

**Meeting Notes for the Sustainable Rangelands Roundtable (SRR)**  
**Denver, CO – March 26-27, 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 initiate a rotating Criteria Group review and critique of draft indicator sets, review the indicator framework to discuss utility and potential modifications/improvements, and identify potential external reviewers for indicator sets.

**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?
- Number of meetings attended?
- Interest you represent?
- Familiarity with documentation?
  - Notes/website
  - Products in progress?

*A list of participants can be found in Appendix A.*

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

**Value of the SRR for rangeland management and policy – Steve Borchard**  
**Sustainability Research for Rangelands - John Mitchell**

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

**Update on Roundtable Network – Tom Bartlett**

The group is envisioned to facilitate cooperation and coordination among the various natural resource sustainability roundtables.

- Second meeting to date held March 7, 2002 in Washington, DC.
- Changed name to Roundtable Network.
- Participation by RSF (Roundtable for Sustainable Forests), SMR (Sustainable Minerals Roundtable), SRR, and SWRR (Sustainable Water Resources Roundtable, which is trying to get started)
- Ted Heinz offered to put together a matrix for all the indicators of all roundtables.
- SRR volunteered to host the RN website with links to other websites, meeting notes, scheduled meetings, purpose statement, documents.
- Purpose statement is to be revised by John Mitchell.

RN goals:

1. Provide a framework for coordination on criteria and indicators and other key roundtable issues, including identification of overlaps and gaps in indicator sets.
2. Identify common elements of roundtable efforts and capture synergistic opportunities through joint and shared work.
3. Identify and provide leadership with respect to work on common challenges such as the need for clarified and common definitions and natural resource classification systems.
4. Identify, minimize and work on solutions to potential inconsistencies among work being done by roundtables.
5. Design and promote a compatible, consistent information reporting system.
6. Facilitate communication among roundtable participants through intra and inter-roundtable dialogue.
7. Promote coordination with broader national and international sustainable development indicator efforts.
8. Facilitate information sharing and communication with broader audiences efforts beyond roundtable participants in order to raise the public profile of roundtable.

As a result of the RN meetings, yesterday the Environmental Indicators Domain group from the Minerals roundtable met with SRR Soil and Water and Ecological Health Criterion groups to share what they are doing. This group will meet again in Lexington in July. Other groups will have interaction sessions in Salt Lake City in June. Want to involve the RSF as well.

**Timeline presentation**, see Appendix C.

**Questions:**

Where does the SRR report go? When will there be a final draft?

Hopefully both public agencies and non-governmental groups will find C&I useful to identify data availability and needs.

Indicators will be frozen in October 2002 – in order to write the 2003 report. Indicators will not be frozen overall, the process will continue.

Suggestion was given for a livestock stakeholder briefing, in which NCBA can invite ranchers in conjunction with the Billings meeting. Perhaps the proceedings or some relevant document may be handed out at those meetings.

**Review of SRM Symposium Accomplishments – Tom Bartlett**

The symposium was successful, particularly the series of papers. The process of writing the papers helped cement and define progress to date. The result has been of great benefit for bringing us all up to date on what all groups are doing. Presentations and papers from SRM symposium are all on the web. Two journals have approached SRR for publication of these papers in a special issue.

**Report on Delphi Results – Helen Rowe**

The Delphi is a research technique used for gathering and developing expert opinion through iterative surveys. The Collaborative Delphi used by the SRR follows this formula: issues are identified at meetings, questionnaires are sent out, individual responses are collated and returned to participants, and individuals are given the opportunity to revise their original answers in response to group feedback. Further discussion may occur through further iterations of Delphi or in subsequent group meetings. The goal of the process is to alleviate the burden of group

decision-making and discussion by deferring specific issues to off site electronic questionnaires with feedback mechanisms.

