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Development and Assessment of Methods and Strategies to Monitor and Manage Mammalian Invasive Species with Special Emphasis on Rodents

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National Wildlife Research Center Scientists Assess and Develop Methods to Manage or Eradicate Introduced and Invasive Mammals

Wildlife Services' (WS) National Wildlife Research Center (NWRC) is the only Federal research organization devoted exclusively to resolving conflicts between people and wildlife through the development of effective, selective, and acceptable methods, tools, and techniques.

The National Invasive Species Council has documented the serious threat to agriculture, property, natural resources, and human health and safety in the U.S posed by invasive or introduced plants, invertebrates, disease agents, and vertebrates. Pimentel and others (2000) estimated that invasive species result in at least \$138 million per year in losses, damage, and control. About 300 species of invasive vertebrates have been accidentally or purposefully introduced into the U.S., including about 20 species of mammals. These include omnivores (rats, feral pigs), predators (mongoose, foxes, feral dogs and cats), and herbivores (feral livestock, non-native deer).

WS has a long history of involvement in invasive species management, not only on the mainland U.S., but in Hawaii, the Caribbean, South America, Africa, Indonesia and the Philippines. Research continues to improve methods and strategies to 1) prevent introductions, 2) detect new introductions, 3) eradicate introductions, and 4) support sustained control for well-established invasive species where eradication is not feasible.



Major Research Accomplishments:

- WS hosted the 2nd National Invasive Rodent Summit in Fort Collins, CO. The conference was jointly sponsored by the NWRC, the U.S. Fish and Wildlife Service and The Wildlife Society's Wildlife Damage Management Working Group. The conference emphasized the management of rodents to conserve plants, other wildlife and habitats. More than 100 people attended representing 10 countries and territories and 23 states. WS employees were involved in 19 presentations.
- WS demonstrated the effectiveness of diaphacinone rodenticide bait in controlling Norway rats in the Aleutian Islands.

Applying Science and Expertise to Wildlife Challenges

Developing Methods to Eradicate rats from the Aleutian Islands—Introduced rats are causing high mortality to protected, nesting seabirds in the Aleutian Islands of Alaska. A study to under-

stand rat ecology and develop methods to control or eradicate the rats on Kiska Island was conducted by NWRC for the U.S. Fish and Wildlife Service. A hand-broadcast application of diphacinone rodenticide pellets seemed to have controlled rats on sample plots.

Assessing the Rodent-Leptospirosis Connection in the Azores—NWRC scientists are studying the ecology and management of introduced rodents in the Portuguese Azores Islands for the U.S. Department of Defense, as part of a cooperative agreement between the U.S. and Portugal. The rodents are a continuous source of the bacteria Leptospirosis that can infect humans and livestock. Effective rodenticide baits and rodent trapping methods are being developed.

Developing Effective Mongoose Control Methods—Mongoose have been introduced to many islands with the hope of controlling introduced rats. Unfortunately, the mongoose feed mainly on native birds and reptiles and have endangered many species. NWRC scientists are working to identify attractants to better monitor and capture mongoose on Hawaii. Additional studies will investigate effective, durable toxic baits and multiple-capture traps for mongoose.

Using Captive, Wild Rats for Pen Studies—NWRC scientists have begun to establish groups of captive, wild rats to allow studies of rat social behavior and responses to new lures, toxic baits, bait stations, and types of traps. These studies will improve resource managers' abilities to monitor, manage, and eradicate introduced rats on islands.



Groups Affected by This Problem:

- Urban citizens
- Farmers
- Livestock producers
- Natural resource managers
- Conservationists
- Military bases

Major Cooperators:

- U.S. Fish and Wildlife Service
- U.S. National Park Service
- U.S. Department of Defense
- U.S. Forest Service
- Island Conservation, Inc.

Selected Publications:

- Witmer, G. 2004. Rodent ecology and plague in North America. In: Proceedings of the 19th International Congress of Zoology; 23–27 August 2004, Beijing, China. Beijing, China: China Zoological Society: 154–156.
- Witmer, G. 2004. Leptospirosis in the Azores: the rodent connection. In: Timm, R. M.; Gorenzel, W. P. eds. Proceedings of the 21st Vertebrate Pest Conference; 1-4 March 2004, Visalia, CA. University of California, Davis, CA: 217-220.
- Witmer, G.; Sander, R.; Taft, A. 2003. Feral swine--are they a disease threat to livestock in the United States? In: Fagerstone, K. A.; Witmer, G. W., eds. Proceedings of the 10th wildlife damage management conference. 6–9 April 2003; Hot Springs, AR. Fort Collins, CO: The Wildlife Damage Management Working Group of The Wildlife Society: 316–325.
- Witmer, G.; Campbell, E.; Boyd, F. 1998. Rat management for endangered species protection in the U.S. Virgin Islands. In: Baker, R. O.; Crabb, C. A., eds. Proceedings of the eighteenth Vertebrate Pest Conference. 2-5 March 1998; Costa Mesa, CA. Davis, CA: University of Davis: 281–286.