



# Sustainable Rangelands Roundtable - Ranch Sustainability Monitoring and Assessment

## Introduction

The Sustainable Rangelands Roundtable (SRR) recognized a need to address rangeland inventory and monitoring at the ranch level, as well as at broader regional and national scales. Consistent information about social, ecological, and economic aspects of rangeland management is necessary to provide a foundation for a business planning approach to family ranching.

As ranchers endeavor to stay on the land and adapt their business practices to changing markets and demands for various goods and services, collection of monitoring data to track trends in elements elaborated in their individual business plan goals will become increasingly important to the long-term sustainability of their ranch operations. For example, the amount of land available nationally for livestock forage production is expected to decrease over the next 50 years. However, the actual rate will depend upon environmental issues, government policies, urban and exurban sprawl, and increased recreation demand. Additionally, managing for multiple goals such as cattle production, migrant bird habitat, and rare plants can be beneficial to both ranchers and communities, increasing income and conservation.



Since 2001, SRR, an open partnership involving rangeland scientists and managers, ecologists, sociologists, economists, policy and legal experts, environmental advocates, and industry supporters, representing nearly 50 organizations, has distilled a set of five criteria and 64 indicators embodying social, economic, and ecological factors for monitoring sustainable rangeland management. Such a monitoring approach also facilitates adaptive management techniques that incorporate change in response to resource condition and available financial resources. In recognition of these needs, as well as to better inform the general dialogue about rangeland management issues, SRR has identified 17 indicators suitable for ranch-level monitoring and compatible with SRR's broader national indicators. The criteria are:

- Criterion 1:** Conservation & Maintenance of Soil & Water Resources on Rangelands
- Criterion 2:** Conservation & Maintenance of Plant & Animal Resources on Rangelands
- Criterion 3:** Maintenance of Productive Capacity on Rangelands
- Criterion 4:** Maintenance & Enhancement of Multiple Economic & Social Benefits for Current & Future Generations
- Criterion 5:** Legal, Institutional & Economic Framework for Rangeland Conservation & Sustainable Management



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## SRR Ranch Assessment Soil Indicators



### Bare ground

Percent bare ground is an indicator of the potential for raindrop impact and wind to move soil particles. Lack of vegetation cover also facilitates the overland flow of water and sheet, rill, or gully erosion. Bare ground may be an artifact of excessive removal of herbage by grazing, other disturbances, or drought. Grazing management should consider the degree of removal or residual herbage left as related to soil surface protection.

### Soil Aggregate Stability

This indicator refers to the degree that soil aggregates retain their structural integrity when exposed to a water bath. The degree of aggregate stability is a function of the soil texture and organic matter in the soil surface. Increased stability will reduce soil erosion. This attribute is likely to be more important in semi-arid-arid systems.

## SRR Ranch Assessment Water Indicators

These indicators address the timing and amount of water for livestock or other animal species as well as aquatic habitat values that may be important. Intermittent or ephemeral sources or no water may limit use of some areas. Vegetation management has been shown to impact stream and spring flows. Drought is a large influence. Management objectives would be improvements in timing and amounts of water from various sources for desired uses.



### Frequency or duration of surface water

a. Measurement: Flow rate (Volume) and duration/ timing of water availability  
i. How long is ephemeral water available in each pasture?

### Amount of water available

a. Questions:  
i. What reliable sources of water do you have (sumps, surface flows & ground water)?  
ii. Do you have adequate water supply or reserves year-round and/or during period of use?  
iii. Do you have adequate depth of stock pond?  
iv. Do you have adequate storage or flow from a well to supply water needs?  
v. Do you have enough water to maintain adequate grazing distribution?  
b. Measurements: Volume

## SRR Ranch Assessment Plant Indicators



Ranchers and/or technical assistance specialists must determine whether baseline data exists, perhaps in an ecological site description (ESD).

**Key species composition:** Key species are those that a rancher wants to manage, or those that are sensitive to management. Their composition on key ecological sites is an important indicator to be monitored. Changes in percent of plants covering the soil surface, categorized by species and age/ growth stage of plants, provide an indication of land management program efficacy in maintaining or improving toward desired composition.

**Extent of invasive species:** Changes in location and abundance of invasive species can provide an indication of the efficacy of management programs.

**Extent of wildfire & prescribed fires:** In systems where wildfire is prevalent or prescribed burning is practiced, mapping fire extent and frequency will provide indications of the need for better fire control or for prescribed burns.

**Extent and condition of riparian areas:** The greenline technique provides percent cover by plant community type along streams. A manager seeks a grazing program to increase wetland obligate sedges and grasses while decreasing community types less effective in maintaining stable banks.