Between the Tucson and Denver meetings, two topics were covered, the Baseline Issue, and Reporting Methods. Delphi has brought out two camps as to when to start data: begin with present/current status or utilize the earliest possible data. For more details see Appendix D. Two rounds on Reporting methods have covered discussion on 7 approaches to reporting methods (Delphi 9) and how many reporting methods the SRR should use (Delphi 10). Delphi 10 presents three options for limiting the number of reporting methods. Option #1 had slightly more support followed by option #3. The following is a summary of responses for each option:

**Option #1:** Limit to two methods: 1 political and 1 ecological (result: 2 methods).

- Simplifies the output for clearer reporting overall.
- Some responses here argued for using geo referencing political data and thereby using only one reporting method.
- All social and economic indicators might not fit with political boundaries (zip code and census tract data).

**Option #2:** Do not limit approaches: each indicator should be reported according to the most appropriate method. (Result: 7 methods)

- No one good method for displaying everything (so more methods allows for more flexibility).
- Best reflects diversity of data.
- Allows for the most appropriate method to be chosen for each indicator. Increases complexity permitted in reporting.
- Difficult to interpret data for policy makers and scientists.
- Not possible to form indicators into an “integrated index”.
- Would have to read each indicator separately.
- Need continuity within the overall report.

**Option #3:** Each criterion group will chose one method to report all of its indicators (result: 4 methods). Standardize reporting methods within the Criterion Group, fewer methods overall than #2.

- Difficult to interpret data for policy makers and scientists.
- Not possible to form indicators into an “integrated index”.
- Would have to read each indicator separately.
- Only one method for each Criterion Group is too narrow.

### **Report on Environmental Indicators Interaction Session with SMR Group – David Pyke**

The Environmental Indicators group from the Sustainable Minerals Roundtable (SMR) met together with SRR Soil and Water and Ecological Health and Diversity Criterion Groups yesterday. They discussed the importance of terminology of a rangeland definition (some rangelands may become forested later), toxic substances (What is toxic?), and water bodies (technical vs. general definition). Philosophical differences emerged between the roundtables in terms emphasis on use vs. tracking resource condition. Scale issues for SMR are much easier because of requirements for measurements already exist for each mine. Data can be aggregated

by state or regions with much more flexibility. SMR has overlaps with SRR on water quality, extent of rangeland, different management uses, and fragmentation/roads. Overall a positive discussion; it helps to learn from SMR difficulties and to hone in on areas where SMR has already identified measurements. SRR measurements can be used by SMR for comparative purposes for mine vs. non-mine watersheds.

**Question:** Why is scale not an issue for SMR?

Mines are required to census everything so indicators simply enumerate how many mine sites have, for example, changes in groundwater or how many are found out of compliance for downstream water quality. These numbers can easily be converted to percents. Therefore it does not deal with scale. The data comes from state regulators.

**Scale – Robert Washington-Allen – See Appendix E**

**Reports from Working Group Leaders**

**Social and Economic Indicators: Aaron Harp**

The Tucson discussion moved toward creating general economic and social categories that can be quantitatively measured via composite indexes using federal data. These would include (these might be aggregated by category for a composite indices):

1. Demographic change (population change and rate, migration, age and gender structure, ethnicity, family structure, educational attainment, length of residence, commuting distances)
2. Community well-being (morbidity/mortality, poverty, water quality, public health, availability of medical services, immunization)
3. Structure of economic activity (SIC categories, agriculture, value produced by SIC, firm number and scale, employment, ERS data, BEA/REIS data, I/O data on capital flows, structure of rangeland management)
4. Structure of Government/Social Services (tax base data, social services, federal transfers, type of local government, public safety expenditure, NACO county government survey, Federal agency presence, municipal dis/incorporation)

In order to understand which measurements can actually be tied to sustainability, this group wants to conduct a survey to investigate links between the social economic attitudes, uses, and outcomes with ecological condition.

**Soil and Water: David Pyke**

The paper written for the SRM proceedings is a good update. A new organic matter indicator will be incorporated. Further work has been done in framing indicators with the 6-point framework. Further discussion will be on protected areas and the connection to soil and water conservation. Looking with a critical eye at the indicators adopted from RSF to really make the connection back to soil and water sustainability.

