



## 7. FORESTS: Research effort examines the effects of fire on birds, small mammals (10/15/2009)

Eryn Gable, special to E&E

The Forest Service is studying how fires affect wildlife populations in ponderosa pine forests in eight Western states with hopes the results will lead to better management of both species and their habitats.

The research effort -- a collaboration among the service's Rocky Mountain and Pacific Northwest research stations, the Nature Conservancy, and several national forests and universities -- includes songbirds and small mammals. But a major focus of the research is cavity-nesting birds, since many of them depend upon on fire-maintained habitats for their survival and they respond to timber and fire management activities. Cavity-nesters also serve an important ecological function in the forest, since they eat bugs, thereby controlling the levels of insects that attack the forest.

"We know that fire is a natural part of these systems as part of a natural disturbance regime, and we know we want to reintroduce fire into these forests," said Bill Block of the Rocky Mountain Research Station in Flagstaff, Ariz. "By doing so, it will have positive to neutral effects on birds. To me, that's a good thing."

The study stems from efforts to learn more about how reducing fuel loads, including through prescribed fire and tree harvesting, affects wildlife populations and their habitats. Traditionally, the focus of many of these management activities was reducing wildfire hazards, particularly around communities in the wildland-urban interface, with less attention given to the ecological effects.

Vicki Saab, research biologist with the Rocky Mountain Research Station in Bozeman, Mont., noted that years of fire suppression in lower elevation forests had created major alterations in fire regimes, as well as the structure and composition of forests. Although land managers now understood the importance of not excluding fire from the landscape, there was still much that was unknown, she said.

"There are a lot of proposed fuel treatments across broad areas of the West, but we really don't know how effective those treatments are and how key species are responding to those treatments," she said.



Forest Service researchers are studying the effects of prescribed fire on bird species in Western ponderosa pine forests. While such activities are known to improve habitat conditions for emergent plants, less is known about how burning affects birds and other animals. Photo courtesy of the Forest Service.

This lack of scientific information made it difficult for land managers to predict the environmental consequences of their actions and also led to litigation claiming violations of federal laws such as the Endangered Species Act, National Forest Management Act and Migratory Bird Treaty Act for species including the Mexican spotted owl, northern goshawk and black-backed woodpecker.

The "Birds and Burns Network" is seeking to fill this gap in scientific knowledge.

### Objectives

Among the study's objectives are to monitor the effectiveness of prescribed fire, evaluate the effects of fuel reductions on habitat and wildlife populations, determine the most productive habitats for cavity-nesting birds, and develop criteria for post-fire salvage logging that maintains habitat for important wildlife species.

The prescribed fire studies began in 2002 and include nine locations in eight Western states -- Washington, Oregon, Idaho, Montana, South Dakota, Colorado, Arizona and New Mexico.

The project was kicked off with \$450,000 in funding from the Joint Fire Science Program, although it has also received funding from the National Fire Plan, Rocky Mountain Research Station and individual research sites.

At each location, researchers conducted sampling on forest units that varied in size from 600 to almost 1,000 acres, collecting information about wildlife populations and vegetation for at least two years before prescribed fire treatments and at least two years after the treatments. The locations include national forests, national parks, and state and private lands.

Craig Bienz, Sycan Marsh program director for the Nature Conservancy, noted that the inclusion of private lands in the study was significant because it allowed research to take place on a faster timeline and with fewer constraints than are required on federal lands, where land managers must follow the guidelines of the National Environmental Policy Act and other federal environmental laws.

By contrast, work at some of the other research sites has been held up by litigation. In the Helena National Forest, for example, Saab noted that a proposal to thin and burn areas to reduce the risk of a beetle outbreak was successfully challenged in court because of its effects on elk winter range. Now, the forest is moving ahead with the project, but the bark beetle outbreak has spread farther into the forest and the trees are no longer valuable for timber.

At the Sycan Marsh site, however, researchers were able to move in a quicker fashion to implement the research. Sycan Marsh, a remote, verdant wetland meadow in Oregon's Klamath Basin that is home to thousands of nesting and migrating birds, threatened fish and aquatic creatures, was chosen for inclusion in the study because the Nature Conservancy's lands there provided the forest structure and species types consistent with the study design.

One of the most significant findings from the Sycan Marsh research was an increase in the abundance of black-backed woodpeckers. At the beginning of the research, Bienz said there were not any black-backed woodpeckers at any of the research sites, but there were a total of nine nesting pairs two years after the burns.

The lesson, Bienz said, is simple. "If we don't do management, if we don't have prescriptions and treatments, there aren't birds," he said. "These closed-canopy situations aren't conducive to maintaining cavity-nesting birds."

The findings at Sycan Marsh were not unusual. Throughout study sites in the Northwest, researchers found that the black-backed woodpecker and three-toed woodpecker, both federally and state-designated as sensitive species, increased in numbers after fire treatments, even moving in to nest in areas previously unused by these birds before being burned.

Other cavity nesters -- including hairy woodpeckers, northern flickers and western bluebirds -- also showed gains in abundance after fire, as did bird species that forage in bark. On the other hand, bird species that forage on insects in foliage declined in burned areas at least temporarily.

## Positive results

The results of the prescribed burn study showed the important role fire plays in ponderosa pine ecosystems. All but one of the eight resident bird species had a positive or neutral response to burning treatments. The one exception, the pygmy nuthatch, showed a neutral response the year following the burn. The response among migratory bird species was more mixed, but the study's preliminary results indicate that negative effects of prescribed fire on birds may be short-term.

The study found only one statistically significant change in nest numbers -- increased nesting densities for western bluebirds in the Northwest -- but there were also increased nesting densities for the hairy woodpecker, northern flicker and brown creeper in the Southwest.

Another preliminary finding was that a mixture of habitat types is best for supporting a wide variety of species, since different species depend on different types of habitats. For example, white-headed woodpeckers and pygmy nuthatches favor habitat conditions created by understory fires, while pileated woodpeckers prefer forests where fire has been excluded from the landscape and black-backed woodpeckers prefer areas that have experienced stand-replacing fires.

"One thing we've learned is that we really need a mosaic of conditions, including everything from high- to low-severity fires, to maintain the suite of species that naturally occur at these dry, lower-elevation conifer forests," Saab said.

Research from the Birds and Burns Network has also provided greater information about the effectiveness of various management practices. Whereas previous research had indicated the importance of protecting nest trees by removing combustible materials around their base before prescribed burns to reduce losses of nesting and roosting snags, research from the network sites indicates that prescribed fire can create snags that actually provide habitat.

The researchers found that although prescribed fire consumed some snags, it also created others, particularly larger snags. The finding is significant because large snags last longer and provide wildlife habitat longer than small snags.

"The information [from the study] is being used across the West to determine how ponderosa pine forests are being managed," Bienz said.

The study builds upon previous research regarding fire and avian ecology in North America, which has demonstrated a close relationship between fires and the response of birds. For example, if soil temperatures stay below 347 degrees Fahrenheit during a fire, nutrients released into the soil enhance plant growth and vigor, leading to an increased abundance of flowers, seeds and insects that provide food for different birds.

Fire also creates logs and dead and dying trees that attract bark and wood-boring beetles, an important food source for woodpeckers. Snags, trees with decay and downed logs are also easier for woodpeckers to bore into to create cavities and provide roosting, nesting and foraging habitat for a variety of wildlife species.

Fires may also reduce populations of nest predators such as tree squirrels and weasels as their habitats are altered or destroyed, which may give cavity-nesting birds a better chance for reproductive success and productivity.

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