THE EFFECTS OF SPRUCE BARK BEETLE INFESTATIONS AND SUBSEQUENT MANAGEMENT

POSITION STATEMENT OF
THE ALASKA CHAPTER OF THE WILDLIFE SOCIETY
ON
THE EFFECTS OF SPRUCE BARK BEETLE INFESTATIONS AND SUBSEQUENT MANAGEMENT
ACTIONS ON WILDLIFE HABITATS AND POPULATIONS

INTRODUCTION

The Wildlife Society is an international organization of professional wildlife researchers, educators, managers, and enforcement personnel dedicated to the sound stewardship of wildlife resources and the environment upon which wildlife and humans depend. The National organization has over 8,000 members with approximately 300 in Alaska. The Alaska Chapter adopts position statements on important wildlife management issues in the State. Our purpose for this position statement is to clarify the significance of effects current spruce bark beetle infestations may be having on wildlife habitats and populations and to recommend courses of action land managers may implement to conserve and enhance wildlife and their habitats.

BACKGROUND

The spruce bark beetle is the most significant natural mortality agent of mature spruce in Alaska, other than fire. In 1996, more than 1 million acres had new and ongoing infestations. These infestations cause extensive tree mortality and greatly alter stand structure by killing most tall, large-diameter spruce (white, Lutz, and occasionally Sitka). Reduced overstory shading and competition also significantly change understory shrub and herbaceous plant competition and productivity, thereby affecting cover and food resources for associated wildlife, although. understory responses may differ throughout the State. Significant changes in the boreal forest landscape lead to associated changes in size and distribution of wildlife populations. Such changes diminish over the period of time necessary for the forest to approach its pre-outbreak condition through natural ecological processes or human intervention.

Specific studies of wildlife responses to spruce bark beetle outbreaks are lacking in Alaska. Some wildlife species, otherwise rare in spruce forests may be common to abundant following outbreaks (e.g., woodpeckers); and wounded, slowly dying spruces may produce large cone crops before dying, thus providing short-term, superabundant food for species feeding on seeds (e.g., squirrels, crossbills). Studies elsewhere of the defoliation of white spruce and balsam fir by spruce budworm indicate that browse and moose production are stimulated where outbreaks are severe enough to kill most of the overstory, and there is subsequent disturbance by logging or fire. More generally, black bear and brown bear movements are known to strongly correlate with food availability, and changes in boreal forest structure are known to greatly affect densities of snowshoe hare, voles, squirrels, shrews and their predators: lynx, marten, coyote, gray wolf, and raptors.

FINDINGS

The Alaska Chapter finds the following.

1. Large-scale infestations of spruce bark beetles occurring in south-central Alaska significantly change the structure and function of wildlife habitats, but these ecosystem responses differ between areas and will diminish with time as habitats approach pre-outbreak conditions through ecological succession. In some areas, however, outbreaks may alter successional pathways and prevent re-establishment of woody vegetation for very long periods of time.
2. Wildlife responses to spruce bark beetle infestations in Alaska need additional study, both during and after outbreaks, recognizing that information from one area may not represent habitat relationships in all areas.
3. Current land cover mapping of areas infested by spruce bark beetles is inadequate.
4. Forest management activities (e.g., timber harvest, road construction, road management) associated with human intervention to control ecosystem responses to beetle infestation have potentially adverse environmental impacts and will affect wildlife habitats and populations.
5. Increased human access resulting from logging roads built to salvage infested trees is a significant concern associated with the conservation of wildlife species (e.g., brown bear, marten, and wolverine) that are sensitive to disturbance or susceptible to increased harvest or other human-induced mortality.
6. Forest canopies have opened in areas of south-central Alaska affected by spruce bark beetles, which has caused the densities of some understory plant species to increase and others to decrease.
7. Removal of 50-70% of the forest canopy through beetle infestation or associated forest management activities may increase wildlife diversity whereas removal of 80-100% of the canopy may decrease wildlife diversity, based on studies conducted elsewhere.
8. Changes in forest canopy structure caused by spruce bark beetle infestations presumably will directly affect use of habitats by Neotropical migratory birds. For example, of the 92 bird species expected to occur on the Kenai Peninsula, we predict from established wildlife-habitat relationships that 37 will decrease in abundance (e.g., spruce grouse, pine grosbeak, Townsend's warbler), 24 increase in abundance (e.g., warblers and sparrows associated with shrubs), 11 have mixed or unknown responses, and 20 not change in abundance (i.e., those not associated with forested habitats).
9. Changes in understory vegetation caused by beetle-induced canopy loss, including potential increases in browse availability and in productivity of berry-producing shrubs, presumably will affect use of habitats by small mammals and may benefit moose, brown bear, and black bear in areas where woody vegetation is not suppressed by dominance of bluejoint grass (Calamagrostis canadensis). Bluejoint dominance may decrease habitat effectiveness for moose and other large mammals. For example, of the 39 mammal species expected to occur on the Kenai Peninsula, we predict from established wildlife-habitat relationships that 13 will decrease in abundance (e.g., red squirrel, porcupine, flying squirrel), 8 increase (e.g., snowshoe hare, voles), 8 have mixed or unknown responses, and 10 not change in abundance (i.e., those not associated with forested habitats).

