



Improving Wildlife Welfare

Wildlife is a precious natural resource, and protecting wildlife populations is important for many people. Unfortunately, as animals become more abundant and adapt to living near people, they sometimes impact human safety, livestock, property, and natural resources. The U.S. Department of Agriculture's (USDA) Wildlife Services (WS) program responds to more than 200,000 human-wildlife conflicts each year. WS' field specialists, disease biologists, and scientists help resolve these conflicts using a variety of science-based, selective, and socially responsible methods.

As the program works to resolve wildlife conflicts, it also focuses efforts on developing methods and approaches that can improve wildlife welfare. The National Wildlife Research Center (NWRC) functions as the research arm of the WS program. Its mission is to apply scientific expertise to resolve human-wildlife conflicts while maintaining the quality of the environment shared with wildlife. NWRC scientists work in collaboration with WS field specialists to improve wildlife welfare through the development and use of nonlethal wildlife damage management tools, such as scare devices, wildlife contraceptives, fencing, and repellents. They also work to ensure that lethal methods are selective—targeting those animals causing the damage—and are sensitive to animal welfare concerns. Approximately 75 percent of NWRC's research budget is devoted to the development of nonlethal tools and techniques.

Scare Devices

NWRC scientists have developed and tested numerous scare devices that incorporate light, sound, and/or movement to disperse wildlife and protect human safety, crops, livestock, and property.

- **Protecting Human Safety:** Collisions between wildlife and aircraft result in more than \$1.2 billion in damages annually to civil aviation worldwide and have been responsible for the loss of more than 200 lives since 1988. Approximately 97 percent of these collisions involve birds. The NWRC is a major contributor in reducing wildlife hazards to aviation. Basic biological studies on bird vision and detection of objects have led to collaborative efforts among NWRC, universities, and the aviation industry to develop and test external lighting systems for aircraft to enhance the detection and avoidance of planes by birds.



The active ingredient (nicarbazin) in the oral contraceptive bait OvoControl® weakens the yolk membrane causing the yolk and albumin to mix.

(Photo by USDA/APHIS/WS)

- **Protecting Agriculture:** Keeping wildlife away from agricultural food resources can be challenging—especially because animals often become accustomed to management techniques. NWRC scientists continually create new and innovative ways to prevent wildlife damage and disease transmission to agriculture.

Recently, NWRC scientists developed a motion-activated scare device to prevent the transmission of bovine tuberculosis (TB) from wild deer to cattle in Michigan at hay bale feeders where TB can be spread as the animals share feed. The bale protector consists of two large poles that rotate around the outside of the feeder ring whenever a deer or other animal “trips” the motion sensor. The device deters deer both by its movement and by gently bumping any deer that get close to the feeder. The device does not deter cattle from eating at the feeders.

NWRC scientists are also evaluating fladry as a scare device to keep wolves away from livestock. Fladry entails hanging strips of fabric from cords strung on fences around pastures or other areas that need protection. Wolves are wary of new or novel items in their environment and, therefore, are cautious of crossing the fladry. In captive studies, NWRC scientists found that both fladry and electrified fladry were effective in excluding wolves from a food resource for short periods of time (1 to 14 days),

though electrified fladry was more effective. Fladry may be particularly valuable during calving and lambing seasons.

- **Protecting Property:** NWRC research has led to the use of effigies or taxidermic/artificial mounts to disperse problem vultures and crows. These birds can damage residential and business property, and their droppings can kill trees and create unsanitary conditions, especially near large roosts. When vulture or crow effigies are placed in a roost site, vultures and crows usually abandon the roost within 3 to 5 days. Sometimes it is necessary to use pyrotechnics or handheld lasers in addition to the effigy. The intense beams of the lasers do not cause physical harm but irritate the birds and cause them to move to other locations.

Wildlife Contraceptives

Wildlife contraception—when used as part of an integrated approach with other methods—is a tool to help manage locally overabundant wildlife populations in settings where traditional management methods are legally restricted, impractical, or socially undesirable. The NWRC is developing and testing contraceptives for use in managing wildlife and preventing the transmission of disease.

- **GonaCon™:** NWRC scientists have developed a single-shot, multiyear immunocontraceptive vaccine called GonaCon™. It is currently registered for use with female white-tailed deer but is

also being evaluated for use on numerous other mammal species, such as prairie dogs, squirrels, feral dogs, wild horses, elk, and bison. GonaCon™ stimulates the production of antibodies that bind to GnRH—a gonadotropin-releasing hormone necessary for production of estrogen, progesterone, and testosterone. By binding to GnRH, the antibodies reduce GnRH's ability to stimulate the release of these sex hormones. As long as a sufficient level of antibody activity is present in the bloodstream, sexual activity is decreased, and vaccinated animals remain infertile.

GonaCon™ is also being evaluated as a tool to control the spread of diseases, such as rabies. NWRC scientists and their collaborators are developing a combined rabies and GonaCon™ vaccine for use in free-roaming dog populations. Worldwide, dogs account for over 90 percent of human cases of rabies. Because rabies and animal overpopulation are linked, combining contraception with rabies immunization might provide a strategic means of controlling dog rabies.

