
***Butte Silver Bow
Council Presentation
“Butte Priority Soils”
Cleanup – 10-15-14***

Presentation Outline

- ✓ *Major Work Completed*
- ✓ *Major Work in Progress/Ongoing*
- ✓ *Perpetual Work Projects*
- ✓ *Moving forward: Getting to a Consent Decree*

What does the Butte Priority Soils OU include and not include?

- Includes:

- The “Butte Hill” from Walkerville to Timber Butte
- Approximately a 5-square mile area

- Does NOT Include:

- Berkeley Pit, aka Mine Flooding OU
- Montana Pole Plant
- Silver Bow Creek, aka Streamside Tailings

Scope of Priority Soils Cleanup

- Eliminate exposure to mine tailings and wastes to protect human health
- Prevent the heavy metals and arsenic in mine wastes from entering storm water and groundwater, thereby protecting Silver Bow Creek

Major Work Completed

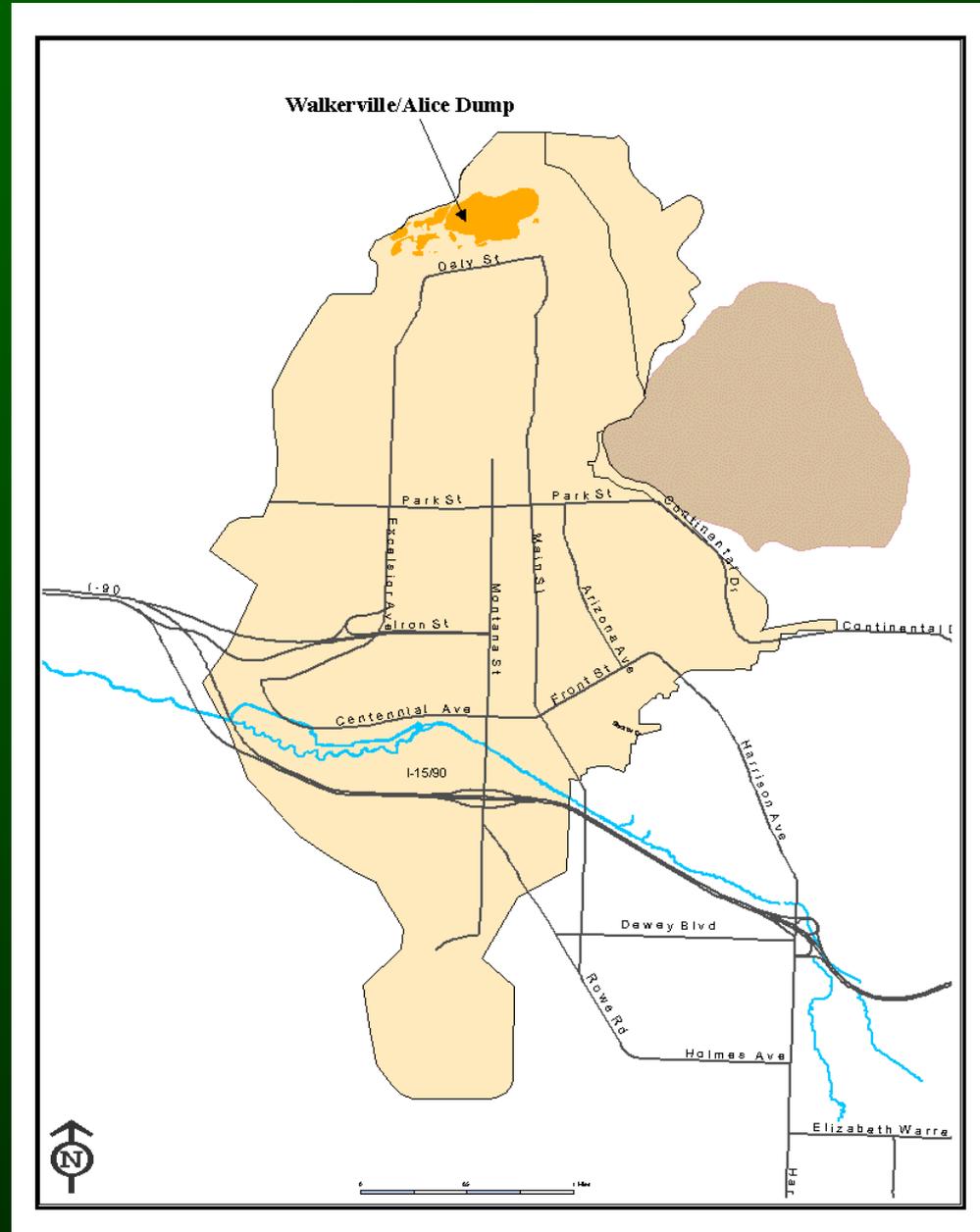
- *Walkerville / Alice Dump*
- *Timber Butte*
- *First 20 Years of Residential Metals Abatement Program*
- *175 Source Areas, including Colorado Smelter*
- *Storm Water Actions
(Missoula, Buffalo, Kelley Ditches and Sediment Basins)*
- *Clark Tailings & Colorado Tailings;
Silver Bow Creek Reconstruction*
- *Lower Area One (LAO)*
- *Railroad Corridors*
- *Granite Mountain Memorial Interpretative Area*

WALKERVILLE

1988-2000

Walkerville /Alice Dump

Cleanup actions were ordered in 1988, 1994, 1996, and 2000. Soils with high levels of lead and arsenic were removed from yards and basements and dust vacuumed out of some attics. About 300,000 cubic yards of mine waste were consolidated and capped on the side of an old baseball field, and about 700,000 cubic yards from the Alice Dump were pushed into the Alice Pit, with the remaining knob re-contoured and capped with vegetation and outfitted with a walking trail and picnic tables

