

Meeting Notes for the Sustainable Rangelands Roundtable (SRR)
Tucson, AZ – January 9-10, 2002
Facilitated by Lou Romero, DeLaPorte & Associates, Inc.

Welcome Remarks – Tom Bartlett, Roundtable Host/Convener

Thank you for the level of support and participation you have shown by your attendance at this and previous meetings. During this meeting we hope to continue to develop a full list of indicators within each criteria group, continue to evaluate indicators by working through the framework, and gain a better understanding of the interrelationships and coordination of all the roundtables.

Participant self-introductions – led by Lou Romero, Roundtable Facilitator

Welcome to the new participants.

Participants should introduce themselves, answering the following questions:

- Name, organization, position?
- Familiarity with this subject?
- Interest you represent?
- Familiarity with previous meeting notes?
- Participation in this and future meetings?

A list of participants can be found in Appendix A.

For a summary of the following talks, please refer to Appendix B.

Importance and potential benefits of Sustainability Indicators – Ted Heintz, DOI

Value of the SRR for rangeland management and policy – Tim Reuwsaat

Sustainability Research for Rangelands - John Mitchell

SRR Process, Leadership, Funding, Logistics, Timeline, and Expected Product/Report - Tom Bartlett

Update on Roundtable Coordination – Tom Bartlett/Deborah Shields

Sustainable Natural Resources Roundtable Coordination Network (SNRRCN) had its first meeting yesterday (January 8, 2002). It was a meeting of the heads of each of the roundtable efforts (forestry, rangelands, and minerals). Jerry Rose drafted the purpose statement: to provide a loosely knit organization to provide coordination among the various natural resource sustainability roundtables.

Deborah Shields described the outcomes of the SNRRCN meeting as follows:

1. Common criteria groups should talk to each other. For example, Soil and Water Groups from SMR, SRR, and SFR should communicate.
2. Recognized a need for understandings- definitions of forests and rangelands need to be decided (the SNRRCN debated between having only one set of definitions or multiple definitions without gaps).

3. Stakeholder contacts for broad representation.
4. Each group will produce first approximation reports, but there will be some collaboration on this work.
5. The team can discuss process, methods, and pitfalls and take the best from each and learn from each other's mistakes.
6. Discussed the possibility of bringing multiple roundtables together for a larger meeting, but left it at bringing working groups together.
7. The networking group focus is to provide communication and leadership in groups and across issues.

SNRRCN goals as presented by Tom Bartlett:

1. Provide an opportunity for coordination on criteria and indicators and other key issues including identification of overlaps and gaps in indicators.
2. Identify common elements of work and synergistic opportunities through joint and shared work.
3. Identify and provide leadership on shared challenges such as the need for clarified and common definitions and natural resource classification systems.
4. Identify, minimize and work on solution of potential inconsistencies.
5. Design and promote a compatible, consistent informational reporting system.
6. Facilitate communication among roundtables.
7. Promote natural resource sustainability effort to others.

Next meeting will be in March.

Sustainable Minerals Roundtable; Hierarchical values and sustainability – Deborah Shields (See appendix B for the summary.)

Report on Delphi synthesis and discussion: Definitions and Important Issues - Helen Rowe

Helen Rowe began with a synopsis of results from Delphi Rounds 1-7. In Delphi 1 and 2 (between Denver and SLC), the group worked on finding common ground through developing mission and vision statements. Participants, through Rounds 3, 4, and 5 (between SLC and Reno), reached agreement on a definition of rangelands, finalized a vision/mission “package”, and gave input on “most important issues” work produced at SLC meeting. Delphi rounds 6 and 7 solicited input on a system to classify indicators.

At the San Antonio meeting, Criteria Groups were encouraged to use the Delphi to answer questions from their groups. The Soil and Water group submitted an indicator that they wished to discard for review and the Health and Diversity group asked the group what should be used as time zero or as a reference point. The responses can be found in Appendix C.

Criteria Groups were again encouraged to use the Delphi for questions to the larger group.

Reports from Working Group Leaders

Socioeconomic: Lou Swanson

This group's task is to develop regional economic indicators of well-being. Currently, these data sets are overwhelmingly biased toward cities. This group wants to develop

case studies with a strong association between possible indicators and rangeland systems to locate indicators.

Soil and Water: David Pyke

Considering 15 indicators. Already have good indicators for soils. Indicator development on water was difficult, but added expertise in San Antonio helped in this area. Between San Antonio and now there were some assignments. Hoped to make some revisions, but it has been difficult with the Department of the Interior internet closure and holidays.

Productive Capacity: Dennis Child

Three general categories:

1. Overall Productivity - total area, carbon sequestering, changes in area (CRP, urban encroachment)
2. Current Production - by physiographic region
3. Determinants of Productivity – by physiographic region

Ecological Health and Diversity: Linda Joyce

They currently have five indicators for land, which are agreed upon, six for species, upon which they have nearly agreed and there are three indicators for process that have done little work. Some issues they are working on are:

- How to quantify biodiversity
 - Numbers of species is inadequate at the national level, no reference point
 - Biodiversity is important, but the challenge is how to describe the status, especially in a spatial context.
- Productivity measure such as NPP
- Targeting meaningful air pollutants indicator
- Process Indicators

Institutional Framework: Tom Lustig

The group decided to begin with a First Approximation report on their set of indicators. The twenty indicators were relevant, we asked the group to do this first approximation report as homework from San Antonio. It will help us decide which indicators to keep.

Thursday, January 10, 2002

Introduction and endorsement by SRM -- Sam Albrecht

Heinz Center Report – Duncan Patten (See appendix B for the summary.)

Working Group Reports:

Outreach (Lori Hidinger): Outreach and steering committee produced news briefs. These were sent to the relevant scientific community, the Trailboss News and ESA newsletters. It was also posted to list serves. The SRR website has a page with a question to the outer world. The SRR will be conducting a symposium at the February 2002 SRM Conference in Kansas City. We also sent in a proposal to do a workshop at the August ESA conference. If anyone has any ideas for list serves, newsletters, or websites that might link to us please contact Lori.

Definitions (John Tanaka): Alison Hill and Paul Geissler are working with the FGDC to propose a definition of Rangelands. Subcommittee in SRR will get a chance to look at it and provide feedback. Ms. Hill will then set up a committee with representation from different organizations to finalize it.

Scale (Paul Geissler): no report

Coordination (Tom Roberts): no report

Criteria Groups Report

Groups were given Wednesday afternoon and most of the day Thursday to work in their criteria groups. Groups were asked to report back to the group on the following questions:

1. Accomplished this meeting?
2. New indicators?
3. Goals for Denver.
4. Anything you would like addressed by Delphi.

Socioeconomic: Lou Swanson

1. Accomplished this meeting?
 - a. County level monitoring
 - i. Demographic
 - ii. Well being
 - iii. Social networks
 - iv. Existing data
 - v. Develop new methodologies at county level
 - b. What is a rangeland county? How to link with the other criteria groups?
Ecology, economics, and sociology should all be included.
2. New indicators? Number of counties with undesirable land uses. How much space is being converted to landfill in rural areas. This might be a measure of social cohesion. (How desperate are they to maintain their land vs. allow conversion.)
3. Goals for Denver.
 - a. Finish these up before Denver
4. Anything you would like addressed by Delphi.
 - a. no

Productive Capacity: Dennis Child

1. Accomplished this meeting?
 - a. Reduced the number of indicators from six to 18.
2. New indicators?
 - a. Ratio of net area production by livestock to the total area of rangeland (by physiographic unit)
 - b. Number of domestic livestock (i.e., cattle, sheep, goat, horses) on rangeland by physiographic region (WILD HORSES & BURROS???)
 - c. Number of wildlife harvested by physiographic region (e.g., elk, deer, etc.)

