



## USDA Forest Service Research & Development

# Science

## Wildlife and Fish Strategic Program Area

### A National Overview

### Program:

The Wildlife and Fish Strategic Program Area provides knowledge and tools to sustain the health, diversity, and productivity of aquatic and terrestrial animals on the Nation's forests and grasslands to meet the needs of present and future generations. The research focus areas are species and ecosystem ecology, land and resource management, current and emerging threats, and science delivery. Forest Service scientists have a long and successful history of science-management partnerships with Federal, State, and Tribal resource agencies, universities, nongovernmental organizations, and international cooperators. In addition, they benefit from the broad network of Forest Service Experimental Forests and Ranges for long-term aquatic and terrestrial wildlife research and adaptive management studies.

The Wildlife and Fish Program includes more than 120 scientists located in 5 research stations distributed throughout the United States, as well as the International Institute of Tropical Forestry in Puerto Rico. As part of the largest forestry research organization in the world, Forest Service wildlife and fish research is fundamentally cross-cutting, with scientists working on interdisciplinary teams to conduct research that spans multiple research program areas, including social science, invasive species, and wildlife.

### Current and Emerging Research Priorities:

- Support restoration and conservation actions across large landscapes and watersheds.
- Inform management of wildlife and fish under future climate scenarios.
- Develop innovative protocols for inventory and monitoring of fish and wildlife populations and habitats.
- Inform strategies to meet growing demand for water, energy, and other forest- and grassland-based commodities, while ensuring the sustainability and diversity of terrestrial and aquatic species and ecosystems.

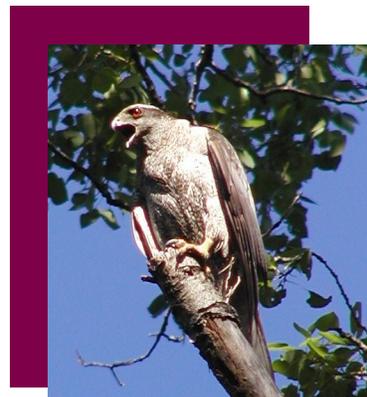
### Partnership Opportunities:

- Basic and applied research to inform wildlife and fish partnerships such as Landscape Conservation Cooperatives and Fish Habitat Partnerships.
- Science delivery and technical transfer, including workshops, short courses, webinars, and decision support tools.
- Science syntheses on national, regional, or topical issues related to wildlife and fish and their habitats.
- Risk assessment, structured decision-making, and adaptive management strategies.
- Science-based policy analysis and evaluation.

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## Wildlife:

**Scientifically Informed Management Decisions Regarding Fishers.** Forest Service scientists employed genomics mapping technology to sequence mitochondrial genomes from fishers, a rare mid-sized carnivore. New information revealed that there are more unique populations than originally believed. Fishers are currently proposed for listing under the Endangered Species Act. This research will aid managers in deciding whether these populations warrant protection.

**Research-Forest Management Collaboration for Northern Goshawk Nesting Management.** Forest Service researchers, in collaboration with the Chequamegon-Nicolet National Forest, examined how landscape-scale forest composition and road density at several different distances from nest sites and random locations throughout the forest influenced the nesting presence of Northern goshawk, a forest-sensitive species. The discovery of the key driver, the ratio of conifer cover to aspen-birch cover surrounding a potential site, will be extremely useful in sustaining nesting goshawk populations throughout the forest.

**Wildlife Corridors Protect Animals and Humans.** Highways are essential for human movement and commerce, but they can carve up habitats, disrupt the natural migration of species, and result in fatal collisions for both animals and humans alike. Scientists are working to develop GIS models that consider factors like land cover, elevation, slope, and human population density to identify places where wildlife crossing structures (such as culverts and grass-covered bridges) should be considered to promote highway safety and maintain healthy wildlife populations. Forest Service researchers and partners recently received the Federal Highway Administration's "2011 Environmental Excellence Award" for their habitat connectivity efforts in Washington State.

## Aquatic:

**Altered River Flow Effects on Growth and Survival of the Foothill Yellow-legged Frog.** Forest Service scientists quantified the effect of large magnitude flow fluctuations in rivers with dams on tadpoles of the lotic-breeding Foothill Yellow-legged Frog, a Species of Concern. They found that tadpoles exposed to repeated velocity stress grew significantly less and experienced greater predation than tadpoles reared at ambient velocities. This research informs the tolerance levels of the tadpoles at the upper limit of flow fluctuations. Similar work also explored habitat suitability. Researchers found that a low percentage of habitats remained suitable or were "buffered" from the pulse, creating a high potential for loss of egg masses or tadpoles. This model-based analysis will be useful for managing foothill yellow-legged frogs or similar aquatic species in regulated river systems.

**Informing Future Restoration Efforts for California's State Fish.** The California Golden Trout is imperiled due to introduced exotic trout, genetic introgression, and degraded habitat, and faces further stress from climate warming. Researchers are identifying which streams are most vulnerable to warming and therefore should be high priorities for active management to ensure the aquatic habitats are more resilient to predicted changes in water temperature, flow, and snow pack.

**Strategically Linking Headwater Habitats Across Ridgelines Benefits Amphibians and Forest Management.** To mitigate interrupted amphibian movement due to forest disturbances, Forest Service scientists have developed criteria for placing and managing dispersal corridors. Federal biologists, land managers, and watershed stewardship councils have shown much interest in this new design that maintains amphibian habitat, while anticipating future needs in response to climate change.

**Fire and Fish Dynamics in a Changing Climate on Native and Nonnative Fish.** Many native fish in the Rocky Mountain region evolved with fire and thus their populations are resilient to fire's effects; however, this resiliency is being reduced in many watersheds because of stream habitat fragmentation and degradation and the invasion of nonnative fish. Forest Service researchers are linking landscape fire succession simulation models with stream temperature and trout growth models to predict changes in trout species distribution. This research will assess the effectiveness of fuels management in promoting persistent native trout populations and help identify tributaries in which to focus bull trout conservation efforts.

