largely finished the $20 million "garden variety" sites on its list and was now taking on huge, very difficult cases — "megasites" costing more than $100 million.

This year, the agency has considered the addition of only two sites, both of them large old mines and both of them orphan sites, one in Montana and one in Nebraska.

"That's the future of the Superfund," Ms. Horinko said.

She said that Congress was happier with the program than it had been in the past in part because it had transformed itself from a "study, study, study program," with endless delays and litigation, to "a big construction program, and the money goes right into the communities."

Katherine Probst, a longtime expert on the Superfund and a senior fellow at Resources for the Future, an independent research group, said the drop was partly because of less money being available for cleaning up more complicated sites and partly because the Superfund program "hasn't been efficiently and effectively managed."

Representative John D. Dingell of Michigan, the top Democrat on the Energy and Commerce Committee, recently wrote to Christie Whitman, administrator of the E.P.A., asking for an explanation by March 6 of "the sudden slowdown."

"Has the administration made a policy decision to slow down Superfund cleanups, contrary to your assurances to us last May?" the letter asks. It also asks for details of each project that the administration had initially designated and no longer does.

The agency has not made that list public, but various officials said they had been sending notices saying activity would be delayed.

For example, Myron Knudson, director of the Superfund division based in Dallas, said he had five sites ready to be cleaned up by the trust fund but was not able to start because he had no money.

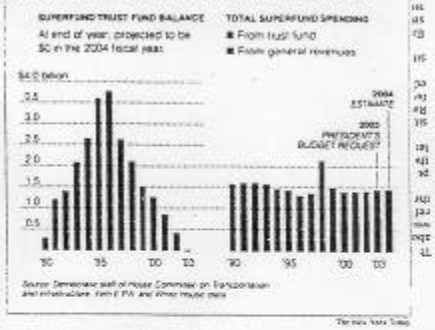
"I have five sites ready to go tomorrow, but I'm sending out letters saying there's no money at this time," Mr. Knudson said.

Since the Superfund began, 1,551

ADDING IT UP

The Costs of Cleanup

Since Congress stopped collecting taxes from chemical and oil companies for a trust fund to pay for the cleanup of toxic waste sites, the costs of cleaning up Superfund sites have shifted to taxpayers.



Source: Democratic staff of House Committee on Transportation and Infrastructure, from E.P.A. and other major data

The New York Times

sites have been put on the national priority list, with 257 sites cleaned up and 552 mostly cleaned up, the E.P.A. said. At most of the sites, groundwater contamination remains a problem that will take years to remedy.

But money also remains a problem. A study by Ms. Probst, financed by Congress, predicted that over the next decade, 230 to 490 new Superfund sites could be added to the E.P.A.'s priority list and would cost at least $14 billion.

Democrats in Congress say they intend to push the administration to reconsider its refusal to reauthorize the corporate taxes, though they have little expectation that it will.

Representative Frank Pallone Jr., a Democrat whose New Jersey district is home to one of the biggest concentrations of Superfund sites in the nation, said, "The problem is that the president is adamantly opposed to the tax, and the Republican leadership is adamantly opposed to it, so the chances of getting it through are very slim."

Mr. Pallone said the situation was complicated by the tight budget. "The amount of money available for this will be dramatically less," he said. He predicted that ultimately, fewer sites would be cleaned up because the administration would not reinstitute the tax and would not allocate more taxpayer money from general revenues.

"I don't think the administration will appropriate enough general revenue money to make up for the loss of the tax," he said.

A spokesman for the Environmental Protection Agency said the agency was at the mercy of Congress.

"If Congress keeps the dollar amount at the same level, we'll continue as we have been," said Joe Martyak, the spokesman. "If Congress cuts it in half, we'll have only half as much."

APPENDIX F. SUPPLEMENTARY DATA

1) Elevated Contaminant Concentration (ECC) Criteria

The first criteria was that used by the EPA I the Site Inspection Reports. The criteria are described in the *Analytical Data* section of the reports under *Data Validation and Interpretation*. Below is a quote from the Captain Jack Mill Report describing the criteria.

> The sample data collected during this focused SI [site investigation] were reviewed using the HRS [Hazard Ranking System] guidelines for analytical interpretation (Office of the Federal Register, 1990). As reported in the analytical results Tables, elevated concentrations of contaminants, as noted by a star (*), are determined by sample concentrations based on the following:
>
> If the background analyte concentration is greater than its Sample Quantitation Limit (SQL), and if the release sample analyte concentration is greater than its SQL, three times greater than the background, and five times greater than the blank concentration.
>
> If the background analyte concentration is not greater than its SQL and if the release sample analyte concentration is greater than its SQL, greater than the background, and five times greater than the blank analyte concentration.

We generated a table that listed the starred values from the above reports (Table 1). The table includes all measured metals and sampling sites. We placed an ECC designation to represent the starred values. ECC refers to elevated concentrations of contaminants. Table 2 shows the sum of all ECC designations for each sampling site.

2) Ambient Water Quality Criteria (AWQC)

The second criteria were taken from the March, 1998 Golden Age Report. They were ambient water quality criteria (AWQC) values for the metals listed below.

Ambient Water Quality Criteria (ug/l)

Copper 12.0	**Iron** 1000.0	**Lead** 3.2	**Mercury** 0.012	**Zinc** 110.0
Cadmium 1.1	**Nickel** 160.0	**Selenium** 5.0	**Silver** 2.3	

The reference for the source of these values was the Superfund Chemical Data Matrix (SCDM). The SCDM is a source for factor values and benchmark values applied when evaluating potential National Priorities List (NPL) sites using the Hazard Ranking System (HRS). Factor values are part of the mathematical equation for determining the relative threat posed by a hazardous waste site and reflect hazardous substance characteristics, such as toxicity and persistence in the environment, substance mobility, and potential for bioaccumulation. Benchmarks are environment- or health-based substance concentration limits developed by or used in other EPA regulatory programs. SCDM contains HRS factor values and benchmark values for hazardous

substances that are frequently found at sites evaluated using the HRS, as well as the physical, chemical, and radiological data used to calculate those values.

Table 3 lists all the samples with concentrations higher than the AWQC criteria and Table 4 lists the sum of all AWQC results.

3) Chronic Aquatic Life Criteria for Dissolved Metals

EPA developed ECC and AWQC as part of the Superfund process to assess the presence of contaminant sources and relative threats for NPL listing. We wanted to compare the reported metal concentrations with standards used to assess environmental and public health. We used chronic aquatic life criteria with both dissolved and total recoverable metals. Measurements from the Captain Jack report, the earlier Golden Age report, the Lefthand Report and some of the River Watch sampling were of total recoverable metals. Measurements from the second Golden Age report and the remaining River Watch samples were of dissolved metals. The records do not indicate the type of metal sampling analyzed for the Left Hand Water District.

Currently the criteria used in Colorado are dissolved metals criteria. The source of these criteria were two publications from the Colorado Department of Health, Water Quality Control Commission:

- Regulation No. 31, Basic Standards and Methodologies for Surface Water www.cdphe.state.co.us/op/waterqualityregs.asp;
- Regulation No. 38, Classifications and Numeric Standards South Platte River Basin, Laramie River Basin, Republican River Basin, Smoky Hill River Basin Report. www.cdphe.state.co.us/op/waterqualityregs.asp

These criteria are listed in Table 10 in the Appendix.

The criteria for several of the metals are dependent on hardness of the water sample. Hardness values were reported only in the River Watch data and the second Golden Age report. However, levels of magnesium and calcium were reported for the other EPA sampling allowing for calculations of hardness using the formula provided in the second Golden Age report. No hardness data were provided with the analysis results for the Left Hand Water District.

Hardness, (mg equivalent $CaCO_3$/L) = 2.497[Ca, mg/L]+4.118[Mg, mg/L]

We calculated hardness for each sample using this formula.

The chronic aquatic dissolved metals criteria were used to evaluate the dissolved metals measurements from the second Golden Age Report and dissolved metal data from the River Watch data.

4) Chronic Aquatic Criteria for Total Recoverable Metals

As mentioned above the current aquatic life criteria were established for measurements of **dissolved** metals. In the past, EPA and the states used criteria for **total recoverable** metals. EPA revised their criteria from total recoverable to dissolved in 1999 (EPA. 1999 National Recommended Water Quality Criteria-Correction. Report 822-Z-99-000). The 1999 report includes a table for calculating hardness dependent criteria for total recoverable metals. It also provides conversion factors to convert the total metals criteria into dissolved criteria. This information is reproduced as Table 11 in the Appendix.

The conversion factors listed in table 11 for **cadmium** and **lead** are identical to the first part of the equations in table 3 that represent current dissolved standards. Therefore, for these two metals we simply calculated total recoverable criteria by removing the conversion factor from the equations in Table 10.

For **copper, nickel,** and **zinc** we used the equations in Table 11 to calculate total recoverable criteria for copper, nickel, and zinc.

