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Developing Approaches to Reduce Wildlife Damage to Forest Resources

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BY DALE L. NOLTE

Wildlife impacts on forest resources can be extensive. Although damage is generally considered in terms of reduced productivity or delayed harvest cycles, attempts to replace trees after a harvest or a fire can fail because of foraging wildlife. Wildlife, particularly mammalian herbivores, can impede attempts to establish native plants to increase forest diversity, improve riparian areas, re-vegetate disturbed sites, restore endangered or threatened plants, or to create or improve habitat for wildlife. Foraging wildlife can be extremely detrimental if animals browse on plants before seedlings are well established, or if foraging is continuous or intense. Native plant projects are often destined to fail because target locations fall amongst animals with limited foraging options.

Managing resources to resolve problems is becoming increasingly difficult. The land base to produce timber is shrinking as increasing acreage is managed to provide suitable habitat for wildlife. Historical approaches to reduce problems are under increasing scrutiny with public demands for non-lethal and humane means to resolve animal damage conflicts. Conflicting management objectives also frequently impede attempts to resolve problems. One forester may need to reduce damage on a timber stand, while concurrently an adjacent landowner is working to increase wildlife populations. The combined result is a critical need for increased and enhanced research and outreach programs geared to solving human-wildlife conflicts and improving wildlife damage management.

PHOTO COURTESY OF NWRC OLYMPIA FIELD STATION

NWRC Olympia Field Station conducts research on a variety of species that impact forest resources.

The Olympia Field Station in Olympia, Wash., is an extension of the National Wildlife Research Center (NWRC) based in Fort Collins, Colorado. NWRC functions as the research arm of the Wildlife Service Program, an agency of the United States Department of Agriculture, Animal and Plant Health Inspection Service, charged with the responsibility of conducting research on a wide variety of wildlife management problems on a national and international basis.

Research conducted at the Olympia Field Station focuses on developing feasible tools and strategies to resolve problems associated with wildlife damage to forest resources. Applied studies are conducted to develop new products (e.g., repellents, attractants, delivery systems), assess new or existing techniques (e.g., efficacy, non-target impacts, long-term conse-

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quences), and investigate forest management options to reduce resource vulnerability. Because new tools cannot be created without first having a fundamental understanding of the problem, research of a more basic nature is also conducted. Station personnel conduct studies to elucidate the role of chemical senses and experience on foraging behaviors, and perform field research to clarify the environmental and ecological factors influencing the occurrence, dispersal and population densities of targeted species. Results are used by a broad array of managers that develop management plans to protect forest resources from damage by wildlife.

The NWRC Olympia Field Station consists of an office/laboratory building and separate animal facilities. The animal facility enables scientists to house and conduct research with most mammals commonly found in the Pacific Northwest. Rodents can be maintained in individual pens for chemosensory assays or held in larger arenas that provide natural environments for behavioral work. Similar facilities are available for scientists to work with deer. These facilities have been completely renovated over the past few years for the well being of research animals, to enhance research activities and to increase safety of employees. Pens are designed to permit flexibility to adjust to any special requirements posed by animals held at the facilities and to enable scientists to adapt facilities for experimental paradigms.

PHOTO COURTESY OF NWRC OLYMPIA FIELD STATION

Several methods including fencing, barriers and repellents have been tested to reduce deer browsing.

Field Station personnel are working to identify new non-lethal tools to remove targeted species causing damage and to evaluate and improve existing animal damage control technologies.

Physical deterrents are effective if they are constructed to completely impede access by offending wildlife. However, construction and maintenance are often cost prohibitive. Efforts are underway to identify less expensive materials and possibly reduced labor costs. Studies are also being conducted to improve our understanding of how materials used to construct barriers affect animals (e.g., attraction) and plants (e.g., microclimate), along with necessary strength, size and configuration for effective physical barriers.