## SRR Ranch Assessment Animal Indicator

Animals include livestock, big and small game, and predators. Some species have commodity value and others may be of special value for their mere presence. Depending on the species, objectives may be to increase, maintain stable numbers, or to see decreases if management is for that change. Large ungulates hold the greatest potential for ranch commodity use.

**Population estimates of wildlife (or feral) species** important to the rancher: These measurements will be general trends obtained through counts on spotlight or daytime transects once a year done at the same time, on the same route with the same weather conditions.



## SRR Ranch Assessment Legal & Institutional Indicators

**Continuing Education & Technical Assistance:** Whether ranchers seek technical assistance and continuing education may be an indicator of a mindset that fosters continued assessment and improvement in an operation. Complacency can be dangerous. A rancher may put this indicator into a business plan with a year-end check-off to ensure completion. A thorough approach includes setting educational/ training goals, scheduling periodic assessment of goals, and then setting new educational/ training goals.

**Protection of special values:** This requires identification by the family or operator of special values that may be non-economic or perhaps even costly to maintain. Goals must be set to handle special values, including periodic review and evaluation of results.

## SRR Ranch Assessment Productive Capacity Indicators



Forage utilization reflects herd size, wildlife numbers, and distribution of grazing; i.e., grazing management of available forage. The forage use attribute should have target levels that the manager can correlate with trends in other resource values to adjust the grazing management program.

**Utilization:** categorization of use levels or residual forage across the landscape in key areas or use maps (dependant on slope, shrubs, water)

- a. Measurement:
  - i. Livestock Utilization Landscape Appearance Method
  - ii. Stubble heights on line transects
  - iii. Paired plot sampling with grazed areas and grazing enclosures

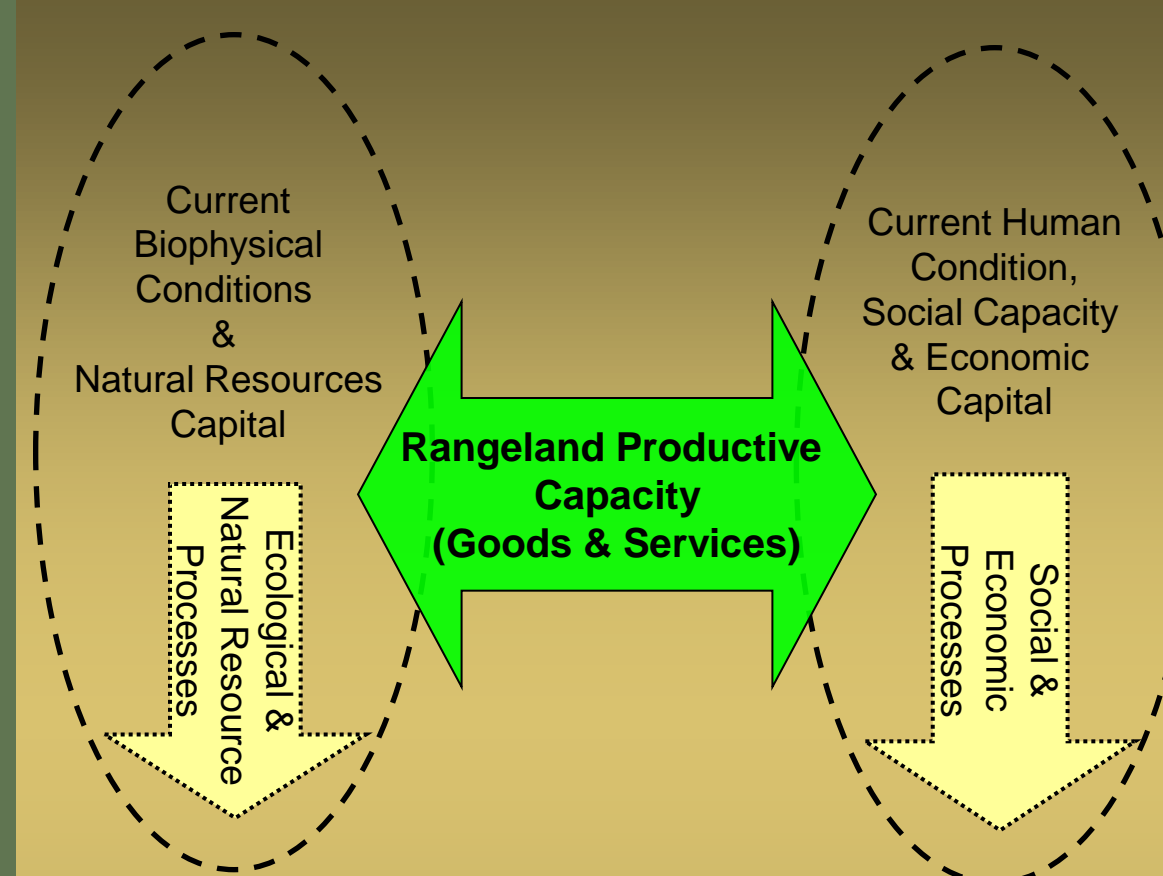
**Domestic meat produced:** Pounds of livestock/beef produced as measured by live-weight sales, not number of animals. Also document rangelands vs. feedlot sources of livestock/beef.