**Productive Capacity: Dennis Child**

Evaluating productive capacity of rangeland must question: “Capacity for what?” An area of rangeland can produce a wide variety of goods and services. Some uses are mutually exclusive, some are compatible, but seldom is there a linear exchange ratio. They have identified 7 indicators:

1. Total acres of rangeland within the context of physiographic regions
2. Percent of available rangeland that is grazed by livestock
3. Number of domestic livestock on rangeland by physiographic region
4. Number of wildlife harvested by physiographic region
5. Acres of invasive and noxious plants by physiographic region
6. Annual removal of non-forage products by physiographic region
7. Annual above ground biomass production by physiographic region.

All seven indicators have been compared with minutes taken at all SRR meetings and with RSF indicators. Next they plan to develop linkages with other groups and assess feasibility of using these indicators.

**Ecological Health and Diversity:** Linda Joyce

This group has identified 16 indicators. Under Biodiversity, there are three indicators on the landscape scale (fragmentation), two for community types (vegetation classes, invasives), and two for population level (species of concern, T&E). From an Ecosystem Health perspective, these indicators cover hydrology (depth to shallow groundwater, natural lake levels, riparian condition), nutrient cycling (productivity, C:N in soil), and energy flow (productivity, changes in fire regimes). Work this meeting will focus on CN ratios, functional groups, updating list of indicators, invasive animals, revising indicator text and consider how to define “healthy” in lay terms.

**Institutional Framework:** Tom Lustig

They have the 20 indicators as revised from the SFR C&I, which are split into five categories.

1. Extent to which the legal framework supports the conservation and sustainable management of ranges.
2. Extent to which the institutional framework supports the conservation and sustainable management of rangelands.
3. Extent to which the economic framework supports the conservation and sustainable management of ranges
4. Capacity to measure and monitor changes in the conservation and sustainable management of ranges.
5. Capacity to conduct and apply research and development aimed at improving range management and delivery of range goods and services.

One issue facing the group is how to resolve conflicting regulations, but the group is not near that level of detail. The group has discussed the scale issue, capacity government unit, state and private lands. Another topic of discussion is whether there are differences in regulations between federal agencies.

**Rotating Criteria Group Indicator Set Review**

*The remainder of the afternoon was spent conducting the Review with the following instructions.*

Purpose: Conduct a substantive review of work to date by documenting feedback across criteria groups in order to move our work to the next level of completeness.

1. Criteria groups meet:
  - a. Decide who will be listener/note taker?

- b. Decide who will rotate to other groups?
- c. Identify areas of “concern” with other group products
- 2. Mixed Criteria Groups meet:
  - a. Note on flipchart – name, indicator, nature of concern
  - b. Each visitor explains concern
  - c. “Group leader” facilitates understanding
  - d. Note taker “listens,” summarizes notes – copy notes to Helen

**Wednesday, March 27, 2002**

**Federal Sustainable Development Indicators Team and Outreach of RSF – Michael Washburn, Roundtable on Sustainable Forests – See Appendix B.**

**Indicator Set Review: Progress from yesterday – Lou Romero**

Yesterday, during the review groups received feedback that revealed important overlaps and gaps and perhaps suggested new indicators. Some found the process difficult because criteria groups are not familiar with all of the indicators yet, but it was a good start to the sharing process.

**Working Group Reports:**

**Outreach** (Lori Hidinger):

SRM symposium was a success, but there was little feedback generated. Hidinger sent out an email to announce that the papers and presentations from the symposium were posted on the website and that SRR will be conducting a workshop at the ESA-SER conference on August 4 for review and input on the ecological indicators. As a result of this email, SRR has been contacted by two journals to print a special SRR edition.

There will be an executive briefing for Executive Directors of Non-profits and agency heads on SRR in DC at the end of May. Dick Loper suggested we host a focus group with ranchers at the Billings meeting.

**Definitions** (Tom Bartlett, reporting): 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. The issue will not be totally resolved, but there will be enough resolution to do our work.

**Scale:** see presentation by Robert Washington Allen

**Coordination:** Duncan Patten will now chair the group. Members to include Eric Hyatt, Neil West, Ted Heintz, and Robert Washington-Allen. The group will connect with other indicator efforts for information sharing.

**Criterion Groups Report**

Groups were given Tuesday afternoon and most of the day Wednesday to work on review and also to work within their own groups.