- ***Also need to capture number of hunter success ratios – will need to measure number of permits/licenses issued as well as the harvest numbers.
- d. Acres of invasive and noxious plants by physiographic region.
- e. Annual removal of non-forage products by physiographic type (landscape material, mushroom, seeds, medicinal plants, firewood, etc.).
- f. Annual aboveground biomass production by physiographic type (Standing Crop)
- 3. Goals for Denver.
 - a. Data sources
 - b. Difficulties (\$, tech, politics...)
 - c. Data GAP's
 - d. Enhance Justification for Indicator (Review Framework)
- 4. Anything you would like addressed by Delphi.
 - a. Should invasive species be listed under Rangeland Health or Productive capacity – or both? [cross-referenced]
 - b. What are the important non-forage commodities? – or rank our list?
 - c. Wild horses and Burros – Livestock?...do they indicate capacity? Health?
 - d. What should the physiographic regions be? Tied to MLRA, Baily's, FGDC veg classification, etc.?

Comments:

1. Consumption is an overlap between Socioeconomic and Capacity groups

Soil and Water: David Pyke

1. Accomplished this meeting?
 - a. Started with 15 Indicators
 - i. Eliminated 1 – Hydrologic Curve Number
 - ii. Retained, but will modify Delphi 8 indicator
 - b. Clarify definition of protected areas and may remove the term.
 - i. Began framing remaining indicators
 - ii. Reviewed the indicators framed since S.A.
2. New indicators? Percent of streams that are intermittent and the duration of zero-flow periods (Heinz Report)
3. Goals for Denver
 - a. Modify the frameworks for those discussed and continue to expand frameworks
 - b. Frame the new indicator
 - c. Circulate among member for review.
 - d. Finalize the Indicator list and the frameworks.
4. Anything you would like addressed by Delphi? No.

Health and Diversity: Linda Joyce

1. Accomplished this meeting?
 - a. Indicators for Land – 2 Agreed-upon
 - b.** Indicators for Landscapes – 3 Agreed upon
 - c. Indicators for Species – 5 Agreed upon
 - d. Indicators for Process – 6 Agreed Upon
2. Changes of note:

- a. Two species indicators were broadened to All species
 - b. Dropped the Air Quality Indicator
 - c. Process: Hydrology, Energy Flow, Nutrient Cycling; 6 indicators developed
 - d. Biodiversity: Worked through how we would approach this idea
3. Challenges for Denver.
- a. Carbon/Nitrogen Ratio in Soil
 - b. Functional Groups (How to define)
 - c. Invasive Animals (Do we need an indicator here?)
 - d. Revise Indicator Text
 - e. How would we define 'healthy' in lay terms using these indicators
4. Overlaps.
- a. SOIL/WATER Group: Hydrological processes
 - i. Depth to shallow groundwater
 - ii. Natural lake levels
 - b. Productive Capacity Group: Energy Flow/Productivity
 - i. Productivity
 - ii. Soil organic matter
 - iii. Fire regime frequency extent and intensity
 - c. SCALE GROUP
 - i. Scale
 - ii. Regional framework

Comments:

- The capacity group is working not in energy flow but above ground productivity.
- Soil group is working on soil organic matter.

Institutional Framework: Stan Hamilton

- 1. Accomplished this meeting
 - a. Criteria and indicators are difficult to quantify so they decided to use the first approximation report to assess the success of the framework.
 - b. New indicators? No.
 - c. Goals for Denver.
- a. Look through first approximation reports
- 4. Anything you would like addressed by Delphi? No

Issues from the Denver Meeting: are we addressing our original issues? Discussion led by Lou Romero.

The following "important issues" were developed at the Denver Meeting in March 2001. These were supposed to be carefully worded, important issues where roundtable meetings should focus their indicator work. Lou Romero presented these to the groups again with the request that participants look to see if all of these previously identified issues have been covered in the indicators. By checking our work against these past ideas, we hope to ensure that important issues do not fall through the gaps.

- 1. Will indicators vary according to land use?
- 2. Will indicators use thresholds, reference states, or set goals?

3. How to define and measure rangeland health?
4. How will we measure how goods and services from rangelands will impact the culture and communities at different scales?
5. Will the SDI endowment outcome model be useful for us?
6. Will biodiversity be an indicator and what will it tell us?
7. Given multiple uses of rangelands, will we need to address who is given access and accompanying access conflicts?
8. How to measure cultural sustainability to all rangeland stakeholders? (Ranchers, Native Americans, recreationalists, mining...)
9. How can we measure productive capacity of the rangelands to include its capacity to produce both market and non-market goods and services? Do we measure both overall amount and condition of rangelands?
10. Do we need to measure the inputs to produce outputs (goods, services and values) and the amounts of the outputs themselves?
11. Are fundamental ecosystem processes and components sustained?
12. What is the nature and extent of human induced ecological stressors, e.g. invasives?
13. Do existing political, legal (laws and regulations), land management and educational institutions provide the capacity to manage public and private rangelands sustainably?
14. What is the extent and degree of changes in disturbance regimes, e.g. invasives, fire, people, weather/climate?
15. What are the nature and extent of changes in rangeland use, e.g. conversion to development or recreational uses, management changes?
16. Can local indicators be folded into the national indicator list? How do we resolve issues of scale?

Some issues for the SRR process:

1. Are all stakeholders represented?
2. Will there be flexibility in the indicator list to reflect changes in social values and science?
3. Will we need to resolve the issue of defining rangeland?

Comments

- Importance of inputs and capital, as well as measures, for indicator development.
- W/ regard to number 13, we are looking at investments, direct and indirect, in the legal institutional group (laws, taxes, funding for programs)
- Interpretation of indicator data will need to deal with thresholds eventually.
- Number 16 remains to be resolved.
- Number 15 is being tracked by socioeconomic and health and diversity groups.
- How do we come up with indicators at the national level that have meaning at the local level, and vice versa?
- Ecological health group will cover areas by condition. They plan to explain how the raw data explains ecological health. This will also help in describing these indicators in lay terms.
- What groupings will we use? – regionalization; physiographic, biologic, etc.
- How will data be collected? Along state/county lines? National? State? Or can we use ecological distinctions?

- Overlap on non-forage products (and forage) between socioeconomic and productive capacity groups.
- Overlap on investment in rangelands, and invasives
- Potential overlap with Sustainable Water Resources Roundtable (SWRR)
- Problem – Legal institutional framework indicator 60 looks at the availability and extent of up-to-date data for Soil and Water indicators 1-7. Therefore, they need these indicators from the Soil and Water group before making progress on their indicator.
- Possible to be measuring same indicator in two or more different ways. Also possible to measure the same way, but have different uses for the results.
- Indicators of rangeland sustainability do not necessarily need to measure the “state of the land.” Rather, we are looking at the sustainability of services and benefits we get from the system in the present and future.
- Sustainability for whom?? Must maintain our Principle of objectivity and not weight one indicator or criteria over another. Realize that sustainability itself is subjective.

Next Steps; Delphi; Denver Agenda – Lou Romero/Tom Bartlett

For a draft of the proposed Denver agenda see Appendix D.

Delphi comments:

- Perhaps revisit the question of reference state/time zero. The concept of reference state/time zero should be distinguished in the next Delphi. Perhaps baseline could be used instead of time zero. Reference point is a separate concept.

Suggestions for Denver:

- At the next meeting the criteria groups will split up and rotate to cover gaps and overlaps.
- There should be a chance for whole criteria groups to meet, so that all can participate.
- Wanted to hear what Paul Geissler had to say about scale and what kind of map framework are we working within. (Biomes or physiographic regions?) Robert Washington Allen volunteers to talk about different maps and spatial aspects.
- Suggestion to separate new folks from the returning participants.
- It is important for the new folks to hear from the returning participants how progress has been made to date.

