



Coal Basin History; Geology, Mining, Reclamation

You have to know the past to understand the future

- Carl Sagan



Geology and Coal Basin



- Welcome to planet Earth, a wonderful but not entirely stable place to live."
-Craig Childs
- Mancos Shale; Cretaceous deep ocean, fine grained sediment;
- MesaVerde Formation
 - Late Cretaceous inter-coastal and near coast inter-bedded coal, sandstone shale development
- Nearby Elk Mountains mountain building pushes sediments upwards

Geology and Coal Basin



- Physical geography and geology are inseparable scientific twins.
[Sir Roderick Murchison, 1857](#)

- -Following mountain building episodes, erosion and mass wasting become dominant land-forming processes in Coal Basin.
 - Dutch Creek debris flows
 - Incised creeks
 - Sediment laden runoff











Coal Basin History

- Late 1800's
 - John Osgood develops Coal Basin Mine
 - Located near headwaters of Coal Creek
 - Coal Basin Mine operates until about 1908
 - Rail and town site remnants still visible
 - Coal refuse located in and adjacent to Coal Creek floodplain

Coal Basin History

- 1956 Mid Continent Coal and Coke Company begins operations;
- Underground mining and coal cleaning operations;
- Five underground mines developed over span of about 10 years;
- Operations cease in 1991

Coal Basin History

- Each mine built at about 10,000 elevation;
- Each mine had about 4 entries and fan entries;
- Entry areas (face-up) developed by excavating mountain to create highwalls;
 - waste downcast over slope;
- Coal mined by room and pillar and longwall methods;

Coal Basin History

- Coal hauled from entries to preparation plant for cleaning;
- Need for facilities space and coal refuse deposition results in channelization of Dutch Creek;
- About 15 miles of haul roads;
- Over-the-road hauling substantially replaced by Rock Tunnel beltline system in mid-'80's;

Coal Basin History

- Continued coal cleaning requires construction of (second large) Sutey Coal Refuse Disposal Facility;
- Mine makes water. In later years mine water discharged at Rock Tunnel entry to treatment ponds;

Coal Basin History

- 1977 Federal Surface Mining Control and Reclamation Act (SMCRA) enacted;
 - State Primacy;
- About 1984 Mid-Continent Resources issued a permit by Colorado;
- Numerous operational and environmental issues;
- Numerous citizen complaints

Coal Basin History

- From late '80's through 1993, lots of Federal / State / Company / Local Public Interest Group jostling to resolve site issues.
- A story unto itself, the upshot is:

Coal Basin History

- MCR files bankruptcy in February, 1992;
- The operating permit is revoked in August, 1992, MCR ordered to complete reclamation;
- Reclamation bond is forfeit by Colorado in September, 1993;
- First of a number of lawsuits between State and MCR initiates in September, 1993;
- State begins reclamation work in 1994.

Coal Basin Environmental History

Environmental Issues Driving Reclamation

- Sedimentation from Mining Related Facilities
 - Road System
 - Facilities Area (Confluence Coal and Dutch Creeks)
 - Mine Bench Outcrops
 - Coal Basin Town Refuse

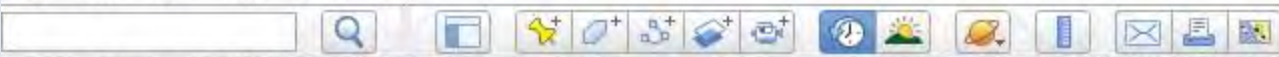
Coal Basin Environmental History

Environmental Issues Driving Reclamation

- ‘Contaminants’
 - Underground Storage Tanks
 - Diesel Stained Soils;
- Old Refuse Pile Instability (Confluence Coal and Dutch Creeks);
- Dutch Creek Diversion Instability