- a. Measurement: Pounds of domestic stock sold (live-weight sales)

**Production of harvestable materials (hay, seed, nuts, wood & other plant materials):**

- a. Measurement: applicable is unit sold.

## Interaction of Socio-Economic and Ecological Systems



The SRR Integrated Social, Ecological & Economic Concept (ISEEC) of ecological, social, and economic indicators is linked through rangeland productive capacity. These goods and services act as the primary bridge between the ecological and social/economic sides of SRR's conceptual model (Tier 0 is shown above). This linkage recognizes that ecological and natural resource processes affect and are affected by social and economic capital stocks, capacities, conditions, and processes. Ecological systems and processes provide the biological interactions underlying ecosystem health on the ranch. Social and economic situations provide the context in which rangeland use and management occurs. These systems and processes interact and feedback on one another over time and space. To adequately assess ranch sustainability and productivity, a synthesis of ecological, economic, and social perspectives is needed.

## SRR Ranch Assessment Socio-Economic Indicators



**Cost of livestock production:** Purchased and raised feed are generally the largest expense of ranching. Costs, including opportunity costs of hay and grazed forages should be determined. Components of the cost analysis such as amortized cost of haying equipment in addition to direct costs should be determined. This analysis identifies the best opportunities to reduce the cost of production and subsequently reduce the breakeven cost.

**Itemized income/ expense of each product produced:** A very effective interpretive tool is the cost per unit of production, a breakeven price. The difference between this cost and the return per unit represents the return to the operator. All enterprises (livestock, forage, hay, hunting, etc.) should have separate analysis. The percentage of net return from each enterprise may be useful in allocating time and other resources to various profit centers.

**Visitor use information for appropriate enterprises:** Trends in dollars/ visitor, and visitor days would be useful in determining efficacy of non-consumptive land use enterprises.

