

CHAPTER VII

Future Direction

BACKGROUND

Since 2001, more than 50 organizations and 100 individuals have joined in the Sustainable Rangelands Roundtable's (SRR) mission to identify criteria and indicators of sustainability, based upon social, economic, and ecological factors, and provide a framework for national rangeland assessments. SRR does not attempt to make or advocate policy decisions, but rather provides opportunities for diverse stakeholders, representing potentially conflicting interests, to discuss information and perspectives on appropriate rangeland sustainability criteria and indicators. While interpretations or conclusions may be contentious, the inclusive, open nature of the roundtable process ensures that criteria and indicators developed by the SRR will provide common ground for ongoing discussions about rangeland sustainability.

Additionally, this report represents a milestone in rangeland monitoring and reporting, presenting five criteria and associated indicators for assessing rangeland sustainability. The criteria and indicators are listed in Table 7-1 with the availability of data sets. Although these criteria and indicators may be refined as work continues, SRR's initial task has been completed successfully. In December 2002, SRR leaders met to review SRR's original mission and vision and to map future operational plans. This group concluded that while the criteria and indicators had been identified and described, they were not yet widely accepted or used. So the group developed strategic goals, objectives, and action plans necessary to facilitate acceptance and use of the criteria and indicators. A modified mission emphasizing enhanced stakeholder dialogue and involvement complements this strategic plan, providing a bold course for SRR to achieve its mission.

SRR FUTURE GOALS

Increasing awareness of SRR initiatives is critical for future success and acceptance of SRR criteria and indicators. The U.S. political process and democratic structure ensure that programs strongly supported by landowners and resource stakeholders will garner support from politicians and appointees representing their interests. For this reason, SRR's efforts will shift to strategic, tactical, and operational goals and objectives emphasizing: criteria and indicator implementation and revisions; data set identification and analysis; comprehensive communication planning and intensive education and outreach efforts; interagency and/or organizational coordination; research protocols and prioritization; and stable and adequate funding.

Table 7-1. Categorized availability of data sets for indicators by each criterion.

Indicator	Availability of data sets¹
Criterion 1: Conservation and Maintenance of Soil and Water Resources of Rangelands	
1. Area and percent of rangeland with significantly diminished soil organic matter and/or high Carbon:Nitrogen (C:N) ratio	D
2. Area and extent of rangelands with changes in soil aggregate stability	B
3. Assessment of microbial activity in rangeland soils	D
4. Area and percent of rangeland with a significant change in extent of bare ground	C
5. Area and percent of rangeland with accelerated soil erosion by water and wind	B
6. Percent of water bodies in rangeland areas with significant changes in natural biotic assemblage composition	A
7. Percent of surface water on rangeland areas with significant deterioration of their chemical, physical, and biological properties from acceptable levels	A
8. Changes in groundwater systems	A
9. Changes in the frequency and duration of surface no-flow periods in rangeland streams	A
10. Percent stream miles in rangeland catchments in which stream channel geometry significantly deviates from the natural channel geometry	B
Criterion 2: Conservation and Maintenance of Plant and Animal Resources on Rangelands	
1. Extent of land area in rangeland	B
2. Rangeland area by vegetation community	B-C
3. Number and extent of wetlands	A
4. Fragmentation of rangeland and rangeland vegetation communities	C
5. Density of roads and human structures	A
6. Integrity of natural fire regimes on rangeland	C
7. Extent and condition of riparian systems	C
8. Area of infestation and presence/absence of invasive and non-native plant species of concern	C
9. Number and distribution of species and communities of concern	A
10. Population status and geographic range of rangeland-dependent species	A-C
Criterion 3: Maintenance of Productive Capacity on Rangeland Ecosystems	
1. Rangeland aboveground biomass	A
2. Rangeland annual productivity	B
3. Percent of available rangeland grazed by livestock	D
4. Number of domestic livestock on rangeland	A-B
5. Presence and density of wildlife functional groups on rangeland	C
6. Annual removal of native hay and non-forage plant materials, landscaping materials, edible and medicinal plants, wood products, and native hay	D

¹ Availability of data sets is categorized by: A – methods and procedures for data collecting and reporting, and data sets of useable quality exist at the regional-national level; B – standardized methods and procedures for data collecting and reporting exist at the regional-national level, but useable data set(s) do not exist at the regional-national level; C – some data set(s) exist at the regional-national level, but methods and procedures are not standardized at the regional-national level; D – conceptually feasible or initially promising, but no regional-national methods, procedures or data sets currently exist.

Table 7-1 (Continued).

