

# Wildlife Services

Protecting People  
Protecting Agriculture  
Protecting Wildlife

National Wildlife Research Center

FY 2017

## Reducing Wildlife Damage in Forests, Wetlands and Rangelands



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### Groups Affected:

- Commercial timber producers
- Gardeners/Landscapers
- Homeowners
- Natural resource managers
- Noncommercial forest landowners
- Oil and gas industries
- Orchard managers
- Ranchers
- State departments of transportation
- Utility cooperatives

### Major Cooperators:

- Bighorn Basin Conservation Districts, Wyoming
- British Columbia Ministry of Forests and Range
- Mississippi State University
- National Council for Air and Stream Improvement
- Oregon Department of Fisheries and Wildlife
- Oregon Department of Forestry
- Oregon Forest Industries Council
- Oregon State University
- Portland State University
- The Jack Berryman Institute
- U.S. Department of Defense
- USDA Forest Service
- Washington Department of Fisheries and Wildlife
- Washington Department of Natural Resources
- Washington Forest Protection Association
- Wyoming Game and Fish Department

### National Wildlife Research Center Scientists Develop Methods to Reduce Wildlife Damage in a Variety of Habitats

Wildlife Services' (WS) National Wildlife Research Center (NWRC) is the only Federal research facility devoted exclusively to resolving conflicts between people and wildlife through the development of effective, selective, and socially responsible methods, tools, and techniques. NWRC's expertise in Corvallis, Oregon, focuses primarily on wildlife damage to forest, wetland and rangeland resources.

Wildlife impacts on regenerating forests following wildfire or harvesting can be extensive. Cutting and gnawing on seedlings by deer, elk, mice, mountain beavers, pocket gophers, rabbits, and voles during the first five years of tree growth greatly hinder reforestation efforts. Other mammals such as bears and porcupines damage mature trees. North American beavers and nutria alter riparian vegetation, which limits streamside restoration efforts, erodes roads and railways and can endanger human health and safety. Common raven populations have increased significantly across North America, and the damage they cause to agriculture and ground-nesting birds, such as snowy plover and greater sage-grouse, is perceived to have increased as well. NWRC scientists are developing nonlethal tools and methods to help manage wildlife damage to these important habitats and resources.

### Applying Science & Expertise to Wildlife Challenges

**Economic Impacts of Black Bear Damage to Douglas-fir Trees.** — Black bear damage to timber resources is an ongoing concern, yet few tools exist to assess current damage and potential future impacts. Black bears peel conifers in early spring to forage on energy-rich inner layers. NWRC researchers and university partners surveyed black bear damage to Douglas-fir tree stands in western Washington and Oregon, and used distance-dependent, individual tree growth and yield models to evaluate economic impacts using two damage scenarios. The first damage scenario (Salvage) accounted for mortality and volume losses of both fully and partially girdled trees while valuing removal of partially damage trees. The second damage scenario (Total Loss) assumed complete loss of all black bear-peeled trees regardless of the amount peeled. Damage resulted in economic losses ranging from 4 to 16 percent (Salvage) and 17 to 46 percent (Total Loss) of net present value. Damage losses in the Total Loss scenario were on average four times greater than those in the Salvage scenario. Although the losses may not be representative of all stands damaged by black bears, this approach may help improve forest management plans that assess damage by black bears and other wildlife species.

**Difficulties Associated With Relocating Beaver To Improve Salmon Habitat.** — A beaver can drastically alter its habitat to make it more suitable for itself and other wildlife species. Recently, some scientists and land managers have suggested that beavers and their damming behaviors could be used to help enhance in-stream habitat for salmon in the Pacific Northwest. Oregon and Washington have passed laws that allow landowners to relocate beavers for management purposes. To evaluate whether relocating beavers can improve coho salmon habitat in Oregon, NWRC and Oregon State University researchers trapped, radio-marked, and relocated 38 nuisance beavers using State relocation guidelines. They released animals into areas with the potential for beaver dams to improve the habitat for coho salmon, a federally protected species. Results showed that all relocated beavers moved from their initial release sites, one as far as 18 miles. Only 50 percent of the relocated beavers survived more than 4 months after being released. Predation and disease accounted for most of the mortalities. Most predation occurred within the first week post-release. Also, very few beaver dams were built, and none of them withstood high water flows. Results indicate that current beaver relocation options for Oregon landowners are not effective for helping to restore stream habitat for coho salmon. Researchers encourage land managers and others who want to use beaver relocation as a management tool to educate landowners about the risks of beavers dispersing out of target areas and causing damage on nearby properties.



United States Department of Agriculture  
Animal and Plant Health Inspection Service

**Habitat Use by American Beaver.** — NWRC and university researchers used a combination of modeling techniques along with GPS locations, presence-absence data, and vegetation characteristics to determine if variables explaining beaver habitat selection are consistent between landscape and fine spatial scales. Contrary to their predictions, results showed that woody wetland edge density, shrub edge density, and open water edge density were important in beaver habitat selection at both landscape and fine spatial scales. Researchers also noted that food resources including woody plants may limit beaver fitness and subsequently determine beaver habitat selection during winter and spring.

**Greater Sage-grouse Nest Survival and Failure in Northwestern Wyoming.** — Nest survival, along with hen and chick survival, are crucial to the growth of greater sage-grouse (*Centrocercus urophasianus*) populations. NWRC researchers identified and monitored the survival of 204 sage-grouse nests on 5 sites in the Bighorn Basin, Wyoming from 2011-2014. Nest predators were identified using camera traps set near the nest sites. Nest survival rates differed across study sites and ranged from 20 to 56 percent. Predation by coyotes were the greatest contributor to nest failure, followed by predation by common ravens, abandonment, and hen mortality. The direct effect of nest depredation by coyotes was greater than other reported sage-grouse studies, yet nest survival rates were consistent with others reported throughout the species range. Coyote removal in the area for livestock and big game protection did not appear to affect nest survival. Nest survival was the lowest on a site where coyotes and ravens depredated nests at nearly the same rate, and where ravens were observed nesting on structures in close proximity to nesting sage-grouse. Future research is needed to determine if raven depredation of sage-grouse nests adds or compensates to the overall loss of nests in areas with coyotes. More so, methods are needed to reduce raven use of man-made structures where their breeding ranges overlap with nesting sage-grouse.

#### **Selected Publications:**

Petro, V.M., J.D. Taylor, and D.M. Sanchez. 2015. Evaluating landowner-based beaver relocation as a tool to restore salmon habitat. *Global Ecology and Conservation* 3:477-486. doi: 10.1016/j.gecco.2015.01.001

#### **Major Research Accomplishments:**

- WS economic models estimated black bear damage to Douglas-fir trees ranged from 4 to 46 percent of the timber's net present value.
- WS research indicated that current beaver relocation options for Oregon landowners did not help to restore stream habitat for coho salmon.
- WS research on beaver habitat selection indicated food resources, including woody plants, may limit beaver fitness and subsequently determine beaver habitat selection during winter and spring.
- WS research showed greater sage-grouse nest survival ranged from 20 to 56 percent in Bighorn Basin, WY. Nest depredation by coyotes was the greatest contributor to nest failure in this area, although coyote management for livestock and big game did not appear to have noticeable effects on nest survival rates.