Producing Wellpad
Full Field Development
Wildlife Habitat

Components
- Food
- Water
- Cover
- Space
Establish Objectives

Restore native vegetation to land disturbed by the development of hydrocarbon extraction

- Required by regulation
- Provide habitat for wildlife
- Provide vegetation for domesticated livestock
- Social license to operate
- Improve understanding of failure, success and science
Set Specific Targets

- Bare Ground – equal to reference
- Stable Soil
- Establish forbs – 5-6 species
- Establish shrubs
- Establish grass - 3 grass/2 must be bunchgrass
- All in a reproductive state
Understand the Environment

Jonah Field – Sublette County, Wyoming

- Average Precipitation 7-9 inches/year – varies in amount and frequency
  - 2012 – less than 2 inches
  - 2009 – shy of 9 inches
  - This year – less than 1 ½ inches until mid August

- Wyoming Big Sage/Rhizomatous Wheatgrass

- Soils
  - Loamy
  - Loamy Slightly Alkaline
  - Sandy Clay Loam

- ESD
  - Wind River Loamy 7-9"
  - Wind River Clayey 7-9"

  - 2015 – 2 Provisional ESD’s for the Jonah Field
    › BS XYZ 9-12” #1
    › BS XYZ 9-12” #2
    › Based upon computer modeling and reference sites within the foothills

- High Desert - 7100’ – 34 frost free days
# Jonah Field Yearly Precipitation

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**Total Average**

5.51”
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Achieving Targets

- Soil Management
- Patience
- Science
- Experiment
- Monitor
Soil Management
Deep rip before topsoiling

Chisel and roll topsoil
Planting
Truax Roughrider Rangeland Drills and Truax OTG Seed Drills
Long term storage

2-5 Inches of Topsoil
3 Growing Seasons

- Yr 1 – Row grass
- Yr 2 – annual weeds flourish
- Yr 3 – irritable things are still there
- Yr 4-8 – desired vegetation outcompetes
Patience
Patience

- Reclaimed and planted in 2008
Science/Experiment

- Support UW Reclamation & Restoration Center
  - Sampling methods
  - Soil analysis
  - Insect studies
  - Vegetation studies
- Partner with NRCS & other operators
  - Forb establishment
  - Shrub studies
- Yale University
  - Vegetation monitoring
- Sublette County Conservation District
  - Habitat improvement
  - Vegetation production
- BLM & State Entities
  - Reclamation Improvement
- Contractors
  - Herbicide trials
  - Equipment
  - BMP’s
Monitor

Monitor to Specific Targets

- **Meaningful**
  - Provide information used to make decisions
- **Consistent**
  - Similar vegetative state year to year
- **Accessible**
- **Easy and Repeatable**
Provides support for decisions

Wellpad reclamation

- Effectiveness of current practices
- Species germination
- Species persistence
- Weed control
- Overall Wellpad
  - Condition
  - trend
Reclaimed Wellpads

- 16.1 species per site
  - 5.8 grass species
  - 7.1 forb species
  - 3.2 shrub species
- 457 lbs/acre
- 54.4% similarity

Reference Sites

- 9.6 species per site
  - 1.3 grass species
  - 4.7 forb species
  - 3.6 shrub species
- 273 lbs/acre
- 46% similarity

YP 75-13

Reference YP 75-13
Insects and Ecosystem Services

**Ecological Engineers**
- **Provisioning Services**
  - food
- **Regulating Services**
  - Pollination, biological control
- **Habitat/Supporting Services**
  - nutrient cycling, soil & nutrient influences, genetic diversity
- **Cultural Services**
  - Touchy feely

**Foundation Service**
- **Mass Flowering Hypothesis**
  - Introduction of flowering plants benefits other species through pollination
- **Insects/Pollinators maintain diverse habitat**
- **Many insects avoid terpenoids (produced by old sagebrush)**
- **96% terrestrial birds rear young on insect protein (includes GSG)**
Reclamation Scenario

Solar
- 703 acres
- Reclaimed 0 acres
- 703 acres remain disturbed
- Production 273 lbs/acre – 191,919 lbs
- Current Production – 0 lbs/acre for 0 total lbs
  - Decreased production by 100%
- 9 species to 0
  - Decreased species richness 100%
- Improved production on 0 acres
- Land available for multiple use – 0 acres
- Removed 703 acres of potential wildlife habitat

Natural Gas
- 18 acres
- Reclaimed 15 acres
- 3 acres remain disturbed
- Production 273 – 4914 lbs
- Current Production 457 lbs/acre to 6855 total lbs
  - Increased production by 40%
- 9 species to 16
  - Increased species richness 77%
- Improved production by 40% on 15 acres
- Land available for multiple use – 15 acres
- Improved 15 acres of wildlife habitat
Jonah Energy LLC

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