Closing Comments by E.T. Bartlett:

- There was lots of good work and good energy at this meeting.
- He will be retiring from CSU, but status with roundtable will not change.

Appendix A
Tucson Participants

1. Sam Albrecht, Society for Range Management
2. Barbara Allen-Diaz, University of California
3. Jennifer Atchley, World Wildlife Fund
4. Tom Bartlett, Colorado State University
5. Marty Beutler, South Dakota State University
6. Ben Bobowski, National Park Service
7. Steve Borchard, DOI-Bureau of Land Management
8. Bob Broscheid, Arizona Game and Fish Department
9. Mark Brunson, Utah State University
10. Larry Bryant, USDA-Forest Service
11. Larry Butler, USDA-NRCS
12. Larry Cadwell, Pacific Northwest National Lab
13. Jason Campbell, National Cattlemen's Beef Association
14. Dennis Child, Colorado State University
15. Charles Curtin, Gray Ranch and Malpai Borderlands Group
16. Elena Daly, DOI-Bureau of Land Management
17. Tom Davis, Bureau of Indian Affairs
18. Maria Fernandez-Gimenez, University of Arizona
19. Bill Fox, Texas A&M University
20. Jan Fox-Holl, Malpai Borderlands Group
21. Bill Haglan, U.S. Fish and Wildlife Service
22. Stan Hamilton, National Association of State Foresters (NASF)
23. Jon Hanson, Northern Great Plains Research Laboratory
24. Aaron Harp, University of Idaho
25. H. Theodore Heintz, Jr., U.S. Department of the Interior
26. Rod Heitschmidt, USDA-ARS
27. Lori Hiding, Ecological Society of America
28. Alison Hill, USDA-Forest Service
29. Lynn Huntsinger, University of California
30. Nelroy Jackson, Invasive Species Advisory Committee
31. Phillip Janik, USDA Forest Service
32. Linda Joyce, USDA Forest Service, Rocky Mountain Research Station
33. Mike Sherm Karl, DOI-Bureau of Land Management
34. Linda Kennedy, Appleton-Whitsell Research Ranch, National Audubon Society
35. Dick Loper, Wyoming State Grazing Board & National Public Lands Council
36. Thomas D. Lustig, National Wildlife Federation
37. Kristie Maczko, MATCOM for the USDA Forest Service
38. Guy McPherson, University of Arizona
39. John Mitchell, USDA Forest Service, Rocky Mountain Research Station
40. Duncan Patten, Montana State University
41. David Pyke, USGS
42. Tim Reuwsaat, DOI-Bureau of Land Management
43. Tom Roberts, DOI-Bureau of Land Management

44. Eric Rodenburg, USGS, Sustainable Minerals Roundtable
45. Lou Romero, DeLaPorte and Associates
46. Jerry Rose, National Association of State Foresters
47. Helen Rowe, Colorado State University
48. Nathan Sayre, Quivera Coalition
49. Jerry Schuman, High Plains Grasslands Research
50. Bob Shaw, Colorado State University
51. Deborah Shields, USDA Forest Service, Rocky Mountain Research Station
52. John Stednick, Colorado State University
53. Pete Sundt, Malpai Borderlands Group
54. Lou Swanson, Colorado State University
55. John Tanaka, Eastern Oregon Agricultural Research Center
56. Arnold Taylor, Hopi Tribe
57. Paul Tueller, University of Nevada
58. Bob Unnasch, The Nature Conservancy
59. Greg Venson, Bureau of Indian Affairs
60. Jeanne Wade Evans, USDA Forest Service
61. Robert Washington-Allen, Oak Ridge National Laboratory

Appendix B Talk Summaries

Importance and potential benefits of Sustainability Indicators – Ted Heintz, DOI

We like to believe that the better information we feed decision makers, the better decisions they will make. Unfortunately, many factors in daily life and other pressures determine their decisions, not simply the facts. Policy makers will argue about what actions will and will not promote sustainability. We need to be able to measure the impacts of these decisions within a feedback loop.

In order for these measures to be used, there needs to be wide support that the measures are appropriate to assess sustainability. “We are more likely to become what we can agree to measure—we need to measure what we agree to become”. If we can agree on indicators of sustainability, then we build common understanding.

In 1993, we embarked on developing the Sustainable Development Indicators, a national report that would organize existing governmental data into a body that could be used to assess national sustainability. This effort drew upon the work done on the Montreal Criteria. The concept of endowments substituted for maintaining capacity. Endowments were felt to be easily understood as the resources to be preserved. For future generations to be at least as well off as the present, the key is sustaining endowments. Underlying capacities must be maintained and must be increased if we are to grow. These capacities are closely linked to the capacities of systems, i.e. the capacity of rangeland to serve people’s wants and needs.

There is a common desire to boil down sustainability into one measure, one indicator. It is impossible to capture the complexity of sustainability into just one indicator. Through indicator sets, we can organize information in such a way that promotes ongoing conversations in relevant policy arenas.

Value of the SRR for Rangeland Management and Policy - Tim Reuwsaat

Currently, we cannot easily assimilate information to track the state of the Nation’s rangelands because of: differing jurisdictions and laws affecting those jurisdictions, multiple uses of rangelands, conflicting societal values, scale issues, ecological, societal, economics changes over time, and inconsistent data collection costs & budgets. Agencies should be able to provide easily understood, nationally consistent information so social, economic and ecological status on the rangelands that can be compared regionally and over time.

A common set of indicators will:

- Lead to improved efficiencies by measuring only what is important.
- Provide for the development of common techniques, again improving efficiencies.
- Allow agencies, universities and organizations to develop sets of protocols and methodologies to measure these ecological, economic, and social indicators. This will help avoid redundancy, but still give flexibility to the independent needs of the various entities collecting the information.
- Help establish workload priorities to those areas most at risk or in need of restoration.

- Through assessments, report consistent and comprehensive status of the nation's rangelands, improving accountability to our partners, stakeholders and Congress.
- Help us determine compliance with applicable laws, i.e. Clean Water Act, Endangered Species Act.
- Provide a national assessment from which recommending funding shifts for new appropriations among work priorities, agencies and Departments.
- Build a foundation of common understanding that will improve the debate on the management of rangelands.

Most importantly, criteria and indicators developed by a diverse group of individuals representing a wide spectrum of values will build a comprehensive understanding of rangeland sustainability now and in the future.

Sustainability Research for Rangelands - John Mitchell

Until two decades ago, perceptions of rangeland sustainability focused upon range condition in relation to livestock grazing. In recent years, the Forest Service and other organizations have started considering sustainability in terms of ecological, economic, and social measures at multiple scales. When trying to incorporate multiple scales in relation to indicators of sustainability, it is important to understand hierarchy theory. Three important scale-dependent attributes of data are grain, extent, and frequency behavior. Tradeoffs among these attributes explain, in part, why it is unfeasible to aggregate site-specific data to a national level.

A number of research forums and reports concerning the sustainable management of rangelands have been published during the past decade. The Ecological Society of America's Sustainable Biosphere Initiative called for increases in basic research on sustainability of ecological systems to help improve the management of natural resources. Two broad scale research items in the SBI are effects of changing land use patterns on ecological processes and feedbacks between ecosystem and atmospheric processes. At least two forums on interrelations between environmental quality and economic growth have been published. They emphasize the need to study linkages among physical, biological and socio-economic systems. The Society for Range Management outlined sustainability research goals for the next century in a 1995 report calling for more work on livestock management systems, enhancing riparian systems, providing for wildlife habitat, and understanding goals of society. Lastly, scientists at the Rocky Mountain Research Station have published evaluations of the 7 criteria and 67 indicators for sustainable development of temperate and boreal forests. Many of these indicators are also important measures of rangeland sustainability. Rangeland C&I fit within the larger R&D framework for monitoring rangelands by facilitating advances in national monitoring systems, thus promoting a feedback mechanism between monitoring and assessments.