**Socioeconomic:** Aaron Harp

This group found three overlaps with other groups:

1. With Capacity group: non-forage products (wildlife harvested, economic value of birdwatchers)
2. With Framework group: human capital side of infrastructure for regulation purposes, tax base and structure
3. With Health/Diversity group: fragmentation, tenure, private land, and also areas of community types

Wrote a second grant proposal question. “What do the socioeconomic indicators have to do with ecological indicators?” Then they went back to rethink the process one more time and categorized indicators into two sets: mediated and unmediated. Mediated indicators are those that must be filtered by some social local organization to find the association with sustainability. Unmediated indicators stand alone, they include # of AUMs, acres burned by fire, etc.

The goal for DC is to whittle down the murky indicators to understand why they are important to sustainability.

**Productive Capacity:** Dennis Child

At this meeting, this group clarified criteria and definitions, made assignments to finish framework, and determined overlaps between Criterion groups. They clarified goals by changing the meaning of the title so that the mandate of the group is now to identify indicators for maintenance of productive capacity for options on rangelands. Productive capacity was defined to include goods and services with a direct connection to the biophysical. The group recognizes that it has strong “connectivity” to other groups. These “linkages” are critical to fulfilling this criterion.

New issue: consider the extent to which capacity for a given use can be measured. Is our ability to measure capacity limited to indirect indicators (e.g., those in “health” standards)?

Their second indicator is percent of available rangeland that is grazed by livestock. “Available” is defined by taking total rangeland acres subtracting rangeland acres withdrawn from domestic grazing and come up with available use, which can then be compared with area grazed by domestic livestock.

Overlaps were discussed with all other groups.

**Soil and Water:** David Pyke

Changed definitions, addressed problems with certain indicators, and cross cut with other roundtables and indicator groups. Targeted overlaps with health/diversity group (C:N, nutrient cycling aspects). Re assessed indicators from SFR, need to expand erosion to include wind as well as water. Look at soil compaction indicator. Change toxic substances indicator to specify herbicides and insecticides being applied on rangelands. These are a potential source of pollutants into organisms and groundwater. Symposium manuscript will be rewritten to reflect changes.

**Health and Diversity:** Lori Hidinger

Identified overlaps with capacity group (area by physiographic region, invasives, NPP, management practices), socioeconomic group (fragmentation, management practices), and soil and water (C:N, depth to shallow groundwater, natural lake levels, riparian condition, management practices). Indicators on plant and animal species that occupy a small portion of their former range and population levels and current geographic range of representative species might be combined. Disturbance regimes other than fire will be addressed. Tasks for DC include: resolve overlaps with Soil and Water Group, begin conversations with Productive Capacity Group on overlaps with them, develop Functional Groups, continue conversations within group on information shared since Kansas City, rework indicator list, revisit species level indicators again, Invasive Animals: Do we need an indicator here?, revise indicator text, and discuss how to describe these indicators in lay terms.

**Institutional Framework:** Tom Lustig

There may be some overlap with the socioeconomic group on the conservation reserve program. The framework group looks at tax structures, while the socioeconomic group assesses at implementation. These may need to be combined under the socioeconomic indicator for better efficiency. For now the group will keep the 20 indicators. Twelve indicators have been written up according to the 6-point framework. Balance has been assigned so that there will be a compilation in a single document by the DC meeting. In DC the group will wordsmith and as a result may eliminate or combine indicators. The group will also work on instructions to the evaluator to help give background and other subtleties to the work. After DC the indicators should be ready to export for review.