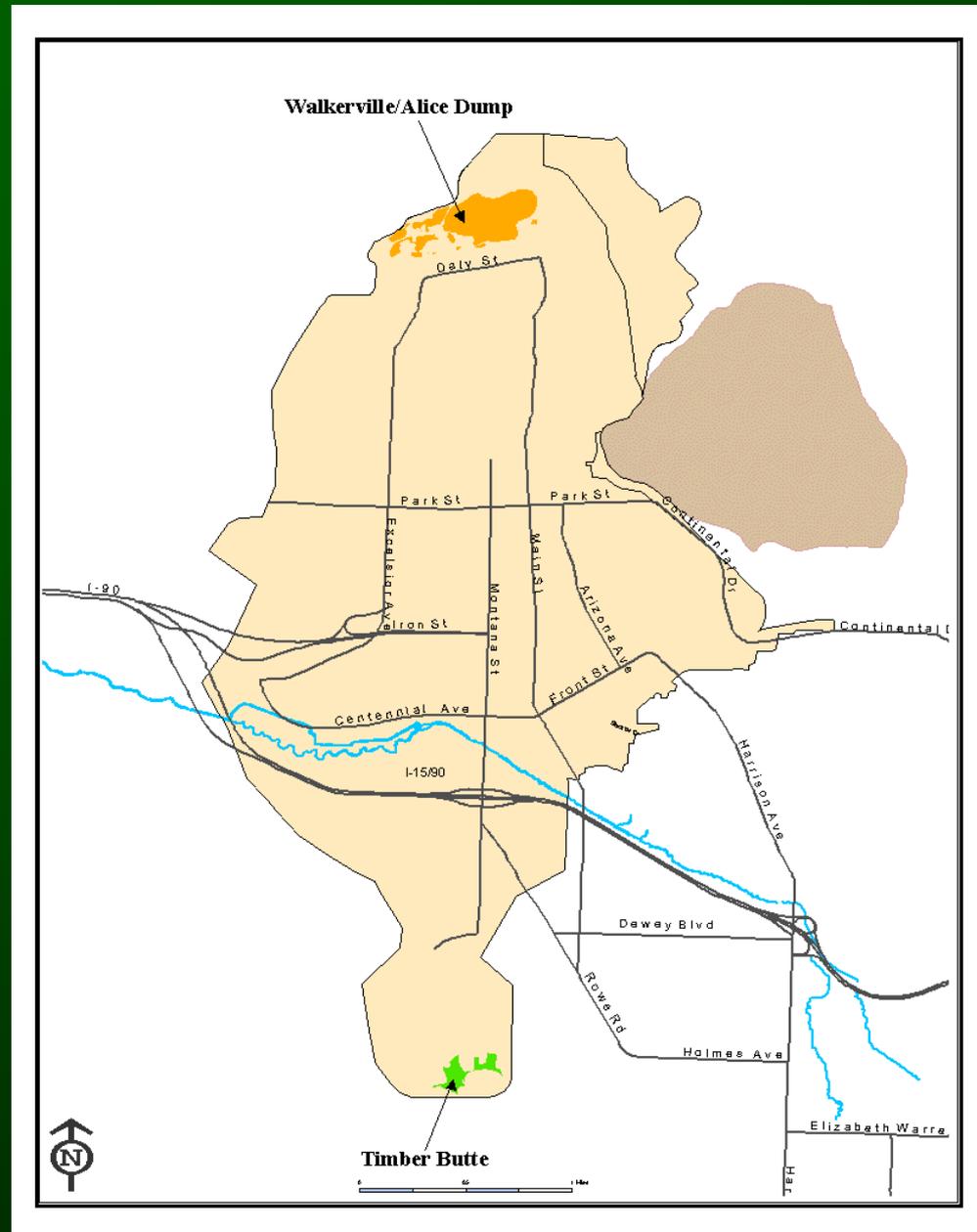


Walkerville / Alice *'Knob' Before & After*



Timber Butte 1989

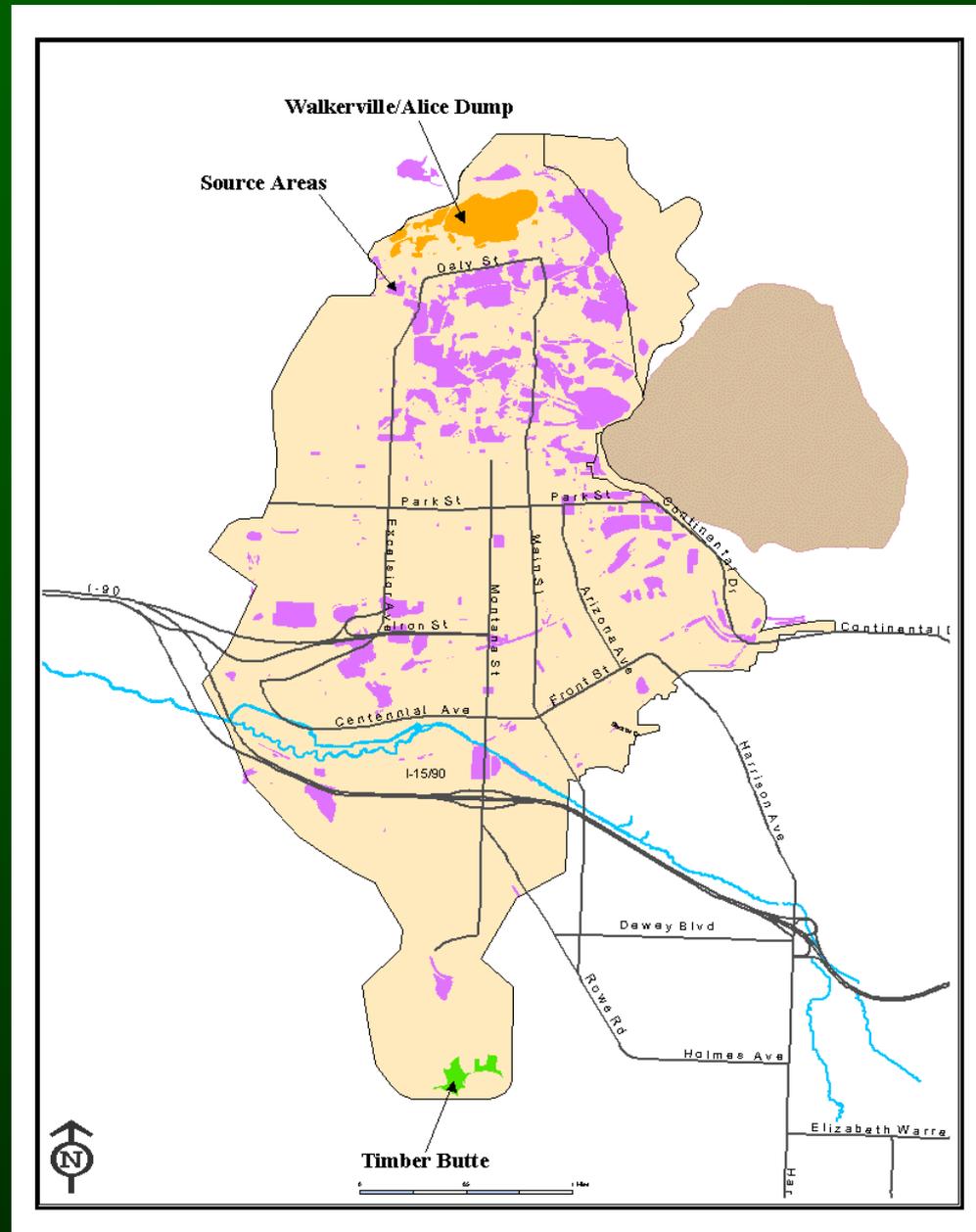
Under a 1989 order, about 40,000 cubic yards of lead-contaminated soil from the Timber Butte mill and two residential yards were consolidated at a nearby repository and then capped. Sites where waste was removed were also capped and planted with vegetation.



Source Areas/BRES Sites

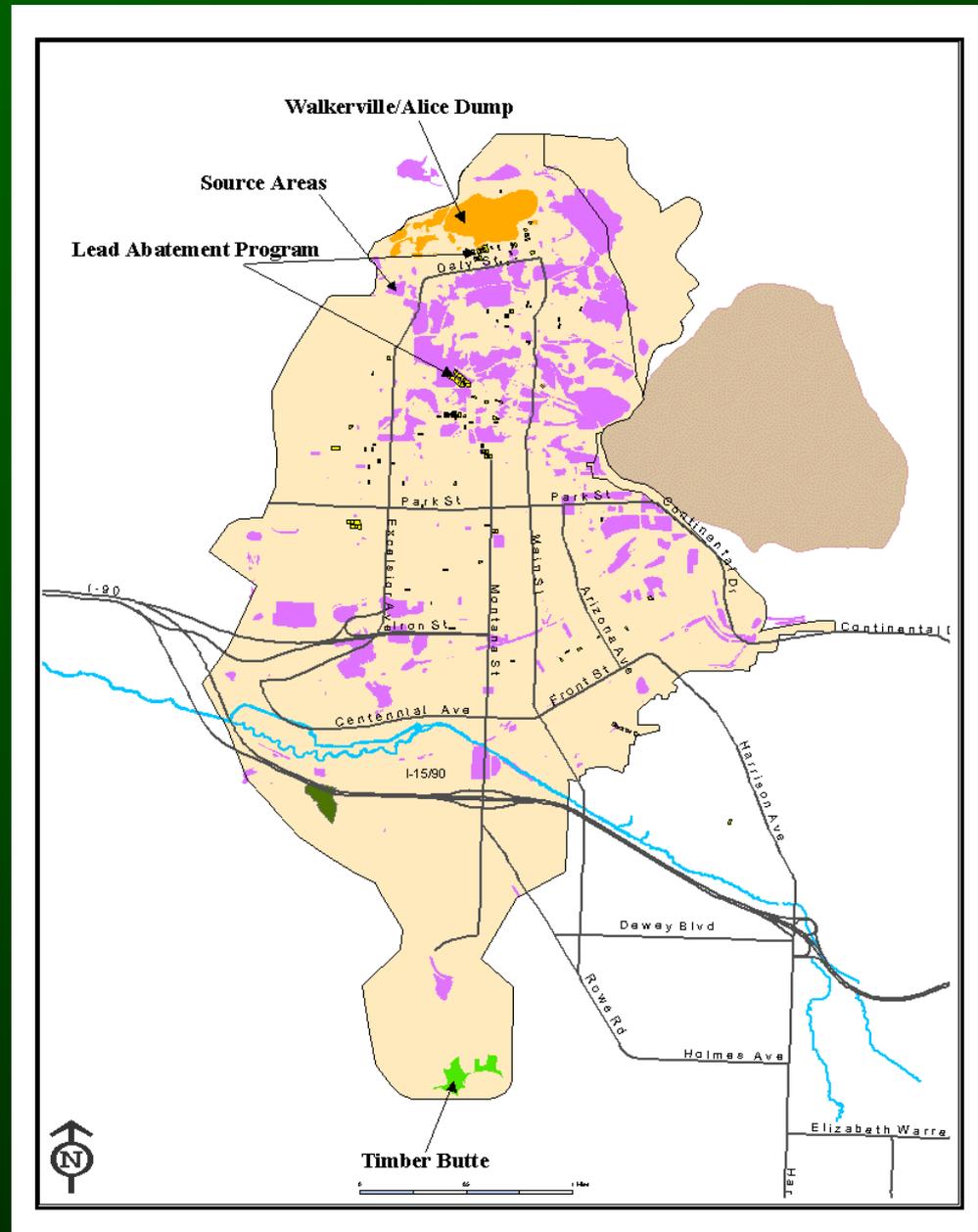
1990-present

About 175 waste dumps spanning 422 acres throughout the site were reclaimed during the 1990s and have been further refined over the past decade, now referred to as BRES sites. Some areas done under a 1990-91 order were redone as part of a 1994 action after deficiencies were found. Some other areas have been upgraded and others improved through maintenance. Work included some waste removal and re-contouring of slopes followed by addition of 18 inches of clean cover soil, fertilizer, and re-vegetation. For example, the Anselmo mine yard was cleaned up under this action.



