The Sustainable Rangelands Roundtable: Soil Health and Economics

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Rangeland Sustainability

- Ensures human well-being while respecting ecosystem well-being and environmental limits and capacities.

- Encompasses environmental and social issues and economic activity.
Balance - Making Choices

Cattle

Wildlife

Management

Environment

Way of Life
Sustainable Rangelands Roundtable Timeline and Process

2001 - SRR Convened
2003 - First Approximation Report
2007 - Conceptual Framework
Project Based Activities

Ecosystem Services
Business Planning/Sustainability
Energy
Food Security
Useable Science
Social and Economics of Public Land Ranchers
NRCS Conservation Practices
Soil Health and Economics
SRR Criteria and Indicators

Encompass social values, economic benefits, and ecological factors

- **Criteria** – Goals, values
- **Indicators** – Measurements, monitoring
Conservation and Maintenance of Soil and Water Resources on Rangelands
ISEEC Framework

- Biophysical and Social/Economic over time
- Nexus is the Ecosystem Services
- Only things that humans want and need have value
Effects of Soil Health on Sustainability

- In our framework, soil is one of the basic biophysical components
- Improving soil health leads to a variety of effects on the ecosystem, including forage production
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- To the extent that society wants more red meat, there is a derived demand for forage (an ecosystem service).
Effects of Soil Health on Sustainability

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- Improving soil health leads to a variety of effects on the ecosystem, including forage production
- To the extent that society wants more red meat, there is a derived demand for forage (an ecosystem service)
- If a rancher can produce that red meat at a profit, they will supply that to society
Soil Health and Ranching

- Forage productivity
- Soil erosion
- Translate into ranch effects
Soil Health and Economics on Rangelands

- No direct research on this topic for rangelands
- Likely to be more anecdotal at this point
- From an economic standpoint, we would like to know responses
Ranch Models - Systems Approach

- Basic premises
  - Cattle somewhere every day
  - Yearlong operation
  - Substitute feeds
Sources of Uncertainty

Wyoming Steer Calf Prices, Adjusted 2012

Precipitation

Crop Year
Precipitation (Inches)
Crop Year
Median
Results - Base Model

- 590 Cows
- Gross annual returns = $369,939
- Average Net Cash Income = $112,895
- Fixed costs = $40,434
- Negative net annual income occurred 22% of the time
So what does this mean for soil health?

- NRCS practices aimed at improving conservation use of rangelands
- Practices that potentially increase forage production
- Practices that potentially improve grazing distribution
- If these simultaneously improve soil health (C transformation, nutrient cycling, soil structure, microbial health), then it is possible to conduct an economic analysis
Caveats

- Improving forage quality or quantity in any given season does not mean it is useful to the yearlong operation
- Have to balance supply of forage with demand for forage

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\text{Supply of Forage by Season of Use} \quad ? \quad \text{Demand for Forage by Season of Use by livestock, wildlife, soil protection, etc.}
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Caveats

- This only looks at the private benefit from improving forage production.
- What other values does society gain?
- Can we place values on those?
  - What is more wildlife habitat worth?
  - What is the value of less soil erosion?
  - What is the value of a soil microbe?
  - What is the value of society “knowing” rangelands are being properly managed?
Soil Health and Economics

- New project at University of Wyoming
  - Dr. John Ritten, Agricultural and Applied Economics
  - Holly Dyer, M.S. Student

- Objectives:
  - A literature review
  - Quantification and valuation
  - Ranch case studies
Questions?