**Potential indicator reviewers: group brainstorm – See Appendix F**

**Delphi:** What should be done with Delphi between now and DC?

- Roundtable Interaction Session Discussion Topic Brainstorming
- Feedback on list of indicators

**Washington D.C. Draft Agenda – See Appendix G**

**SRR 2002 schedule, including interaction sessions with other roundtables- See Appendix H**

## **Appendix A Denver Participants**

1. Sam Albrecht, Society for Range Management
2. Barbara Allen-Diaz, University of California
3. Tom Bartlett, Colorado State University
4. Pete Biggam, National Park Service
5. Ben Bobowski, National Park Service
6. Steve Borchard, DOI-Bureau of Land Management
7. Mark Brunson, Utah State University
8. Larry Bryant, USDA-Forest Service
9. Larry Butler, USDA-NRCS
10. Evert Byington, USDA-Agricultural Research Service
11. Jason Campbell, National Cattlemen's Beef Association
12. Dennis Child, Colorado State University
13. Bill Fox, Texas A&M University
14. Stan Hamilton, National Association of State Foresters (NASF)
15. Jon Hanson, Northern Great Plains Research Laboratory
16. Aaron Harp, University of Idaho
17. Joy Hecht, Sustainable Minerals Roundtable
18. H. Theodore Heintz, Jr., U.S. Department of the Interior
19. Karl Hermann, EPA
20. Lori Hiding, Ecological Society of America
21. Eric Hyatt, EPA
22. Nelroy Jackson, Invasive Species Advisory Committee
23. Leonard Jolley, SRM
24. Linda Joyce, USDA Forest Service, Rocky Mountain Research Station
25. Mike Sherm Karl, DOI-Bureau of Land Management
26. Keith Kuhlman, Western States Land Commissioners
27. Dick Loper, Wyoming State Grazing Board & National Public Lands Council
28. Thomas D. Lustig, National Wildlife Federation
29. Kristie Maczko, MATCOM for the USDA Forest Service
30. John Mitchell, USDA Forest Service, Rocky Mountain Research Station
31. Toney Ott, EPA
32. Duncan Patten, Montana State University
33. David Pyke, USGS
34. Tom Roberts, DOI-Bureau of Land Management
35. Tim Reuwsaat, DOI-Bureau of Land Management
36. Tom Roberts, DOI-Bureau of Land Management
37. Lou Romero, DeLaPorte and Associates
38. Helen Rowe, Colorado State University
39. Terri Schulz, TNC
40. Jerry Schuman, High Plains Grasslands Research
41. John Stednick, Colorado State University
42. Lou Swanson, Colorado State University
43. Allen Torell, New Mexico State University

44. Paul Tueller, University of Nevada
45. Michael Washburn, Yale
46. Robert Washington-Allen, Oak Ridge National Laboratory
47. David Wheeler, USDA Forest Service
48. Bill Ypsilantis, DOI- Bureau of Land Management

## **Appendix B Talk Summaries**

### **Value of the SRR for Rangeland Management and Policy – Steve Borchard**

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.

**Question:** Is this the official position of the SRR? Introduction some of the values involved (there is no real official policy).

### **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/>.

**Question:** Why can we no longer use carrying capacity? It's considered a constant, whereas how much can be supported depends on climate variation (such as the amount of rainfall in a given year), and grazing methods. At a smaller scale it has no meaning, but perhaps at a national scale it would have some meaning.

### **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.

**Question:** Do we have commitments from the Federal land agencies to incorporate these indicators into monitoring assessment? No, but we are working on it. We are designing a briefing to be held in DC on May 28, 2002 for agency heads and directors of NGOs. We hope to get our message planted that these indicators will lead to common methodologies for assessing sustainable development. The briefing will present who we are, what we do, and what we hope to produce.

In addition, NRCS NRI (National Resource Inventory) is revising the kind of data they collect that pertains to rangelands, which may generate interest in the SRR indicators. FIA (forest inventory and analysis) with the USFS might sample on the non-forested land – again, this may pull others into our work.

**Federal Sustainable Development Indicators Team and Outreach of RSF** – Dr. Michael P. Washburn, is the Director for Programs at the Yale Global Institute for Sustainable Forestry, and a member of the Sustainable Development Staff in the Washington Office of the USDA Forest Service. He co-chairs the Communications and Outreach Work Group of the Roundtable on Sustainable Forests.

