The Application of Ecological Principles to Accelerate Reclamation of Well Pads

Presented By: Joshua Eldridge
Colorado State University
September 5, 2008
Natural Gas Pad Reclamation

- Current Challenges
  - Arid conditions makes reclamation more difficult.
  - Invasive species dominate large tracts of the land being developed.
Identify techniques that will improve the success of reclamation efforts on natural gas well pads on the western slope of Colorado.
Ecological Processes & Modifying Factors

- Seed Dispersal & Seedbed Preparation
- Resource Supply & Soil Impoverishment
- Environmental Stress & Species-Rich Mixtures
- Interference & Cover Crops
Pad Characteristics

- Two plant community types: Pinyon-Juniper and Sagebrush-Greasewood
- Five pads total (3 in Sagebrush-Greasewood and 2 in Pinyon-Juniper)
- Elevation ranges: 1609 – 1789 meters (5278 – 5870 ft)
- Total pad area ranges: 0.56 – 0.78 hectares (1.38 – 1.93 acres)
Treatments

- 2 Tillage treatments
  - Rough
  - Smooth

- 2 Amendment treatments
  - Wood chips
  - No wood chips

- 2 Seeding methods
  - Island broadcasting (forbs and shrubs separated from grasses)
  - Traditional broadcasting (all life forms in same seed mix)

- 2 Seed mixes
  - Annual and perennial species combined
  - Only perennial species
Plot Installation Photos
Monthly Precipitation Totals for Rifle, CO

- Precipitation
- 50 year average
Results

Tillage Effects on Native Planted Cover

Tillage Effects on Native Planted Cover

Year

Mean % Cover

Tillage

2007

2008

rough

smooth

rough

smooth

rough

smooth
Results

Effect of Wood Chips on Non-Native Plant Cover

Effect of Wood Chips on Total Plant Cover
Tillage Effects

Mean Cover by Class and Tillage Treatment

% Change in Cover
- Native Planted Species +34%
- Non-native Species +17%
- Total Plant Cover +21%
Wood Chip Effects

Mean Cover by Class and WC Treatment

% change in cover

- Native Planted Species  -0.8%
- Non-native Species  -44%
- Total Plant Cover  -29%

NoWC WC

[Bar chart showing Mean Cover by Class and WC Treatment]
Preliminary Findings

- The rough tillage treatment significantly increases native plant cover, especially during dry years.
- The addition of wood chips significantly reduces non-native plant cover.
- Overall rough tillage increases plant cover for all cover classes, while wood chips decreases plant cover for all cover classes except the native planted species.
- Still awaiting biomass data to determine seeding method effects.
Questions or Comments?