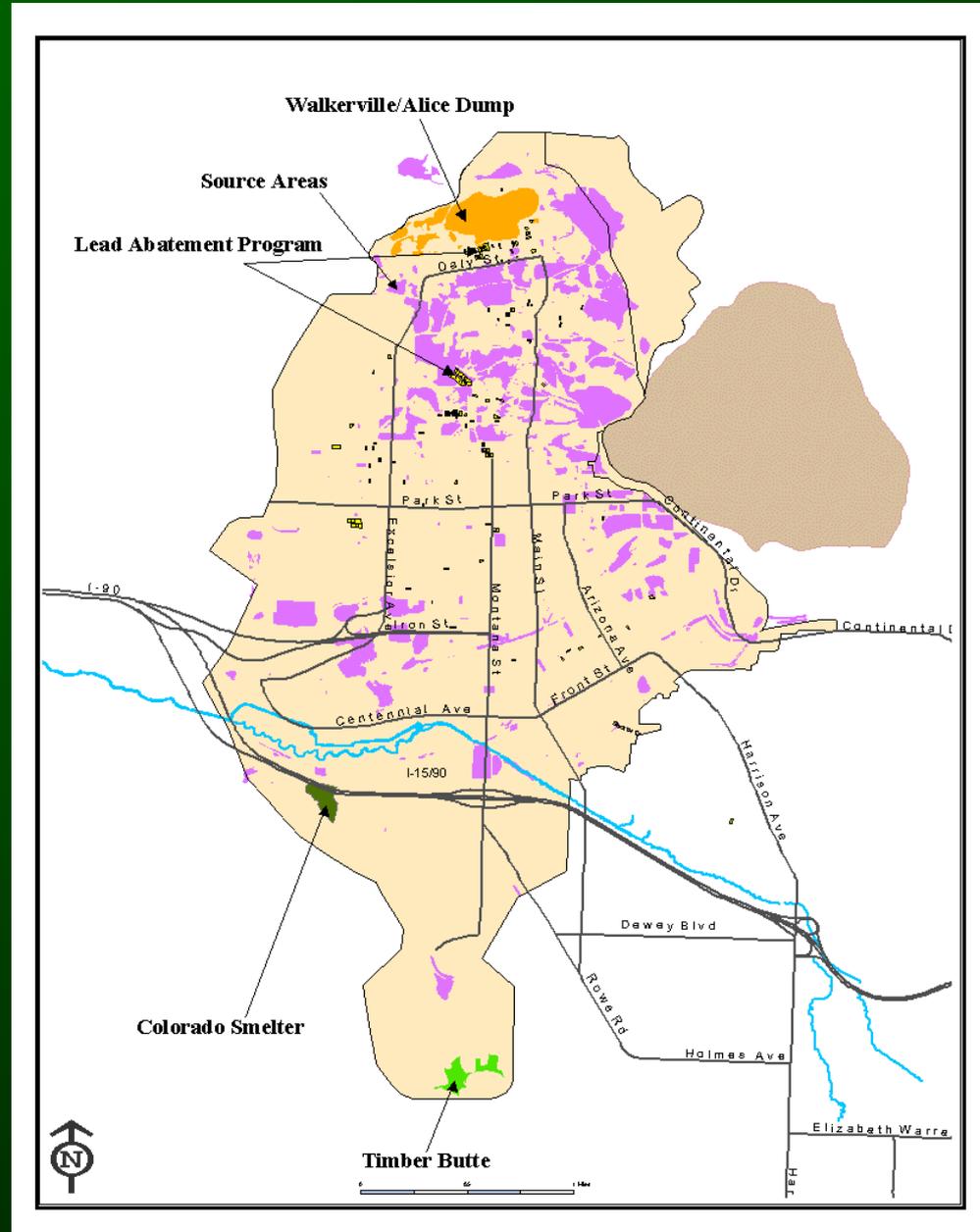
Lead Abatement Program

Indoor and outdoor sources of lead contamination removed from about 200 yards and homes through an ongoing program managed by the county health department. Ongoing program (see more slides later in presentation).



Colorado Smelter 1991

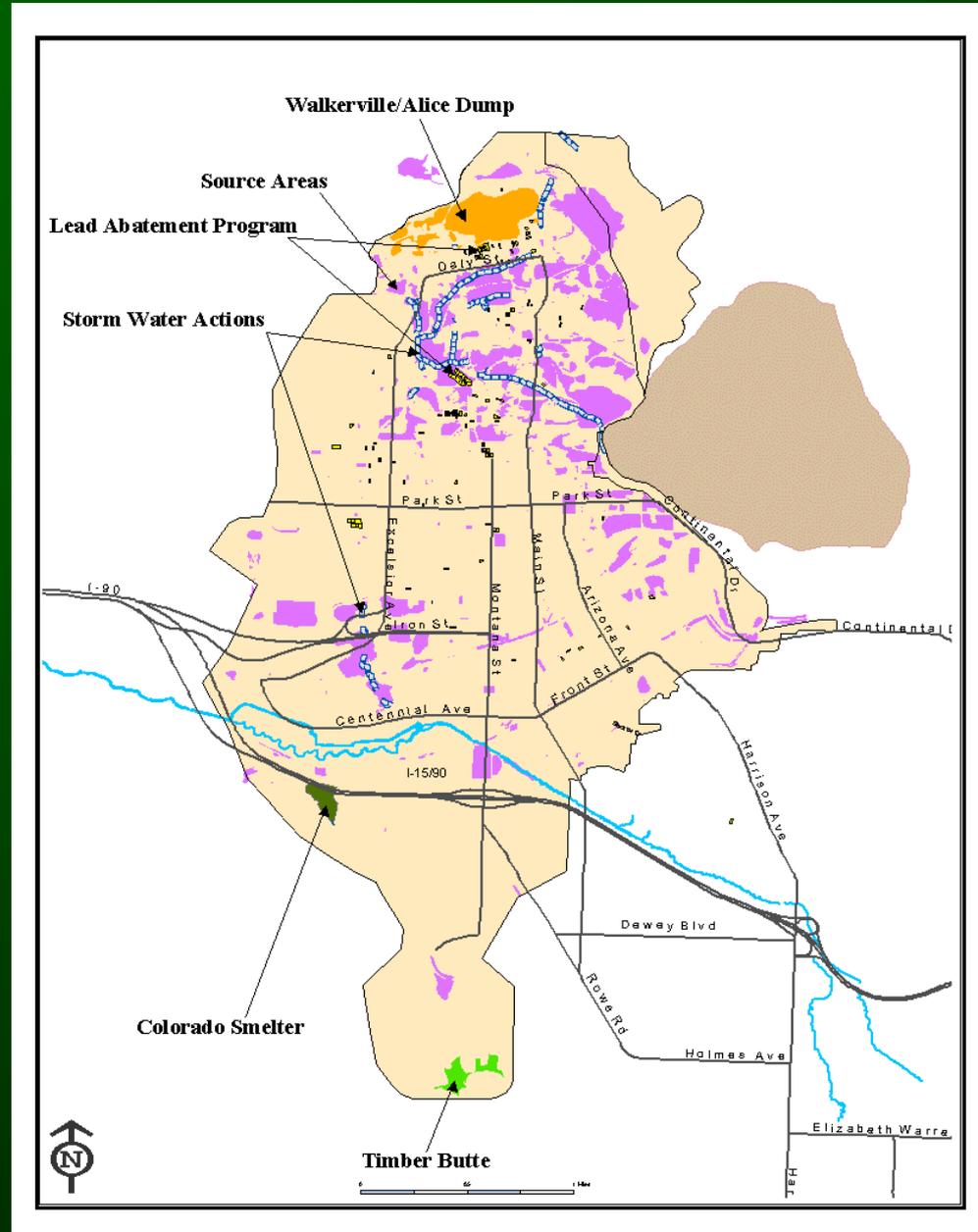
In 1991, about 40,000 cubic yards of Colorado smelter waste was consolidated at an on site repository and capped.