Technology has provided a multitude of frightening devices and operating systems (e.g., acoustics, visuals, detection devices). Scientists are working to understand wildlife species responses to varied delivery intervals, paired consequences and varied responses depending on status (i.e., male vs. female, dominant vs. submissive, individuals vs. groups).

In addition, the station routinely evaluates efficacy of commercial repellents to deter deer browsing. Scientists continue to evaluate natural products (e.g., plant extracts, predator odors) to assess their potential as active ingredients in repellents. The Field Station recently completed a series of studies evaluating efficacy of an alternative feeding program to reduce tree girdling by bears, and assessing possible impacts on nutritional status and behavior of bears using feeding stations.

Developing non-lethal means to alleviate damage requires a thorough

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understanding of the underlying mechanisms governing foraging behavior. Although much information exists to describe foraging in a few model species (e.g., rats, sheep), little data have been collected for wildlife. Moreover, there is limited understanding of the factors that determine the effectiveness of most management strategies, including environmental context, forage and site selection by wildlife, and variables influencing animal movements and dispersal. All too often this limited understanding leads to the failure of management plans to achieve their intended objectives.

PHOTO COURTESY OF NWRC OLYMPIA FIELD STATION

Deer are handled for both veterinary care and station research in the deer handler system at the Olympia Field Station.

Several studies conducted at the Olympia Field Station have explored the roles that experience and chemical senses play in the foraging behaviors of various species. For example, a series of studies determined criteria used by black bears to select trees for girdling, and then related these criteria to silvicultural practices. Other ongoing studies are interpreting deer foraging response to active ingredients used in repellents. Scientists working at the station are trying to determine what role secondary metabolites (e.g., terpenes), contained in most conifers, have on wildlife foraging. A series of studies is investigating whether prior experience may cause animals to be more tolerant of metabolites and thus more likely to browse seedlings. Other studies seek to determine whether foraging preferences exhibited by deer among western redcedar genotypes is correlated with terpene concentrations. Scientists also are investigating whether nutritional status of deer affect their ability to cope with secondary metabolites.

Scientists also are assessing potential baits to reduce rodent populations because non-lethal tools are not always feasible, such as when wildlife populations exceed the capacity of available foraging resources. Thus the most effective, yet humane and environmentally safe products need to be identified.

Although the Olympia Field Station's primary focus is to develop approaches to protect forest resources, its staff has emerged as the NWRC leaders in conducting research with aquatic mammals. Scientists, cooperating with several Wildlife Services state programs across the nation, are assessing differences in biological and behavioral differences between beaver in colder climates and beaver from areas where food is less limiting. Ongoing collaborative efforts are developing non-lethal approaches to alleviate problems associated with beaver in urban areas or destructive to wetland enhancement projects. Other research is directed toward developing feasible approaches to protect native marshes by reducing destructive foraging by nutria.

NWRC Olympia Field Station personnel are dedicated to developing feasible tools and strategies to resolve problems associated with wildlife damage to forest resources. They also recognize that an effective program requires a continuous informational exchange with resource managers. The Field Station has benefited from resource managers providing guidance to identify emerging issues, establishing experimental priorities, and ensuring the practicality of results. Anyone interested in resolving wildlife impacts to forest resources is encouraged to contact the field station. ◆

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Collaborative Research Team

The Collaborative Research Team (CRT) is a collaboration of persons interested in identifying feasible solutions to resolving wildlife negative impacts to forest resources. An informal structure is used to keep participants apprised of research results and to exchange information on emerging methods and strategies to prevent damage. The Olympia Field Station has relied heavily on input from this group while developing research objectives.

CRT has provided guidance on problems associated with a variety of wildlife species. Past bear research and ongoing mountain beaver research in particular have benefited from CRT activity. CRT participants also have solicited resource and fiscal support for select projects. Past CRT participants have represented private and industrial forestry, along with several state and federal agencies. Anyone interested in participating with the CRT should contact the NWRC Olympia Field Station at 360-956-3793.