Dr. Washburn spoke about current outreach activities of the Roundtable, including a March 22, 2002 focus group with private forest landowners in Washington DC, and upcoming review workshops for the National Report on Sustainable Forests. Details on these and other Roundtable activities can be found at: [www.sustainableforests.net](http://www.sustainableforests.net)

Dr. Washburn additionally made brief remarks about an emerging effort to develop a set of indicators for sustainable development. This effort, launched March 10-13, 2002 at a conference in Terrytown, New York is an attempt to craft useful, consensus based indicators for use by government, companies, and other decision makers as they seek a more sustainable future. For additional details on this effort, please contact Dr. Washburn at [Michael.Washburn@Yale.Edu](mailto:Michael.Washburn@Yale.Edu).

**Appendix C  
SRR Timeline**

	Nov-2001	Jan-2002	Mar-02	May-02	Jul-02	Oct-2002	Jan-03	Mar-03	May-2003
<b>Specific Meeting Dates</b>	11/7,8	1/9,10	3/26,27	5/29,30	7/30,31	10/29,30	1/14,15	3/18,19	5/20,21
<b>Meeting Locations</b>	San Antonio	Tucson	Denver	Washington D.C.	Billings	San Diego	Florida or Mississippi	New Mexico	Joint Meeting w/ Other Roundtables ? DC
<b>Indicators</b>									
Preliminary Draft Indicator List									
Identify Potential Reviewers for Indicator Set									
Review Indicator Lists									
Discuss and Refine Indicators				Migrate indicators from draft list to completed indicator Continue developing indicators with regional input					
Indicators Frozen									
<b>Data</b>									
Compilation of data sources				Identification of data sets and gaps					
<b>First Report of Rangeland Sustainability Indicators</b>									
Draft Outline									
Preparation of Draft Report									
Final Draft Report									

## Appendix D

### Summary of Baseline Responses from Delphi 8 and 9

#### Questions and Responses Delphi 8, Part I:

##### 2. Do all indicators need a baseline?

Yes	No
10	12

##### 3. Will one baseline work for all indicators?

Yes	No
3	19

#### Questions and Responses Delphi 9, Part II:

1. SRR will use current/present status as time zero (baseline) for all indicators with the understanding that those interpreting the results may still use past data sets for comparative purposes. (Please refer to definitions of acceptance level before responding):

Unacceptable* (1)	Slightly acceptable** (2)	Moderately acceptable*** (3)	Highly acceptable**** (4)
3	4	10	4

\*Unacceptable = now should only be used if there is no earlier data available

\*\* Slightly acceptable = this is not ideal, but could live with it

\*\*\*Moderately acceptable = this is not my preference, but it would be acceptable

\*\*\*\* Highly acceptable = this is my preference

2. SRR will use the earliest possible data as time zero (baseline) for each indicator with the understanding that the current/present status may, in some cases, be the earliest possible data. (Please refer to definitions of acceptance level before responding):

Unacceptable* (1)	Slightly acceptable** (2)	Moderately acceptable*** (3)	Highly acceptable**** (4)
2	4	5	10

\*Unacceptable = past data should not be used, we should start from current status

\*\* Slightly acceptable = this is not ideal, but could live with it

\*\*\*Moderately acceptable = this is not my preference, but it would be acceptable

\*\*\*\* Highly acceptable = this is my preference

*Below is a summary of arguments made in both Delphi 8, part I and Delphi 9, part II for using the current status vs. using earliest possible data as the baseline.*

#### **Use current/present status as time zero:**

- If we set up the baseline as current/present status, but we allow interpretation of the indicator relative to past data sets, then the credibility of the current/present status “baseline” is diminished.
- Using the present as the baseline prevents bias. The end user can compare with historical data on his/her own.
- In some cases earliest possible has limited relevance (e.g., do we really want to go back to the levels of poverty that existed in the “Old West” as a baseline?).
- Collecting historical data may not be 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.”

- It may not make much difference what we use for “time zero” as long as we have data for measurement. 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.
- 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.
- The biggest concern here is that the data from the past may not have all been collected using the same protocol, making comparisons across time less certain.