As a final point, a forum on science and technology for sustainability has been proposed. The forum believes sustainability science to be an emerging discipline with a goal of understanding the nature of interactions between nature (ecology) and society (social and economic factors). See <http://sustsci.harvard.edu/>.

SRR Process, Leadership, Funding, Logistics, Timeline and Expected Product/Report - Tom Bartlett

Roundtable general agenda: the first two hours will be introductions for new members; therefore, returning participants can arrive at mid-morning break. The agenda of these meetings is meant to be flexible to fit the needs and dynamics of the group process.

At the end of day two, we assess our progress, determine the topics for Delphi process, and agree on a tentative agenda for the next meeting.

The Delphi Process will be used between meetings to make progress through discussion on topics from the previous meeting, continue to develop ideas, and discuss needs for the next meeting. Full participation is critical for success. Helen will send out the questions, members respond, Helen will analyze and summarize responses anonymously, and will send these out with further questions. The process is iterative. The Delphi is beneficial as it keeps members involved and decreases the slow start up time for next meeting.

SRR team: Co-Chairs: Tom Bartlett and John Mitchell
 Facilitator: Lou Romero, de LaPorte & Associates, Inc.
 Kristie Maczko: Hotel arrangements, notes, and communications
 Helen Rowe: Delphi process, web page, communications, travel reimbursements
 Al Abee, Larry Bryant, Alison Hill, and Mike Manfredo: Idea staff and coordination

In addition to the staff, SRR has a Steering Committee and various working groups.

The Sustainable Rangelands Roundtable (SRR) is meant to be an open, positive, future focused, dynamic process that values and respects all opinions and contributions of members. Our purpose is to identify indicators for sustainable rangelands. We will publish a report on US Sustainable Rangelands in 2003. SRR gains from links with other indicator efforts, such as the Heinz Report, RSF, SMR, and others.

Time line: we hope to be done by 2003 (nine meetings - four in 2001, five in 2002).

The main support is the attendance of participants. USDA-FS and CSU are matching funds; the Bureau of Land Management and Agricultural Research Service provide additional funding. Additional partners are needed.

Sustainable Minerals Roundtable; Hierarchical values and sustainability – Deborah Shields

In its initial report “Sustainable America,” the U.S. President’s Council on Sustainable Development recommended that the Federal government develop national indicators of progress toward sustainable development (SD) in collaboration with the private sector and non-governmental organizations, and regularly report on these indicators to the public. In partial response, the United States Department of Agriculture Forest Service committed to using the Criteria and Indicators (C&I) of sustainability generated by the Montreal Process as part of their comprehensive monitoring program. These C&I of Sustainable Forest Management were agreed to by the 12 countries whose lands comprise 90% of the world’s temperate and boreal forests. They only tangentially address minerals leading to the question of mineral resources place in SD.

Commitment to SD principles necessitates integration of environmental policies and development strategies so as to satisfy current and future human needs, improve the quality of life, and protect resources. Essentially, it involves managing resources in a way that is conducive to long term wealth creation and the maintenance of capital (natural, social, human, economic and built-physical). This perspective extends naturally to mineral resources, which are themselves a form of endowed wealth and are an important source of wealth creation. These resources are integral components of economic systems, providing essential inputs to virtually every economic sector and acting as the driving force for some local, regional and national economies. Nonetheless, resource extraction, processing, use and disposal can have serious environmental consequences that have the potential to threaten environmental security and degrade present and future quality of life. Moreover, the environmental, economic, and social costs and benefits stemming from mineral development and use are consumed over multiple generations.

Because mineral resources offer both positive and negative contributions to a sustainable future, stakeholders representing government, the minerals industry, and the environmental community expressed interest in finding ways to include minerals in the discussion of sustainable resource management. In response, the Forest Service provided a forum within which such discussions could take place. There was agreement at the initial meeting that multi-stakeholder dialog and collaboration needed to continue, which resulted in the formation of the Sustainable Minerals Roundtable (SMR). Meetings of the SMR are now convened by Dr. Dirk van Zyl, Director of the Mining Life-Cycle Center, MacKay School of Mines, University of Nevada Reno. Membership is open to all interested parties, with information from and results of preceding meetings posted on the SMR website (www.mackay.unr.edu/smr/). The SMR meets approximately every two months; meeting locations vary so as to facilitate broad participation.

The SMR participants have developed a Mission, Vision, and set of Guiding Principles. The goal that the SMR set for itself was to develop a set of national scale indicators of sustainability for mineral resources, organized to the degree appropriate under the existing Criteria from the Montreal Process. Indicators describe, display, or predict the status or trend of some aspect of sustainable development. It was agreed that indicators and their associated data would facilitate a more balanced and informed public debate about the role of mineral resources in sustainable development.

Rather than work toward a single, consensus set of indicators, participants in the SMR are free to propose any indicator that they believe will be essential to analysis of the contribution minerals make to sustainability. The group agreed that a series of questions would need to be answered for each proposed indicator. To wit: 1) What aspect of sustainability will it quantify? 2) What specific issue will it address? 3) Is the indicator measurable and at what cost? 4) Is the indicator interpretable? 5) Does adequate underlying science exist to justify the use of the indicator? 6) What data will be required and are they available? 7) Is the measure unbiased? 8) At what spatial and temporal scales is the indicator applicable?

The SMR revised the Montreal Process Criteria to create a more inclusive, rather than minerals specific, set of Montreal-like Criteria. The SMR is focusing on four of the original seven Criteria, though others may be added later if the need arises. One Criteria is “Maintain or enhance soil and water resource quality.” Indicators on emissions,

reclamation, and ambient environmental quality have been proposed. Second is “Maintain or enhance productive capacity.” Indicator categories include: resources (access to, identified, commodities, and stocks), exploration capacity (location, expenditures, and discovery rates), production, extractive capacity, processing capacity, and use capacity. The third Criteria is “Maintain or enhance long-term social, economic and cultural benefits.” Categories under this Criteria are: employment and community needs; production and use; recreation and tourism; investment; cultural, social and spiritual needs; and environmental justice. The final Criteria is “Legal and institutional framework.” The associated categories are: the extent to which the legal (statutory) framework (laws, regulations, guidelines) supports sustainable practices [in the minerals sector]; extent to which the institutional framework supports sustainable practices [in the minerals sector]; and the capacity to conduct and apply research and development relevant to sustainable practices in the minerals sector.

The SMR has completed the draft set of indicators. Once the indicators have been put in a consistent format, they will be subjected to external, technical review. Thereafter, cooperating Federal agencies will compile existing data for the indicators and complete a draft First Approximation Report (FAR). The FAR will be reviewed by members of the SMR and any other interested members of the public, revised as necessary, and made available to the public through print and electronic media. Because the results will represent an initial, draft set of indicators, it is assumed that additional work, including revisions and additions, will take place subsequent to the publication of the FAR.

Heintz Center Report – Duncan Patten

The Heinz Center “State of the Nation’s Ecosystems” indicator project is a program that utilizes working groups for six ecosystems: coastal waters, farmlands, forests, grassland/shrublands, urban/suburban areas, and fresh waters. These groups identify and describe indicators that will be used to show trends in changing conditions of the ecosystems. The indicators fall within four general categories: systems dimensions, chemical and physical conditions, biology, and human use. Subgroups of these four categories can best be understood through description of indicators for the grassland/shrubland working group.

