



United States
Department
of Agriculture

Forest Service

Rocky Mountain
Research Station

Research Note
RMRS-RN-23-4-WWW

December 2004

Fuels Planning: Science Synthesis and Integration

Environmental Consequences Fact Sheet: 4

Wildlife Responses to Fuels Treatments: Key Considerations



Pacific Northwest
Research Station



North Central
Research Station

Synthesizing Scientific Information for Fire and Fuels Project Managers

David Pilliod

USDA Forest Service
Rocky Mountain Research Station
Aldo Leopold Wilderness
Research Institute
Missoula, MT

Environmental Consequences
Team Leader

Elaine Kennedy Sutherland
USDA Forest Service
Rocky Mountain Research Station
Missoula, MT

Fuels planning: Science synthesis and integration, an interagency research/management partnership to support the Ten-Year Fire Plan, led by Russell T. Graham, RMRS, and Sarah M. McCaffrey, NCRS.

Conceptualizing the Problem

Managers face a difficult task in predicting the effects of fuels treatments on wildlife populations, mostly because information on how animals respond to fuels treatments is unavailable or does not exist. Often, existing information on treatment effects on species is ambiguous, due to the natural variability that exists in animal populations from different locations and to the difficulty in setting up valid field experiments. When information is unavailable or ambiguous, it can be difficult to know how to proceed with a planned treatment.

Key Considerations

Despite this scarcity of information from studies, predictions of effects may be possible after considering aspects of an animal's ecology and then using available information in a conceptual framework. The context of an animal's ecology should include:

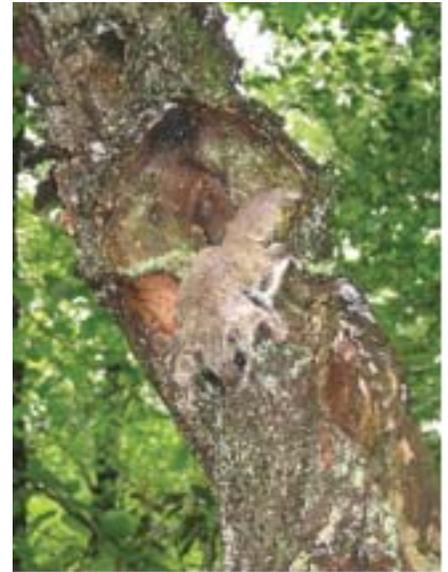
1. Species distribution and abundance
2. Migratory and dispersal characteristics
3. Habitat requirements and preferences
4. Potential responses to changes in habitat

Species with common habitat requirements may respond to fuels treatments in a similar manner. Groups of species can be organized taxonomically (for example, all woodpeckers) or behaviorally (for example, cavity nesting birds). Evaluating treatment effects on groups of species rather than individual species is advantageous when species-level information is sparse.

1. Species distribution and abundance—

If a species is broadly distributed regionally, then any local effects in a project area may be inconsequential to species viability, whereas a species with a limited distribution warrants special consideration. Given that a fuels treatment does not alter habitat to the point that it is no longer suitable, an abundant species should be more resilient to negative treatment effects than a rare species.

2. Migratory and dispersal characteristics—Likewise, a species that is abundant outside of the project area is more likely to colonize a treated stand than will a rare species. This response depends on species' dispersal capabilities, as well as treatment area size, shape, edge characteristics, habitat quality, and landscape setting.



Northern flying squirrel (photo credit: Kate Schick).

3. Habitat requirements and preferences—Species require specific habitats to survive and reproduce. Meeting critical habitat needs in the project area may include ensuring perpetuation of characteristics important for breeding, producing, and rearing of young, feeding, refuge from predators, and protection from inclement environmental conditions. Some species will meet all their habitat requirements within the project area, whereas other species will use the project area for only part of the year or part of their life cycle.

4. Potential responses to changes in habitat—Depending on which habitat elements (for example, down wood) are affected by a fuel treatment, species may or may not respond to habitat changes from fuels treatments. Most fuel treatment effects change over time, and thus species responses will also change over time. For example, down wood may be consumed in a prescribed fire, but 5 and 10 years later, fire-killed trees could result in greater amounts of down wood than pre-treatment levels.

The Wildlife Response Model

A more formal way to conceptualize potential responses to changes in habitat does exist, even if species information is sparse. The Wildlife Response Model (the topic of a companion fact sheet in this series) is a computer-based tool designed to help managers understand how fuel treatment activities will alter wildlife habitat.



Boreal toad (photo credit: David Pilliod).

The Wildlife Response Model uses ecological information from scientific studies and expert opinion to show how changes in key wildlife habitat elements in a forest stand can influence a species use of that stand for reproduction, food acquisition, and shelter from predators and environmental extremes. The advantage of this tool is that it does not rely solely on the few experimental studies designed to answer questions regarding fuels treatment effects, but draws on life history characteristics and known habitat associations. The Wildlife Response Model was developed by David Pilliod and M. Elena Velasquez.

Environmental Consequences Fact Sheets

Look for fact sheet topics from the Environmental Consequences Team including information about the effects of fire behavior and alternative treatment strategies, Wildlife Response Model, weed responses, riparian systems, soil erosion, restoration objectives, treated spaces, the Fire Effects Information System (FEIS), and the First Order Fire Effects Model (FOFEM).

Fuels Planning: Synthesis and Integration

This fact sheet is one in a series being produced as part of a larger project supported by the USDA Forest Service to synthesize new knowledge and information relevant to fire and fuels management. Fact sheets address topics related to stand structure, environmental impacts, economics, and human responses to these factors. Information in the fact sheets is targeted for the dry forests of the Inland West, but is often applicable across broad regions of the country. For more information, please visit our Web site at: www.fs.fed.us/fire/tech_transfer/synthesis/synthesis_index

The Fuels Planning fact sheets are based on preliminary findings. Information from fact sheets will be synthesized in an upcoming publication.