Introduction

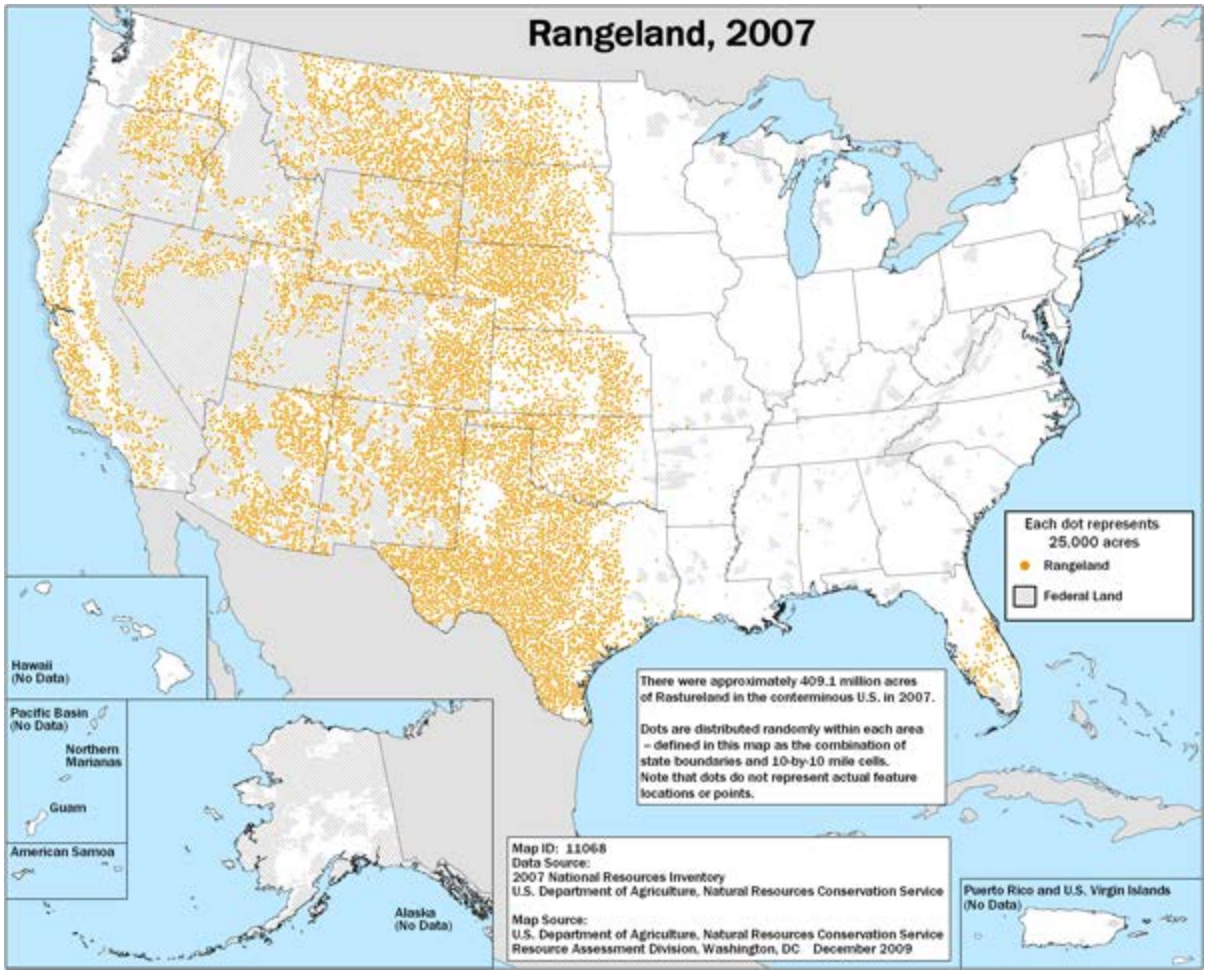
Information about the condition of the land and related natural resources is needed at many different scales to inform decision makers. The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) gathers rangeland on-site data as part of the National Resources Inventory (NRI). This report focuses on information derived from NRI rangeland data collected on-site 2004 to 2011. The findings reported here focus on key issues in rangeland science, including rangeland health, non-native plant species, non-native and native invasive plant species, bare ground, inter-canopy gaps and soil surface aggregate stability. Future reports will provide monitoring results based on data collected at revisited sites.