Storm Water Action

1996 - 1998

Under a 1996 order, a system of channels and catch basins was built to capture storm water runoff from Missoula and Buffalo gulches, diverting it to sediment basins at the Syndicate Pit and two others near the bottom of Excelsior Avenue. A second channel system through the Kelly mine yard and a major pipeline below the Belmont head frame collect runoff further east (Anaconda Road Gulch) and divert the water into the Berkeley Pit. The slopes that form the gulches were also re-contoured and capped and the Missoula ball field area and trail redeveloped as part of this action.

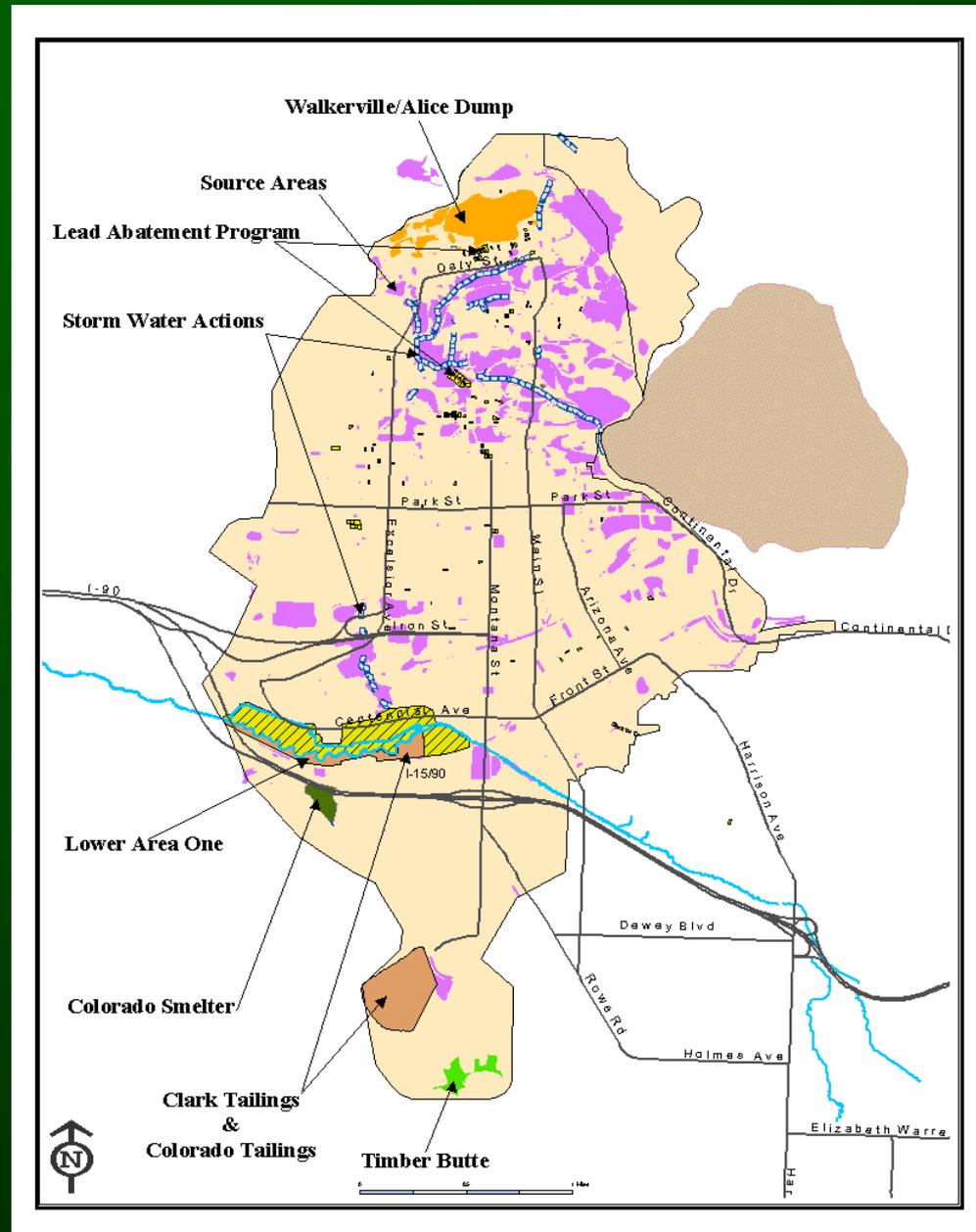


Missoula Gulch Storm Water Channel



Clark Tailings and Colorado Tailings; Silver Bow Creek Reconstruction

The major part of this 1998 action involved removing 1.2 million cubic yards of the Colorado tailings west of Montana Street near Centennial Avenue and placing them on top of the Clark tailings near Timber Butte. The site was then capped with the Copper Mountain Sports and Recreation Complex, featuring baseball and football fields, a walking trail, and a playground. Silver Bow Creek in the area of the Colorado tailings was reconstructed



Clark Tailings Before & After

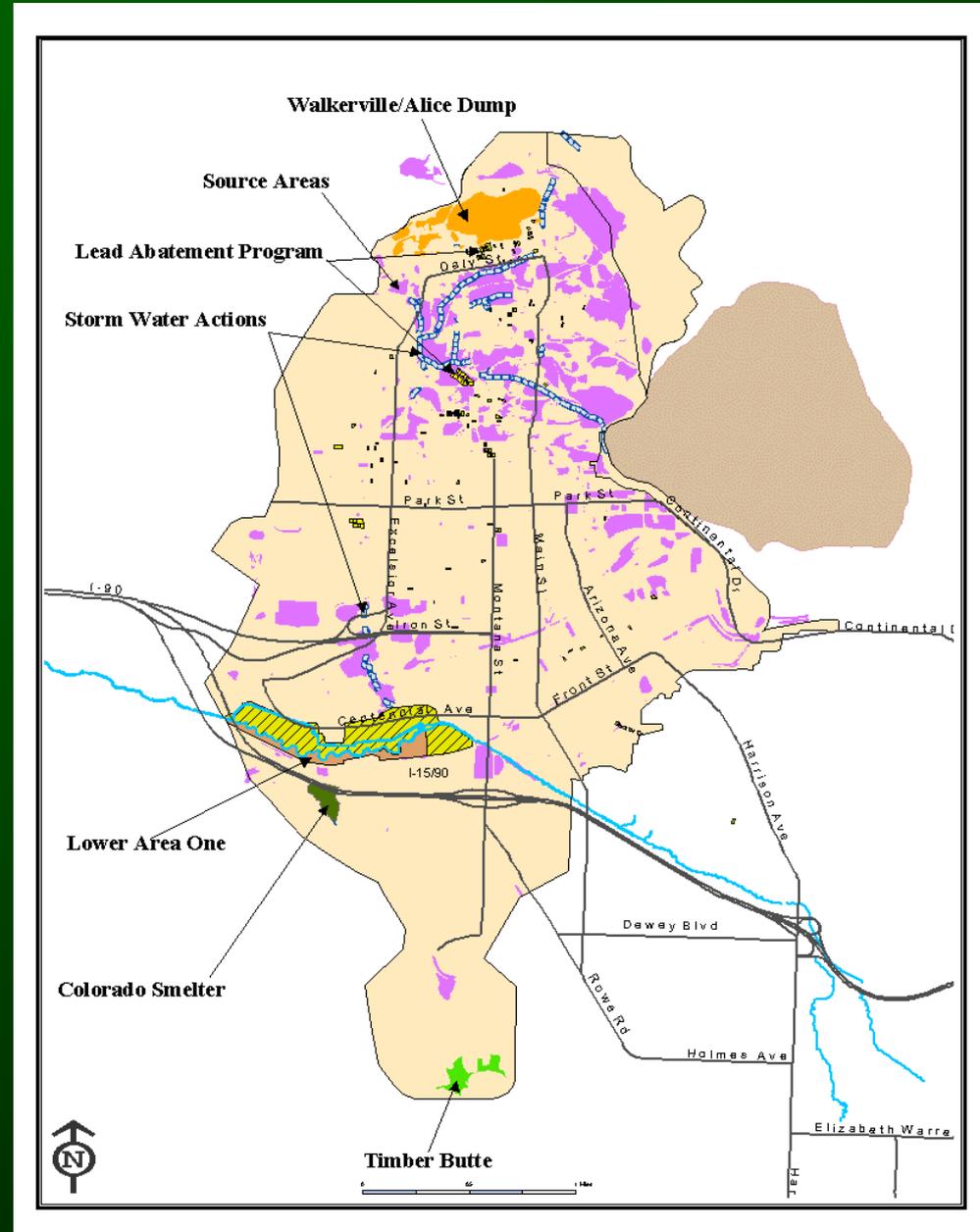


Clark Tailings After



Lower Area One 1998

The main unanswered questions are whether the lagoon system there now will be approved as the final solution for all water treatment and whether more waste will be ordered out. If the lagoons don't work, a conventional treatment plant might be built or the waste could be pumped to the Horseshoe bend plant near the Berkeley Pit. Another issue is making sure the area looks nice when work is complete, including a wildlife viewing area and a trail to connect the Blacktail Creek Trail with the Silver Bow Creek Greenway.



