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## Reducing Wildlife Damage to Forested and Riparian Ecosystems

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### National Wildlife Research Center Scientists Develop Methods to Reduce Timber Damage

Wildlife Services' (WS) National Wildlife Research Center (NWRC) is the only Federal research facility devoted exclusively to resolving conflicts between people and wildlife through the development of effective, selective, and acceptable methods, tools, and techniques. NWRC's field station in Olympia, WA, has the capacity to conduct research on most animals associated with forest resource damage. Damage to timber resources at the human-wildlife interface often occurs in a variety of environments, ranging from bottomland hardwood forests to upland conifer farms.

Wildlife impacts on forest resources can be extensive. For example, attempts to replace

trees after a harvest or a fire can be complete failures because of foraging wildlife. Reforestation efforts are greatly hindered by bears, beavers, deer, elk, mice, mountain beavers, pocket gophers, porcupines, and voles cutting and gnawing on seedlings. Some of the same species that damage seedlings also damage and destroy established trees after canopy closure. Select species cause multiple impacts by their behavior and habits. For example, beavers are found in upland, lowland, and riparian habitats and they directly destroy trees by their foraging habits. Impounded water created by beaver damming activity floods and kills additional trees. Furthermore, altered water patterns caused by beaver damming erode roads and railways causing danger for human health and safety.

Developing nonlethal methods to manage wildlife damage is a priority in the ongoing research conducted at NWRC's Washington field station. Scientists are currently conducting research to develop alternatives to lethal control, including physical deterrents, repellents, frightening devices, habitat and behavior modification, and improved capture methods.

NWRC scientists are working with a variety of natural resource managers to address the most significant wildlife damage problems in forested areas. The research that NWRC is conducting is specifically targeted to find solutions to problems found in the North-western and Southeastern forests of the United States.



### Applying Science and Expertise to Wildlife Challenges

#### A New Tool for Managing Mountain

**Beavers**—The mountain beaver (*Aplodontia rufa*) is a rodent species endemic to the Pacific Northwest and northern coastal California. Unlike a true beaver, it has a short tail and is not well adapted to aquatic life but lives underground and is seldom seen. This herbivore is managed as a pest species because of the impact it has on newly planted Douglas-fir (*Pseudotsuga menziesii*) seedlings and Douglas-fir trees 10-15 years old. Attempts to manage mountain beavers through repellents, barriers, and trapping are costly and not always productive. Results from a series of studies at the Washington field station concluded that chlorophacinone was an efficacious and environmentally safe toxicant with potential as a tool to control mountain beavers. Consequently, special local needs (SLN) labels were recently approved in Washington and Oregon for the use of Rozol™ (active ingredient chlorophacinone) as an additional tool to manage mountain beavers. Results from additional studies recommend integrating this tool with traditional trapping to increase forest health and reduce economic impacts.

#### Major Research Accomplishments:

- WS evaluated efficacy of chlorophacinone as a toxicant for managing mountain beavers.
- WS evaluated the efficacy of hydrolyzed casein as a new repellent for rodents and ungulates.
- WS evaluated flavor aversion learning (FAL) for deterring ungulates from select tree species.
- WS assessed beaver demographics in high use areas of the southeastern United States.
- WS determined the demographics and territorial behaviors of mountain beavers in the Pacific Northwest.

### **Developing and Testing Repellents**

**to Protect Forest Resources**—Use of repellents for protecting trees can be cost prohibitive and results are generally short term. Thus, the need exists for a cost effective and long lasting repellent for application in forest management. NWRC studies are evaluating the effects of hydrolyzed casein as a repellent for rodents and ungulates. Initial results showed a simple repellent made from glue and hydrolyzed casein may offer considerable browse protection from deer when alternative forage is available. NWRC scientists also concluded that avoidance of foods treated with animal-based proteins, such as hydrolyzed casein, was mediated by changes in palatability, not fear of predation. Other studies are working to identify genetically-controlled chemical characteristics which promote herbivore avoidance of select tree species.

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### **Groups Affected By These Problems:**

- Commercial timber producers
- Gardeners/Landscapers
- Homeowners
- Natural resource managers
- Noncommercial forest land owners
- Orchard managers
- State departments of transportation

### **Major Cooperators:**

- Mississippi State University
- Oregon Forest Industries Council
- Oregon Department of Forestry
- Tres Rios, City of Phoenix
- Washington Forest Protection Association
- Washington Department of Natural Resources
- USDA Forest Service
- Utah State University

**Dietary Behaviors**—Most problems associated with wildlife occur because of their foraging activities. NWRC researchers are working to determine how select wildlife species respond to chemical components in foods. Forestry practices, such as thinning or fertilizing, influence plant chemistry, with one consequence being the increase in sugar to terpene ratio, making trees more desirable as a food to many wildlife species. Conversely, pruning trees decreases their likelihood of being targeted as food. Ongoing collaborative efforts will determine which traits can be selected to produce less palatable trees. Concurrently, ongoing studies suggest that a deer's nutritional status impacts its willingness to ingest foods containing high terpene levels. Understanding these and other mechanisms that control dietary behaviors aid in the development of management strategies for decreasing damage and help create models for predicting where damage is most likely to occur.

### **Selected Publications:**

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- Kimball, B.A., Nolte, D.L., and Perry, K.R. 2005. Hydrolyzed Casein Reduces Browsing of Trees and Shrubs by White-tailed Deer. *HortScience*. 40:1810-1814.