Sage, Speed, and Steel: The Dynamic Interplay between Sagebrush, Pronghorn, and Natural Gas Development

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Antilocapra americana
Pronghorn Use of Sagebrush

- Aldo Leopold wrote that each species of wildlife has a unique, characteristic range of variation in habitat requirements, which may be considered a property of that species (Cited in O’Gara & Yoakum, 2004).

- Forage
- Cover
  - Parturition (Fawning)
  - Movement/ Protection from Predators
- Migration
Sagebrush as Forage

- Pronghorn consume 2.5-3.0lbs of air-dried vegetation per day (O’Gara & Youkam)
- Smith & Beale (1980) showed 98% diet sagebrush
- Pronghorn prefer Low sagebrush, Big sagebrush, and Black sagebrush (Hansen, 1986; Smith & Beale, 1980)
- Terpenoids, camphors, and secondary compounds deter foraging (Shultz, 2012)
- Water-soluble coumarins attract wildlife, fluoresce under ultraviolet light (directly correlated with palatability and wildlife use) (Shultz, 2012)
- 20% protein content in seedheads (Shultz, 2012)
- Sagebrush considered “life-sustaining” and “survival browse” species in winter (O’Gara & Yaokum, 2004)
Fawns lay in seclusion: three weeks after birth (Fichter, 1974; Byers & Byers, 1983; Aldredge et al., 1991)

Gravid females prefer sagebrush areas for parturition

Migration of 100- to 150-miles, GTNP→UGRB; longest in N. America

Migration depends on snow timing/depth

Sagebrush is likely the reason pronghorns are able to sustain migration

Not able to solely sustain wintering mule deer (Ferrel & Leach, 1952; O’Gara & Youkam)
Potential Impacts to Sagebrush Communities and Pronghorn

- Housing and Energy Development (Sawyer et al., 2005)
- Natural Gas Development?
- Habitat loss (Beckmann et al., 2012)
- In 2006, 4,834.6 total acres (7.6 sq. mi.) of surface disturbance @ 340 well pads (BLM, 2008).
- 5.1% of PAPA area.
- Currently 380 well pads (BLM, 2014)
Potential Impacts to Sagebrush Communities and Pronghorn

- 42% Mule deer decline, and avoidance of well-pads (Sawyer & Nielson, 2013; Sawyer et al. 2006).
- Pronghorn actually use areas close to well-pads (Sawyer & Nielson, 2011; Beckmann et al., 2008).
- Congregated ungulate foraging on winter range (Boccadori et al., 2008).
- Decreased neonatal mass, protein losses (Barnow-Meyer et al., 2011).
- Studies tend to be short-term, observational (Sawyer et al., 2002).
Impact Analysis

- NEPA process component
- Collaboration with “experts”
- Baseline condition assessment; impact prediction; and integrated mitigation analysis (Maughlin, 2013)
- Significance criteria (BLM, 1999)

“While the list of impacts identified by the public and agencies (most of them direct or primary) seems to grow with every project, NEPA practitioners base impact evaluations on assumption, conjecture and inference derived from studies of similar types of actions but in diverse locations and on different but similar species.” –BLM Wildlife Technical Report, Part I-Wildlife Habitat Models (BLM, 1999)
Effectiveness

- Predicted some impacts (e.g. increased wildlife-vehicle collisions)
- Missed others (e.g. mule deer WMMM threshold exceeded)
- Based on “assumption, conjecture, and inference”
- Impacts within Significance Criteria bounds?
- Lacking novel survey methods
- Successful collaboration with WGFD
- Scoping lacking (Poor stakeholder consultation)
- Scale of impacts
Improvements

- Better use of local knowledge as compass, facilitator of stakeholder communication (Cash, 2003; Wilkinson, 2007; Wik et al., 2000)
- Immediate collection of baseline data and integration
- Improvement of statistical analyses and probability estimates (Sawyer et al. 2006)
- Unconventional methods for baseline research (Maughan, 2013)
- Ensure long term funding for scientific analyses
- Understanding, quantifying, and analyzing uncertainty (Morgan, 2009)
- Communicate uncertainty to public (Morgan, 2009)
The Big Picture
Conclusions

- Sagebrush are critical to many pronghorn populations for forage, migration, and parturition
- Pronghorn have evolved to use sagebrush as viable forage
- Natural gas development has reduced sagebrush habitat
- Further research is necessary to fully identify impacts/mechanisms
- Improvements to impact analysis and other policy may limit or avoid impacts
- Impact analysis is not fully effective in its current form
- Efforts to conserve and improve sagebrush-steppe habitat are necessary
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Literature Referenced