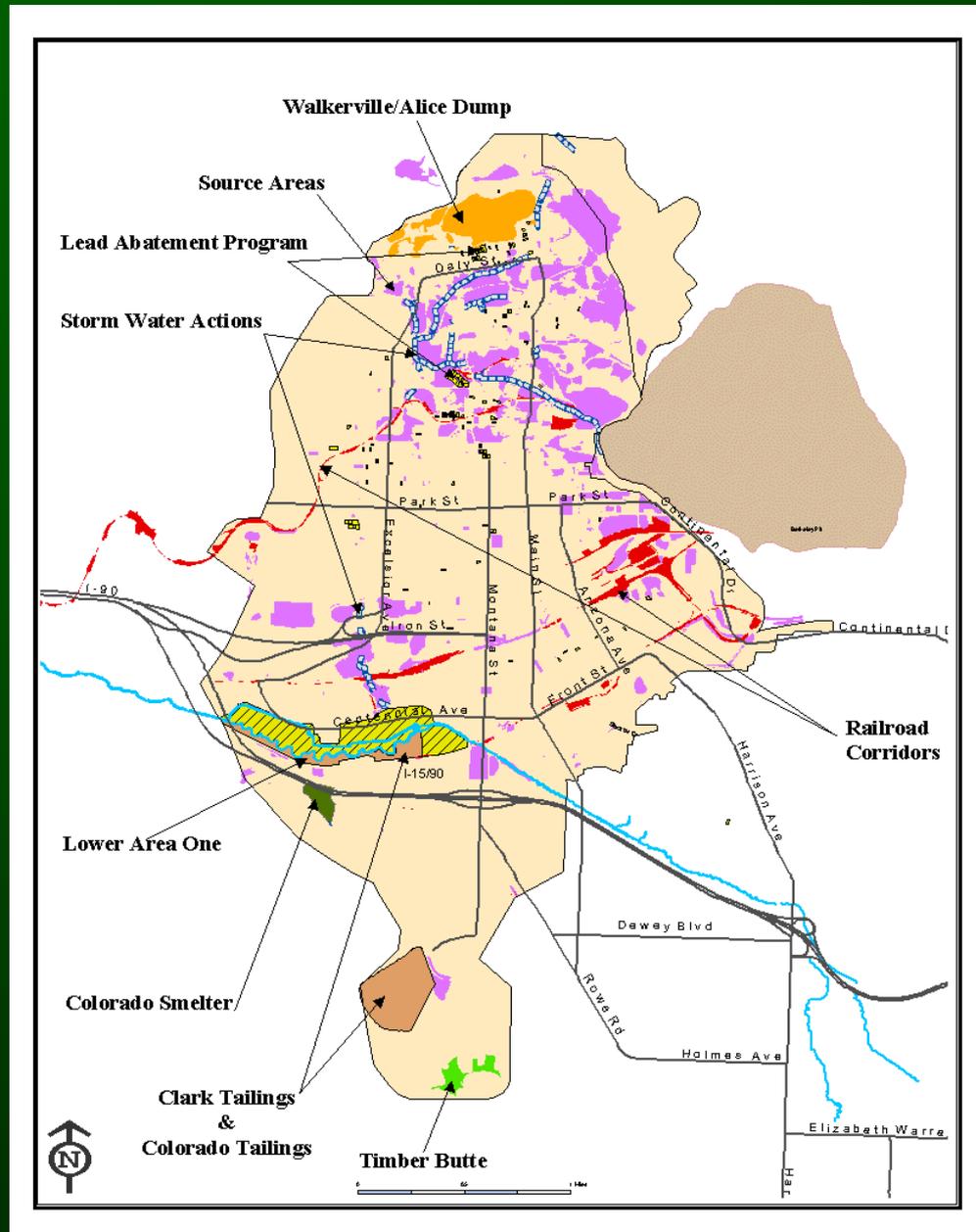
Silver Bow Creek *- Reconstructed*



Railroad Corridors

2000

A combination of waste removal and capping took place along most of the railroad tracks through the site as part of this 2000 action. Abandoned tracks were torn out on the Butte Hill and replaced by pedestrian trails, and active lines were cleaned as well. Nine different types of caps were used, and a rail road waste repository was built below the Belmont head frame.



Railroad Corridors Before

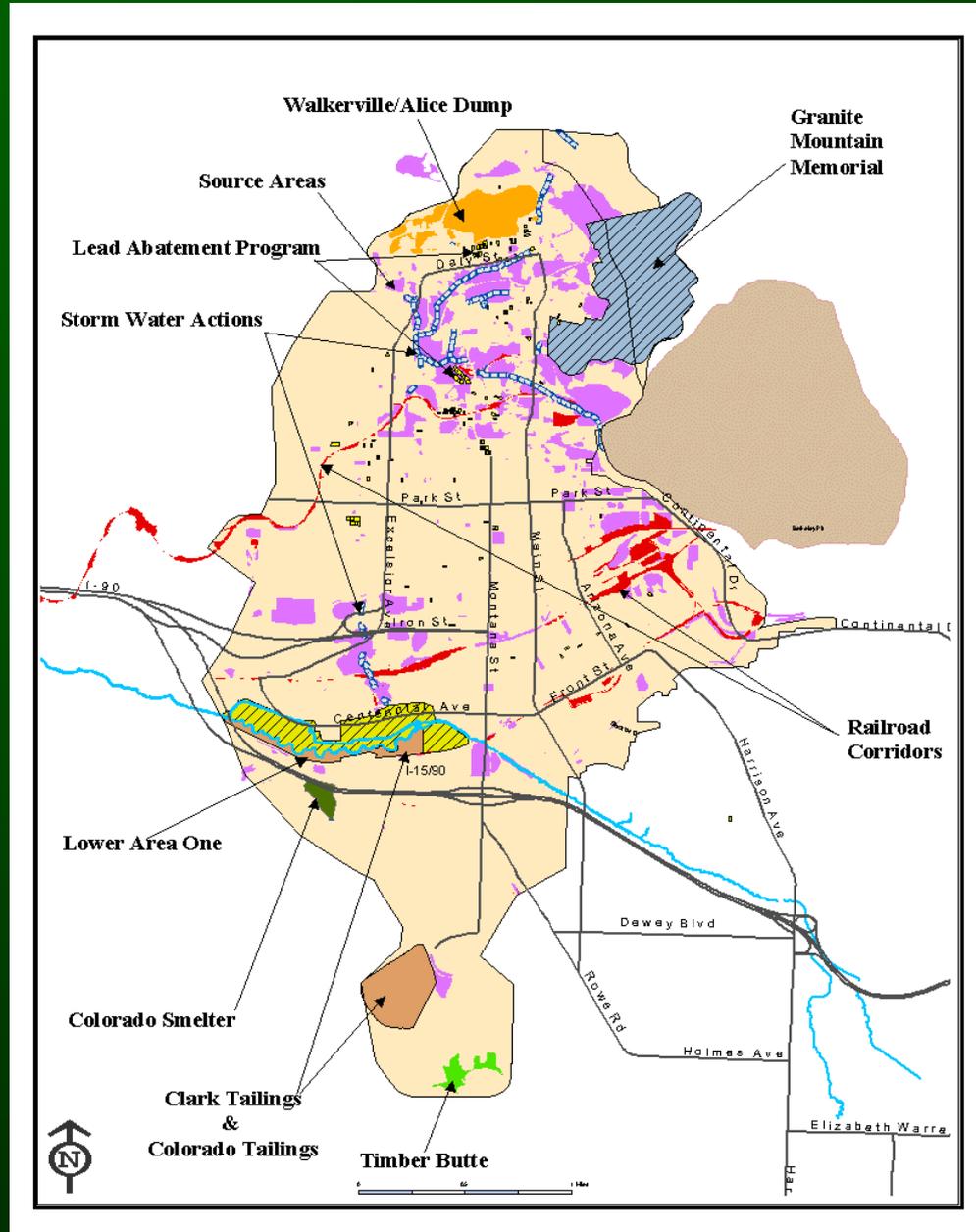


Railroad Corridors After



Granite Mountain Memorial

More reclamation is planned for all mine dumps located west of the Granite Mountain Memorial. Initial tests show that lands to the south and east of the memorial don't pose a threat to human health or the environment, and as a result they might be left as is for historic preservation purpose. Redevelopment features planned include completing the memorial with flags, parking, paved access road and picnic area, trails connecting to other historic sites, and additional interpretive signage to explain the sites to visitors.



