Wamsutter Reclamation – Field Trip Preview

June 3, 2013
Today’s Discussion

Background on the Wamsutter Field

Reclamation Challenges

Ecology

✓ Soils – The Foundation for Reclamation
✓ Plant Communities
✓ Land Use

Conference Field Trip
Wamsutter Field

- 1700 Square Miles (1,100,000)
- 5000+ Natural Gas Wells
- Tight Gas
- Discovered in 1950s
- Estimated 50 TCF of Natural Gas
- BP, Devon, Anadarko, 50 more
KC Harvey Wamsutter Reclamation Program  
(Began 2007)

Reclamation Science and Monitoring
✔ Soils, Plants, Weeds, Water, Range

Implementation
✔ Seeding
✔ Amendments
✔ Weed Control
✔ Fencing
✔ Stormwater BMPs
Wamsutter Area

2000 Well pads
Pipelines
Other Facilities
Regulatory Requirements

Rawlins Field Office RMP (2008)

Wyoming BLM Reclamation Policy (2009)

Rawlins BLM Field Office Reclamation Guidance (2011)

- Pre-construction soil salvage
- Construction
- Monitoring
- Reclamation Success Criteria
Wamsutter Area Reclamation Challenges

Limited Precipitation
✓ 7-9 inches/year

Limited Soils
✓ Thin, rocky, sandy, calcareous
✓ Saline or Sodic soil chemistry

Invasive Weeds
✓ Halogeton, Russian Thistle, others

Grazing
Climate

Cumulative Precipitation for Wamsutter, WY

- Average Cumulative
- 2010 Cumulative
- 2011 Cumulative
- 2012 Cumulative

Precipitation (in)

Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec
Soils – Foundation for Reclamation

Limited Soil Resources

Soil Chemistry Degrades with Depth

Without Good Soil Management, Reclamation will not be Successful
Soils – Wamsutter Field

Limited Soil Resources

- Thin, rocky, sandy, calcareous
- Saline or Sodic soil chemistry
  - 50% suitable soils
  - 30% saline soils (High total Salts Ca, Mg, Na)
  - 20% sodic soils (High Na)
Pre-Construction Assessment

Sagebrush and saltbush communities
## Case Study 2

<table>
<thead>
<tr>
<th>Division</th>
<th>Depth (inches)</th>
<th>Parameter</th>
<th>pH</th>
<th>EC (dS/m)</th>
<th>SAR</th>
<th>% Saturation</th>
<th>% Lime</th>
<th>Texture</th>
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<tbody>
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<td>Pre-Construction</td>
<td>A 0-6</td>
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Invasive Plants

Monitoring
Seeding
Herbicide
Mechanical control
Data management and reporting
Grazing

Wildlife and Livestock

✓ Larger Impact During Drought
Correlation of Soil Chemistry and Plant Community

Sagebrush, grass
✓ Suitable soils

Grass, saltbush, sagebrush
✓ Slightly-Moderately Saline soils

Saltbush, Grass
✓ Saline (or sodic) soils

Greasewood
✓ Sodic, (or saline/sodic)
Correlation of Surface Soil Chemistry and Plant Community

<table>
<thead>
<tr>
<th>Plant Community</th>
<th>pH</th>
<th>EC</th>
<th>SAR</th>
<th>% Sat</th>
<th>% Clay</th>
<th>% Lime</th>
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<td>0.8</td>
<td>1.4</td>
<td>37.0</td>
<td>24.1</td>
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<td>Grass, saltbush, sagebrush</td>
<td>7.7</td>
<td>1.1</td>
<td>3.6</td>
<td>39.3</td>
<td>30.1</td>
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<td>Saltbush, grass</td>
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<td>7.0</td>
<td>45.2</td>
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<td>Greasewood</td>
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<td>11.2</td>
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# Correlation of Surface Soil Chemistry and ESD

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<th>ESD</th>
<th>Count</th>
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<th>% Clay</th>
<th>% Lime</th>
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<td>Sandy (Sy) 7-9 GR</td>
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<td>44.0</td>
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<td>Saline Lowland, drained (SLdr) 7-9 GR</td>
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<td>51.7</td>
<td>46.7</td>
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</tbody>
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Vegetation

- Sagebrush, Grass
- Grass, Saltbush, Sagebrush
- Saltbush, Grass
- Greasewood

Distance Scale: 0 5 10 20 Miles
Soil SAR

SAR
- 0-4
- 4-8
- 8-10
- 10-13
- >13

Miles
Field Trip Route
Field Wide Reclamation Approach

**Reclamation Science**
- Soil Science
- Plant Ecology
- Weed Science
- Water Management
- Range Management

**Reclamation Implementation**
- Seeding
- Soil Amendments
- Mulch Application
- Weed Control
- Fencing
- Stormwater BMPs

**Reclamation Monitoring**
- Vegetation
- Soils
- Weeds
- Erosion
- Land Use