



USDA Forest Service Research & Development

Science

Wildlife and Fish Strategic Program Area

Wildlife and Fish Research on Experimental Forests and Ranges

Background:

The wildlife and fish research conducted on the vast network of Forest Service Experimental Forests and Ranges (EFRs) provides crucial knowledge and decision support for managing ecosystems to sustain terrestrial and aquatic animals and rare plants. Forest Service lands provide habitat for a wide variety of wildlife and fish species. Many native wildlife and fish depend primarily on public forests and rangelands for the food, water, and shelter they require for survival and reproduction. Some species are now at risk due to habitat loss, landscape fragmentation, and other factors impacting population sustainability. With the addition of global threats such as climate change and the spread of invasive species, these risks are accelerating. The long-term research and monitoring that epitomizes EFRs provide comprehensive and high quality science to support management of ecosystems and human activities on forests and rangelands.

Science conducted on the EFRs enhances our ability to:

- Quantify and predict the short- and long-term effects of forest and rangeland management activities on wildlife, fish, and rare plants.
- Assess the effects of long-term change in vegetation climate, and soil, water, and air pollution on wildlife and fish using models and long-term studies.
- Understand and quantify the basic biology, ecological relationships, and risks of management options on populations of threatened, endangered, and at-risk species.
- Understand the influence of natural and human-caused disturbance on ecosystems.
- Synthesize knowledge of wildlife and fish conservation status and habitat relationships over multiple watersheds with multiple ownerships.



About Experimental Forests and Ranges:

Forest Service Experimental Forests and Ranges (EFRs) are scientific treasures, providing secure, protected research sites where complex and diverse ecological processes are studied over the long term. EFRs provide a wealth of records and knowledge of environmental change in natural and managed forest and rangeland ecosystems across the United States. The present system of 80 Experimental Forests and Ranges has been established progressively since 1908; many sites are more than 50 years old. The system provides places for long-term science and management studies in major vegetation types across the 195 million acres of public land administered by the Forest Service.

Online Resources:

<http://www.fs.fed.us/research/efr/>

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Research Activities:

Informing American Marten Habitat Conservation: Forest Service researchers are utilizing historic survey data on the occupancy of the American marten at the Sagehen Experimental Forest to understand marten habitat change. Over a span of thirty years, researchers observed a decrease in habitat patch size, core area, and total amount of marten habitat in the study area, as well as an increase in distance between patches. Recent marten detections were 60% lower than in historical surveys and no martens were detected in the lower elevations, where most of the recent forest management activity occurred. Scientists recommended that future management of forests in this area focus on restoring and connecting residual marten habitat to improve habitat quality.

Maintaining the Longest Running Salamander Study in the World: In 1975 Forest Service scientists initiated a project to monitor terrestrial salamander trends at Coweeta Experimental Forest, making it the longest salamander study in the world. Focusing on Red-legged Salamanders and Southern Appalachian Salamanders, researchers found that terrestrial salamander trends were stable over the 35-year period. However, preliminary results suggest that Red-legged Salamanders, a high elevation species, appear to be retreating to even higher elevations, further limiting their range, and inter-breeding with Southern Appalachian Salamanders. To better understand these trends, scientists have established plots along an elevation gradient to capture and mark individual salamanders.

Examining the Response of Elk and Deer to Off-road Vehicle Activities: Off-road recreation is increasing rapidly on public lands, but few studies have evaluated its effects on wildlife. To address this need, scientists at the Starkey Experimental Forest and Range conducted a three-year study to evaluate responses of mule deer and elk to ATV riding, mountain biking, horseback riding, and hiking. Elk movement was substantially higher during all four activities, particularly during ATV and mountain bike riding compared to hiking or horseback riding. Mule deer were much less responsive to off-road activities. Results have national implications for recreation management and have been used in travel management planning for National Forests in the western United States.



New Approaches to Identify Drivers of Flammulated Owl Habitat: Scientists have collected 18 years of data on Flammulated Owl productivity, nest success, territory occupancy, mate fidelity, breeding dispersal, and tenure of adults on territories for a breeding population in the Manitou Experimental Forest. Preliminary analyses demonstrated differences among owl territories in demographic performance, suggesting differences in territory quality. Researchers are developing methods to rank territories based on all demographic parameters that discriminate among territories to enhance understanding of the forest characteristics important for the survival and fecundity of owl populations. They will also correlate ranked territories with specific environmental features in territories such as vegetation structure and composition, as well as with frequency of nest predation and insect abundance, to better understand potential limiting factors that underlie owl-habitat relationships. This study will provide a novel and valuable test of a demographic approach for identifying critically important breeding habitats of other forest-dwelling species.

Informing Pond Restoration for Amphibian Habitat: Forest Service scientists are working on the Stephen F. Austin Experimental Forest and Davy Crockett National Forest in eastern Texas to examine frog species that use wildlife ponds and, through the creation of new ponds, explore the succession of frog species and predators in newly created artificial ponds. The 28-year long study will also evaluate possible relationships among frog population dynamics, pond community structure, predator-prey interactions, and global climate change. Seasonal ponds are being restored to reverse the effects of past fire suppression and thus reestablish historical plant communities and amphibian breeding habitat.

Mercury Accumulation in Food Webs: Forest Service scientists are studying bioaccumulation of mercury in aquatic food webs of peatlands at Marcell Experimental Forest. Researchers are examining how mercury is transported through the landscape and how it interacts with other compounds. Experimental results show that declines in sulfate deposition can reduce mercury contamination in aquatic animals. Understanding how management activities can lessen mercury inputs or increase storage in terrestrial systems is critical for human health and the fishing industry.