COAL BASIN AND CRYSTAL RIVER CONFLUENCE AREA PROJECT

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ROARING FORK WATERSHED COLLABORATIVE
Thank You

Colorado Division of Reclamation Mining & Safety
Inherent Conditions

Surface Geology

Mesa Verde Sandstones
rockfall

Mancos Shale
very susceptible to erosion

Wasatch and Ohio Creek Formation
susceptible to erosion

Maroon Formation,
large rockfall blocks
YOU HAVE TO KNOW THE PAST TO UNDERSTAND THE FUTURE

- CARL SAGAN

Photo sources: Bill Kight, George Sudsworth, Steve Renner
Source: Steve Renner, Division of Reclamation Mining and Safety
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Environmental Issues Driving CDRMS Reclamation

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

Source: Steve Renner, Division of Reclamation Mining and Safety
Facilities Area and Dutch Creek Diversion Reclamation—Before and After

Source: Steve Renner, Division of Reclamation Mining and Safety
Coal Basin Environmental History

Steve Renner (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;
- Build Micro Climates;
- Disperse Water at Every Opportunity;
- “Soils” and Remnant Refuse Respond to Addition of Organic Matter;
Goal: Bring technical experts together to develop a coordinated, innovative, science-based and effective plan to continue restoration efforts in Coal Basin and the Crystal River confluence area. Brought together 50 resource experts.
Overall project goal is to integrate and complete projects to:

- Improve riparian area function/wildlife value
- Minimize sediment delivery to streams
- Improve upland vegetation to stabilize soils
- Improve instream habitat and fisheries
- Address water quality issues
- Protect Redstone from flood flow damages
- Increase late summer flows
*Connected Disturbed Areas (CDAs) are disturbed clearings and roads that artificially intercept and combine natural channels increasing flows, erosion, and sediment transport.*
2012 Pilot Project Area
Building on previous restoration efforts continue to address the impacts in Coal Basin:

- Disconnect Connected Disturbed Areas (CDA) along legacy mine roads
- Improve water infiltration/reduce overland flow
- Encourage sediment deposition and storage on alluvial fans within Coal Basin
- Amend soils for enhanced vegetative growth and soil moisture
- Assess the effectiveness and utility of biochar using a control, compost/biochar blend, and compost
- Revegetate treatment areas
- Monitor flow, sediment transport, vegetation and soils
HOPE MINE RECLAMATION

FOR 30 YEARS IT LOOKED LIKE THIS.

July 2010

NOW IT LOOKS LIKE THIS.

August 2011

The Hope Mine
Colorado

© Pacific Pyrolysis

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<th>Biochar Rate (ton/acre)</th>
<th>Moisture %</th>
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www.biocharreclamation.com
2012 Pilot Project Work

Source: EcoFlight, 2012
Pre cross-ripped road prism with minimal infiltration and excessive overland flow
Cross-ripped Site 1 with biochar/compost

Cross-ripped with no soil amendment
Pre 2a – Connected Disturbed Area (CDA)
2012 Pilot Project Work

Source: EcoFlight, 2012
2a
Disconnecting Connected Disturbed Area (CDA)
Building Micro-habitats for Slope Stability, Revegetation, and Sediment Storage
Alluvial Fan
Before
Source: EcoFlight, 2012
Reconstruction of Alluvial Fan
Seeding with Native Vegetation
October 31, 2012
Roaring Fork Watershed Plan

Plan Implementation “Urgent Actions”

Coal Basin and Crystal River Area Workshop

Task 5: Coal Basin Road Reclamation Pilot Project

Task 3: Collect Stream Flow and Climate Data for Coal Basin

Watershed-Scale Restoration

Task 1: High-level Geomorphic Assessment of Crystal River Watershed

Task 2: Targeted Assessment of Coal Basin

Task 4: WQ, Macros, and Sediment Sampling in Coal Basin