Beetles, Birds, & Fire in Western Forests

Introduction: The mountain pine beetle is native to Montana, but a recent epidemic has fundamentally altered the forests of the intermountain West. Avian responses to bark beetle outbreaks are largely unknown, and will have important implications for forest management. Some species, such as the foliage gleaning Yellow-rumped Warbler may decline after beetle epidemics, while other species like the beetle-eating American Three-toed Woodpecker may thrive. Information on the avian response to the mountain pine beetle epidemic in the Helena National Forest will provide valuable information to forest managers in dry coniferous forests throughout the West.

Monitoring & Research Objectives:

• Estimate changes in occupancy by the avian community in relation to the beetle outbreak.
• Evaluate changes in nest survival over the course of the mountain pine beetle outbreak.
• Evaluate and quantify the magnitude, spatial and temporal distribution of bark beetles and wood borers on habitat suitability of woodpeckers and fuel dynamics following a mountain pine beetle (MPB) outbreak.
• Apply fire behavior simulation modeling to assess how changes in fuels after MPB outbreak may affect fire behavior under different environmental conditions.
• Develop habitat suitability models for key wildlife species based on insect population trends, vegetation change and projected fire behavior after MPB outbreak.

Monitoring & Research Approach:

• Nest survival monitoring – designed to establish baseline estimates of nest survival and identify any changes that may occur as a result of the mountain pine beetle outbreak.
• Broad-scale occupancy monitoring - designed to provide reliable, standardized data on the site occupancy, turnover, and colonization for over 50 bird species in addition to species richness before and after the epidemic.
• Vegetation/Fuels data collection – designed to support modeling of habitat suitability for key species, as well as predict future mountain pine beetle epidemics under various future fire and climate scenarios.

Management Implications:

Primary outcomes include models that will characterize pre- and post-MPB outbreak fuels, fire, and wildlife habitat conditions across a spectrum of MPB outbreak severity. These developments will aid managers in operational decisions, as well as in NEPA analysis relating to fuels management, fire risk, and activities to promote the persistence of ponderosa pine and key wildlife species. In addition the results will be useful regarding salvage operations following outbreaks, as tradeoffs between habitat related beetle-caused snag-retention and fuel-related fire danger will be explicitly addressed.

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