The chronic aquatic total recoverable metals criteria were used to evaluate the total recoverable metals measurements from the Captain Jack Report, the first Golden Age Report, the Lefthand Report and the total recoverable metal data from River Watch sampling.

5) Drinking Water Criteria (DWC)

The Drinking Water Criteria in Table 12 came from the State Criteria for Water Quality Regulations, Regulation 31 Basic Standards and Methodologies for Surface Water. Effective 10/30/2001. www.cdphe.state.co.us/op/waterqualityregs.asp. The Drinking Water Criteria are for total recoverable metals. Measurements from all four EPA reports were compared with the Drinking Water Criteria even though some of the measurements were for dissolved metals. We wanted to maximize the number of samples we evaluated against the DWC, so our rationale was that the criteria for total metals would actually be higher than that for dissolved metals, so any samples that exceeded the DWC for total metals would likely exceed the criteria for dissolved metals.

Table 7 lists the results from the DWC evaluation for all sites and metals. Table 8 lists the sum of DWC results for all sites.

6) *Only Option* Criteria:
For several metals we only found one criteria and decided to use what we could find. For aluminum the only criteria we found was for Chronic Aquatic Life, dissolved (see Table 10). For silver we had no conversion from total to dissolved so we used the chronic dissolved criteria for trout, as recommended in Regulation 38 (Table 3).

The *only option* criteria were used to evaluate measurements from all four EPA reports as well as the RiverWatch data.

Table 5 lists all samples where the metals concentrations exceeded the chronic aquatic criteria for dissolved or total metals (ALC) or the o*nly option* criteria discussed above. Table 6 lists the sum of ALC results.

We found **no** criteria for calcium, cobalt, potassium, magnesium, sodium, and vanadium.

PHYSICAL HAZARDS

In addition to the analysis of environmental hazards, CGS examined the nature of physical hazards at mines on US Forest Service lands. CGS devised a Physical Hazard Rating system based upon the following general criteria:

E = EMERGENCY - This will seldom be noted on the data form since it reflects a "sudden danger or impairment that presents a high probability of substantial physical harm to the health, safety, or general welfare of people before the danger can be abated under normal program operation procedures" [Office of Surface Mining Rules and Regulations, Section 872.5(c)]. An emergency involves a sudden and recent change on which immediate action should be taken

1 = EXTREME DANGER - This means a “condition that could reasonably be expected to cause substantial physical harm to persons, property....and to which persons or improvements on real property are currently exposed” [OSM Rules and Regulations 872.5(e)]. Sites falling in this category will generally have a high degree of exposure to the chance of injury or damage. A high degree of peril coupled with a high degree of jeopardy being placed on persons or property, either knowingly or unknowingly, is generally involved. Easy access to the general public is a factor. Situations involving open vertical shafts, unstable adits (incompetent rock), very high highwall, or collapsed stopes near roads or towns would fall into this category.

2 = DANGEROUS - The specific mining feature may be as perilous as in a #1 situation, but may be less likely to cause injury or damage because of the remoteness of the site or other constraints on uncontrolled access to the site.

3 = POTENTIALLY DANGEROUS - any open or partially filled adit, moderate height highwall, etc. that is not close to a road or town and would be infrequently accessed by people. This includes situations where the exact hazard is unknown, but could involve a degree of risk at certain times or under certain conditions. 4= (not used during this inventory) - In order to maintain some degree of consistency, this Mine Hazard rating system is based on one used by Colorado Division of Minerals and Geology during an earlier, less detailed inventory. In the earlier inventory, a rating of "4" indicated possible environmental degradation, rather than physical hazard. The "4" rating is not applicable for physical hazards in this inventory.

5 = NO SIGNIFICANT HAZARD - includes collapsed or filled features that are being naturally or intentionally reclaimed, stable mine dumps, and mine sites where all physical hazards have been effectively mitigated.

As with the environmental hazards, the physical hazards were assessed for mine openings, tailings piles, and mining areas.

Mine Openings

There were 230 mine openings on US Forest Service land identified by the CGS study within the mapped boundaries of the Left Hand Creek watershed. 221 of these were given a PHR. Many (n

= 98) were rated “no significant hazard”. Sixty-nine were rated “potenitally dangerous”, 49 “dangerous” and five “extreme danger”. The location of these openings is shown in map 11.

Tailings Piles

CGS identified 186 tailings piles identified on US Foreest Service Land in the mapped limits of the Lefthand Creek Watershed. PHR’s were attributed to 177 of those. The vast majority (n=176) were rated as “no significant hazard”. One tailing pile in Nugget Gulch was rated as “dangerous” (see map 12).

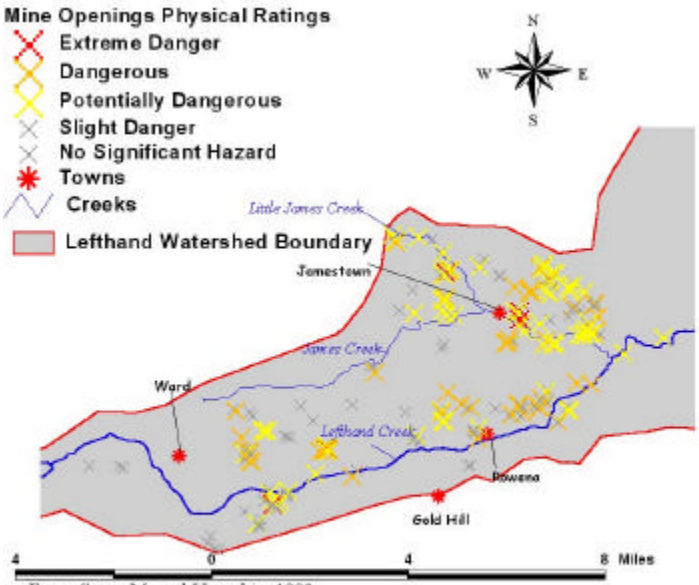
Mine Inventory Areas

Seventy-one mine inventory areas were identified on US Forest Service lands within the mapped boundaries of the Lefthand Creek watershed. The inventory area boundaries were based upon the occurrence of mine openings, adits, shafts, tailing piles dumps and spoil banks. PHR’s were applied to 66 of the mine inventory areas. Fifteen were rated as “no significant hazard”, 20 were rated “potentially dangerous”, 27 as “dangerous” and four as “extreme danger”. The five “extreme danger” sites are:

- FR-2008 (East Overland Mtn.-Unnamed Gulch)
- Buffalo Gulch And Lower Hill Gulch
- North Spring Gulch Pass
- Points East Ridge/Upper Left Hand Canyon

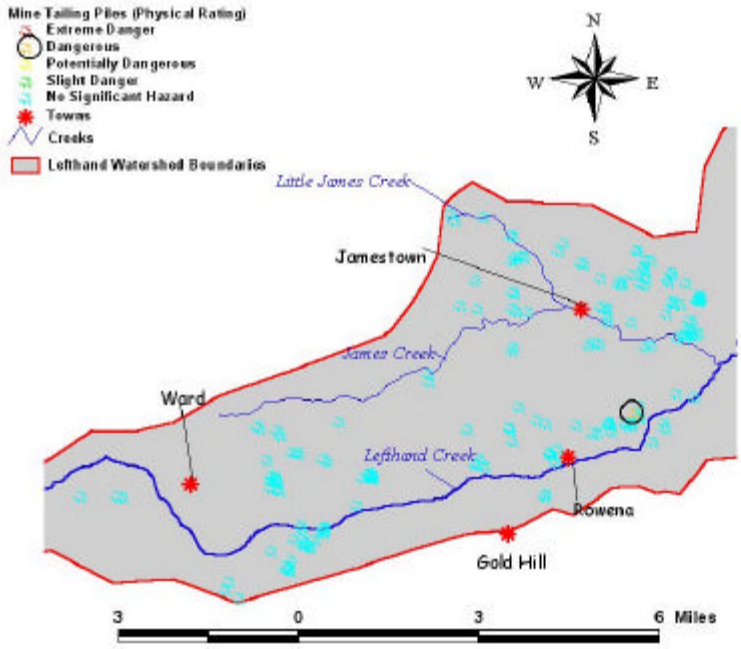
See map 13 for more information.

Map 11. Physical Hazard Ratings on mine openings in the Lefthand Creek Watershed from the USFS Report.