National Resources Inventory Rangeland On-Site Data

- Rangeland is defined by the NRI as a land cover/use category on which the climax or potential plant cover is composed principally of native grasses, grasslike plants, forbs, or shrubs suitable for grazing and browsing, and introduced forage species that are managed like rangeland. This includes areas where introduced hardy and persistent grasses, such as crested wheatgrass, are planted and such practices as deferred grazing, burning, chaining, and rotational grazing are used, with little or no chemicals or fertilizer being applied. Grasslands, savannas, many wetlands, some deserts, and tundra are considered to be rangeland. Certain communities of low forbs and shrubs, such as mesquite, chaparral, mountain shrub, and pinyon-juniper, are also included as rangeland.
- NRI rangeland on-site data has been collected in 17 western states, encompassing those states from North Dakota to Texas and west. A limited amount of NRI rangeland on-site data has also been collected in Louisiana and Florida.
- The NRI rangeland on-site data are collected at a scientifically selected subset of NRI sample points, allowing the NRI rangeland on-site data to be linked to broader estimates of surface area and land cover use provided in the NRI. Rangeland area estimates were developed based on 2007 NRI estimates of 409 million acres of rangeland in these states.
- The NRI rangeland results presented here address current conditions and based on data collected at over 18,000 NRI rangeland field locations between 2004 and 2011. With the assistance of a global positioning system (GPS), data collectors navigate to sample locations and collect on-site data. Data collected at these locations are assimilated to form a baseline and analyzed in order to present estimates that meet statistical standards and are scientifically credible in accordance with NRCS policy and Office of Management and Budget (OMB) and USDA Quality of Information Guidelines.
- An interagency group—the USDA-NRCS, USDA-Agricultural Research Service (ARS), U.S. Department of Interior (USDI)-Bureau of Land Management (BLM), USDI-U.S. Geological

Survey (USGS), and the USDA-Forest Service (USFS)—worked together to develop field data collection protocols and data elements that could be used for national inventories. Pilot studies tested the rangeland protocols prior to implementing them as part of the NRI Grazing Land Study that began in 2003. Rangeland data collected according to these protocols provide information that can be used to assess current conditions, and in the future as sites are revisited, data collected with these protocols will provide the basis for determining changes in rangeland conditions.

Figure 1. Acres of Non-Federal Rangeland, 2007.



About the Inventory Process

- Detailed on-site data are collected on both macro plots (150-foot diameter circular plots) and along the two intersecting 150-foot transects.
- Quality assurance is an integral part of the NRI rangeland on-site process. Key components of the quality assurance process include training, calibration and authorization of on-site data collectors, a hand-held field computer assisted survey instrument that helps to ensure completeness and accuracy of collected data, and a review process for both raw and summarized data.
- Results calculated from the NRI database produce estimates – not absolute facts. This is because, like nearly all science-based studies, the results are tabulations of NRI rangeland sample data as opposed to data from a census or a direct measurement of all data. Thus, proper interpretation of NRI rangeland results requires an understanding of the inventory procedures and the amount of uncertainty associated with each estimate. Margins of error are reported for all NRI estimates.
- The precision of NRI estimates depends upon the number of samples within the region of interest, the distribution of the resource characteristics across the region, the sampling procedure, and the statistical estimation techniques. Characteristics that are common and spread fairly uniformly over an area can be estimated more precisely than characteristics that are rare or unevenly distributed.

Methods and Indicators

Summaries presented here are derived using data collected for four field protocols:

- Rangeland health data are used to assess three broad attributes (soil and site stability, hydrologic function, and biotic integrity). Data collectors compare biological and physical characteristics of the sample site and record degrees of departures from reference conditions based on comprehensive materials describing the ecological site.
- Line point intercept data are utilized in summaries of non-native plant species, non-native invasive herbaceous species, native invasive woody species, and bare ground. Line point intercept data are collected along two intersecting 150-foot transects centered on each sample location. Data collectors record plant species, litter, lichen, moss, rock fragment, bedrock, and/or bare soil present at each 3-foot interval.
- Line intercept for inter-canopy gaps data are used to identify areas with large foliar inter-canopy gaps which have more exposure to erosion and may provide opportunity for invasive plants to become established. It also provides information that can be used to describe wildlife

habitat structure. Data collectors record lengths of plant inter-canopy gaps along the two intersecting 150-foot transects.

- Soil aggregate stability is a recognized indicator of soil quality and rangeland health. Data collectors immerse soil surface peds (peds are natural soil aggregates) collected at the sample site in water and subject them to five dipping cycles. Soil stability is rated based on the outcomes of these water exposure techniques.

What to Look for in the Future

- Present results address current (baseline) conditions. Beginning in 2012, rangeland on-site data are collected on sites visited in previous surveys. This will allow future reports to include estimates for change in rangeland resource conditions.
- Erosion modeling efforts have been under development for the Rangeland Hydrology and Erosion Model (RHEM) and Wind Erosion Model (WEMO). NRI rangeland on-site data are utilized in these models to produce erosion estimates. These estimates will support a more detailed, large scale assessment of the environmental benefits of conservation practices and programs.
- The NRI on-site data collection efforts are expanding to other grazing land communities (e.g., pastureland) and will culminate in a variety of databases, assessments, publications, and other products—useful for many purposes and at many levels—that help to inform the public, from land users and local governments to national policy makers.

About the NRI

The National Resources Inventory (NRI) is a statistical survey designed to help gauge natural resource status, conditions, and trends on the Nation's non-Federal land. Non-Federal land includes privately owned lands, tribal and trust lands, and lands controlled by State and local governments.

The NRI is conducted by the Natural Resources Conservation Service (NRCS) in cooperation with Iowa State University's Center for Survey Statistics and Methodology.

The NRI is carried out under the authority of a number of legislative acts including the Rural Development Act of 1972, the Soil and Water Resources Conservation Act of 1977, the Federal Agriculture Improvement and Reform Act of 1996, and the Farm Security and Rural Investment Act of 2002.

More Information

Related journal article: National Ecosystem Assessments Supported by Scientific and Local Knowledge, Frontiers in Ecology and the Environment, October 2010

Send comments and questions to the NRI Help Desk