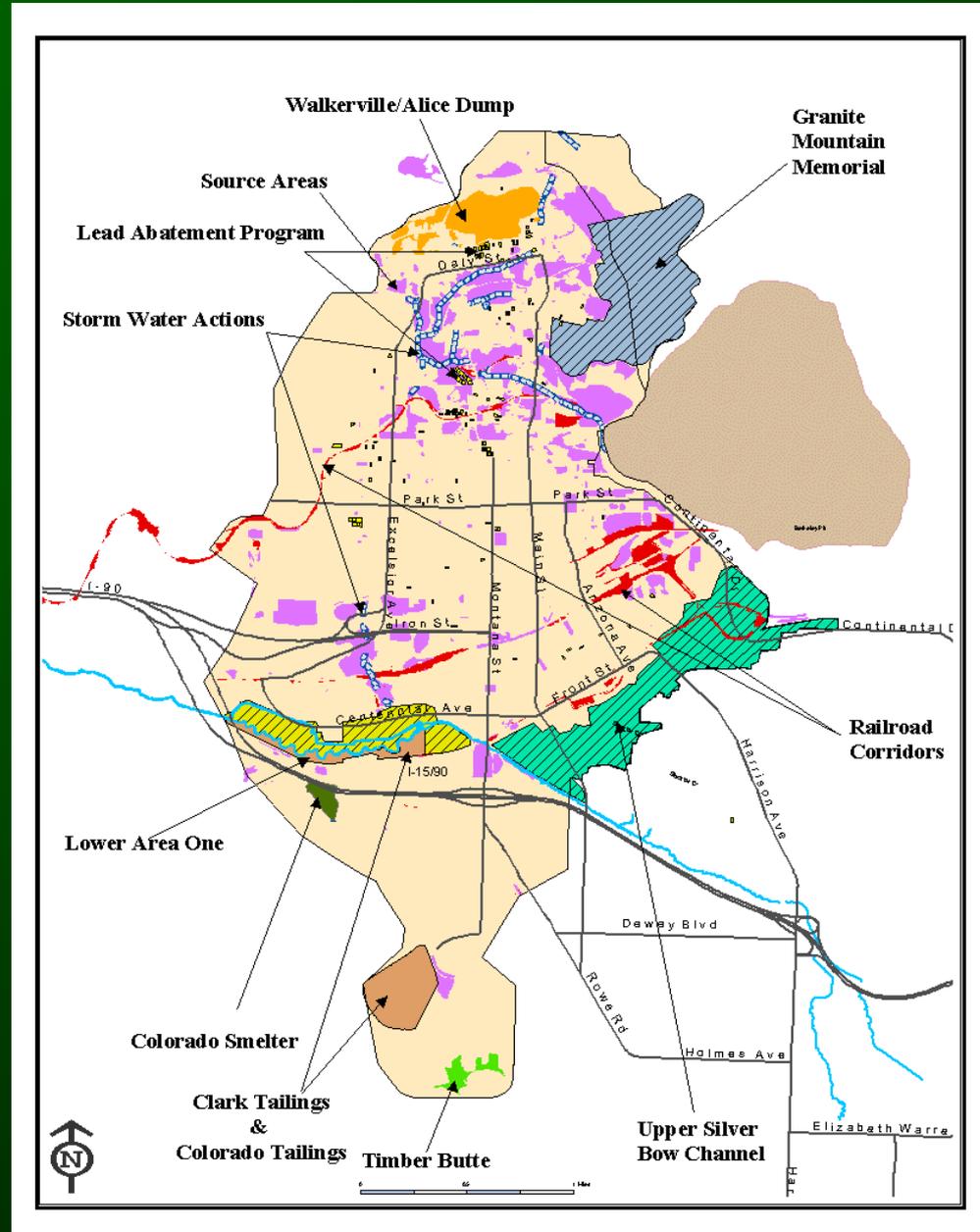


Major Work in Progress/Ongoing

- ❖ Upper Silver Bow Creek Channel (Parrot Tailings, East Diggings, North Diggings – Restoration activity)*
- ❖ Lower Area One Reclamation and Surface Enhancements*
- ❖ Effective Water Treatment System: Butte Treatment Lagoons and ground water collection system (under creek channel from Harrison Avenue to Montana Street)*
- ❖ Storm Water Best Management Practices (BMPs)*

Upper Silver Bow Channel – Parrot Tailings

In 2004, under a voluntary cleanup, work was completed to reconstruct the channel itself and install a ground water collection system below it during 2004. Waste encountered during the construction process was removed and clean fill was imported. A new walking trail/park area was installed as part of the finished product. The next steps will be to remove additional waste from the corridor, including the Parrot tailings, East and North Diggings, and the Blacktail Creek Berm, and then install surface enhancements, all of which will be completed as a restoration project under the NRDP/BNRC programs.



Upper Silver Bow Channel Before Construction



Upper Silver Bow Channel Under Construction



Lower Area One/Groundwater Collection and Treatment

- *Since 2006, the Butte Treatment Lagoons have been reconstructed and upgraded as a permanent facility.*
- *There is now a five-year shakedown period to confirm that the system/facility will be reliable in perpetuity, and meet the evaluation criteria that BSB set forth in 2004:*
 - ❖ *Meets State discharge standards to Silver Bow Creek*
 - ❖ *Provides aesthetics*
 - ❖ *Allows for maximum reuse of LAO*
 - ❖ *Practical O&M*
 - ❖ *Trust fund to operate / maintain / monitor / upgrade*