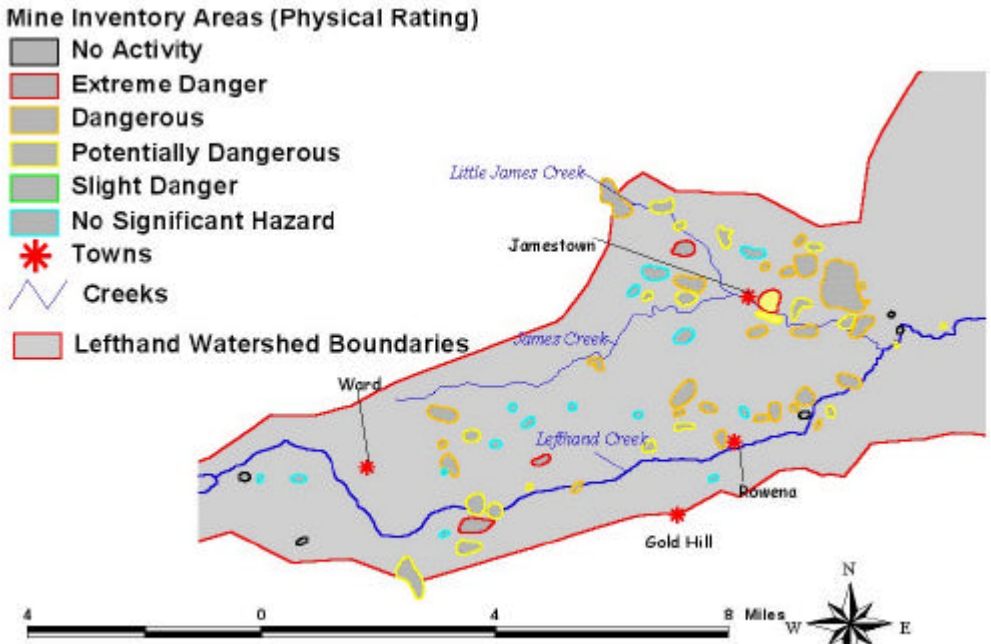
From: Sares, M. and J Lovekin. 1993. USFS [United States Forest Service]-Abandoned Mine Land Inventory Project. Final summary report. For the Boulder Ranger District. Colorado Geological Survey. 40 pp.

Map 12. Physical Hazard Ratings on mine tailings piles in the Lefthand Creek Watershed from the USFS Report.



From: Sares, M. and J Lovekin. 1993.
USFS [United States Forest Service]-Abandoned Mine Land Inventory Project.
Final summary report. For the Boulder Ranger District. Colorado Geological Survey. 40 pp.

Map 13. Physical Hazard Ratings on mines in the Lefthand Creek Watershed from the USFS Report.



Sares, M. and J Lovekin. 1993.
USFS [United States Forest Service]-Abandoned Mine Land Inventory Project.
Final summary report. For the Boulder Ranger District. Colorado Geological Survey. 40 pp.

TABLES 1-15

Table 1. Metals in a given sample that exceeded the Elevated Contaminant Concentration (ECC) (designated as a 1). Column 2 represents the total number of metals in a given sample that exceeded the Elevated Contaminant Concentration. SE = sediment, SW = surface water

SITE ID	tally	Al	Ag	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	Hg	K	Mg	Mn	Na	Ni	Pb	Th	Sb	Se	Tl	V	Zn
Jun-97																									
CJX-SW-1	0																								
CJX-SW-2	8	1					1				1	1			1	1			1						1
CJX-SW-3	6	1					1				1					1			1						1
CJX-SW-4	5						1				1					1			1						1
CJX-SW-5	12	1				1	1	1	1		1	1			1	1		1	1						1
CJX-SW-6	0																								
CJX-SW-7	0																								
CJX-SW-8	8	1					1				1	1			1	1			1						1
CJX-SE-1	0																								
CJX-SE-2	5		1	1				1											1						1
CJX-SE-3	9		1	1	1			1			1								1		1	1			1
CJX-SE-4	8		1	1				1			1		1						1		1				1
CJX-SE-5	5			1							1	1									1	1			
CJX-SE-6	1																					1			
CJX-SE-7	2			1															1						
CJX-SE-8	9		1	1	1						1	1	1						1			1			1
Oct-97																									
GA-AR-SE-1	0																								
GA-AR-SE-2	9		1	1	1		1	1			1						1		1						1
GA-AR-SW-2	0																								
GA-BA-SE-1	0																								
GA-BA-SE-5	5		1	1	1		1					1													
GA-BA-SW-1	0																								
GA-BA-SW-5	7					1						1		1		1	1		1						1
GA-CA-SE-1	0																								
GA-CA-SW-1	0																								
GA-EM-SE-1	0																								
GA-EM-SE-2	0																								
GA-GI-SE--1	0																								
GA-GI-SW-1	0																								
GA-HI-SE-1	2																1								1
GA-HI-SE-2	0																								

Table 1. Cont'd.

SITE ID	tally	Al	Ag	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	Hg	K	Mg	Mn	Na	Ni	Pb	Th	Sb	Se	Tl	V	Zn
GA-HI-SE-3	1																1								
GA-HI-SW-1	3										1					1			1						
GA-HI-SW-2	0																								
GA-HI-SW-3	5										1	1				1			1						1
GA-JC-SE--1	0																								
GA-JC-SE--2	1																1								
GA-JC-SE-3	2							1			1														
GA-JC-SE-4	2															1	1								
GA-JC-SE-5	1																1								
GA-JC-SE-6	4							1			1						1								1
GA-JC-SE-7	8					1	1	1		1	1						1	1							1
GA-JC-SE-8	12	1				1	1	1	1	1	1				1		1	1						1	1
GA-JC-SW-1	0																								
GA-JC-SW-2	1															1									
GA-JC-SW-3	1															1									
GA-JC-SW-4	4										1					1			1						1
GA-JC-SW-5	3												1			1			1						
GA-JC-SW-6	4										1					1			1						1
GA-JC-SW-7	3										1					1			1						
GA-JC-SW-8	4										1					1			1						1
GA-JE-SE-1	0																								
GA-JE-SW-1	0																								
GA-LHC-SE-1	0																								

GA-LHC-SE-2	2					1	1																				
GA-LHC-SW-1	0																										
GA-LHC-SW-2	1											1															
GA-LJ-SE-1	0																										
GA-LJ-SE-2	4		1	1			1															1					
GA-LJ-SE-4	7		1	1			1			1		1										1			1		
GA-LJ-SE-5	8	1	1				1	1			1	1							1			1					
GA-LJ-SE-6	19	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1			1			1	1	
GA-LJ-SW-1	0																										
GA-LJ-SW-2	0																										
GA-LJ-SW-4	10	1				1	1						1		1	1	1	1		1							1
GA-LJ-SW-5	9	1				1	1						1		1	1	1	1		1							
GA-LJ-SW-6	10	1				1	1						1		1	1	1	1		1							1

Table 1. Cont'd.

SITE ID	tally	Al	Ag	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	Hg	K	Mg	Mn	Na	Ni	Pb	Th	Sb	Se	Tl	V	Zn
Jun-98																									
GA-AR-SW-2	0																								
GA-BA-SW-1	0																								
GA-BA-SW-5	7					1						1		1		1	1		1						1
GA-CA-SW-1	0																								
GA-GI-SW-1	0																								
GA-HI-SW-1	0																								
GA-HI-SW-2	0																								
GA-HI-SW-3	1	1																							
GA-JC-SW-1	0																								
GA-JC-SW-2	0																								
GA-JC-SW-3	0																								
GA-JC-SW-4	1	1																							
GA-JC-SW-5	1	1																							
GA-JC-SW-6	1	1																							
GA-JC-SW-7	1	1																							
GA-JC-SW-8	1	1																							
GA-JE-SW-1	0																								
GA-LHC-SW-1	0																								
GA-LHC-SW-2	1	1																							
GA-LJ-SW-1	0																								
GA-LJ-SW-2	0																								
GA-LJ-SW-4	7	1									1					1	1		1				1		1
GA-LJ-SW-5	8	1				1	1								1	1	1		1						1
GA-LJ-SW-6	8	1				1	1								1	1	1		1						1
Jun-00																									
LH-SW-1	0																								
LH-SW-4	0																								
LH-SW-5	0																								
LH-SW-11	0																								
LH-SW-12	0																								
LH-SW-13	0																								
LH-SW-16	0																								
LH-SW-17	0																								
LH-SW-18	0																								
LH-SW-19	0																								
LH-SW-20	0																								

Table 2. Number of times metals exceeded the Elevated Contaminant Concentration (ECC) Criteria in a given sample. Values from the two GA samplings were combined.
SE = sediment, SW = surface water