There are several indicators that were identified by most work groups that were thus elevated to “national indicator” status. Briefly, these were: area of the six major ecosystems, fragmentation of natural lands, exportation of nitrogen from watersheds to coastal waters, chemical contamination and exceedence, fraction of U.S. species at risk, fraction of U.S. lands that are highly managed, trends in plant growth regionally and in different ecosystems, quantities of key ecosystem-related commodity goods, recreational activities, and ecosystem services.

Indicators related to the grassland/shrubland ecosystem were limited to 18. This was to enable production of a “user-friendly” report for upper-level resource managers and decision-makers. The report is meant to show state and trends but not explain the cause-effects, nor use “drivers” or “stressors” as indicators.

Indicators by major group are:

- Indicators of System Dimension: amount of land covered by grass and shrublands; acres used for various human activities such as mining, rural residence and recreation; and patch sizes of grass/shrubland types.
- Indicators of Chemical and Physical Conditions: amount of nitrate in groundwater; carbon stored in grass/shrubland; fraction of streams with intermittent flows; depth to shallow groundwater; condition of riparian areas; and changes in frequency of fires.
- Indicators of Biological Condition: fraction of grassland/shrubland species rare or at risk; percent of cover occupied by non-native plant species; and non-native bird population.
- Indicators of Human Use: number of livestock fed on grasslands/shrublands; and harvest of game animals.

Description of these indicators include: (a) indicator description, (b) importance of the indicator, (c) data if available, (d) what the data show, (e) why data aren't available if they are not, (f) what should be done to acquire appropriate data.

Comparison of Heinz Center project and the Sustainable Rangeland Roundtable project:

The Heinz project is specifically oriented to upper-level decision makers while the SRR may be scaled to regional use. The Heinz project is strictly a “state” condition which if presented over a time period will show changes in condition, while SRR is based on ecosystem sustainability which means the indicators should relate to present and continued benefits and services (ecological and human).

Appendix C

Delphi 8 Responses

For Delphi 8, participants were asked to respond to questions generated by two Criteria Groups. Results are shown below.

Part I: The Health and Diversity group submitted three questions regarding reference states or time zero. Their group was having difficulty addressing these questions and wanted to use the Delphi to get input from the large group and begin to develop consensus on the issue. The idea behind reference states or time zero is that each indicator needs a reference point of sustainability from which to compare current condition. The difficulty is in deciding what date or general time period provides a good benchmark for how things “should be”. Without reference states or a time zero, it is difficult to assess whether the indicators are moving towards or away from sustainability.

1. What will we use for reference states? What is time zero for these indicators?

Now as time zero/reference state:

The concept of a reference state or time zero implies that we know where we want to go or that we assume that what was “sustainable” 100, 200, 1,000 years ago is where we want to be today or in the future. To me time zero is whenever we start. In all likelihood, we cannot go back and collect much data from the 1800’s nor is it particularly useful in the interpretation phase since so many other things have changed. Whether the change from this point on is “good” or “bad” from a sustainability point depends on the vision one has for the future. I think this effort leads us down the path of pre-designing the results and is entering the political/social zone of what “should be.”

The reference state for most indicators should be what state they are in now. It is often difficult to go back to history to determine a state as history seems to always be subject to interpretation now days.

I think reference states are subjective and not repeatable in that others may select different reference state (site). I think we should impartially measure the current situation and not try to define the desired state, as many Roundtable participants may have very different views of the desired state. Assessments of movement can be obtained by repeated measurements of the indicators.

I believe that the best way to approach this is from a current (baseline) starting point. In practical terms, defining “time zero” as the current status of the ecosystem would be more applicable, and less confusing. We can use the current status as the benchmark from which to begin developing trends of the system. The baseline data would be set as the current and the end user can make the argument as to the value of the trends from that point. Also, based upon the methodology used, there could be some opportunity to make comparisons with past data for defining longer time trends, but the starting point would still be the current time period. I do not like the use of “time zero” as the starting point. Reference state, benchmark, baseline point, etc. is more descriptive and less confusing. --The main thing to keep in mind is that our starting point provides us the ability to make comparisons with what happens after that point. Inference can be made with past data, but we would continue to measure from that one point forward for our sustainability goals. The second thing to keep in mind is that with new technologies being

brought forward, there will be opportunities to change the methodology we use to gather the data. In this case, we can work to define correction factors that allow us to continue to use the initial baseline point. Flexibility is key to developing a long-term measurement of rangeland sustainability.

I think all indicators need a baseline or reference state, but it seems unlikely that we can adequately capture a long-past historical state for all indicators. To get a comparable indicator measure we would likely have to monitor the same historic locations in the exact same manner, and that seems unlikely. So for some indicators, the zero or reference time may be the time that we first employ the defined and chosen indicator.

Use the earliest possible data:

Unfortunately there is very little good information on reference states from most indicators. Time 0 should be defined as the current situation as the monitoring begins unless there are some good published or unpublished data that describes an earlier state that can be used as the reference. I think the “as is” state is the reference that will have to be used for most indicators and is defined by the inventory of the characteristics for that indicator at a specified time. Then future changes are compared to this reference.

Arrival/permanent settlement by European persons to the North American continent is typically used in most ecological studies.

The only indicator they [Health and Diversity group] are considering that has a baseline associated with it is Indicator 11, area and percent of rangeland affected by processes or agents beyond the range of historic variation. The zero time for these processes/agents should be set at the times data concerning these variables first became available. For example, data exist on the introduction of non-indigenous species and concerning early fire patterns.

I think reference state and “time zero” are dependent on the data for the indicator. It’s tough to have a reference state at a time when data do not exist. Hence, one criteria for reference state is data have to exist (or at least be able to be constructed such that the reference is a reliable depiction of conditions at whatever that point in time is). In cases where data do not exist or cannot be reliably reconstructed, reference state is whenever the first data occur.

I disagree [with the explanation of reference state given in the Delphi instructions] that the benchmark determines how things “should be.” The only function of a benchmark is for comparison—are things the same or has something changed? The direction of change or the trend of change if continued will imply consequences at some future state. Those consequences, as we understand them, need to be disclosed but I don’t know that they can necessarily be judged as good or bad in all cases.

I don’t understand why we don’t use the first data measurement we can identify for that indicator. If that data point is in 2005, fine. If we have data points in 1895, so much the better. I don’t understand why it’s necessary to set a time zero in advance - - would we discard data points that preceded this “time zero?” Why?

One solution would be to start with now and track changes into the future, but that doesn't tell us much about the current situation. What I imagine is likely to happen is that each indicator will use the earliest data collected as its starting point and this will vary for all indicators.

It seems to me that the "time zero" "reference state" would be "The Way We Were." That condition probably equates best to the Forest Service concepts of "pre-settlement condition" and "range of variability." That may be the only way to reference a condition before cattle were introduced to western rangelands and grasslands.

We should use at least 40 years of data to show trends, thus the reference state is 1960 or earlier.

Now or earliest possible: (written by a single respondent)

That may not be the best way to evaluate sustainability.

There are millions of acres of rangelands that have now been grazed for upwards of 150 years. Few would argue that grazing of cattle has not changed those lands considerably from their "pre-settlement condition."

The settlers of the west also decided that they did not wish to be burned out every ten years or so, so they aggressively prevented and suppressed wildfire whenever they could.

Then, with government help, they decided they could improve things, so they knowingly, and unknowingly, introduced plants, animals, and insects from other places and ecosystems.

Lastly, they worked diligently to eliminate many of the large predators that prowled the rangelands to the point that the food chain has been significantly altered from the pre-settlement condition.