Butte Treatment Lagoons: Groundwater



ORGANIC CONTENT
 ● <3.0%
 ● >3.0%

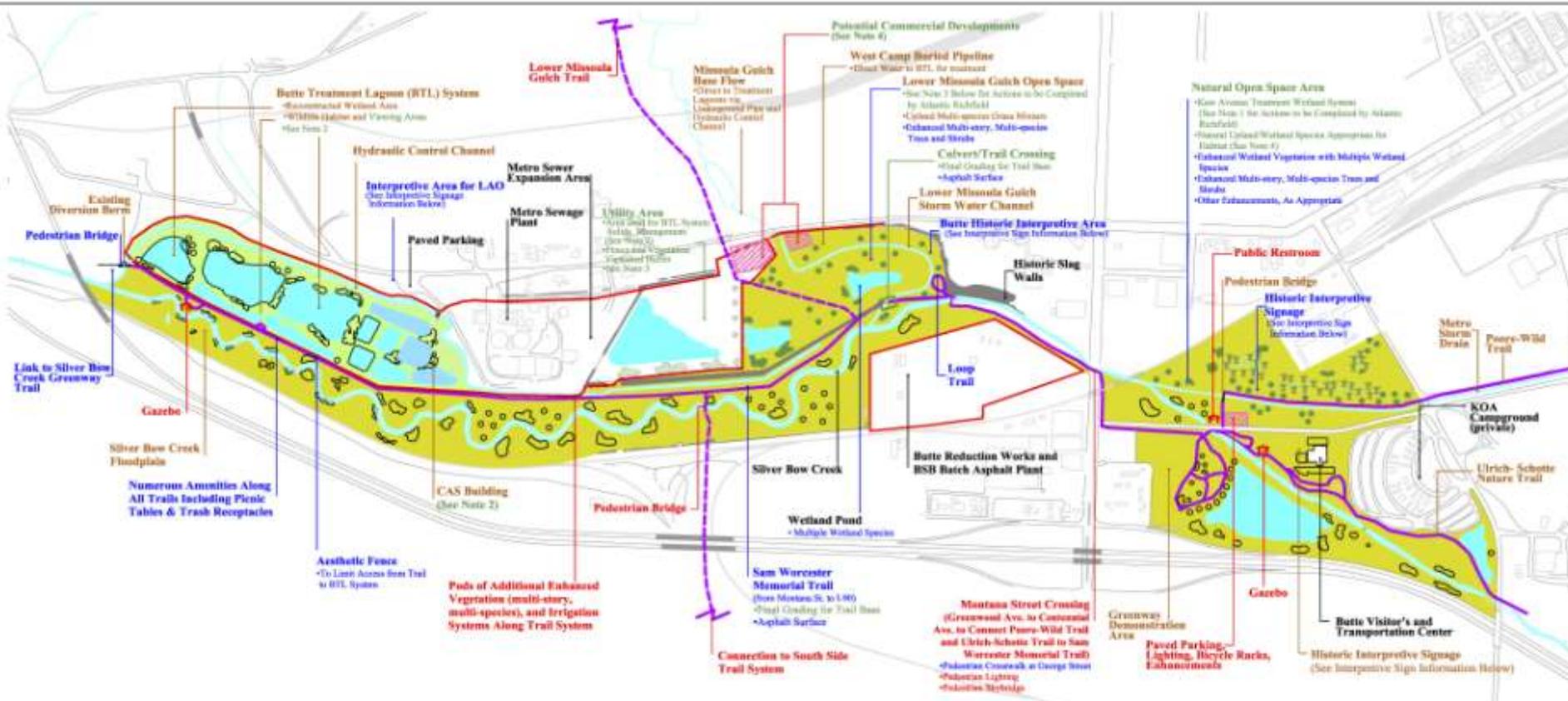


FIGURE 13



**BTL-LAO SURFACE SOILS
 ORGANIC MATTER
 CONTENT (%)**

DATE: 7/14/2014



- Legend**
- Land Use Area**
- Open Water/Wetland Pond
 - Full Public Access
 - Utility Area (restricted access)
 - Wildlife Viewing "Pulchra" with Interpretive Signs
 - Trail / Trail Linkages
 - Proposed Trail / Trail Linkages
 - Potential Enhancements by HBB
 - To be Completed by Butte Silver Bow (See Note 4)
 - Existing Features
 - To Be Completed by Atlantic Richfield
 - To Be Completed by HBB Subject to Matching Other Fund Sources (See Note 4)
- Vegetation Type**
- Vegetative Enhancements by BSB/Others
 - Vegetative Enhancements by Atlantic Richfield
 - Wetland/Marsh
 - Existing Trees
 - Existing Shrubs/Thicket
- Interpretive Signs**
- Butte Silver Bow Design/Installation
- 1 - Butte National Historic Landmark District Gateway
 - 2 - Historic Park (Butte Reduction Works) Overview
 - 3 - Marquette Reduction Process
 - 4 - Oil Storage Tank Mining Museum/Marsh
 - 5 - Furnace Foundations
 - 6 - Old Bar
 - 7 - Slag Material Use
 - 8 - Asphalt/Water Diversion and Usage
 - 9 - Wetland Ecosystem (in Lower Area One)
 - 10 - Trailings to Wetlands (i.e., story of reclamation)
 - 11 - Groundwater Remediation (i.e., story of ground water collection and treatment)
 - 12 - Sam Worcester Memorial Trail (Atlantic Richfield to Design)

- Notes**
- 1) Atlantic Richfield to decommission equipment & infrastructure from the ground surface of former wetland demonstration and return surface appearance to natural wetland setting.
 - 2) Atlantic Richfield to upgrade groundwater treatment system per Exhibit 21.
 - 3) Atlantic Richfield has Completed Phase I of the Lower Missoula Gulch Restoration Action in Butte Reduction Works (not including area occupied by BSB's Asphalt Plant). Atlantic Richfield will complete Phase II of this action by the end of 2008.
 - 4) Prior to Butte Silver Bow implementing surface enhancements, Atlantic Richfield shall complete all installation and remediation subject to Allocation Agreement and/or ROD.
 - 5) In the event the Utility Area is not used for utility management per the ROD, Atlantic Richfield shall complete all installation and remediation subject to Allocation Agreement and/or ROD.

Exhibit 19

LAO Surface Enhancements and Land Use Plan



Municipal Storm Water System -- Capital Upgrades and O&M



Recent Storm Water System Improvements

- 5 hydrodynamics devices: Warren, Dakota, Texas, Civic Center, Montana
- Slip line of two major trunk lines: Anaconda Road (2,000 lf.); Buffalo Gulch (6,000 lf.);
- Municipal system repairs: Main and Daly St.; O'Neil and Bennett St.; Bell and Buffalo St.; E. Park; Hornet St.; Edison St.; Kaw Ave.; Lexington St.; up to 15 drop inlets per year for four years now;
- Two cycles of curb and gutter installations – 14,000 lf., including Alabama St.; 11th St.; Boardman; Empire Street; E. Granite; E. Broadway; Covert; Pearl; Ruby; Agate; many others; valley gutters;

Install Hydrodynamic Devices



Status of Major Storm Water Trunk Lines



Install Slip Lines in SW tunnels and new manhole at Kaw Ave



Storm Water Management Tools

- *2012 – Adopt Storm Water Ordinance*
- *2013 – Adopt Excavation and Dirt Moving Protocols*
- *2012 – MS4 Permit Requirements: public education (CFWEP); public involvement; illicit discharge detection and elimination (>20); storm water runoff controls during and after construction; and, most importantly, implementing a robust operations and maintenance program*

Long-Term Work Projects

- ❖ *Long-Term Lead and Attic Dust Abatement Program*
- ❖ *Municipal Storm Water System Capital Upgrades and perpetual operations and maintenance of both Superfund Structures and the overall municipal system*
- ❖ *Long-Term Maintenance of All Reclaimed Properties, known as BRES sites, Butte Reclamation and Evaluation System*
- ❖ *Redevelopment Initiatives*

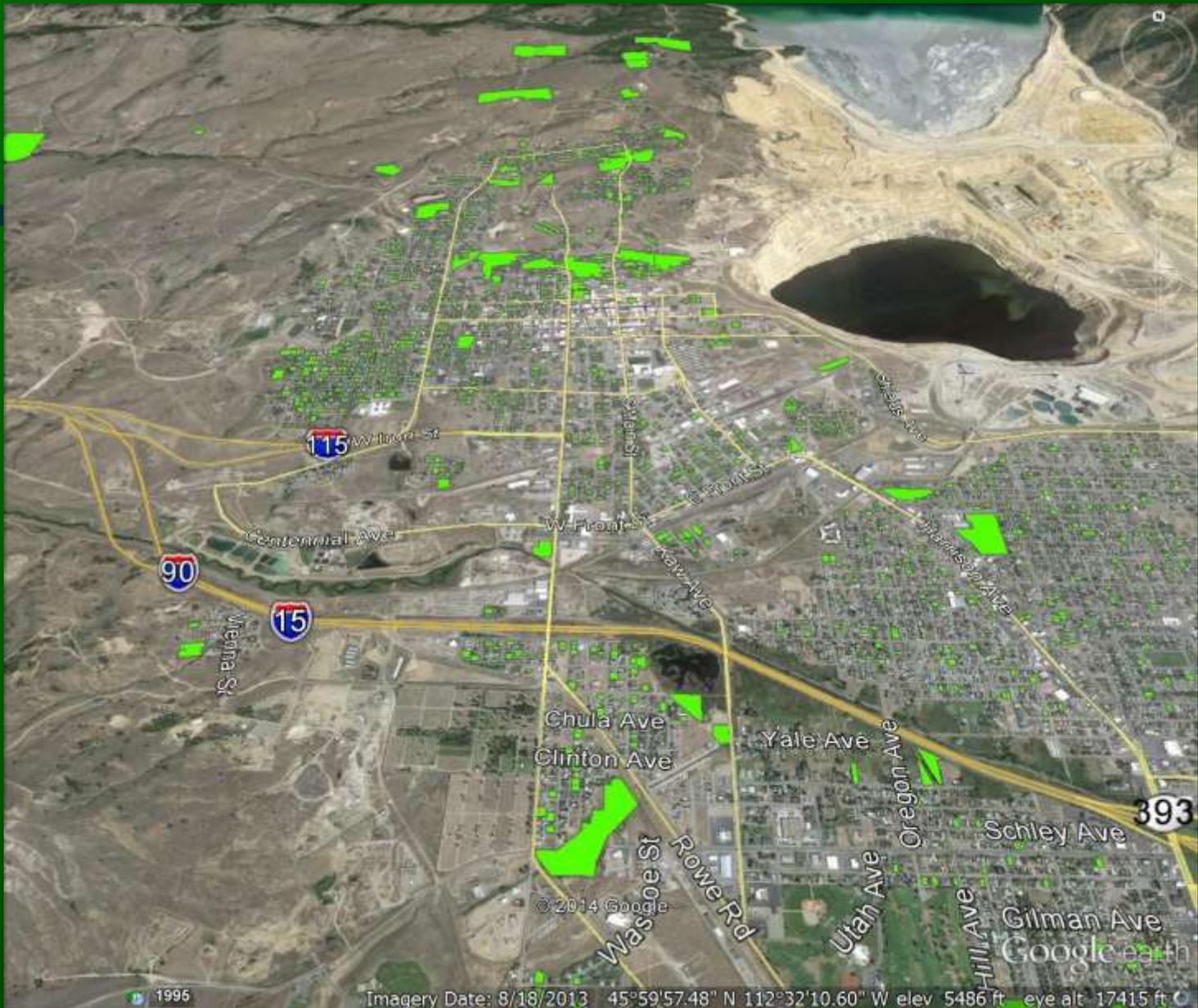
Long-Term Lead and Attic Dust Abatement Program

Indoor and outdoor sources of lead contamination removed from about 200 yards and homes through an ongoing program managed by the county health department.