SITE ID	ECC
CJX-SE-1	0
CJX-SE-2	5
CJX-SE-3	9
CJX-SE-4	8
CJX-SE-5	5
CJX-SE-6	1
CJX-SE-7	2
CJX-SE-8	9
CJX-SW-1	0
CJX-SW-2	8
CJX-SW-3	6
CJX-SW-4	5
CJX-SW-5	12
CJX-SW-6	0
CJX-SW-7	0
CJX-SW-8	8
GA-AR-SE-1	0
GA-AR-SE-2	9
GA-AR-SW-2	0
GA-BA-SE-1	0
GA-BA-SE-5	5
GA-BA-SW-1	0
GA-BA-SW-5	14
GA-CA-SE-1	0
GA-CA-SW-1	0
GA-EM-SE-1	0
GA-EM-SE-2	0
GA-GI-SE-1	0
GA-GI-SW-1	0
GA-HI-SE-1	2
GA-HI-SE-2	0
GA-HI-SE-3	1
GA-HI-SW-1	3
GA-HI-SW-2	0
GA-HI-SW-3	6
GA-JC-SE-1	0
GA-JC-SE-2	1
GA-JC-SE-3	2
GA-JC-SE-4	2
GA-JC-SE-5	1
GA-JC-SE-6	4
GA-JC-SE-7	8
GA-JC-SE-8	12
GA-JC-SW-1	0
GA-JC-SW-2	1
GA-JC-SW-3	1
GA-JC-SW-4	5
GA-JC-SW-5	4
GA-JC-SW-6	5
GA-JC-SW-7	4
GA-JC-SW-8	5
GA-JE-SE-1	0
GA-JE-SW-1	0
GA-LHC-SE-1	0
GA-LHC-SE-2	2
GA-LHC-SW-1	0
GA-LHC-SW-2	2
GA-LJ-SE-1	0
GA-LJ-SE-2	4
GA-LJ-SE-4	7
GA-LJ-SE-5	8
GA-LJ-SE-6	19
GA-LJ-SW-1	0
GA-LJ-SW-2	0
GA-LJ-SW-4	17
GA-LJ-SW-5	17
GA-LJ-SW-6	18
LH-SW-1	0
LH-SW-4	0
LH-SW-5	0
LH-SW-11	0
LH-SW-12	0
LH-SW-13	0
LH-SW-16	0
LH-SW-17	0
LH-SW-18	0
LH-SW-19	0
LH-SW-20	0

Table 3. Metals in a given sample that exceeded the Ambient Water Quality Criteria (designated as a 1). Column 2 represents the total number of metals in a given sample that exceeded the AWQC.

SITE ID	AWQC tally	Ag	Cd	Cu	Fe	Hg	Ni	Pb	Se	Zn
Jun-97										
CJX-SW-1	1					1				
CJX-SW-2	7		1	1	1	1		1	1	1
CJX-SW-3	3			1		1		1		
CJX-SW-4	4			1		1		1		1
CJX-SW-5	6		1	1	1	1		1		1
CJX-SW-6	1					1				
CJX-SW-7	1					1				
CJX-SW-8	6		1	1	1	1		1		1
Oct-97										
GA-AR-SW-2	7	1	1	1	1	1		1		1
GA-BA-SW-1	5		1	1		1		1		1
GA-BA-SW-5	6	1	1		1	1		1		1
GA-CA-SW-1	5		1	1		1		1		1
GA-GI-SW-1	1					1				
GA-HI-SW-1	3			1		1		1		
GA-HI-SW-2	3			1		1				1
GA-HI-SW-3	3			1		1		1		
GA-JC-SW-1	1					1				
GA-JC-SW-2	1					1				
GA-JC-SW-3	1					1				
GA-JC-SW-4	3			1		1		1		
GA-JC-SW-5	3			1		1		1		
GA-JC-SW-6	4		1	1		1		1		
GA-JC-SW-7	3			1		1		1		
GA-JC-SW-8	4		1	1		1		1		
GA-JE-SW-1	4		1	1		1				1
GA-LHC-SW-	2					1		1		
GA-LHC-SW-	3			1		1		1		
GA-LJ-SW-1	5		1	1		1		1		1
GA-LJ-SW-2	4		1	1		1				1
GA-LJ-SW-4	6		1	1	1	1		1		1
GA-LJ-SW-5	6		1	1	1	1		1		1
GA-LJ-SW-6	6		1	1	1	1		1		1

Table 3. Cont'd

SITE ID	AWQC tally	Ag	Cd	Cu	Fe	Hg	Ni	Pb	Se	Zn

Jun-98									
GA-AR-SW-2						1			
GA-BA-SW-1	4			1		1		1	1
GA-BA-SW-5	5		1		1	1		1	1
GA-CA-SW-1	4		1	1		1			1
GA-GI-SW-1	2	1				1			
GA-HI-SW-1	2	1				1			
GA-HI-SW-2	2	1				1			
GA-HI-SW-3	2	1				1			
GA-JC-SW-1	2	1				1			
GA-JC-SW-2	2	1				1			
GA-JC-SW-3	2	1				1			
GA-JC-SW-4	1					1			
GA-JC-SW-5	1					1			
GA-JC-SW-6	1					1			
GA-JC-SW-7	1					1			
GA-JC-SW-8	1					1			
GA-JE-SW-1	2			1		1			
GA-LHC-SW·	2			1		1			
GA-LHC-SW·	1					1			
GA-LJ-SW-1	2			1		1			
GA-LJ-SW-2	3			1		1		1	
GA-LJ-SW-4	5		1	1		1		1	1
GA-LJ-SW-5	6	1	1	1		1		1	1
GA-LJ-SW-6	6	1	1	1		1		1	1
Jun-00									
LH-SW-1	3	nd	nd	1	1	nd	nd	1	nd
LH-SW-4	1	nd	nd			1	nd		nd
LH-SW-5	3	nd	nd	1	1	nd	nd	1	nd
LH-SW-11	1	1	nd			nd	nd		nd
LH-SW-12	4	1	nd	nd	1	1		1	nd
LH-SW-13	1	1	nd			nd	nd		nd
LH-SW-16	0	nd	nd			nd	nd		nd
LH-SW-17	2	1	nd	nd		1	nd		nd
LH-SW-18	2	1	nd	nd		1	nd		nd
LH-SW-19	1	nd	nd			1	nd		nd
LH-SW-20	0	nd	nd			nd	nd		nd

nd = sample not analyzed for this metal

Table 4. Number of times metals exceeded the Ambient Water Quality Criteria (AWQC) in a given surface water sample. Values from the two GA samplings were combined.

SITE ID	AWQC
CJX-SW-1	1
CJX-SW-2	7
CJX-SW-3	3
CJX-SW-4	4
CJX-SW-5	6
CJX-SW-6	1
CJX-SW-7	1
CJX-SW-8	6
GA-AR-SW-2	7
GA-BA-SW-1	10
GA-BA-SW-5	11
GA-CA-SW-1	9
GA-GI-SW-1	3
GA-HI-SW-1	5
GA-HI-SW-2	5
GA-HI-SW-3	5
GA-JC-SW-1	3
GA-JC-SW-2	3
GA-JC-SW-3	3
GA-JC-SW-4	4
GA-JC-SW-5	4
GA-JC-SW-6	5
GA-JC-SW-7	4
GA-JC-SW-8	5
GA-JE-SW-1	6
GA-LHC-SW-1	4
GA-LHC-SW-2	4
GA-LJ-SW-1	7
GA-LJ-SW-2	7
GA-LJ-SW-4	11
GA-LJ-SW-5	12
GA-LJ-SW-6	12

SITE ID	AWQC
Jun-00	
LH-SW-1	3
LH-SW-4	1
LH-SW-5	3
LH-SW-11	1
LH-SW-12	4
LH-SW-13	1
LH-SW-16	0
LH-SW-17	2
LH-SW-18	2
LH-SW-19	1
LH-SW-20	0

Table 5. Metals in a given sample that exceeded the Chronic Aquatic Life Criteria (ALC) (designated as a 1). Column 2 represents the total number of metals in a given sample that exceeded the Chronic Aquatic Life Criteria.

SITE ID	tally	Al	Ag	As	Cd	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Se	Tl	Zn
Jun-97															
CJX-SW-1	6	1	1		1		1		1			1			
CJX-SW-2	9	1	1				1	1	1	1		1	1		1
CJX-SW-3	8	1	1		1		1		1	1		1			1
CJX-SW-4	8	1	1		1		1		1	1		1			1
CJX-SW-5	9	1	1		1		1	1	1	1		1			1
CJX-SW-6	6	1	1		1		1		1			1			
CJX-SW-7	6	1	1		1		1		1			1			
CJX-SW-8	8	1	1				1	1	1	1		1			1
Oct-97															
GA-AR-SW-2	9	1	1		1		1	1	1	1		1			1
GA-BA-SW-1	7	1	1				1		1	1		1			1
GA-BA-SW-5	7	1	1					1	1	1		1			1
GA-CA-SW-1	8	1	1		1		1		1	1		1			1
GA-GI-SW-1	3	1	1						1						
GA-HI-SW-1	7	1	1		1		1		1			1			1
GA-HI-SW-2	4	1	1						1	1					
GA-HI-SW-3	7	1	1		1		1		1			1			1
GA-JC-SW-1	4		1				1		1			1			
GA-JC-SW-2	5	1	1				1		1			1			
GA-JC-SW-3	5	1	1				1		1			1			
GA-JC-SW-4	7	1	1		1		1		1			1			1
GA-JC-SW-5	5	1	1				1		1			1			
GA-JC-SW-6	7	1	1		1		1		1			1			1
GA-JC-SW-7	5	1	1				1		1			1			
GA-JC-SW-8	7	1	1		1		1		1			1			1
GA-JE-SW-1	7	1	1		1		1		1			1			1
GA-LHC-SW-1	4		1				1		1			1			
GA-LHC-SW-2	5	1	1				1		1			1			
GA-LJ-SW-1	7	1	1		1		1		1			1			1
GA-LJ-SW-2	6	1	1				1		1			1			1

Table 5. Cont'd.