Criterion 4: Maintenance and Enhancement of Multiple Economic and Social Benefits to Current and Future Generations	
1. Value of forage harvested from rangeland by livestock	A
2. Value of production of non-livestock products produced from rangeland	A-B-C-D
3. Number of visitor days by activity and recreational land class	C
4. Reported threats to quality of recreation experiences	B
5. Value of investments in rangeland, rangeland improvements, and recreation/tourism infrastructure	D
6. Rate of return on investment for range livestock enterprises	D
7. Number and value of conservation easements purchased	A
8. Expenditures (monetary and in-kind) to restoration activities	C-D
9. The threat or pressure on the integrity of cultural and spiritual resource values	D
10. Poverty rate – general	A
11. Poverty rate – children	A
12. Income equality	A
13. Index of social structure quality	B
14. Community satisfaction	A
15. Federal transfers by categories (individual, infrastructure, agriculture, etc.)	A
16. Presence and tenure of natural resource non-governmental organizations at the local level	D
17. Sources of income and level of dependence on livestock production for household income	B-D
18. Employment diversity	A
19. Agriculture (farm/ranch) structure	A
20. Years of education	A
21. Value produced by agriculture and recreation industries as percent of total	A
22. Employment, unemployment, underemployment, and discouraged workers by industrial sector	A
23. Land tenure, land use, and ownership patterns by size classes	D
24. Population pyramid and population change	A
25. Income differentials from migration	A
26. Length of residence (native, immigrant more than 5 yrs., less than 5 yrs.)	A
27. Income by work location versus residence	A
28. Public beliefs, attitudes, and behavioral intentions toward natural resources	C-D
Criterion 5: Legal, Institutional, and Economic Framework for Rangeland Conservation and Sustainable Management	
1. Land law and property rights	B
2. Institutions and organizations	D
3. Economic policies and practices	C
4. Public information and public participation	C
5. Professional education and technical assistance	C
6. Land management	C-D
7. Land planning, assessment, and policy review	C
8. Protection of special values	C
9. Measuring and monitoring	C
10. Research and development	C

Goal: Continued C&I Development

SRR's primary goal continues to be criteria and indicator development and refinement. In addition, SRR will expand efforts to identify data sets and data needs for indicators. SRR has acknowledged challenges to criteria and indicators application and the identification of data sets and data set applicability for particular SRR indicators.

SRR participants likely will encounter similar challenges to those issues itemized in the final draft of the 2003 National Report on Sustainable Forests. Complementary content of RSF and SRR criteria and indicator sets leaves little doubt that priority data issues identified in the draft sustainable forests report also will impact rangeland criteria and indicator efforts. Particularly relevant priority issues include: database management, consistency, and integration; definitions of forest and rangeland; implementation of the National Vegetation Classification System and conversion of existing systems; and human community and economic indicators (USDA Forest Service 2002).

Existence of data gaps and inconsistent or incomplete information affecting efficacy of SRR criteria and indicators already have been noted. Generally, effectiveness of inventory and monitoring systems based upon criteria and indicators depends upon resolution of database management, consistency, and integration issues. However, national monitoring systems deemed adequate to track changes in the U.S. forest land base are not capable of measuring conditions on all rangelands. Authors of the sustainable forests draft report found that little effort has been made to ensure standardization of content, format, and structure of national databases, and critical information about the databases (metadata) is often lacking (USDA Forest Service 2002).

A primary concern cited by authors of the draft report on sustainable forests focuses on differing operational definitions of forest and rangelands (USDA Forest Service 2002). SRR participants addressing conservation and maintenance of plant and animal resources on rangelands also have identified this issue. Currently, overlaps between these definitions cause the total rangeland plus the total forest land base to sum to more than the total land area of U.S. rangelands and forests. The Oregon Demonstration Project (Goebel et al. 1998) found 10 to 15 percent difference in areas of forests and rangelands depending on definitions. Presently, stakeholders from the Roundtable on Sustainable Forests, the SRR, the Federal Geographic Data Committee (FGDC) Sustainable Forest Data Working Group, FGDC Vegetation Subcommittee, FGDC Sample Inventory and Monitoring of Natural Resources and the Environment Working Group, Bureau of Land Management (BLM), Forest Service, Natural Resources Conservation Service (NRCS), U.S. Geological Survey (USGS), Society for Range Management (SRM), Society of American Foresters, and NatureServe are working to develop standard definitions.

Also highlighted is the importance of National Vegetation Classification System (NVCS) implementation and conversion of existing systems (USDA Forest Service 2002). SRR participants have discussed this topic as well. NVCS is the U.S. federal standard for vegetation classification; however, land management agencies have not yet fully employed it. Related efforts to develop standardized methods for designating vegetation community types include the Gap Analysis Program, the USGS/National Park Service Vegetation Mapping Program, NatureServe, the aforementioned FGDC Vegetation Classification Standards, the Ecological Society of America Vegetation

Classification Panel, and NRCS ecological site descriptions. Protocols for designating vegetation community types are being developed under each program, and use of consistent classification systems is essential for maximization of data sharing potential (USDA Forest Service 2002).

