USDA Forest Service Experimental Forests and Ranges

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Experimental Forests and Ranges (EF&Rs) have provided and continue to provide scientific information for the management of National Forests, industrial and private lands. In accordance with federal authority 4062.01 of the Forest Service Manual, section 4000 provisions of the Organic Administration Act of 1897 (16 USC 551), and the Forest and Rangeland Renewable Act of 1978 (16 USC 1643) the Secretary of Agriculture has the authority to establish experimental forests and ranges. The major objective is that experimental forests and ranges be used for conducting applied research that serves as a basis for the management of forests and rangelands.

There are specific establishment and procedural requirements for officially designating areas as experimental forests and ranges. The establishment requirements must follow specific processes and formats for formal approval. The official establishment document must include information that address sections on authority, objective, policy, responsibility, establish record, disestablishment, content of establishment record, designation order, withdrawal from mineral entry, revision of boundaries management, administration, timber cutting, cultural practices, grazing, and special uses.

The 77 EF&R research sites make the USDA Forest Service unique among land management agencies. Each EF&R research site has a long history of experimentation and research which contributes information that provides current and future answers to questions concerning impacts of management activities and their mitigation, and how to better achieve management goals. Most have served as focal points for educational and demonstration projects and as venues for the interaction between scientists, land managers and training of graduate students in forestry and related sciences. Research on EF&Rs has also greatly contributed to a better fundamental understanding of how ecosystems work. This work has long been recognized as having regional, national and international importance.

Most EF&Rs have uniquely valuable long-term studies and monitoring efforts that provide an invaluable record of recovery from disturbance, and allow unusual events to be placed in the context of larger spatial and temporal patterns. EF&Rs address questions on forest management at the appropriate scales of time and space, and are places to learn fundamentals of natural ecosystem structure and dynamics. Finally, each EF&R represents areas with a broad range of disturbance and recovery with well known land use history, protected under special land-use designations that allow manipulative research and protection of control sites (i.e. a secure research platform).

There is an EF&R in every ecoregion throughout the contiguous United States. The Forest Service has invested tens of millions of dollars into infrastructure, experiments and long-term data collection and maintenance of EF&Rs. The activities of these resources are managed and maintained jointly by Forest Service Research and Development and the National Forest System.

Forest Service Research and Development has the primary role of conducting and administering research activities on EF&Rs. Research and Development structure includes the 1) Pacific Northwest Research Station (PNWRS), 2) Pacific Southwest Research Station (PSWRS), 3) Rocky Mountain Research Station (RMRS), 4) North Central Research Station (NCRS), 5) Northeastern Research Station (NERS), 6) Southern Research Station (SRS), 7) International Institute of Tropical Forestry, and 8) Forest Products Laboratory (FPL). The number of experimental forests and ranges has exceeded over 110 since 1903 but with the processes of establishment and disestablishment the current number is at 77. For example, the Santa Rita Experimental Range was established in 1903 but has since been placed under the ownership of the state of Arizona. Some of the existing and oldest established EF&Rs are the Priest River Experimental Forest (1911) in Idaho and the Bent Creek Experimental Forest (1927) in North Carolina. The last experimental forests established were the Estate Thomas Experimental Forest (1964) in U.S. Virgin Island and the Entiat Experimental Forest (1971) in Chelan County, Washington. The distribution of EF&Rs are as following PNW—10; RMRS—14; SRS—19; NCRS—14; IITF—2; NERS—8; PSWRS—10. There are efforts under way to establish an EF in Hawaii to study tropical ecosystems in the Pacific. The Research Stations, IITF, and (FPL) cover vast geographical areas.

Efforts of the previous and current Deputy Chief of Forest Service Research and Development (R&D) established a chartered working group (2004) to facilitate a system and long-term vision to better coordinate a national focus on EF&Rs. The Group consists of a representative from the Washington Office R&D, each Stations, IITF, FPL, and one individual from the National Forest System Regional and Washington Office. The role of the Experimental Forests and Ranges Working group is to assist and advise the Deputy Chief of Research and Development in achieving the mission of the Experimental Forests and Ranges.

Current efforts are to make information easily accessible electronically and available to a wider audience. For example most experimental forests and ranges produce unique scientific products. The products are usually a result of various collaborative research efforts with federal, state, academic, and nongovernmental organizational partners. Products have made significant impacts not only to the science community but have impacted policy at the nation level. The following are representative summary examples of major scientific accomplishments at select EF&Rs.

Hubbard Brook

—Major center for hydrologic research
—Long-term data bases
—Research accomplishments on management
—Small watershed techniques for studying biogeochemistry
—First documentation of acid rain in North America
—Effects of forest harvesting disturbance on water quality and quantity

Great Basin Experimental Range

—Pioneering sites that helped established discipline of range management
—Oldest continuously monitored paired watersheds in the world
—Wildlife habitat restoration

Luquillo Experimental Forest

—World wide aquatic leaf decomposition experiment
—Earthworms and soil processes in tropical ecosystems
—Canopy herb ivory and soil processes in a temperate and tropical forest
—Wood production via plantations

Bent Creek Experimental Forest

—Hardwood improvement cutting
—Long-term single tree selection studies
—Ecological site-classification prediction models
—Intermediate stand management practice

Marcell Experimental Forest

—Current concepts of peat land hydrology and ecology first tested
—Extensive long-term evaluation of ground water wells
—Early studies on soil compaction

San Joaquin Experimental Range

—Significant contributions made in development of sustainable grazing systems in oak woodland savannas
—Long-term bird counts for exploring year-to-year variation of bird populations and diversity in oak woodland savannas

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—Douglas fir old growth forest dynamics
—Forest-stream interactions
—Roles of coarse woody debris
—Long-term decomposition studies
—Close link between research and land management

The continued cutting edge research activities and products from EF&Rs are the result of extremely strong partnerships between universities, other federal agencies, tribal governments, state governmental agencies, private industry and private land owners.

Challenges to maintain high levels of productivity are aging infrastructure, stable funding, conducting manipulative research, and use of EF&Rs extensive data sets as components of a larger usable network of scientific information.

Forest Service Research and Development supports the continuation of exploring opportunities to use new authorities to conduct research, the enhancement of partnerships, and the synthesis of extensive research that could be used in land management decisions and demonstration projects. The Healthy Forest Restoration Act signed into law by the President in 2003 is one tool that will support efforts in conducting applied research on EF&Rs that will help land managers make science-based decisions in managing natural resources.

The sources of this information are USDA Forest Service, Gen. Tech. Rep. NE-321, www.fs.fed.us., unpublished reports and personal communications.