SITE ID	tally	Al	Ag	As	Cd	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Se	Tl	Zn
GA-LJ-SW-4	8	1	1				1	1	1	1		1			1

GA-LJ-SW-5	8	1	1				1	1	1	1		1			1
GA-LJ-SW-6	8	1	1				1	1	1	1		1			1
Jun-98															
GA-AR-SW-2:															
GA-BA-SW-1	6	1	1						1	1		1			1
GA-BA-SW-5	8	1	1				1	1	1	1		1			1
GA-CA-SW-1	5	1	1						1	1					1
GA-GI-SW-1	4		1				1		1			1			
GA-HI-SW-1	5	1	1		1				1			1			
GA-HI-SW-2	5	1	1						1	1		1			
GA-HI-SW-3	5	1	1				1		1			1			
GA-JC-SW-1	6	1	1		1		1		1			1			
GA-JC-SW-2	6	1	1		1		1		1			1			
GA-JC-SW-3	6	1	1		1		1		1			1			
GA-JC-SW-4	6	1	1				1		1			1			1
GA-JC-SW-5	6	1	1				1		1			1			1
GA-JC-SW-6	5	1	1						1			1			1
GA-JC-SW-7	4	1	1						1			1			
GA-JC-SW-8	4	1	1						1			1			
GA-JE-SW-1	6	1	1				1		1			1			1
GA-LHC-SW-1	5	1	1				1		1			1			
GA-LHC-SW-2	6	1	1		1		1		1			1			
GA-LJ-SW-1	5	1	1				1		1			1			
GA-LJ-SW-2	5	1	1				1		1			1			
GA-LJ-SW-4	6	1	1				1		1	1		1			
GA-LJ-SW-5	6	1	1				1		1	1		1			
GA-LJ-SW-6	6	1	1				1		1	1		1			
Jun-00															
LH-SW-1	6	1	nd	nd	nd	nd	1	1	nd	1	nd	1	nd	nd	1
LH-SW-4	1		nd	nd	nd	nd			1		nd		nd	nd	
LH-SW-5	6	1	nd	nd	nd	nd	1	1	nd	1	nd	1	nd	nd	1
LH-SW-11	3		1	nd	nd	nd	1		nd		nd	1	nd	nd	
LH-SW-12	3			nd	nd	nd	nd	1	1	1			nd	nd	

Table 5. Cont'd.

SITE ID	tally	Al	Ag	As	Cd	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Se	Tl	Zn
LH-SW-13	3		1	nd	nd	nd	1		nd		nd	1	nd	nd	
LH-SW-16	2		nd	nd	nd	nd	1		nd		nd	1	nd	nd	
LH-SW-17	4	1	1	nd	nd	nd	nd		1		nd	1	nd	nd	

LH-SW-18	3		1	nd	nd	nd	nd		1	nd	1	nd	nd		
LH-SW-19	4	nd		nd	nd	nd		1	1	nd	1	nd	nd	1	
LH-SW-20	1			nd	nd	nd		nd		nd	1	nd	nd		

Table 6. Number of times metals in a given surface water sample exceeded the Chronic Aquatic Life Criteria (ALC). Values from the two GA samplings were combined.

SITE ID	ALC
CJX-SW-1	6
CJX-SW-2	9
CJX-SW-3	8
CJX-SW-4	8
CJX-SW-5	9
CJX-SW-6	6
CJX-SW-7	6
CJX-SW-8	8
GA-AR-SW-2	9
GA-BA-SW-1	13
GA-BA-SW-5	15
GA-CA-SW-1	13
GA-GI-SW-1	7
GA-HI-SW-1	12
GA-HI-SW-2	9
GA-HI-SW-3	12
GA-JC-SW-1	10
GA-JC-SW-2	11
GA-JC-SW-3	11
GA-JC-SW-4	13
GA-JC-SW-5	11
GA-JC-SW-6	12
GA-JC-SW-7	9
GA-JC-SW-8	11
GA-JE-SW-1	13
GA-LHC-SW-1	9
GA-LHC-SW-2	11
GA-LJ-SW-1	12
GA-LJ-SW-2	11
GA-LJ-SW-4	14
GA-LJ-SW-5	14
GA-LJ-SW-6	14

SITE ID	ALC
LH-SW-1	6
LH-SW-4	1
LH-SW-5	6
LH-SW-11	3
LH-SW-12	3
LH-SW-13	3
LH-SW-16	2
LH-SW-17	4
LH-SW-18	3
LH-SW-19	4
LH-SW-20	1

Table 7. Metals in a given sample that exceeded the Drinking Water Criteria (DWC) (designated as a 1). Column 2 represents the total number of metals in a given sample that exceeded the Drinking Water Criteria.

SITE ID	tally	Ag	As	Ba	Be	Cd	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Se	Tl	Zn
Jun-97																	
CJX-SW-1	1															1	
CJX-SW-2	3								1		1					1	
CJX-SW-3	3								1		1					1	
CJX-SW-4	2										1					1	
CJX-SW-5	8				1	1		1	1		1	1	1			1	
CJX-SW-6	1															1	
CJX-SW-7	1															1	
CJX-SW-8	3								1		1					1	
Oct-97																	
GA-AR-SW-2	5					1			1		1		1			1	
GA-BA-SW-1	4								1		1		1			1	
GA-BA-SW-5	5				1				1		1		1			1	
GA-CA-SW-1	2										1					1	
GA-GI-SW-1	1															1	
GA-HI-SW-1	1															1	
GA-HI-SW-2	3				1						1					1	
GA-HI-SW-3	2								1							1	
GA-JC-SW-1	1															1	
GA-JC-SW-2	1															1	
GA-JC-SW-3	1															1	
GA-JC-SW-4	1															1	
GA-JC-SW-5	1															1	
GA-JC-SW-6	1															1	
GA-JC-SW-7	1															1	
GA-JC-SW-8	1															1	
GA-JE-SW-1	1															1	
GA-LHC-SW-1	1															1	
GA-LHC-SW-2	1															1	
GA-LJ-SW-1	1															1	
GA-LJ-SW-2	1															1	
GA-LJ-SW-4	5				1				1		1		1			1	
GA-LJ-SW-5	4				1				1		1					1	
GA-LJ-SW-6	6				1	1			1		1		1			1	
Jun-98																	
GA-AR-SW-2: not sampled																	
GA-BA-SW-1	4								1		1			1		1	
GA-BA-SW-5	6				1				1		1		1	1		1	
GA-CA-SW-1	2										1					1	
GA-GI-SW-1	2								1							1	
GA-HI-SW-1	2								1							1	
GA-HI-SW-2	3				1						1					1	
GA-HI-SW-3	2								1							1	
GA-JC-SW-1	2								1							1	
GA-JC-SW-2	2								1							1	
GA-JC-SW-3	2								1							1	
GA-JC-SW-4	2								1							1	

Table 7. Cont'd.

SITE ID	tally	Ag	As	Ba	Be	Cd	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Se	Tl	Zn
GA-JC-SW-5	2								1							1	

GA-JC-SW-6	2								1							1	
GA-JC-SW-7	2								1							1	
GA-JC-SW-8	2								1							1	
GA-JE-SW-1	1															1	
GA-LHC-SW-1	2								1							1	
GA-LHC-SW-2	2								1							1	
GA-LJ-SW-1	3								1					1		1	
GA-LJ-SW-2	3								1					1		1	
GA-LJ-SW-4	5								1		1		1	1		1	
GA-LJ-SW-5	4				1				1		1					1	
GA-LJ-SW-6	3				1						1					1	

Jun-00

LH-SW-1	2	nd	nd		nd	nd	nd		1	nd	1	nd		nd	nd	nd	
LH-SW-4	0	nd	nd		nd	nd	nd					nd		nd	nd	nd	
LH-SW-5	2	nd	nd		nd	nd	nd		1	nd	1	nd		nd	nd	nd	
LH-SW-11	0		nd		nd	nd	nd			nd		nd		nd	nd	nd	
LH-SW-12	2		nd		nd	nd	nd	nd	1		1			nd	nd	nd	
LH-SW-13	0		nd		nd	nd	nd			nd		nd		nd	nd	nd	
LH-SW-16	0	nd	nd		nd	nd	nd			nd		nd		nd	nd	nd	
LH-SW-17	0		nd		nd	nd	nd	nd				nd		nd	nd	nd	
LH-SW-18	1		nd		nd	nd	nd	nd	1			nd		nd	nd	nd	
LH-SW-19	1	nd	nd		nd	nd	nd			1		nd		nd	nd	nd	
LH-SW-20	0		nd		nd	nd	nd			nd		nd		nd	nd	nd	

Sum for each metal		0	0	0	10	3	0	1	34	1	23	1	8	5	0	55	0

66 total samples

Table 8. Number of times metals in a given surface water sample exceeded the Drinking Water Criteria. Values from the two GA samplings were combined.