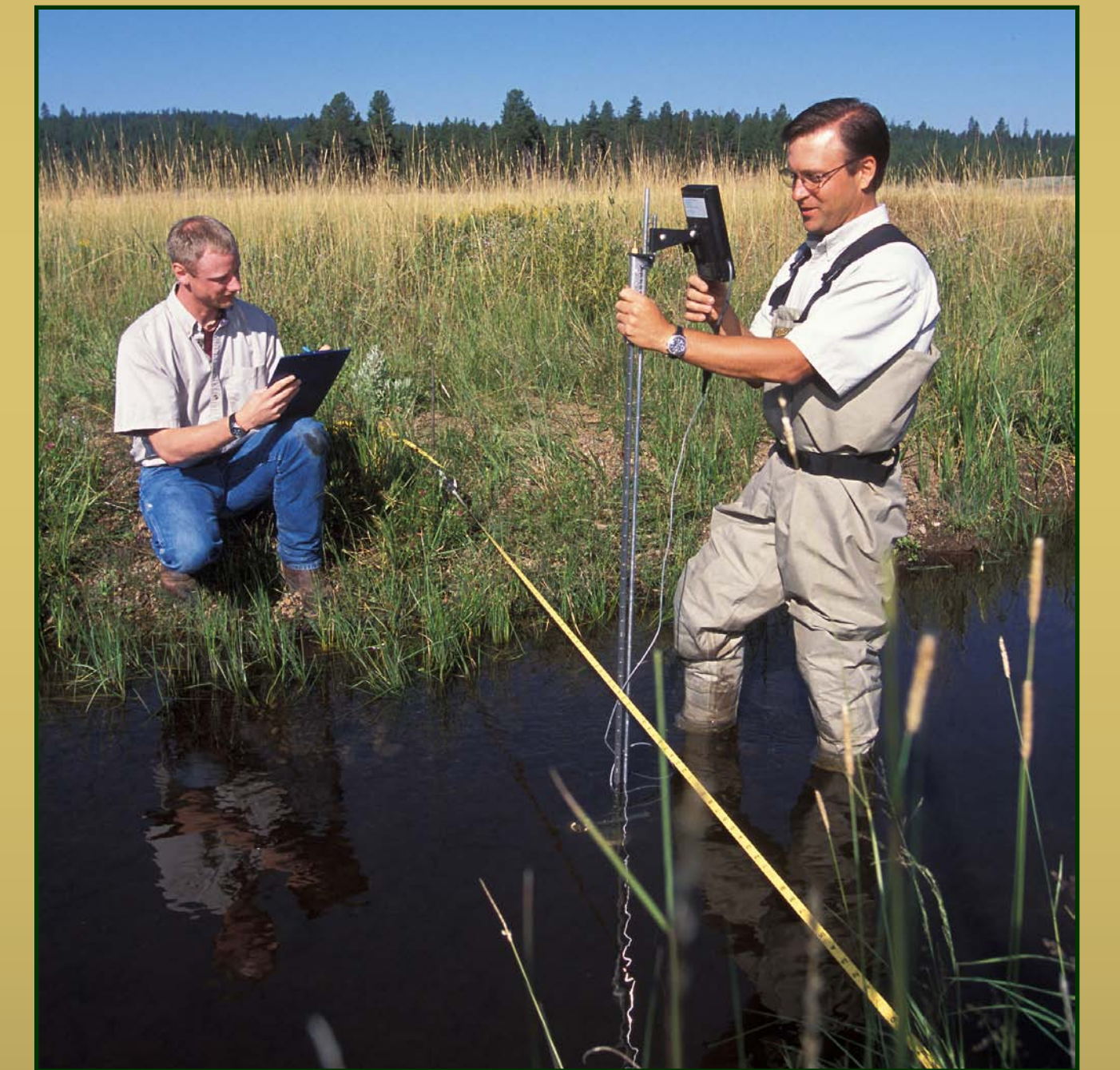
## SRR Ranch Assessment Business Planning

The Wyoming Business Council (WBC) handbook on *Sustaining Western Rural Landscapes, Lifestyles, and Livelihoods* contains detailed guidance for development of a business plan, as well as forms for documentation of supporting information. Worksheets included in the WBC guide highlight the importance of accurate information about soil, water, plant, animal, productive capacities and alternate income streams from rangeland goods and services, comprehensive socio-economic records and legal and institutional frameworks for sustainable rangelands management. The SRR Ranch Sustainability Monitoring and Assessment indicators described herein offer additional guidance for data collection and evaluation to support ranchers' business plans.

According to the WBC, there are several key areas that any agricultural enterprise developing a business plan must address. These include: their business concept and structure, market analysis and plan, management plan, financial plan, and break even analysis. Some agribusiness enterprises also need to consider a design and development section, a manufacturing plan for products, and/or an operations plan for associated service businesses. If a business plan will be read by potential investors or lenders, it is helpful to provide an executive summary, proposed funding information, and appendices of any supporting materials.

### Contents of an Agribusiness Plan:

- Executive summary
- Overview of the industry & the business
- Market analysis
- Market plan
- Management team
- Design and development (optional)
- Manufacturing plan/operations plan (optional)
- Financial plan
- Break-even analysis
- Proposed offering (optional)
- Appendix



## Conclusions

The primary purpose of this project is to assist ranchers in gathering information that will improve the ecological and economic sustainability of their operations. While Sustainable Rangelands Roundtable participants want to know whether the information collected is helpful to ranchers, the ranchers will not be obligated to share their data with SRR. Rather, SRR will provide the template for monitoring that addresses economic as well as resource and social issues. Ranchers will assemble the data to monitor trends in specific attributes that are helpful to them. The rancher will be interested in these trends if they are actually useful for guiding ranch management. SRR is interested in whether the attributes monitored are effective to inform ranch management, an assessment largely made by the rancher and/or individuals providing technical assistance.

Sustainable Rangelands Roundtable ranch assessment workgroup participants and their producer partners will continue to develop these indicators, fulfilling SRR's mission to "promote social, ecological, and economic sustainability of rangelands through the development and widespread use of criteria and indicators for rangeland assessments," and to provide "a forum for dialogue on sustainability of rangelands." Roundtable conveners and participants look forward to engaging interested partners in monitoring and reporting upon SRR indicators. Ultimately, comprehensive information will inform discussion and debate about economic, social, and ecological sustainability issues to improve ranch management and profitability, as well as visibility and understanding of rangeland management issues.