EVALUATION OF MECHANICAL, BIOLOGICAL, AND CHEMICAL TREATMENTS TO RESTORE SAGEBRUSH STEPPE IN NORTHEASTERN UTAH

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Introduction

• Greater sage-grouse (*Centrocercus urophasianus*) populations are declining
• Candidate species for listing under ESA
• Sage-grouse biology is well-documented
• Species/population response to management at the landscape level
Sagebrush obligate

- Breeding habitat
  - lekking
  - nesting
  - early brood-rearing
- Late brood-rearing habitat
- Winter habitat
“Game can be restored by the creative uses of the same tools which have heretofore destroyed it—axe, cow, plow, fire, and gun”

ALDO LEOPOLD
Sagebrush-steppe Restoration Tools – (Leopold)

- “Lop and Scatter” of Pinyon-Juniper (axe)
- Biological manipulation (cattle and sheep)
- Dixie and chain harrow (plow)
- Chemical treatment (in lieu of fire)
Research Question 1

• Can biological (strategic intensive sheep grazing), mechanical (Dixie and chain harrow), and chemical (Plateau herbicide) manipulations improve the ecological site conditions and enhance sage-grouse brood-rearing habitat on lower elevation xeric sites?
Research Question 2

• Can the combined effect of mechanical hand-cutting of pinyon (*Pinus* spp.) and juniper (*Juniperus* spp.) trees and cattle grazing (biological manipulation) reduce bromegrass (*Bromus inermis*) dominance and improve ecological site conditions and sage-grouse habitat on mesic sites?
Research Question 3

• Can the combined effect of mechanical mastication of juniper and pinyon-pine trees and grazing improve the ecological site conditions and enhance sage-grouse habitat on higher elevation, mesic sites?
Research Sites

Deadman’s Bench (1)
Anthro Mountain (2)
Rock Springs Mesa (3)
Deadman’s Bench

• Located in Uintah County, southeast of Vernal
• 1700 m
• Historically used for sheep/cattle grazing
• Recent natural gas field development
• Remnant sage-grouse population
Anthro Mt

- Ashley NF south of Duchesne
- 2700 m
- Historically used for cattle grazing – sagebrush reseeded to brome in 1950’s
- Small resident sage-grouse population – site of recent sage-grouse translocation
- PJ encroachment
- Energy development
Rock Springs Mesa

- Located in Grand County near Moon Ridge (Book Cliffs)
- 2000 m
- Historically used for cattle grazing
- Sage-grouse status unknown
- Bison herds
- Energy development
Cooperative Sagebrush Initiative (CSI)

- Public/private/industry partnership
- Partners agree that energy foot print will disappear
- How to best restore sites and pay for it
- Mitigation credits to off set energy development
- Credits cost tied to restoration effects
- Funding research
Deadman’s Bench Treatments (In Chronological Order)

- Chemical application (Plateau – Fall 2010)
- Mechanical treatments – (Fall 2010)
- Broadcast seeding (Fall 2010)
- Sheep grazing (Winter 2010)
Anthro Mt - Treatments

• Hand-cutting of pinyon (*Pinus spp.*) and juniper (*Juniperus spp.*) trees (November 2009)

• Cattle grazing (June 2009)
Rock Springs Mesa - Treatments

• Mechanical mastication of pinyon/juniper (Bullhog machine – Nov 2010)
• Material left on site
• Cattle grazing
Response Metrics

- Vegetation
  - Ecological sites
  - Vegetation nutrient quality (Deadmans sheep experiment)
    - Changes in percent cover and plant composition
      - Daubenmire and line-intercept
- Sage-grouse
  - Changes in use
    - Pellet counts
    - Bird dog surveys
Desired Results

• Deadman’s Bench-(xeric site)
  – Reduction of invasive species
  – Increased diversity of forb and grasses
  – More grouse

• Anthro Mountain- (mesic site)
  – Decreased competition – Brome and PJ
  – Increased native forbs and grasses
  – More grouse

• Rock Springs-(intermediate mesic)
  – Increased native forbs and grasses
Expected Benefits

• Knowledge will assist state and federal land management agencies and private landowners in managing sage-grouse habitat
QUESTIONS OR COMMENTS?