SITE ID	DWC
CJX-SW-1	1
CJX-SW-2	3
CJX-SW-3	3
CJX-SW-4	2
CJX-SW-5	8
CJX-SW-6	1
CJX-SW-7	1
CJX-SW-8	3
GA-AR-SW-2	5
GA-BA-SW-1	8
GA-BA-SW-5	11
GA-CA-SW-1	4
GA-GI-SW-1	3
GA-HI-SW-1	3
GA-HI-SW-2	6
GA-HI-SW-3	4
GA-JC-SW-1	3
GA-JC-SW-2	3
GA-JC-SW-3	3
GA-JC-SW-4	3
GA-JC-SW-5	3
GA-JC-SW-6	3
GA-JC-SW-7	3
GA-JC-SW-8	3
GA-JE-SW-1	2
GA-LHC-SW-1	3
GA-LHC-SW-2	3
GA-LJ-SW-1	4
GA-LJ-SW-2	4
GA-LJ-SW-4	10
GA-LJ-SW-5	8
GA-LJ-SW-6	9

SITE ID	DWC
LH-SW-1	2
LH-SW-4	0
LH-SW-5	2
LH-SW-11	0
LH-SW-12	2
LH-SW-13	0
LH-SW-16	0
LH-SW-17	0
LH-SW-18	1
LH-SW-19	1
LH-SW-20	0

Table 9:
Inorganic Laboratory Results for Left Hand Water District Spurgeon Treatment Plant (1980-2001). Data provided by Mr. Hank Schmidt, Water Treatment Manager Left Hand Water District.

EPA MCL[1]	Sb[2]	Arsenic	Barium	Be[3]	Cd[4]	Cr[5]	Copper	Flouride	Lead	Hg[6]	Nickel	Se[7]	Sodium	Silver	Sulfate[8]	Th[9]
	0.006	0.05	2.0	0.004	0.005	0.1	1.3	4.0	0.015	0.002	0.1	0.05	N/A	0.05	500	0.002
Spurgeon Plant Tested Level																
1980	No Test	N/D	N/D	No Test	N/D	N/D	No Test	0.4	N/D	No Test	No Test	N/D	No Test	N/D	No Test	No Test
1982	No Test	N/D	N/D	No Test	N/D	N/D	No Test	0.9	N/D	No Test	No Test	N/D	6	N/D	No Test	No Test
1983	No Test	N/D	N/D	No Test	N/D	N/D	No Test	1.1	N/D	No Test	No Test	N/D	7	N/D	No Test	No Test
1985	No Test	N/D	N/D	No Test	N/D	N/D	No Test	0.9	N/D	No Test	No Test	N/D	8	N/D	No Test	No Test
1986	No Test	N/D	N/D	No Test	N/D	N/D	No Test	0.2	0.009	No Test	No Test	N/D	<5	N/D	No Test	No Test
1987	No Test	N/D	N/D	No Test	N/D	N/D	No Test	0.3	N/D	No Test	No Test	N/D	N/D	N/D	No Test	No Test
1988	No Test	N/D	N/D	No Test	N/D	N/D	No Test	0.3	N/D	No Test	No Test	N/D	6	N/D	No Test	No Test
1990	No Test	N/D	N/D	No Test	N/D	N/D	No Test	0.3	N/D	No Test	No Test	N/D	6	N/D	No Test	No Test
1991	No Test	N/D	0.025	No Test	N/D	N/D	No Test	0.6	N/D	No Test	No Test	N/D	9.5	N/D	No Test	No Test
1992	No Test	N/D	0.018	No Test	N/D	N/D	0.008	0.3	N/D	No Test	No Test	N/D	2.3	N/D	No Test	No Test
1993	N/D	N/D	0.010	N/D	N/D	N/D	0.007	1.0	N/D	N/D	N/D	N/D	5.8	No Test	9.1	N/D
1994	N/D	N/D	0.018	N/D	N/D	N/D	0.011	0.9	N/D	N/D	N/D	N/D	9.6	No Test	16	N/D
1995	N/D	N/D	0.015	N/D	N/D	N/D	0.008	0.7	0.002	N/D	N/D	N/D	8.7	No Test	18	N/D
1996	N/D	N/D	0.014	N/D	N/D	N/D	0.010	0.9	N/D	N/D	N/D	N/D	11	No Test	12	N/D
1997	N/D	N/D	0.010	N/D	N/D	N/D	N/D	1.1	N/D	N/D	N/D	N/D	12	No Test	15	N/D
1999	N/D	N/D	0.036	N/D	N/D	N/D	0.002	1.0	N/D	N/D	N/D	N/D	22	No Test	45	N/D
2000	N/D	N/D	0.012	N/D	N/D	0.001	No Test	0.8	No Test	N/D	N/D	N/D	10	No Test	No Test	N/D
2001	N/D	N/D	0.024	N/D	N/D	0.003	No Test	1.1	No Test	N/D	N/D	N/D	13	No Test	No Test	N/D

[1] Maximum Contaminant Level
[2] Antimony [3] Beryllium [4] Cadmium [5] Chromium [6] Mercury [7] Selenium [8] Recommended Maximum [9] Thallium

Table 10. **Colorado dissolved metals criteria (chronic)**, from Water Quality Regulations, Regulation 38 Classification and Numeric Standards for South Platte River Basin; Laramie River Basin; Republican River Basin; Smody Hill River Basin. Also Regulation 31 Basic Standards and Methodologies for Surface Water. Effective 10/30/2001. found at www.cdphe.state.co.us/op/waterqualityregs.asp

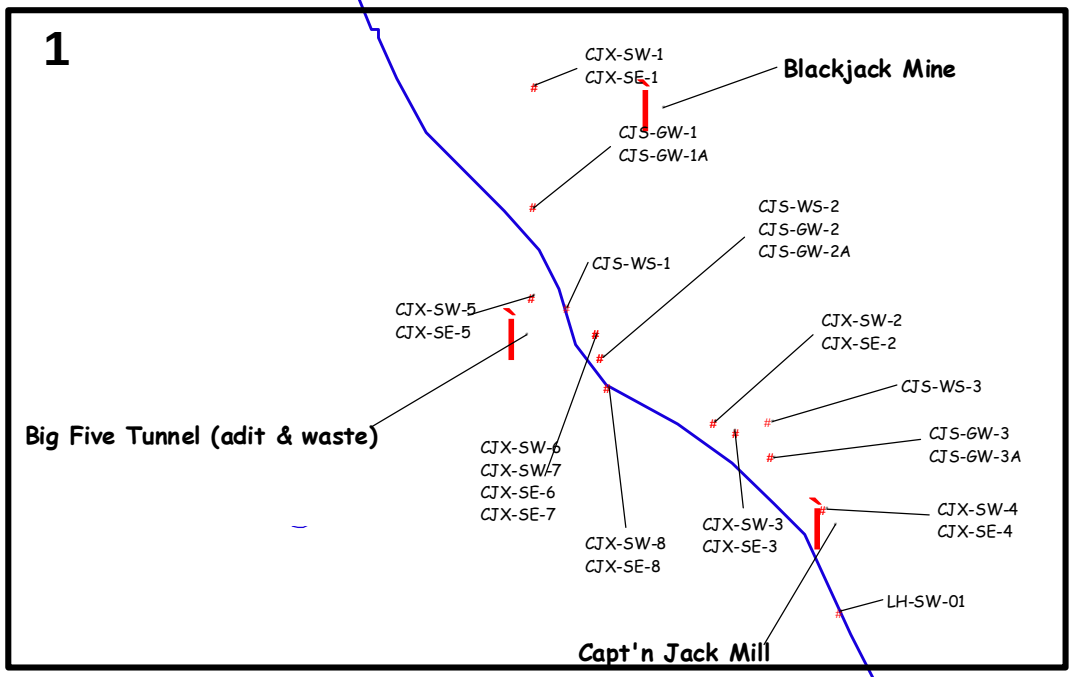
Metal	Metal abbr.	Aquatic Life Chronic (ug/l)
Aluminum	Al	87
Antimony	Sb	
Arsenic	As	150
Barium	Ba	
Beryllium	Be	
Cadmium	Cd	(1.10167-ln(hardness)*(0.04184)]*exp(0.7852*[ln(hardness)]-2.715)
Calcium	Ca	
Chromium III	Cr III	exp(0.819*[ln(hardness)]+0.5340)
Chromium VI	Cr IV	11
Cobalt	Co	
Copper	Cu	exp(0.8545*[ln(hardness)]-1.7428)
Iron	Fe	1000 (total recoverable) **Local Criterion**: existing quality as of 1/1/200 or 300 ug/l dissolved
Lead	Pb	(1.46203-[ln(hardness)*(0.145712)]*exp(1.273*[ln(hardness)]-4.705)
Magnesium	Mg	
Manganese	Mn	exp(0.3331*[ln(hardness)]+5.8743) **Local Criterion:** Existing quality as of 1/1/200 or 50 ug/l dissolved
Mercury	Hg	0.01
Nickel	Ni	exp(0.846*[ln(hardness)]+0.0554)
Potassium	K	
Selenium	Se	4.6
Silver	Ag	exp(1.72*[ln(hardness)]-9.06) **Local Criterion**: exp(1.72*[ln(hardness)]-10.51)
Thallium	Tl	15
Uranium	U	exp(1.102*[ln(hardness)]+2.2382)
Vanadium	V	
Zinc	Zn	exp(0.8473*[ln(hardness)]+0.8699)