The sustainable forests draft report called for development of a national strategy for monitoring human community and economic indicators that includes consideration of social, economic, and cultural impacts of management activities on regions and communities. The culture and economy of resource-dependent communities are linked closely to the lands around them; however, only qualitative information is available about their cultural and spiritual significance. Although written for forest-dependent communities, these points apply equally to rangeland-dependent areas and add to challenges already identified by SRR participants dealing with maintenance and enhancement of multiple economic and social benefits to current and future generations.

Goal: Enhanced Outreach

The SRR will conduct bold and aggressive outreach and marketing initiatives resulting in recognition of the importance of sustainable rangelands and the wide acceptance and use of SRR ecological, economic, and social criteria and indicators for rangeland sustainability. By June 2005, SRR will be recognized as the primary source of sustainable rangeland information.

Outreach and marketing success will be evidenced by: (1) increases in the number of publications involving SRR criteria and indicators and associated applications; (2) recognition by academic institutions of the value of SRR criteria and indicators and incorporation of these into their curricula; (3) government agencies, environmental organizations, industry, and researcher's use of SRR criteria and indicators to assess rangelands and associated human communities; and (4) existence of a constituency that actively champions the use of SRR criteria and indicators within agencies.

Five specific tactical objectives were developed to meet the outreach goal of SRR.

- The Outreach Working Group and Steering Committee will finalize and implement a formal communications plan by spring 2003.
- A suite of outreach and educational materials for different constituencies and stakeholders will be developed by 2004.
- Example of interpretations and assessments using SRR criteria and indicators at multiple scales will be developed by June 2005.
- SRR leadership will meet individually with agency leaders and relevant Congressional staff at least once a year.
- SRR participants will encourage environmental, scientific, academic, and producer groups to champion the importance of ecological, social, and economic sustainability of rangelands in the United States.

Goal: Coordination

Numerous efforts within agencies and organizations are identifying indicators of rangeland sustainability, especially those focused on ecological factors. SRR's Coordination Working Group has identified indicator work by other roundtables, federal

agencies, states, NGOs, and international efforts. The RSF, the Sustainable Minerals and Energy Roundtable (SMR), and the Sustainable Water Resources Roundtable all are focused on developing criteria and indicators related to their respective resources, and SRR criterion groups have met with RSF and SMR participants in formal interaction sessions, sharing indicator work, data sources, and reporting ideas. SRR coordinates with the other roundtables through the Roundtable Network and works with the RSF on defining forests and rangelands.

Nationally, the Office of Science and Technology Policy promotes sustainability science. In addition, the Council on Environmental Quality is organizing efforts to advance roundtable coordination at the federal level. Federal departments and agencies addressing sustainable rangeland use and management include the U.S. Department of Agriculture (USDA), the Department of the Interior and the Environmental Protection Agency (EPA). Within USDA, the Agricultural Research Service (ARS) has developed, adapted, and statistically evaluated protocols that generate a suite of indicators that are relevant to the first three SRR criteria (Havstad, et al. In Press; Herrick, et al. Draft). The protocols have been evaluated across a broad range of sites and plant communities throughout the United States, Mexico, and Central America. Similarly, the Forest Service continues to assess the state of the nation's rangeland and forest resources through the Resources Planning Act assessments and reports on the health of the nation's forests and rangelands (Hof et al. 1999). The Natural Resources Conservation Service (NRCS) conducts the National Resource Inventory, which provides "scientifically credible information about status, conditions, and trends on nonfederal rangelands" (Spaeth et al. 2003). NRCS also has been cooperating with The Bureau of Land Management and U.S. Geological Survey (USGS) in assessing rangeland health at the local level (Pellant et al. 2000).

Furthermore, EPA is evaluating the nation's ecosystems under the Environmental Monitoring and Assessment Program. EPA has nearly completed a report on selected national indicators of the state of the environment. The National Park Service is involved with the Vital Signs Program, which identifies indicators for long-term evaluation of the park system, and the U.S. Fish and Wildlife Service maintains the National Wetland Inventory.

Efforts of non-governmental organizations in this area are led by The Heinz Center for Science, Economics and the Environment, which recently published an assessment of the nation's ecosystems (The H. John Heinz III Center 2002). Significantly, this report devoted an entire chapter to grassland and shrubland indicators. Additionally, NatureServe maintains a complementary searchable database of more than 50,000 plants, animals and ecological communities.