9/2/1998



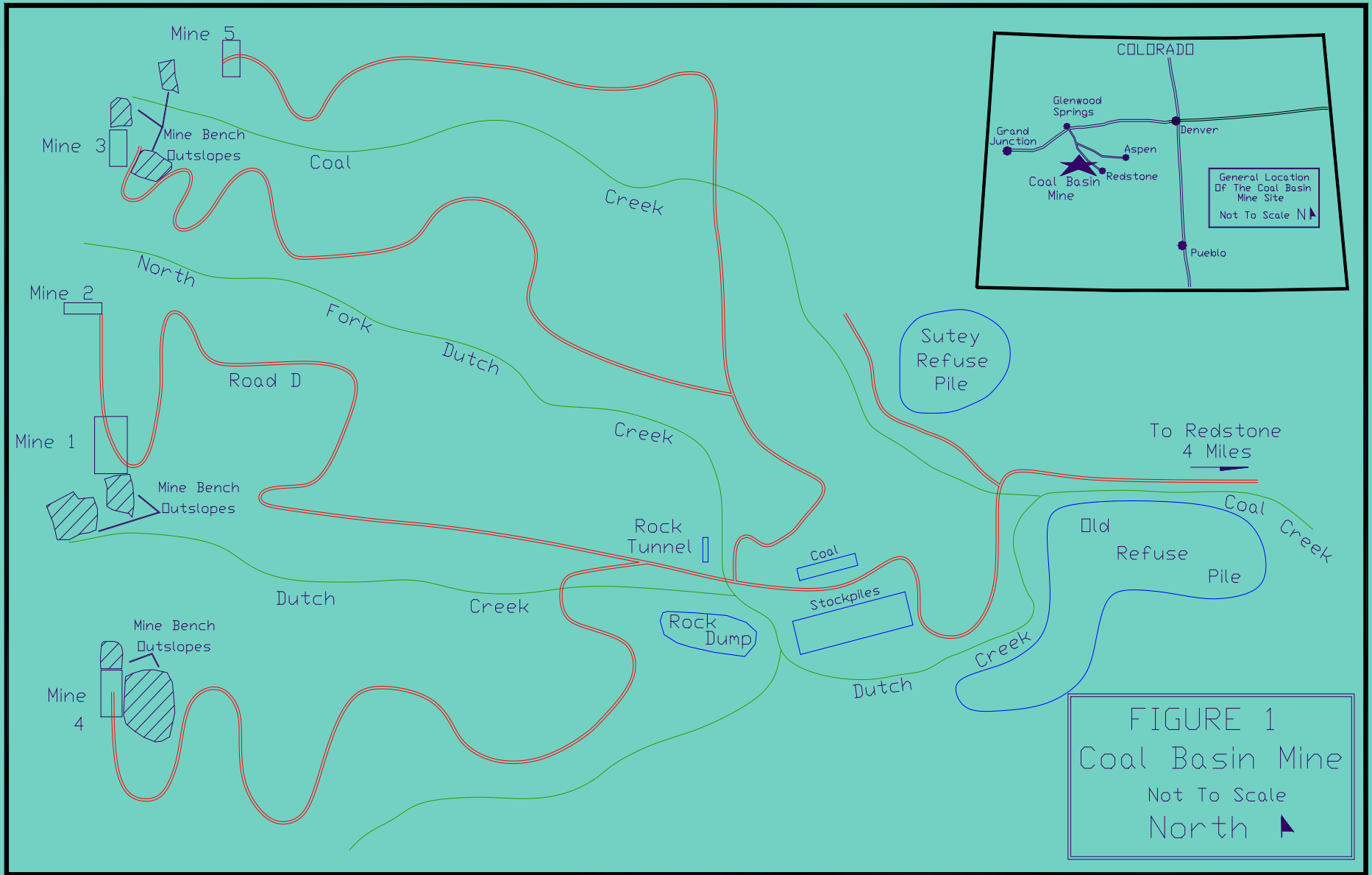


FIGURE 1
 Coal Basin Mine
 Not To Scale
 North

COLORADO

Grand Junction, Glenwood Springs, Aspen, Redstone, Coal Basin Mine, Denver, Pueblo

General Location Of The Coal Basin Mine Site
 Not To Scale N

To Redstone
 4 Miles

Coal Basin Environmental History

An aerial photograph of a coal basin showing significant environmental damage. The landscape is dominated by dark, eroded soil and large piles of light-colored material, likely coal waste or slag. Several large, dark pipes run across the top of the basin, supported by blue metal structures. A dirt road or path winds through the area, and a small orange and blue object is visible on the left side. The overall scene depicts the aftermath of coal mining and the need for environmental reclamation.