Residential Metals Abatement Program: Progress since inception/current scope

- *Since 1995, 2595 properties sampled*
- *820 properties abated: 450 yards; 370 attics*
- *Annual scope: 240 properties to sample, 30 yards abated; 30 attics*

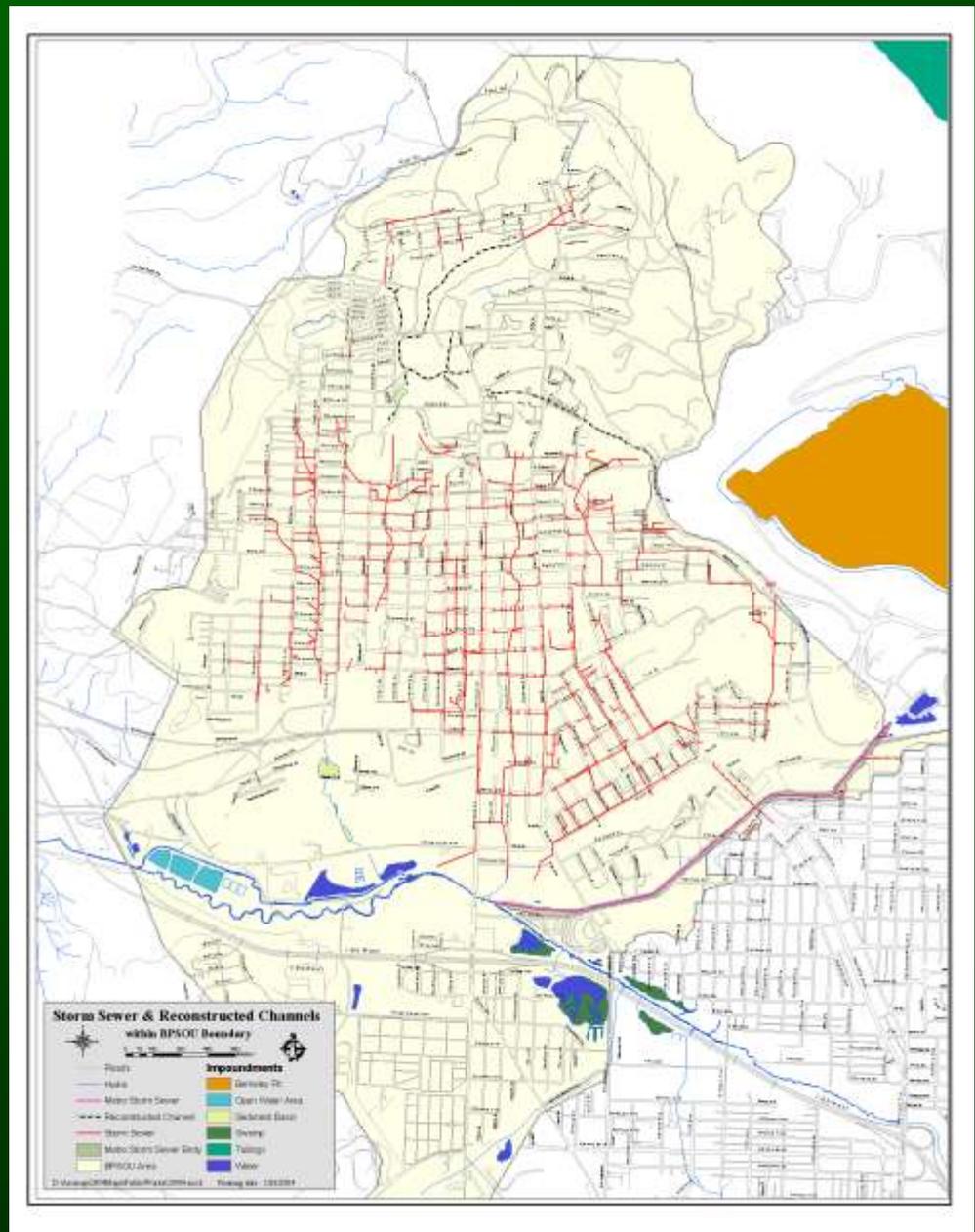


1996

Imagery Date: 8/18/2013 45°59'57.48" N 112°32'10.60" W elev 5486 ft eye alt 17415 ft ©

Storm Sewer Upgrades: Long-, long-, long- term endeavor

In addition to the \$millions spent on the work completed in the past 20 years, approximately 40 miles of underground storm sewer infrastructure, including the major trunk line in Missoula Gulch from the Anselmo Mine to Iron Street, must be evaluated and replaced as necessary, to keep metals and sediments out of Silver Bow Creek.



Long-Term Maintenance of All Reclaimed Properties

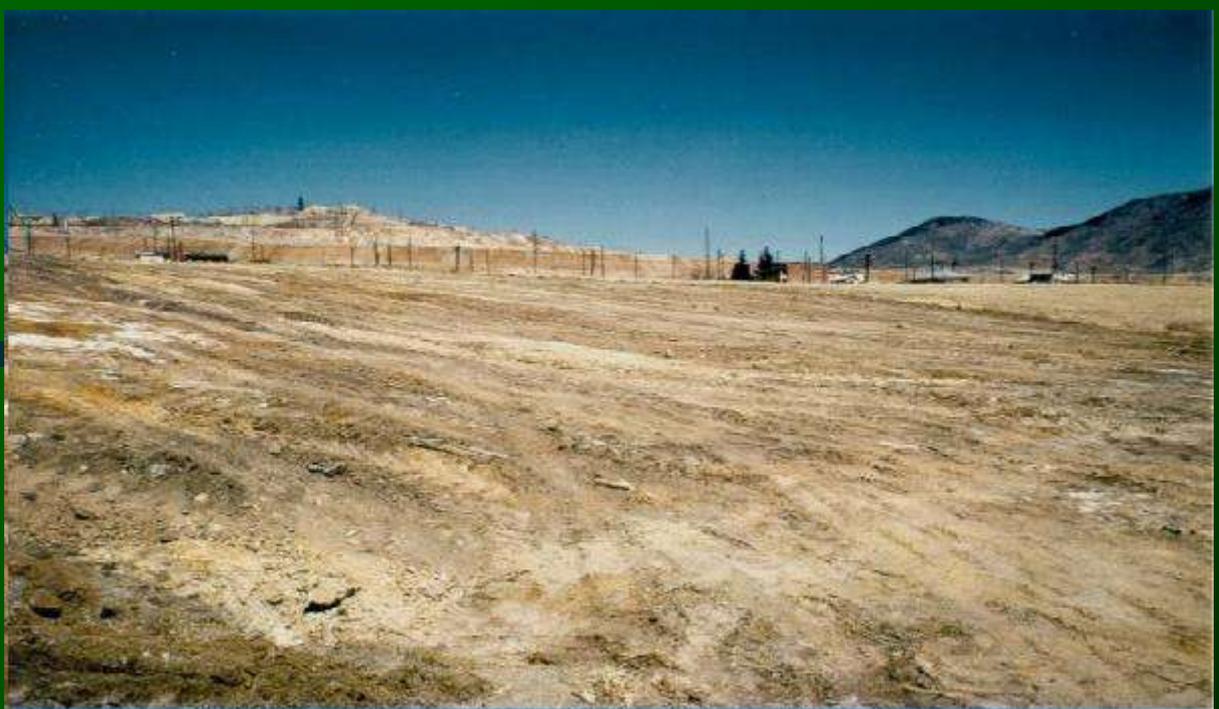


Redevelopment Initiatives

- ❖ *Designated “Developable” by Land Use Evaluation findings*
- ❖ *Excavation/Dirt Moving assistance for landowners to properly develop/redevelop Superfund sites, with financial aid (in most cases) through the Redevelopment Trust.*



Aware Property Before & After



Integration Strategy: Getting to a Consent Decree

Major Issues:

- ❖ Surface water discharge standards on Silver Bow Creek – need achievable objectives*
- ❖ Ensure performance standards apply to all discharges to the Creek, including METRO effluent, storm water (Superfund/non-Superfund), groundwater, MT Pole, TMDL's,*
- ❖ Agree on final cycle of Best Management Practices*
- ❖ Organize crews to perform effective, perpetual maintenance and BMP enforcement*
- ❖ Assure adequate funding levels and staffing*



Silver Bow Creek

Effective Water Treatment System