In contrast to such ambitious efforts underway in the United States, relatively few international programs conduct work related to SRR. During September 1997, an international workshop was held in Iceland to examine worldwide rangeland desertification. Also, Australia currently is conducting a national land and water resources audit, which focuses on information needs of national and provincial governments on issues of land and water resource management. Lastly, South Africa reported on the sustainability of terrestrial ecosystems in 1999, and will host the International Rangelands Congress in July 2003.

Domestically, SRR will strive to facilitate institutional arrangements among key organizations supporting criteria and indicator efforts to develop a national strategy for assessment programs that is integrated across environmental and natural resource systems. These agreements will further define the role of SRR and other efforts within the next year. SRR will initiate a review, to be completed within two years, of the data acquisition and assessment efforts of various organizations addressing rangeland indicators. SRR also will continue to provide a multi-scale forum for dialogue among stakeholders.

Three specific tactical objectives related to the coordination goal include:

- Within 6 months, obtain commitments from Federal government agencies to establish formal agreements with SRR and sponsoring entities to describe their roles and responsibilities. These agreements must include implementation of periodic reporting for interpretation and assessment of rangeland sustainability.
- Convene a workshop of scientists and organizations collecting data to identify available data sets, data sources, data gaps, data incompatibilities, and data quality.
- Communicate with ongoing local and regional assessment efforts to initiate stakeholder dialogue to gauge acceptance and use of national level criteria and indicators, and relationships to on-the-ground management assessments.

Goal: Sustainability Research

SRR will promote research to develop methodologies for measurement and data collection pertinent to sustainable rangeland indicators. Additionally, SRR will identify priority research topics addressing interrelationships and relevance of ecological, economic, and social indicators to sustainability of rangeland systems. While considerable challenges must be met before SRR criteria and indicators can be implemented successfully, the novelty of this endeavor and related sustainability efforts invite innovation and experimentation. Thus, the future of sustainable resource management is fraught with fresh opportunities to develop collaborative research protocols and information exchange for improved monitoring and assessment.

With this in mind, SRR leadership has targeted three tactical objectives for completion by 2008:

- SRR will work to ensure that all research funding organizations have a defined, stable, and long-term program emphasizing rangeland criteria and indicator research.
- SRR will develop a national database of extant rangeland indicator protocols and research projects to supplement comparable private sector information sources.
- SRR will prioritize researchable questions related to SRR indicators and encourage shifting rangeland research to provide understanding requisite to this goal.

Significant factors to be considered include: rigorous scientific evaluations of the indicators and the reliability of their relationship to the criteria, a statistically based benefit-cost analyses on indicator use, assessment of probabilities for successful indicator application, and stakeholder acceptance of the criteria and indicators. Achievement of this goal will require collaboration with agencies and organizations responsible for

funding and conducting research to motivate shifts in priority projects and changes in existing natural resource research programs.

Goal: Funding and Support

Between 2003 and 2008, SRR will secure stable and adequate funding to (1) promote sustainability of rangelands through the development and widespread use of the criteria and indicators, and (2) provide a forum for continued and expanded dialogue on sustainability of rangelands. Funding will support ongoing SRR efforts, further implementation of SRR's revised vision, and accommodate future reporting needs.

CONCLUSION

SRR held 11 facilitated working meetings over a period of two years. Financial support for SRR has been provided by the USDA Forest Service, Colorado State University, BLM, and USGS. However, the most significant support has come from dedicated participants who have devoted considerable time and effort to the process. The commitment and critical contributions of SRR participants to progress in the successful development and application of criteria and indicators for sustainable rangelands cannot be overstated.

SRR will continue to provide a forum for stakeholder discussion and debate on rangeland sustainability. SRR's work on criteria and indicators will benefit private and public land managers by facilitating dialogue on rangeland sustainability oriented outcomes including:

- Ongoing criteria and indicator development and improvement.
- Implementation of routine, standardized periodic reporting.
- Development and support of common assessment capabilities among a wide range of users, permitting local, regional, and national comparisons.
- Promotion of a dialogue to yield wide acceptance and use of SRR criteria and indicator information.
- Provision of an agreed upon framework for data collection and reporting to more clearly depict rangeland management performance and to minimize duplication in reporting standards.
- Increased likelihood of obtaining complete coverage of key attributes to monitor.
- Improved information available to decision makers and stakeholders.
- Better informed national policy debates and deliberations.
- Clear illustration of the relationship among measurable variables and criteria that reflect broader goals of society.

The SRR process will continue to be an inclusive, dynamic journey, capitalizing on new opportunities and meeting challenges to fulfill the SRR vision.

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