- Road Reclamation















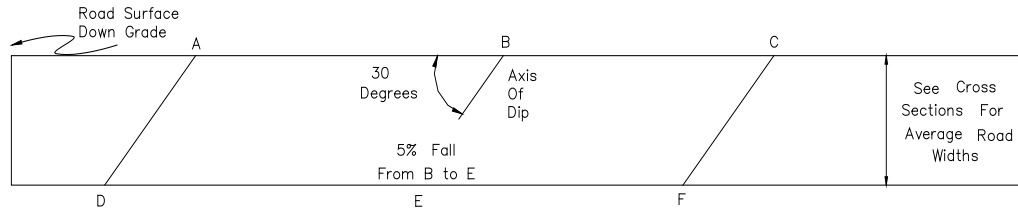




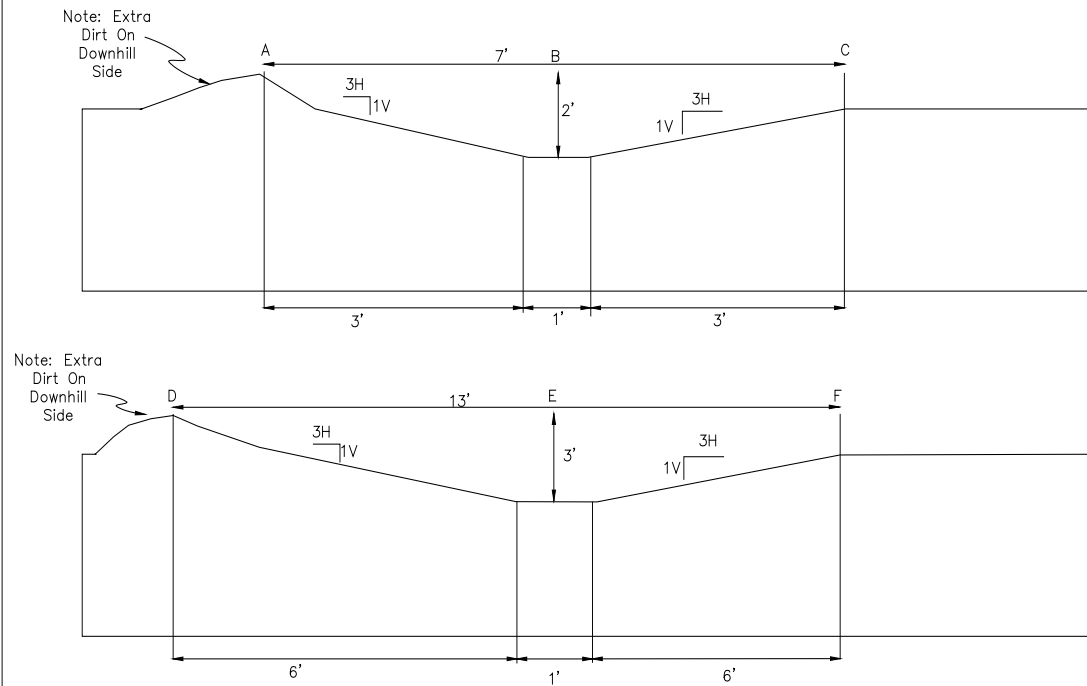


Rolled Dip Construction

PLAN VIEW



PROFILE VIEWS





Coal Basin Environmental History

- Mine Entry Area Reclamation















Coal Basin Environmental History

- Mine Bench Outslope Reclamation



























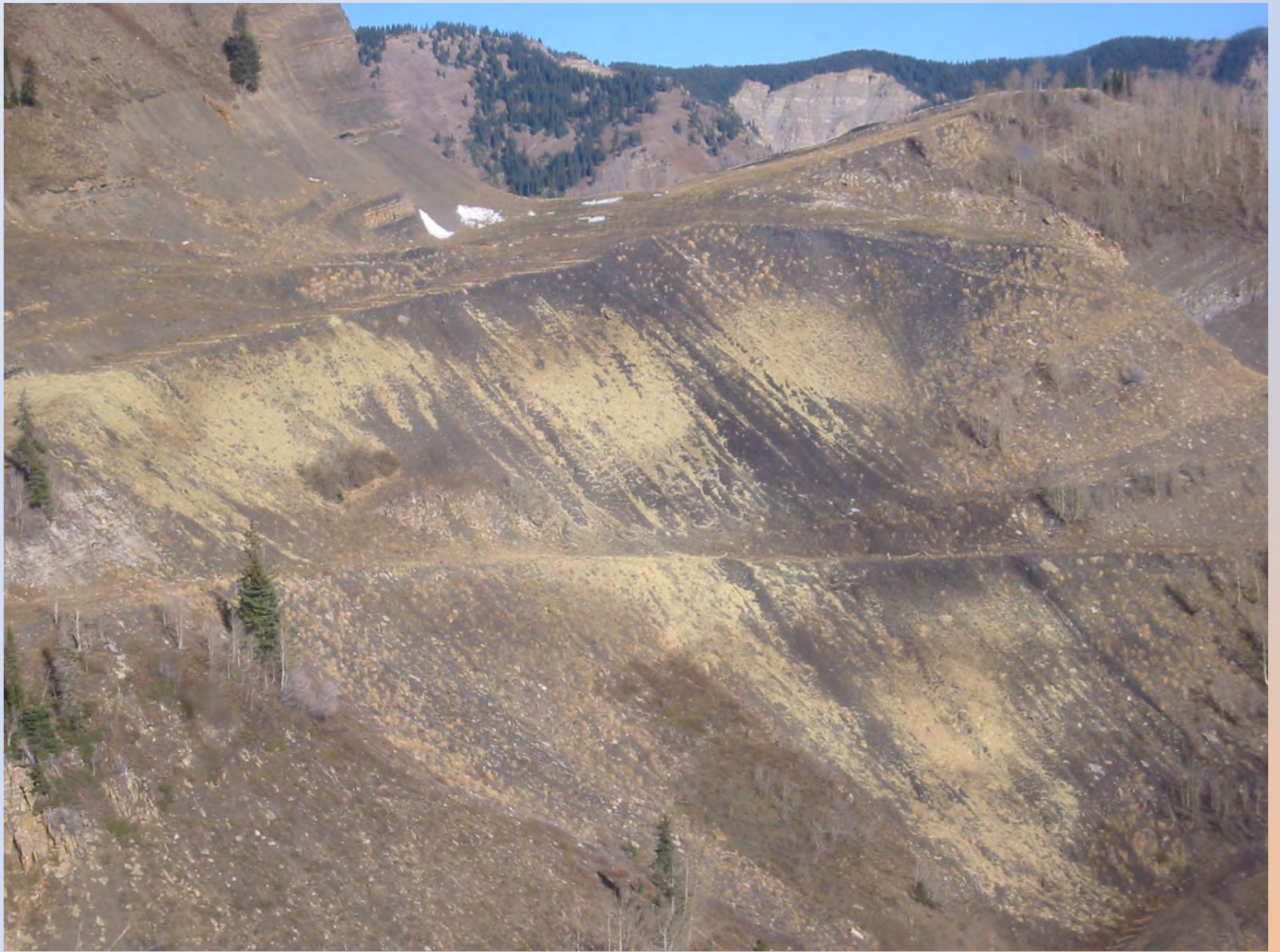






















Coal Basin Environmental History

- Facilities Area and Dutch Creek Diversion Reclamation



























Coal Basin Environmental History

- Refuse Pile and Other Sediment Control Reclamation Projects









































Reclamation Funding

Primary Reclamation Funding

- Reclamation Bond @ \$2.5 Million
- Work in Lieu of Cash @ \$500,000

- TOTAL @ \$3,000,000

Supplemental Funding

- OSM Civil Penalty Grant (Dutch Creek Diversion) @ \$110,000;
- AML Fund (Old Refuse Pile) @ \$437,000;
- AML Fund (Coal Basin Town Refuse Pile) @ \$135,000;
- CWA (319) Fund (Outslopes) @ \$196,000;
- USFS, WRNF (Outslopes) @ \$50,000;
- Colo. Dept. Ag (Weed Control) @ \$ 6,000

- TOTAL @ \$934,000

Coal Basin Environmental History

- My Soap Box (What I've Learned):
 - Understand the Environment at Coal Basin and Work With its Unique Character;
 - Exceptionally Dynamic and Mobile System;
 - Graze Only After Substantial Maturity and Diversity Established;

Coal Basin Environmental History

- My Soap Box (What I've Learned), Cont'd:
 - Build Micro Climates;
 - Disperse Water at Every Opportunity;
 - “Soils” and Remnant Refuse Respond to Addition of Organic Matter;