- **OvoControl®-P and -G:** Expanding goose and pigeon populations in urban areas are often considered a nuisance and potential health problem. OvoControl® is a registered oral contraceptive bait for Canada geese, ducks, and feral pigeons that was developed by NWRC scientists in partnership with Innolytics, LLC. OvoControl® contains nicarbazin, an active

ingredient traditionally given to broiler chickens to prevent the disease coccidiosis. A side effect of nicarbazin is decreased egg production and hatching rates. When fed to Canada geese and pigeons, OvoControl® reduces the hatching success of eggs. When it is withdrawn from the diet, egg production and hatchability return to normal within a few days.

Fencing

Fencing and other barriers are common tools for preventing wildlife damage or disease transmission, but their high costs can be prohibitive to some landowners. NWRC scientists evaluate the effectiveness of these tools and work to design barriers that are cost-effective. For example, to prevent the spread of chronic wasting disease, bovine tuberculosis, and other diseases, it is often imperative to limit the interaction between wild and captive animals along fence lines. NWRC researchers are testing fence designs for their effectiveness in preventing contact



NWRC researchers are testing fence designs for their effectiveness in preventing contact among wild and captive deer and elk.
(Photo by USDA/APHIS/WS)

among wild and captive deer and elk. In one study, researchers documented 700 contacts between elk on either side of a single woven-wire high fence. Following installation of an additional electric fence, contacts dropped to zero.

Fences typically installed to manage white-tailed deer damage include wire or plastic mesh, electrified high-tensile steel wire, and electrified polytape or polyrope fence. NWRC researchers have reviewed these various designs and developed a computer-based tool to help landowners determine the most appropriate fence design based on cost-effectiveness and specific management needs.

NWRC researchers are also testing fencing designs to limit access of feral swine to agricultural crops. There are more than 4 million feral swine in the United States. Their estimated damage, which totals \$800 million annually, does not include costs associated with the spread of disease or the loss of native habitats and species. NWRC researchers have evaluated several fence designs to help prevent feral swine access to domestic swine and agricultural crops. In field trials, NWRC scientists observed a 64 percent decrease in crop damage by feral swine and other wildlife in areas protected by electric fences.

Repellents

NWRC researchers identify, develop, and improve the use of nonlethal chemical repellents for reducing bird damage to corn, sunflower, rice, forage grasses, and other crops. For example, NWRC is working

with a private company to register anthraquinone for use in certain food crops. Anthraquinone, which occurs naturally in some plants, produces a laxative effect when eaten. In addition, it absorbs near-ultraviolet light that is visible to most birds and may improve its repellency effect. Though anthraquinone is registered as a pesticide by the U.S. Environmental Protection Agency for use as a goose repellent at or near airports and urban areas, it is not currently registered for agricultural applications. NWRC is also investigating whether adding anthraquinone to rodenticide baits reduces consumption of the baits by nontarget geese, pheasants, and other birds.

Humane Wildlife Capture Methods

Trapping and other capture methods are important tools for managing animal damage and conducting wildlife research. NWRC scientists continue to develop and test new devices and attractants to more selectively, efficiently, and humanely capture specific species.



Remote trap monitors alert field specialists, wildlife managers, and others when animals are captured in traps.

(Photo by USDA/APHIS/WS)

For instance, a recent NWRC study evaluated new designs for foot snares, which are often used to manage damage caused by coyotes. Scientists rated the effectiveness and injury caused by different cable foot-restraint devices. The results suggest that adding a cushioning sleeve to a cable restraint actually increases the number and severity of injuries, and that injuries to coyotes caught in unmodified cable foot-restraints are similar to those of coyotes caught in padded steel jaw traps.

NWRC scientists also evaluated the effectiveness of remote trap monitors to alert field specialists, wildlife managers, and others when animals are captured in traps. The device, which can be used with any type of trap, consists of a small radio transmitter that emits a unique pulse rate when an animal is captured. This helps to reduce the amount of time an animal remains in a trap.

NWRC has also assisted State conservation agencies, in cooperation with the Association of Fish and Wildlife Agencies, in developing best management practices for the capture of 23 species of State-regulated furbearers harvested for fur and subsistence. The program provides technical information and educational resources for State, Tribal, and Federal wildlife management agencies, conservation organizations, trappers, trap manufacturers, and others interested in efficient, selective, safe, and practical animal capture systems that meet international criteria for humaneness. This cooperative program conducted by State wildlife agencies also provides a means for the United States to meet international

commitments to encourage the use of humane capture systems for wildlife species harvested for fur. Information on the program can be viewed at www.fishwildlife.org/furbearer_resources.

Additional Information

**For more information, please contact:
National Wildlife Research Center
USDA, APHIS, WS
4101 LaPorte Avenue
Fort Collins, CO 80521**

You may also call NWRC at (970) 266-6000 or visit our Web site at http://www.aphis.usda.gov/wildlife_damage/nwrc/.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.