Linkages between Rangeland Indicator Efforts: Sustainable Rangeland Roundtable and Heinz Center Programs

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Abstract

The indicator concept is widely used and accepted, especially the use of selected attributes to demonstrate condition of ecosystems of concern. Recently, use of indicators has been elevated to regional and national scales. Two parallel and complementary programs are developing indicators of rangeland condition. The Sustainable Rangeland Roundtable (SRR) program is building an extensive foundation of indicators with emphasis on western rangelands. The Heinz Center program on "The State of the Nations Ecosystems" is developing indicators for many ecosystems including forests, grassland/shrublands (rangelands), farmlands, freshwater, coastal waters, and urban/suburban systems. Consequently, the Heinz Center program has limited its number of indicators for each ecosystem, while the SRR is developing an extensive list of indicators. Both the SRR and Heinz Center program have used an iterative process to identify indicators. The Heinz Center program emphasizes state or condition and attempts to show change using sequential time data. SRR indicators are being selected to show present conditions while using sets of indicators for evaluating sustainability of rangelands. The SRR program will be helpful to rangeland managers and resource agencies, while the Heinz program is to be used by national decision-makers and resource managers. The difference in emphasis of the two programs makes them complementary. Details of the Heinz Center are presented at a forum titled "Rangeland Indicators from the State of The Nation's Report" on Monday at this meeting.

Introduction

Resource managers as well as local and national decision-makers often want to know how well we are managing our natural resources and whether their condition is improving or declining with time. Many agencies (e.g., NRCS) sample the condition of the ecosystems under their management, reporting changes in status in nationally available reports. However, no one agency manages or reports on the national coverage of any one ecosystem type, for example, forest or rangeland. Consequently, there is a need for national status reports of these systems, reports that can be used as guidance for long-term management decisions or for decisions on resource funding. Although extensive amounts of information may be developed by the resource agencies, these data need to be filtered and reduced to a manageable level of comprehension and usability. Additionally, data may be incomplete and data compatibility among agencies for similar resources is often poor. One approach for reducing and presenting large amounts of information is to identify attributes of the ecosystem of concern (e.g., rangelands) that will illuminate changes in condition of that ecosystem over time. These attributes that show change are often called indicators.

The indicator concept is widely used and accepted. Recently, use of indicators has been elevated to regional and national scales. For example, the U.S. Environmental Protection Agency's Environmental Monitoring and Assessment Program (EMAP) has developed the concept of indicators as "measurable characteristics of the environment, both abiotic and biotic, that can provide quantitative information on ecological resources". This approach is also being used internationally for forests (e.g., Montreal Process).

Program Comparison

Two parallel and complementary programs are presently developing indicators on rangelands. The Sustainable Rangeland Roundtable (SRR), one of several sustainable roundtable programs (others address forests, minerals, and water), is building an extensive foundation of indicators with emphasis on U.S. rangelands. The H. John Heinz III Center for Science, Economics, and the Environment program on "The State of the Nations Ecosystems" is also developing indicators for six major ecosystems that encompass the United States. These include forests, grassland/shrublands (rangelands), farmlands, freshwater, coastal waters, and

urban/suburban systems. The Heinz Center program has limited the number of indicators for each ecosystem to 18 to enable production of a "user-friendly" report for upper-level resource managers and decision-makers. The SRR, like the other roundtables, is developing an extensive list of indicators. Both the SRR and Heinz Center program have used an iterative process to identify indicators. Each of the Heinz Center working groups had 12 to 18 members which met several times to identify and parse a set of indicators. The Heinz Center program also had an oversight Design Review Board that set basic guidelines for the working groups and helped identify indicators arising from the working groups that had national significance. In contrast, the SRR has held a number of roundtables with up to 55 attendees working in subgroups to identify and winnow a list of indicators of rangeland sustainability. The products of these subgroups have been presented in the preceding papers.

The difference in approach between the two programs, that is, use of small working groups compared to a large, multifaceted roundtable may result in quite different quality sets of indicators and reports. To overcome the deficiency of not using large numbers of participants and many meetings, the Heinz Center indicator program has depended on both an extensive internal and external review process. This process has improved descriptions of indicators and caused the working groups to rethink indicator selection.

Heinz Center Program

The Heinz Center program indicators fall within four general categories designated by the Design Review Board. These are systems dimensions, chemical and physical conditions, biology, and human use. A few overlapping indicators were identified by most work groups within the Heinz Center program. Because these had common roots, they were elevated to "national indicator" status and were in addition to the 18 allowed for each group. Briefly, these are: area of the six major ecosystems, fragmentation of natural lands, exportation of nitrogen from watersheds to coastal waters, chemical contamination and exceedance of national standards, 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. It is important to realize that these national indicators should also be considered indicators of each of the ecosystems. Recreational activities, for example, are important within forests and rangeland ecosystems, as are ecosystem services. Review of indicators within an ecosystem will seem incomplete unless one considers the "national indicators" as part of the set of indicators for the ecosystem.

The Heinz Center indicators by general category are:

A. Indicators of System Dimension: area 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.

B. 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.

C. 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 populations.

D. Indicators of Human Use: number of livestock fed on grasslands/shrublands; and harvest of game animals.

Description of these indicators in the "State of the Nation's Ecosystems" report 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, and (f) what should be done to acquire appropriate data. These indicators were presented to the SRR at a roundtable session. It was obvious from the presentation that many of the Heinz Center indicators and those of the SRR have similar foundations and justifications for selection. In some cases, Heinz Center indicators were considered as additional indicators by the SRR.

The Heinz Center program has been concerned that adequate and reliable data for an indicator are not commonly available. Rather than discard the indicator for this reason, the indicator description points out the quality or inadequacy of the data and then suggests how sufficient data of high quality might be achieved and developed for a national evaluation of ecosystem state. In several cases, the Heinz Center contracted with external scientists to develop comprehensive data sets for an indicator. The subgroups within the SRR are also considering the availability of data when selecting indicators. Availability of data, especially if data are incomplete, although an important criterion, is not being used to select or discard a potential indicator in the SRR program.

Conclusions

The Sustainable Rangeland Roundtable and the Heinz Center program have similar goals; however, the Heinz Center program differs in that it emphasizes state or condition using primarily bio-physical values and attempts to show change using sequential time data. The Heinz Report will not explain cause-effects, nor use "drivers" or "stressors"

as indicators. SRR indicators are being selected to show present conditions while using sets of indicators for evaluating sustainability of rangelands. This means the indicators relate to present and continued ecological and human benefits and services and thus emphasize socio-economic values as much as biophysicial conditions. The SRR criteria and indicators will be helpful to state and national resource agencies and rangeland managers at all levels, while the Heinz program is aimed at decision-makers and resource managers primarily at the national level. The difference in emphasis of the two programs makes them complementary. Details of the Heinz Center program and indicators will be presented at this SRM meeting on Monday afternoon February 18 at a forum titled “Rangeland Indicators from the State of The Nation’s Report”.