

Criteria and Indicators for Sustainable Rangelands

The First Approximation

June 2003

Criterion 1: Conservation and Maintenance of Soil and Water Resources of Rangelands

Soil-based Indicators

1. Area and percent of rangeland soils with significantly diminished organic matter and/or high carbon:nitrogen (C:N) ratio.
2. Area and extent of rangelands with changes in soil aggregate stability.
3. Assessment of microbial activity in rangeland soils.
4. Area and percent of rangeland with significant change in extent of bare ground.
5. Area and percent of rangeland with accelerated soil erosion by water or wind.

Water-based Indicators

6. Percent of water bodies in rangeland areas with significant changes in natural biotic assemblage composition.
7. Percent of surface water on rangeland areas with significant deterioration of their chemical, physical, and biological properties from acceptable levels.
8. Changes in ground water systems.
9. Changes in the frequency and duration of surface no-flow periods in rangeland streams.
10. Percent of stream length in rangeland catchments in which stream channel geometry significantly deviates from the natural channel geometry.

Criterion 2: Conservation and Maintenance of Plant and Animal Resources on Rangelands

11. Extent of land area in rangeland.
12. Rangeland area by plant community.
13. Number and extent of wetlands.
14. Fragmentation of rangeland and rangeland plant communities.
15. Density of roads and human structures.
16. Integrity in natural fire regimes on rangeland.
17. Extent and condition of riparian systems.
18. Area of infestation and presence/absence of invasive and other nonnative plant species of concern.

19. Number and distribution of species and communities of concern.
20. Population status and geographic range of rangeland-dependent species.

Criterion 3: Maintenance of Productive Capacity on Rangelands

21. Rangeland aboveground biomass.
22. Rangeland annual productivity.
23. Percent of available rangeland grazed by livestock.
24. Number of domestic livestock on rangeland.
25. Presence and density of wildlife functional groups on rangeland.
26. Annual removal of native hay and non-forage plant materials, landscaping materials, edible and medicinal plants, and wood products.

Criterion 4: Maintenance and Enhancement of Multiple Economic and Social Benefits to Current and Future Generations

27. The value of forage harvested from rangeland by livestock.
28. Value of production of non-livestock products produced from rangeland.
29. Number of visitor days by activity and recreational land class.
30. Reported threats to quality of recreation experiences.
31. Value of investments in rangeland, rangeland improvements, and recreation/tourism infrastructure.
32. Rate of return on investment for range livestock enterprises.
33. Number of conservation easements purchased.
34. Expenditures (monetary and in-kind) to restoration activities.
35. The threat or pressure on the integrity of cultural and spiritual resource values.
36. Poverty rate (general).
37. Poverty rate (children).

38. Income inequality.
39. Index of social structure quality.
40. Community satisfaction.
41. Federal transfers by categories (individual, infrastructure, agriculture, etc.).
42. Presence and tenure of natural resource nongovernmental organizations at the local level.
43. Sources of income and level of dependence on livestock production for household income.
44. Employment diversity.
45. Agriculture (ranch/farm) structure.
46. Years of education.
47. Value produced by agriculture and recreation industries as percent of total.
48. Employment, unemployment, under-employment, and discouraged workers by industrial sector.
49. Land tenure, land use, and ownership patterns by size classes.
50. Population pyramid and population change.
51. Income differentials from migration.
52. Length of residence (native, immigrant more than 5 years, less than 5 years).
53. Income by work location vs. residence.
54. Public beliefs, attitudes, and behavioral intentions towards natural resources.

Criterion 5: Legal, Institutional, and Economic Framework for Rangeland Conservation and Sustainable Management

55. *Land Law and Property Rights.* Extent to which laws, regulations, and guidelines clarify property rights and land tenure arrangements, recognize customary and traditional rights of indigenous people, and provide means of resolving property disputes by due process as they relate to the conservation and sustainable management of rangelands.
56. *Institutions and Organizations.* Extent to which governmental agencies, educational institutions, and other for-profit and not-for-profit organizations affect the conservation and sustainable management.

57. *Economic Policies and Practices.* Extent to which economic policies and practices support the conservation and sustainable management of rangelands.
58. *Public Information and Public Participation.* Extent to which laws, regulations, and guidelines, institutions and organizations provide opportunities for: (1) public access to information; and, (2) public participation in the public policy and decision-making process relating to rangelands.
59. *Professional Education and Technical Assistance.* Extent to which laws, regulations, and guidelines, institutions, and organizations provide for professional education and the distribution of technical information and financial assistance related to the conservation and sustainable management of rangelands.
60. *Land Management.* Extent to which land management programs and practices support the conservation and sustainable management of rangelands.
61. *Land Planning, Assessment, and Policy Review.* Nature and extent of periodic range-related planning, assessment, and policy review activities, including planning and coordination between institutions and organizations.
62. *Protection of Special Values.* Extent to which laws, regulations, and guidelines, institutions, and organizations provide for the management of rangelands to conserve special environmental, cultural, social and/or scientific values.
63. *Measuring and Monitoring.* Extent to which agencies, institutions and organizations devote human and financial resources to measuring and monitoring changes in the condition of rangelands.
64. *Research and Development.* Nature and extent of research and development programs that affect the conservation and sustainable management of rangelands.