We now have millions of acres of rangelands that vary from pre-settlement condition by a little or a lot – the magnitude of change being somewhat dependent on individual points of view.

It is fairly well established that altered ecosystems do not usually return to their "original condition" – even with human help -- when disturbance ends. Further, society will probably not accept many of the changes that would be necessary to return rangelands to pre-settlement conditions, even if we could do so.

The first task to be done is to identify what really makes rangelands sustainable. That is the task of the Roundtable. The problem is that we can measure lots of things that seem to indicate rangelands are, or are not sustainable without actually identifying what makes rangelands sustainable.

The most important factor for ensuring sustainability would seem to be the continued existence of rangelands as rangelands. The biggest threat to the sustainability of rangelands is conversion to other uses such as cities, suburbs, farms, and the myriad other uses an inventive real estate community can conjure up.

The second biggest threat to the sustainability of rangelands is the use to which rangelands are put. Overgrazing is probably the most prevalent threat, but it may be the one most easily overcome.

The third biggest threat, or maybe the second, is the exclusion of wildfire from rangelands. The vigorous exclusion of fire is the biggest factor in the explosion of Juniper forests on the rangelands of eastern Oregon, northern Nevada, and southern Idaho. It is also a major factor in the expansion of the Pinion-Juniper of the southwest.

Unfortunately, the re-introduction of fire will not be greeted with support from those concerned about the apparent decline of Sage Grouse populations in many western states. And, people still do not like to be burned out every few years.

My point is that it may not make much difference what we use for “time zero” as long as we have data for measurement. The worst-case scenario is that we start with the current condition as reference condition and go forward. The real problem is that historical conditions may not be of much value if we can’t realistically get back to them. And not getting back to pre-settlement conditions, precisely, may not make rangelands any less sustainable in the future. Sustainability means being there. Rangeland quality is important, but being there is the most important.

Use reference state (site) instead of reference time:

For reference states, you can use well-managed areas to provide reference states. These should not be only areas protected from uses or from fires. No single vegetation community will describe a site. Natural disturbances will contribute to vegetation changes as will climate. Choosing a reference time is more problematic. By choosing a date (e.g., 150 to 180 yrs. BP) then that may provide one unique ‘signature’ for that climate cycle. Also, it will/may provide a pre-European human perspective for many area in the western US, but will not provide an equivalent for the remainder of the US.

The problem with choosing a general time period as a benchmark for how things should be is that the time period may not reflect the full range of variability a natural system might express, and is therefore too limiting.

It would be better to determine the potential natural community and work towards that, together with monitoring which shows the current condition and progress, or lack of progress, towards it.

We need some type of ‘reference state’ for quantification. Hopefully this state would be tied to a healthy system, which might be one of many steady states that the rangeland ecosystem could exist in. In order to interpret an indicator, some comparison must be made; change through time, change from a reference state, change from a time zero. Because rangeland ecosystems are multiple-steady state systems, the reference states must reflect this variability. Also, rangeland ecosystems are subject to episodic and often extreme events, the reference states must incorporate some indication (acceptance) of this variability.

It might be easier to initially start out with detecting change, or establish the inventory year and aim to detect change from that year. Acres of rangeland have increased or decreased. Then evaluate the significance of that through social and political discussions.

Desirable plant community?

I worry a bit about this approach for the history of range management and the great failure of the discipline is the search for returning rangelands to original condition. Yet even in an undisturbed system you can never return to some arbitrary pre-condition. For example, the early settlement of the West was toward the end of the little ice age, a time of cool temps and moisture, so in periods with warmer drier conditions a return to the grasslands present during a cooler and wetter period is unrealistic. Given this reality the references state should not be time based, but should focus on ecosystem functional attributes. These should recognize up front as being value-laden decisions and the underlying assumptions, goals, and values should be explicit.

If we assume this question is asking about all indicators, then the answer seems fairly evident – for example, for any indicator that has an underlying objective of improvement (e.g., in economic conditions) a negative reference state/time zero would be irrelevant and a positive (future) reference state indeterminable. If we simply focus on Health and Diversity the answer isn't as straightforward but I still believe there can be indicators for which the underlying objective is improvement.

Some indicators may not need reference state, but minimum value:

Some indicators will need some reference point such as soil organic carbon and these will need reference points established to evaluate historic changes but even then “time zero” reference points should be established for long-term follow-up. These time zero reference points can be established now. Other indicators like mineral nitrogen and nitrogen cycling dynamics are too dependent upon climatic and edaphic conditions to really establish a reference point. Some indicators will probably best be evaluated by establishing a minimum value that indicates that the system is okay or if it drops below that point it indicates something isn't working right. I also think we will have to look at some indicators over time and determine their trend which will give us the necessary information for evaluation of the system. To set a single time zero is probably impossible for all indicators.

2. Do all indicators need reference states/time zero?

Yes	No
10	12

Yes comments:

- From the standpoint of ecological health and diversity, I think that we have to have something to compare against if we are going to measure where the system is and where it is heading.

No comments:

- Would be helpful, but could use current measurement as base for future measurements.
- I think there are likely to be some indicators without reference states since the societal desire may not be the same as the past condition.
- Again, one should avoid the historical pitfall regarding time zero [as a] return to previous conditions. That said, we do need specific, definable, and measurable goals. This needs to

be the goals of indicators – to characterize system function and to be realistically measurable.

3. Will one reference state/time zero work for all indicators?

Yes	No
3	19

Yes comments:

- Unless a prior readily accepted benchmark exists.
- For the ecological health and diversity, I think that one would work if based upon the current status of the system.
- It would be nice if that would work.

No comments:

- Again it would be ideal, but information would probably not be available.
- I think it would be nice to be able to say here is what has happened on US rangelands since (some date) but that might not be feasible or desirable.
- Especially since we need to consider not just ecological measures, but also socio-economic ones.
- I think the issue is important and that for standardization purposes there do need to be “reference state/time zero.” But is it possible for “all” indicators. I do not think we should pin ourselves down if there are significant unforeseen barriers for doing so. Therefore I am suggesting a no, but, with the caveat that we should seek to do so for all indicators if feasible.

Part II: The Soil and Water group requested a review of an indicator that they believe should be discarded. Below their write up of the Soil and Water Indicator 2 are the responses to Delphi questions 4-6.

Soil & Water Indicator 2 (original Sustainable Forest Roundtable Indicator 19): Area and percent of rangeland managed primarily for protective functions.

1a. What does it measure?: We agree with the concern put forward in Neary et al. (2000), “This indicator is mostly a measure of societal valuation of protection areas and proper management than a real guarantor of rangeland sustainability.” Neary, D.G, W.P. Clary, and T.W. Brown, Jr. 2000. Applicability of Montreal Process Criterion 4 (soil and water conservation) to rangeland sustainability. *International Journal of Sustainable Development and World Ecology* 7:128-137. The indicator could be modified to “An area of rangeland managed primarily for soil and water maintenance and conservation.” Managing for protective function tends to imply a passive, hands-off management approach. A passive, hands-off management approach that forms the premise for rangeland sustainability can be a faulty approach. Some rangeland areas managed primarily for protective functions remain at risk of degradation and decline in sustainability, from threats such as exotic and native invasive species expansion, wild ungulate grazing & browsing, and wildfire. Rangeland areas that are now being managed primarily for protective functions, but in the past were managed for extractive commodity use that was not sustainable, pose dilemmas for managers because the vegetation, soil, and water changes that have occurred and were attributable to the extractive commodity use, can remain on-going subsequent to a change to a more passive approach. If the management for protective

function is primarily a passive, hands-off management approach, it is likely that the changes in vegetation and soils will not reverse themselves of their own accord. Case examples exist. For example, in the Bandelier Wilderness, a 23,000 acre area within the Bandelier National Monument, New Mexico, unsustainable trends in vegetation and soils are attributable to past land use. Pinon-juniper woodlands have expanded and are continuing to expand there (Sydoriak et al. 2000/2001). Sydoriak, C.A., C.D. Allen, and B. Jacobs. 2000/2001. Would ecological landscape restoration make the Bandelier Wilderness more or less of a wilderness? Wild Earth, Winter 2000/2001. There are recently-raised concerns that threats to public land rangeland areas can emanate from outside their boundaries, from cumulative hydrologic alterations such as groundwater extraction, dams, impoundments (Pringle 2000). Pringle, C.M. 2000. Threats to U.S. public lands from cumulative hydrologic alterations outside of their boundaries. Ecological Applications 10:971-989. *Based on this rationale, we do not recommend that this indicator be furthered in the SRR process.*

b. **Why is it important?:** We do not believe it is important.