***Use the earliest possible data for the baseline:***

- It seems that the baseline concept has to be defined for each indicator using common sense. It really doesn’t matter when that is since we are looking for changes through time and assigning our own values as to whether they are “good” or “bad” changes. Having reliable and consistent data would seem to be more important than worrying about defining a baseline.
- Our choice of a baseline is dependent on the data available. For some indicators such as climate, we can start many centuries ago and compare current conditions with the very long-term conditions. For other indicators, we do not have data now, and we will have to use a baseline sometime in the future when information is available. We should focus on objectively reporting the available information and let others draw conclusions and interpretations from it.
- If we start “now” we won’t be able to say anything for a while.
- The scale for all time-dependant variables should start at 1800 and move forward by decade or 25-year intervals. Reliable historical information always strengthens the presentation.
- I don’t understand why we don’t use the first data measurement we can to identify 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?
- 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.
- We should use at least 40 years of data to show trends, thus the reference state is 1960 or earlier.

**Appendix E**  
**Scale- Spatial Reporting Methods**  
**Robert Washington Allen**

Definition: A Spatial Framework is a mapped set of geographic regions that supports agency programs or studies. (McMahon et al. 2001).

At local to landscape spatial scales vegetation and soil configuration and structure can change dynamically. Since the research I have done has been carried out at local to sub-regional scales, I have been wondering how these dynamics change at regional to national scales. Each region is relatively homogenous and distinct from adjoining regions.

Spatial framework distinctions are of two types:

1. Specific characteristics of interest
  - a) Political
  - b) Hydrological Units
  - c) GAP analysis
  - d) University of Maryland Land Cover
  - e) NRCS STATSGO
  - f) Olsen's World Ecosystems Complex
  - g) Matthews Vegetation Types Map
  - h) Modified Matthews Vegetation Types Map
  - i) National Land Cover Data set
  
2. Broader categories of resource potential
  - a) Quantitative vs. Weight-of-Evidence (Qualitative) Methods
  - b) Visual Pattern Recognition vs. Data-Driven Perspectives

Visual Pattern Recognition

- a) Bailey's Ecoregions: Bailey (1995, 1996) delineated 52 ecoregions at the finest province level, increased from 30 in his original Bailey (1983) version. Other, different ecoregions, based on other criteria and for other purposes, have been specified by Holdridge (1947), Walter and Box, Thornwaite, Koppen and many others. Because the delineation is based on subjective criteria, there are as many sets of ecoregions as there are experts.
- b) Holdridge Life Zones: The Life Zones were devised using three indicators: biotemperature (based on the growing season length and temperature); mean annual precipitation; and a potential evapotranspiration ratio, linking biotemperature with annual precipitation to define humidity provinces.
- c) US EPA: Omernick's 1987 aquatic ecoregions were based on perceived patterns of a combination of causal and integrative factors, including land use, land surface form, potential natural vegetation, and soils. Although delineated

for national-level studies of water resources, Omernick's 76 national ecoregions have been borrowed for many other kinds of ecological studies as well.

- d) The National Resources Conservation Service (NRCS) has developed a version of ecoregions called Major Land Resource Areas (MLRAs). MLRAs are much finer than most of the other types of ecoregions, for example, there are 78 MLRAs in the 13 southeastern states. MLRA boundaries are drawn with regard to edaphic and physiographic relationships, but are still subjective.

#### Data-Driven Perspectives

- a) National map clustered on elevation, edaphic, and climate variables into 3000 ecoregions using similarity colors: Clustering is data-driven and empirical. This objectivity means that one obtains the same result every time, given the same data and a request for the same number of clusters. This is in contrast to regions drawn by expert opinion.

#### Hybrid Approach: Qualitative and Quantitative

##### Common Ecoregions Map: Towards a Common Spatial Framework

- Regions are areas within which abiotic and biotic capacities and potentials are similar.
- Foster an ecological understanding of a landscape's terrestrial and aquatic resources.
- Provide the basis for interagency coordination and collaboration in the design and implementation of ecosystem research, assessment, and management.
- Fully integrated Peer-reviewed (participating agencies) National Map developed with common objectives.

*Citations can be found on the web at <http://www.cnr.colostate.edu/RES/srr/denver.htm>.  
Click on Scale Handout and Citations.*

## **Appendix F**

### **Potential External Reviewers List**

NAS – Gordon Orions; Indicators Panel

National Research Council (NAS)

Society for Range Management (RAM Committee)

ESA's Rangeland Ecology Section

International Groups – Australia?