Table 11. Adapted from Appendix B from EPA April 1999 Report (822-Z-99-001) National Recommended Water Quality Criteria - Correction

Metal	Metal abbr.	**Total metals criteria** Aquatic Life Chronic ug/l	**Conversion from Total to Dissolved Criteria** Chronic Conversion Factor
Aluminum	Al		
Antimony	Sb		
Arsenic	As	150	
Barium	Ba		
Beryllium	Be		
Cadmium	Cd	exp(0.7852*[ln(hardness)]-2.715)	1.10167-[ln(hardness)*(0.04184)]
Calcium	Ca		
Chromium III	Cr III	exp(0.819*[ln(hardness)]+0.6848)	0.86
Chromium VI	Cr IV	(1/0.962)*11 = 11.4	
Cobalt	Co		
Copper	Cu	exp(0.8545*[ln(hardness)]-1.702)	0.96
Iron	Fe		
Lead	Pb	exp(1.273*[ln(hardness)]-4.705)	1.46203-[ln(hardness)*(0.145712)]
Magnesium	Mg		
Manganese	Mn		
Mercury	Hg		
Nickel	Ni	exp(0.846*[ln(hardness)]+0.0584)	0.997
Potassium	K		
Selenium	Se	no conversion factor	
Silver	Ag	no conversion factor	
Thallium	Tl		
Uranium	U		
Vanadium	V		
Zinc	Zn	exp(0.8473*[ln(hardness)]+0.884)	0.986

Table 12. State Criteria from Water Quality Regulations, Regulation 31 Basic Standards and Methodologies for Surface Water. Effective 10/30/2001. www.cdphe.state.co.us/op/waterqualityregs.asp

Metal	**Metal abbr.**	**Drinking Water Supply Total recoverable ug/l**	
Aluminum	Al		
Antimony	Sb	6	30 day
Arsenic	As	50	1 day
Barium	Ba	490	30 day
Beryllium	Be	4	30 day
Cadmium	Cd	5	1 day
Calcium	Ca		
Chromium III	Cr III	50	1 day
Chromium VI	Cr IV	50	1 day
Cobalt	Co		
Copper	Cu	1000	30 day
Iron	Fe	300	diss. 30 day
Lead	Pb	50	1 day
Magnesium	Mg		
Manganese	Mn	50	diss. 30 day
Mercury	Hg	2	1 day
Nickel	Ni	100	30 day
Potassium	K		
Selenium	Se	50	30 day
Silver	Ag	100	1 day
Thallium	Tl	0.5	30 day
Uranium	U		
Vanadium	V		
Zinc	Zn	5000	30 day


1
CJX-SW-1
CJX-SE-1
Blackjack Mine
CJS-GW-1
CJS-GW-1A
CJS-WS-2
CJS-GW-2
CJS-GW-2A
CJS-WS-1
CJX-SW-5
CJX-SE-5
CJX-SW-2
CJX-SE-2
CJS-WS-3
CJS-GW-3
CJS-GW-3A
Big Five Tunnel (adit & waste)
CJX-SW-6
CJX-SW-7
CJX-SE-6
CJX-SE-7
CJX-SW-8
CJX-SE-8
CJX-SW-3
CJX-SE-3
CJX-SW-4
CJX-SE-4
LH-SW-01
Capt'n Jack Mill

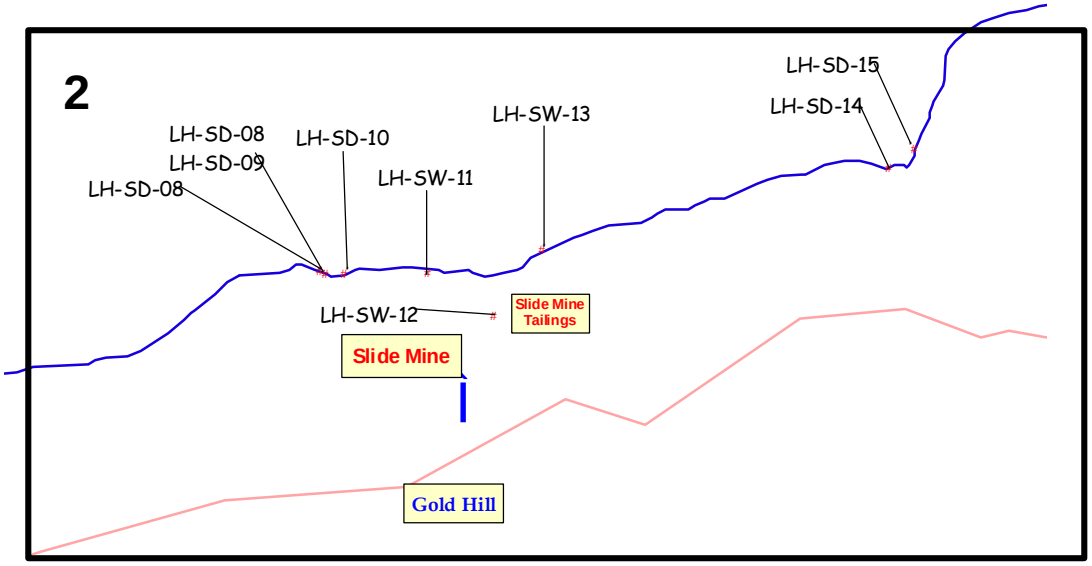

2
LH-SD-15
LH-SD-14
LH-SW-13
LH-SD-08
LH-SD-09
LH-SD-10
LH-SW-11
LH-SD-08
LH-SW-12
Slide Mine Tailings
Slide Mine
Gold Hill

Table 13. Tally of exceedences of Colorado chronic values for cold water aquatic life, Class 1 streams. Water Quality data collected on May 3, 1990 (total and first dissolved columns for each metal) and October 11, 1990 (dissolved values only--shown second). From Colorado Water Quality Control Commission. 1991. Little James Creek and James Creek Nonpoint Source Study. 31 pp