2. Is the indicator meaningful at different geographic sites, regions and climatic scales?:

No

3. Can the indicator be adequately monitored with existing or obtainable data and/or models? Are measures of the indicator repeatable, reliable and accurate? Can indicators using nominal and ordinal measurement scales be adequately reported over time? If one or more of the above is not true, is the indicator sufficiently important to maintain without an adequate monitoring framework in place?: The area could be measured, but it will not be meaningful.

4. Is the indicator sensitive over time frames commensurate with its scale? It could be sensitive.

5. Is the indicator understood and accepted by the general public? No.

Notes – discussed if we should hold onto this indicator. Does protection really protect conservation of soil and water. This is more of a social value than anything else. Probably a societal value rather than a strong indication of stability of soil and water systems. This indicator might be used to develop reference sites for other indicators. How does the change in acreage of land managed for protection function increase sustainability? Do others agree or disagree with these recommendations.

Delphi questions 4-6:

4. Rate your level of acceptance for dropping this indicator (please refer to definitions of acceptance level before responding):

Unacceptable* (1)	Slightly acceptable** (2)	Moderately acceptable*** (3)	Highly acceptable**** (4)
3	4	6	9

*Unacceptable = disagree, indicator should be kept as written

** Slightly acceptable = the indicator can be dropped, but only if another indicator is written to encompass specific aspects (please explain in #2)

***Moderately acceptable = acceptable, but would support developing a new indicator to encompass protected areas

**** Highly acceptable = acceptable, indicator should be dropped

5. If this indicator is dropped are there aspects of this indicator that should be preserved in another indicator?

Soil and water conservation:

I agree with the statement from above that the indicator could be modified to “An area of rangeland managed primarily for soil and water maintenance and conservation.”

How has this group defined maintenance of soil and water functions? This would be the important aspect of this indicator that should be preserved.

I think there is an underlying aspect of this indicator that needs to be maintained. I disagree that managing for protective function implies passive, hands-off management. I think the idea behind this indicator is that there are some areas that are managed to maintain soil and water conservation and water quality and quantity (this is particularly true in forest ecosystems, but could also apply to rangelands). I think the alternative phrasing of “Area of rangeland managed primarily for soil and water maintenance and conservation” could capture this. Of course this could then beg the question, should lands in programs such as CRP, which are technically managed for soil conservation, count as sustainable rangelands?

Management/use/control site:

The only aspect that would be worth saving is the area under management, in general. I think the problem comes in when we try to tie that management to a specific use or goal (soil and water conservation).

I am hard pressed to think of any aspects of this indicator that need to be preserved, except as alluded to in the above comments, i.e., that maybe such areas be used as control areas in which we could get a handle on how other indicators might move in the absence of other influences. Such areas might be incorporated into the reference state to which indicators measured in other areas are compared. But as an indicator in and of itself, I think this one can be dropped.

First, I don't accept the premise that “Rangeland areas that are now being managed primarily for protective functions, but in the past were managed for extractive commodity use that was not sustainable, pose dilemmas for managers because the vegetation, soil, and water changes that have occurred and were attributable to the extractive commodity use, can remain on-going subsequent to a change to a more passive approach.” Certainly many riparian areas in rangelands are able to heal if left alone – the soil and water changes are not ongoing.

Second, to the extent this indicator measures “societal valuation of protection areas and proper management” that is not a reason to discard it. In fact, it would be useful information to compare the amount of rangeland left alone for protective reasons with other changes in range condition, including impacts on the local economy (does ranching revenue decline? Does tourist revenue increase? What is happening to water quality? What is happening to wildlife?)

It would be important to know if leaving rangeland alone would cause other indicators to improve, get worse, or remain the same.

It's true that the indicator written for sustainable forestry is not helpful for rangelands.

“Protected areas” they refer to are places where commodity extraction (logging) is not allowed; wilderness areas for example. But commercial forage extraction (livestock grazing) is allowed in almost every “protected area” I can think of, so the “protection” these areas offer is meaningless in this context.

However, because such a high percentage of public lands are grazed by commercial livestock, it will serve a useful purpose to indicate rangelands where livestock are excluded, particularly if the results of monitoring in those places were compared to results elsewhere. Grazing is a huge experiment being carried on with no controls. Putting some controls into the experiment could only be beneficial.

If there is a “use” indicator.

The idea of an indicator demonstrating the amount of land managed for soil and water conservation (CRP) etc. would be of benefit (for example) to track ag (crop) land converted to rangeland for conservation purposes.

There is a certain amount of rangeland that no longer is being used for productive purposes but rather has been set aside. This should be recognized regardless of the fact that it may be changing because of various successional processes like forest invasion which in themselves may be unnatural because other processes like fire have been altered.

Ecological health and diversity Criteria:

I believe that, for rangeland, much of this indicator’s essence is captured in Indicator 5 under Maintenance of Ecological Health and Biodiversity. The distribution of rangeland by some category of protected class is seen as a broad-scale measure of sustainability by some interest groups and all federal land management agencies. If Soil and Water Indicator 2 is dropped, I believe it is more essential to keep Ecological Health and Biodiversity Indicator 5. I would suggest going to a simpler classification for protected class; e.g. TNC’s:

1. Highest level of protection – lands owned by private entities and managed for biodiversity conservation or administered by public agencies for conservation; e.g., TNC preserves, research natural areas.
2. High level of protection – lands generally managed for natural values but possibly incurring other uses; e.g., state wildlife areas.
3. Multiple Use – lands managed for multiple uses; e.g., national grasslands, state parks, military reservations, private ranches.

Legal, Institutional and Economic Framework Criteria:

Worth asking the Legal, Institutional and Economic Framework folks if they feel there is a need to incorporate the “protected area” concept more fully into their indicators if this one is dropped from Soil and Water.

No:

I think it would be difficult to include this indicator or parts of it in other indicators because I think it is one of those things that is “sort of in the eyes of the beholder” as we will all see it very differently. It really is a societal thing and I’m sure we all have a different perception as to whether protection really results in the end product we want.

I believe this measure should be dropped for a variety of reasons. But if the premise is that protected areas need little management then this idea is particularly faulty because even to sustain natural processes such as fire requires extensive management. The Bandalier example is a good one for the Cerro Grande fire is a nice example of what happens when one avoids active management until the last possible moment.

6. Any other comments? (Optional.)

Reword the indicator:

Protection as a term implies that the rest is unprotected. There are certainly values tied up in the phrase as indicated in the groups description where “protected” can be interpreted to mean “locked up” or unavailable for human use. The suggested revision is slightly better, but still suffers from the same problem. Using the term “managed” by itself can lead to a lot of definitional problems when it comes time to actually collect the information. Mesquite control in the southwest to try to improve water yields is different than that same practice to improve a forage base. On private lands, is putting into place a conservation plan the same thing as a public land wilderness area?