10. Human uses of wildlife (e.g., hunting, viewing) will change in response to spruce bark beetle infestations, but the effects will depend on the objectives of the users and responses of individual wildlife species to habitat changes. For example, moose numbers may increase and offer more opportunities for hunting and viewing whereas populations of some song birds may decline and offer fewer bird watching opportunities for those species.

RECOMMENDATIONS

Mortality of mature white spruce as a result of infestations by spruce bark beetles temporarily increases potential for wildfire, and there is increased likelihood of timber harvest for salvage. Fire and logging further change habitats already altered by beetle infestation, but also represent tools of potential value to wildlife management. Forest management in the absence of full consideration of the potential effects of management actions on wildlife will likely exacerbate the negative effects of spruce bark beetle infestations on wildlife. Management of infested spruce forests that incorporates a fuller understanding of wildlife habitat relationships in those stands will result in conservation of wildlife populations. It is important to understand that spruce bark beetle infestations are part of a natural process, and they should not be considered an ecological disaster. Associated management actions should be conducted so that they maintain or increase wildlife populations.

The Alaska Chapter recommends the following actions.

1. Decision-making criteria for use of salvage harvests and associated harvest techniques, including construction of logging roads, should include full examination, careful consideration, and public disclosure of the potential effects of the harvest on wildlife habitats or populations. Salvage harvests and associated harvest techniques may be appropriate in some areas (e.g., near communities to reduce fire risk) but not in others (e.g., important habitats). In some circumstances (e.g., critical habitats, important wildlife travel corridors), land managers should maintain roadless areas as strategic habitat reserves.
2. Land managers should ensure, and have a concomitant responsibility for, regeneration of a diversity of tree species (e.g., spruce, hardwoods, willows) by using techniques such as scarification or burning, if salvage harvests are implemented.
3. Land managers should mitigate road construction by closing roads to public access during logging operations and completely removing roads after logging has been completed. Land managers and wildlife management agencies should use regulation and enforcement to prevent vehicular (e.g., ATV) use of removed roads and to control use of roads retained for legitimate wildlife management purposes (e.g., hunter access) by request of a wildlife management agency.
4. Land managers should plan timber harvests on a regional scale to assess cumulative effects of actions by various public and private organizations. Planning should include specific actions to be taken during and after timber harvest, including forest regeneration and disposition of roads, and should specify future management plans for the affected lands.

5. Resource management agencies should cooperate to acquire comprehensive, digital land cover maps of infected areas for resource assessment and evaluation of cumulative effects of management actions. Such analysis is essential for planning prior to implementation of further management actions. The Kenai Peninsula could serve as a pilot project, although other infested areas should be considered as well.
6. Resource management agencies should cooperate to study wildlife responses to new, ongoing, and past spruce bark beetle infestations and to forest management activities associated with salvage harvests.