Tongway (CSIRO)

Neil West

American Soil Science Society

Arlene Tugel (NRCS Soil Quality Institute)

Rob Hendricks – governing body of Montreal Process

Larry Schmidt (USFS Water Institute)

I&M Institute of USFS

Steve Archer

Rangelands Conservation Committee (GLCI)

Heinz Center

American Assoc. of Agricultural Economists

Bob Costanza

**Appendix G**  
Sustainable Rangelands Roundtable  
Preliminary Draft Agenda  
May 29 – 30, 2002

**Objectives:**

1. Criteria groups continue to refine indicators and complete 6-point framework
2. Prepare to have indicator work reviewed by external reviewers

**Special Sessions:** 8:00 – 10:30 am

1. Interaction between Socio-economic and Productive Capacity Criterion Groups
2. Continued joint work between Soil and Water and Ecological Health and Diversity Criterion Groups

**General Session:** 8:30 – 10:45 am

SRR Overview for New Participants and Interested Parties

- Welcome Remarks – **Tom Bartlett, Roundtable Host/Convener**
- Participant self-introductions – **led by Lou Romero**
- Importance and Potential Benefits of Sustainability Indicators – **Ted Heintz**
- Value of the SRR for Rangeland Management and Policy - **TBA**
- Sustainability Research for Rangelands – **John Mitchell**
- SRR Process and Purpose – **Tom Bartlett**
- SRR Criteria and Indicator Overview – **Linda Joyce**
- Future Plans and Milestones - **Rod Heitschmidt**
- Questions and Comments

10:45 am **Break**

11:15 am Report on Delphi Results – **Helen Rowe**

11:30 am Temporal Scale Presentation – **Robert Washington-Allen**

12:00 pm **Lunch**

1:15 pm Status of Criterion Groups by Group Leaders

1:45 pm Small Groups Refine Criterion Work; Continue to Populate 6-Pt. Framework (includes break)

5:00 pm **Adjourn Day 1**

**May 30, 2002**

8:00 am Group Discussion – Temporal Reference Point and Unit of Analysis

9:30 am **Break**

10:00 am Continue Criterion Group Work

11:30 am Status of National Sustainability Efforts – **Phil Janik**

12:00 pm **Lunch**

1:15 pm Working Group Reports (Outreach, Coordination, Definitions)

1:30 pm Preparation for External Review (Discussion) – **led by Lou Romero**

2:00 pm **Break**

2:30 pm Continue Criterion Group Work

4:00 pm Criterion Work Report Out by Group Leaders

4:20 pm Report on AM Executive Briefing – **Tom Bartlett**

4:40 pm Next Steps

5:00 pm **Adjourn**

## **Appendix H**

### **SRR Schedule - 2002**

- 5/28 Steering Committee Meeting, ESA Conference Room
- 5/29 Mid-Level Agency and NGOs – 2 hr. SRR Overview
- 5/30 SRR general session and Agency Head Briefing
- 5/31 RSF Workshop
  
- 6/3 Interaction Sessions (SE, PC, L&I), Salt Lake City
- 6/4 SMR, Salt Lake City
- 6/5 SMR, Salt Lake City
- 6/6 SMR, Salt Lake City
- 6/7 RN, Salt Lake City
  
- 7/18 Industry Focus Groups and Panel at Reno Livestock Meeting
- 7/24 Environmental Indicator Interaction Session 2, Lexington
- 7/25 SMR, Lexington
- 7/26 SMR, Lexington
  
- 7/29 Steering Committee Meeting
- 7/30 SRR, Billings
- 7/31 SRR, Billings
- 8/1 Rancher Focus Group Lunch Meeting 10-2
  
- 8/3 ESA Workshop Planning Session, Tucson
- 8/4 ESA Workshop
  
- 9/10 or 9/13 Congressional Briefing in DC  
(Possibly w/ SMR??)
  
- 10/28 Steering Committee Meeting
- 10/29 SRR, San Diego
- 10/30 SRR, San Diego