I agree with the Soil and Water group argument against the indicator as it currently stands. The possibility for confusion in the interpretation of the indicator could lead end users to make a mistake as to the value of the indicator. Restructuring the indicator would be beneficial to providing a useful indicator of soil and water conservation activities on rangelands.

I prefer the modification option – this is still an indication of how well we’re doing, but I agree that “protection” in this context is a nebulous concept that may not, in fact, be protective.

Area of land conservation should be measured:

I don’t totally agree with the point of view presented by the soils group. Some areas, particularly those that have been taken over by noxious weeds or fire-prone annuals, could possibly benefit from some action to restore native vegetation (although many such actions are unsuccessful). But many areas *could* benefit from the “passive, hands-off approach” (e.g. Riparian areas, seeps, springs – anywhere with water, and uplands which contain viable populations of native plants). I don’t agree with the example given of the need for intervention -- the expansion of pinyon-juniper woodlands. What’s being lost in the expansion is forage for livestock, and studies I’ve read have not shown the expansion to be significant in terms of large scale habitats. I’ve read that efforts to curb the expansion in the southwest were mostly abandoned because of the expense and poor results, and little has been done to study juniper expansion in the northwest. This strong move towards burning and otherwise “controlling” juniper must be carefully examined before we move forward.

That the indicator has societal value only is not a viable reason for dropping the indicator. Some parts of society value protecting rangelands and see protecting rangelands as the only way to sustain these lands. The committee has identified problems with using such an indicator in terms of quantifying whether the hydrologic functions have been maintained. The committee has not balanced these issues with the controversy over the technical issues of quantifying soil and water processes. Some parts of the public will not support the technical indicators for soil and water,

either through disagreement with the science or a lack of understanding of the science. There is value in quantifying how the rangelands are officially managed—for protective purposes, for example. There may be more acceptance of this legal term that the committee may see.

Indicator 19 should not be discarded or moved.

Forestry Indicator 19 is a little different than what our soil and water group is using. The actual language, modified for rangeland use is:

CRITERION 4: Conservation and maintenance of soil and water resources

Indicator 19: (MP-4.b) Area and percent of rangeland managed primarily for protective functions (e.g. watersheds, flood protection, avalanche protection, riparian zones.)

It appears as though the authors of the forestry indicator thought that any land managed primarily for protective functions similar to the described purposes (watersheds, flood protection, avalanche protection, riparian zones, etc.) would be protective of soil and water resources over the long haul. The basis for such an idea is that the existence of protective oversight implies that there is some sort of deliberate (not necessarily active) management effort to protect soil and water resources, such as:

- (1) Owner intent carried out by voluntary BMPs;**
- (2) Nonprofit group owner intent carried out through force account, lease terms, permit conditions, or the terms of a conservation easement;**
- (3) Regulatory requirement enforced by a federal, state, or local government agency;**
- (4) Management objectives carried out on public lands through force account, lease terms, or permit conditions; or,**
- (5) Nonuse carried out by any and all of the above devices.**

Land areas protected in this manner are INDICATIVE that someone cares about sound management and resource conservation. They are also INDICATIVE of the existence of stewardship, good intentions, and a desire to do the right thing by the land. Where someone cares – where there is oversight -- there is probably the interest, and a will, to achieve rangeland sustainability and all that the concept implies.

Unfortunately, the protection devices available for use often produce widely varying results from similar situations. Mandatory programs are not always better than voluntary programs. Often, voluntary BMPs produce better results on

private land than “mandatory” permit and lease conditions on public lands. Regulatory programs can be very effective, but it really depends on the support among the regulated constituency. If they want to be regulated, the program will be very effective.

“Good Management” is in the eye of the beholder, and many beholders use subjective tests rather than objective tests to evaluate land conditions and the success of resource conservation programs. It also depends on who must “pay the cost” to achieve the desired results. Therefore, it is probably desirable to assess the effectiveness of such protection areas in an objective manner – a difficult task.

Measuring the aerial extent of land subject to management for protective functions is fairly easy. Most such areas are probably in public ownership or nonprofit organization ownership.

It would be much more difficult to measure the existence and success of regulatory devices such as stream protection zones created by most mandatory Forest Practices Acts. One must measure stream miles and multiply by the width of the required zone, e.g., 100 feet, to arrive at surface area protected. Nevertheless, it is possible to estimate such zones with enough accuracy to be suitable for our needs if such programs exist.

Despite the difficulty in measuring effectiveness of protection functions, I recommend keeping Indicator 19. I believe that it does provide useful information about rangeland sustainability to the evaluator.

I believe that such protections are useful and can be very successful. They do not guarantee sustainability, or even better rangeland conditions, but they do provide the means to correct problems and protect soil and water resources when the need arises. And, hopefully, they demonstrate that someone cares about sustainability.

I think it is important to know the area that is being managed to preserve natural ecosystems. This does not imply the active management is not used to restore the natural ecosystem. I do not think the area is scale dependent, but it would be useful to know how much of each rangeland type is being preserved. I think the public will clearly understand a measurement of how much natural rangeland is being preserved. It is critically important to save some of each type of rangelands in their natural state for future generations, and if we don’t measure it, we probably won’t save it.

There are certainly core and buffer conservation of land management areas to borrow from conservation biology approaches. I believe it is important to be explicit and to justify the level of management of given landscapes and given existing and future resources, to make management priorities. To some extent the concept was that priority setting is a crucial goal. This certainly needs to be a part of the application of indicators.

Appendix D
Sustainable Rangelands Roundtable (SRR)

Denver, Colorado

March 26 and 27, 2002

Facilitated by Lou Romero, DeLaPorte and Associates, Inc.

SRR Session Objectives

1. Initiate rotating Criteria Group review and critique of draft indicator sets.
2. Review indicator framework to discuss utility and potential modifications/improvements
3. Identify potential external reviewers for indicator sets.

Tuesday, March 26

8:00 am Welcome Remarks – **Tom Bartlett, Roundtable Host/Convener**
8:10 am Participant self-introductions – **led by Lou Romero**
8:20 am Importance and Potential Benefits of Sustainability Indicators – **Ted Heintz**
8:40 am Value of the SRR for Rangeland Management and Policy – **Tim Reuwsaat**
9:00 am Sustainability Research for Rangelands – **John Mitchell**
9:20 am SRR Process, Leadership, Funding, Logistics, Timeline, and Expected Product/Report – **Tom Bartlett**
9:40 am Achievements at Previous SRR meetings – **Lou Romero**
10:00 am **Break**
10:30 am Update on Roundtable Coordination – **Tom Bartlett**
10:45 am Review of SRM Symposium Accomplishments – **Tom Bartlett**
11:00 am Report on Delphi Results – **Helen Rowe**
11:15 am Scale – **Paul Geissler and Robert Washington-Allen**
12:00 pm **Lunch**
1:00 pm Status of Criteria Groups
1:45 pm Break into Small Groups and Continue Criteria Group Work (includes Break)
5:00 pm **Adjourn Day 1**

Wednesday, March 27

8:00 am Local Presentation
8:45 am Working Group Reports (Outreach, Scale, Coordination, Definitions)
9:15 am Introduction to Rotating Criteria Group Indicator Set Review – **Lou Romero**
9:30 am Indicator Set Review (Includes Break)
12:00 pm **Lunch**
1:00 pm Established Criteria Groups reconvene to incorporate comments and continue indicator work (Includes Break)
4:30 pm Summary of Work Accomplished at this Roundtable – **Lou Romero**
4:45 pm Next Steps; Washington D.C. Agenda – **Lou Romero, Tom Bartlett**
5:00 pm **Adjourn**