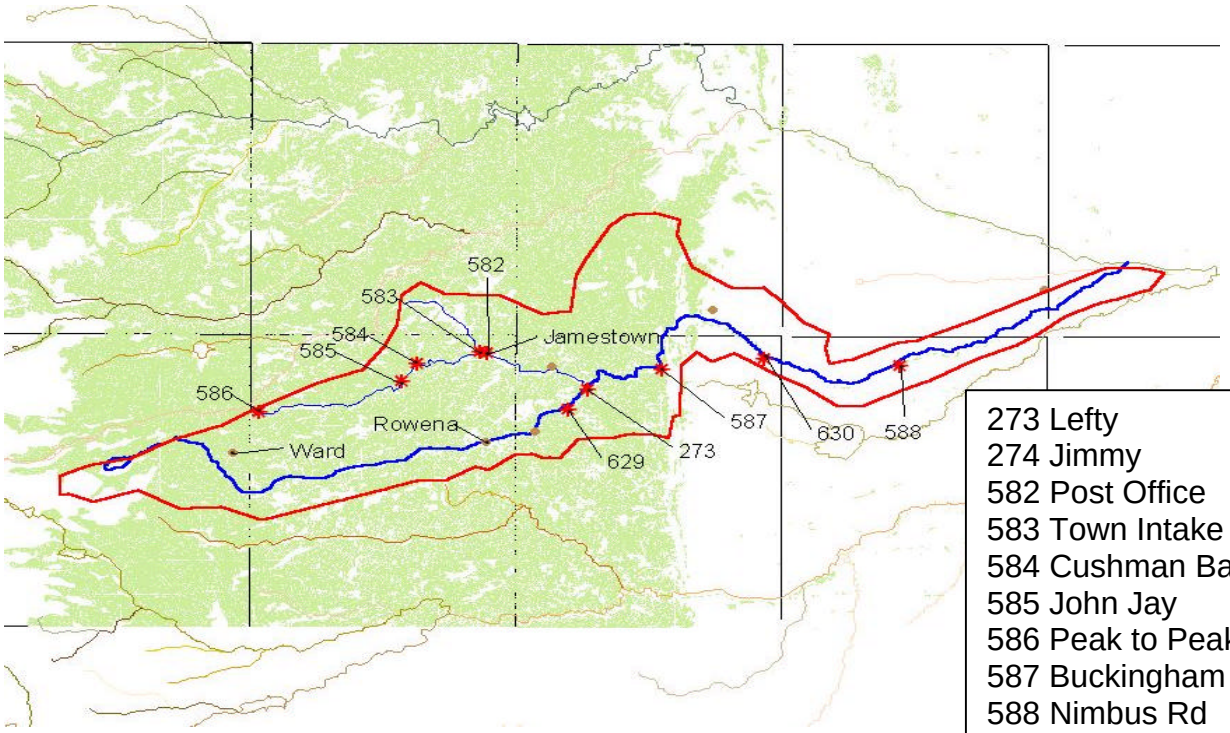
Sample Site	Tally	pH	pH	Ag-T	Ag-D	Ag-D	Al-T	Al-D	Al-D	Cd-T	Cd-D	Cd-D	Cu-t	Cu-d	Cu-d	Fe-T	Fe-D	Fe-D	Hg	Hg
Little James 7	0																			
Upper Adit Seep	0																			
Little James 6	0																			
Trib 3	0																			
Trib 2	1	**1**																		
Trib 1	2	**1**	**1**																	
Little James 5	3								**1**											
Argo Drainage	9	**1**						**1**	**1**		**1**	**1**		**1**	**1**					
Little James 4	4	**1**												**1**						
Emitt Adit	6	**1**										**1**			**1**	**1**				
N Balarat 5	1	**1**																		
S Balarat 5	1	**1**																		
Balarat Gulch 4	2	**1**																		
Balarat Gulch 2	4	**1**	**1**																	
Burlington Mine Pond	7	**1**	**1**					**1**								**1**				
Balarat Gulch 1	8	**1**	**1**					**1**			**1**					**1**				
Little James 3	6	**1**	**1**					**1**						**1**						
Little James 2	5	**1**						**1**			**1**			**1**						
Little James 1	6	**1**	**1**					**1**			**1**									
James Cr. 4	0																			
James Cr. 3	0																			
Jenks Adit	2	**1**																		
Jenks Gulch	8	**1**	**1**						**1**		**1**	**1**		**1**						
James Cr. 2	0																			
Castle Gulch Adit	2	**1**																		
Castle Gulch	11	**1**	**1**					**1**	**1**		**1**	**1**		**1**						
James Cr. 1	1								**1**											
Left Hand Creek 2	0																			
Left Hand Creek 1	1								**1**											

Table 13. Cont'd

Sample Site	Pb-T	Pb-D	Pb-D	Mn-T	Mn-D	Mn-D	Ni-T	Ni-D	Ni-D	Se-T	Se-D	Se-D	Zn-T	Zn-D	Zn-D
Little James 7															
Upper Adit Seep															
Little James 6															
Trib 3															
Trib 2															
Trib 1															
Little James 5														**1**	**1**
Argo Drainage		**1**												**1**	
Little James 4														**1**	**1**
Emitt Adit				**1**		**1**									
N Balarat 5															
S Balarat 5															
Balarat Gulch 4														**1**	
Balarat Gulch 2						**1**								**1**	
Burlington Mine Pond				**1**		**1**								**1**	
Balarat Gulch 1					**1**	**1**								**1**	
Little James 3						**1**								**1**	
Little James 2														**1**	
Little James 1						**1**								**1**	
James Cr. 4															
James Cr. 3															
Jenks Adit				**1**											
Jenks Gulch														**1**	**1**
James Cr. 2															
Castle Gulch Adit				**1**											
Castle Gulch				**1**		**1**								**1**	**1**
James Cr. 1															
Left Hand Creek 2															
Left Hand Creek 1															

Table 14. River Watch Project: Metal standard exceedence scores for environmental or public health based criteria. (Using most up to date criteria)

Station Number	Sum	Al-Dis	Cd-Dis	Cd-T	Cu Dis	Cu T	Fe D	Fe T	Mn Dis	Mn Total	Pb Dis	Pb Total	Zn Dis	Zn Toal
273	**69**	0	0	3	0	0	0	14	0	42	0	2	0	8
274	**88**	0	0	1	0	0	0	13	0	53	0	4	0	17
582	**254**	10	39	0	56	0	0	11	16	60	4	4	37	17
583	**141**	0	3	1	37	0	0	11	1	32	0	1	17	38
584	**131**	0	2	0	34	0	0	12	0	32	1	0	9	41
585	**134**	0	1	0	33	0	0	7	0	32	0	0	11	50
586	**129**	0	4	0	39	0	0	0	0	22	1	0	8	55
587	**24**	0	0	0	0	0	0	6	0	14	0	2	0	2
588	**23**	0	0	0	0	0	0	3	0	15	0	1	0	4
629	**11**	0	0	0	0	0	0	1	0	5	0	2	0	3
630	**10**	0	0	1	0	0	0	2	0	4	0	1	0	2



273 Lefty
274 Jimmy
582 Post Office
583 Town Intake
584 Cushman Bark
585 John Jay
586 Peak to Peak Hwy
587 Buckingham Pk
588 Nimbus Rd
629 Above James Cr
630 Below James Cr

Table 15. Total number of times that metals exceeded the ECC, AWQC, and DWC criteria in a given sample. The total tally is the sum of the ECC, AWQC, and DWC tallies.

SITE ID	Total tally	ECC tally	AWQC tally	DWC tally	ALC tally
Jun-97					
CJX-SW-1	8	0	1	1	6
CJX-SW-2	27	8	7	3	9
CJX-SW-3	20	6	3	3	8
CJX-SW-4	19	5	4	2	8
CJX-SW-5	35	12	6	8	9
CJX-SW-6	8	0	1	1	6
CJX-SW-7	8	0	1	1	6
CJX-SW-8	25	8	6	3	8
Oct-97					
GA-AR-SW-2	21	0	7	5	9
GA-BA-SW-1	16	0	5	4	7
GA-BA-SW-5	25	7	6	5	7
GA-CA-SW-1	15	0	5	2	8
GA-GI-SW-1	5	0	1	1	3
GA-HI-SW-1	14	3	3	1	7
GA-HI-SW-2	10	0	3	3	4
GA-HI-SW-3	17	5	3	2	7
GA-JC-SW-1	6	0	1	1	4
GA-JC-SW-2	8	1	1	1	5
GA-JC-SW-3	8	1	1	1	5
GA-JC-SW-4	15	4	3	1	7
GA-JC-SW-5	12	3	3	1	5
GA-JC-SW-6	16	4	4	1	7
GA-JC-SW-7	12	3	3	1	5
GA-JC-SW-8	16	4	4	1	7
GA-JE-SW-1	12	0	4	1	7
GA-LHC-SW-	7	0	2	1	4
GA-LHC-SW-	10	1	3	1	5
GA-LJ-SW-1	13	0	5	1	7
GA-LJ-SW-2	11	0	4	1	6
GA-LJ-SW-4	29	10	6	5	8
GA-LJ-SW-5	27	9	6	4	8
GA-LJ-SW-6	30	10	6	6	8

SITE ID	Total tally	ECC tally	AWQC tally	DWC tally	ALC tally
Jun-98					
GA-AR-SW-2	0	0			
GA-BA-SW-1	14	0	4	4	6
GA-BA-SW-5	26	7	5	6	8
GA-CA-SW-1	11	0	4	2	5
GA-GI-SW-1	8	0	2	2	4
GA-HI-SW-1	9	0	2	2	5
GA-HI-SW-2	10	0	2	3	5
GA-HI-SW-3	10	1	2	2	5
GA-JC-SW-1	10	0	2	2	6
GA-JC-SW-2	10	0	2	2	6
GA-JC-SW-3	10	0	2	2	6
GA-JC-SW-4	10	1	1	2	6
GA-JC-SW-5	10	1	1	2	6
GA-JC-SW-6	9	1	1	2	5
GA-JC-SW-7	8	1	1	2	4
GA-JC-SW-8	8	1	1	2	4
GA-JE-SW-1	9	0	2	1	6
GA-LHC-SW-	9	0	2	2	5
GA-LHC-SW-	10	1	1	2	6
GA-LJ-SW-1	10	0	2	3	5
GA-LJ-SW-2	11	0	3	3	5
GA-LJ-SW-4	23	7	5	5	6
GA-LJ-SW-5	24	8	6	4	6
GA-LJ-SW-6	23	8	6	3	6
Jun-00					
LH-SW-1	11	0	3	2	6
LH-SW-4	2	0	1	0	1
LH-SW-5	11	0	3	2	6
LH-SW-11	4	0	1	0	3
LH-SW-12	9	0	4	2	3
LH-SW-13	4	0	1	0	3
LH-SW-16	2	0	0	0	2
LH-SW-17	6	0	2	0	4
LH-SW-18	6	0	2	1	3
LH-SW-19	6	0	1	1	4
LH-SW-20	1	0	0	0	1