

Wildlife Services

Protecting People
Protecting Agriculture
Protecting Wildlife

Protecting Wildlife

FY 2012

Guarding Against Invasive Species



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Nonnative species that cause harm are collectively known as invasive species. Invasive species may prey upon, displace, or otherwise harm native species. Some invasive species also alter ecosystem processes, transport disease, interfere with crop production, or cause illnesses in animals and humans - affecting both aquatic and terrestrial habitats. For these reasons, invasive species are of national and global concern. Invasive species accounted for 53% of all the animals Wildlife Services lethally removed in FY 2012, a total of 1.76 million animals taken.

In 1999, Executive Order (E.O.) 13112 established the National Invasive Species Council (NISC), co-chaired by the Secretaries of the Interior, Agriculture, and Commerce. NISC was charged with providing coordination, planning, and overall leadership for Federal invasive species programs and reaching out to State, tribal, local, and private partners. E.O. 13112 seeks to prevent the introduction of invasive species and provides for their control to minimize the economic, ecological, and human health impacts that invasive species cause. WS plays a central role in several initiatives being developed by the Federal Invasive Terrestrial Animals and Pathogens Committee (ITAP). ITAP facilitates information gathering, planning, and action implementation among various Federal, State, public, and private entities, which pursue invasive species management.

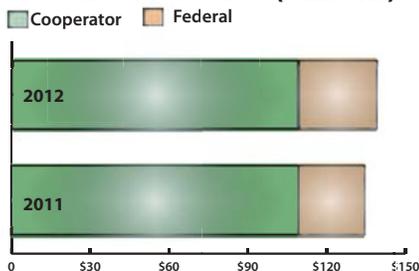
WS predation management efforts are especially important in protecting Federally-listed species and preserving island ecosystems, such as Cuba, U.S. Virgin Islands, Hawaii, Puerto Rico, and San Clemente Island, California. Nonnative, or invasive, predators can devastate island ecosystems where a lack of natural enemies and resource competition can allow invasives to thrive, and harm native wildlife. Of special concern are rodents, a main cause of damage to island habitats. WS' research efforts target these introduced, invasive species, especially in remote and rural areas. It has led to development of more efficient removal techniques, allowing WS to target only those animals directly impacting populations of threatened and endangered species.

In Florida, WS partnered with State agencies to conduct an eradication program targeting the invasive Gambian pouched rat, which threatened native species in the Florida Keys. Since 2004, 192 Gambian rats have been captured. Currently, the project is in a monitoring phase, which will continue for several years before WS can be confident that Gambian rats have been eradicated from the Florida Keys. WS also provided valuable assistance to protect natural resources in the Everglades when invasive Burmese pythons were identified as a major threat to many wild species. Large pythons can consume a wide variety of native wildlife, including raccoons, rabbits, bobcats, ibis, and limpkins. Pythons are also affecting the previously endangered American alligator and the currently endangered Key Largo wood rat.

Brown Tree Snake—One of the most ecologically damaging invasive species is the brown tree snake (BTS). In just half a century, the BTS have eliminated 10 of 12 native bird species and most lizard and bat species on Guam. This native of the South Pacific and Australia is responsible for large economic losses from damaged electrical lines and resulting power outages, and poses hazards to human safety from bites. Accidentally introduced to Guam in the late 1940s or early 1950s, BTS have caused extensive economic and ecological damage to the island.

While managing the BTS population on Guam, WS actively prevents its spread to other Pacific islands and the U.S. mainland. Efforts are concentrated at sea ports and commercial warehouses. WS uses specially trained Jack Russell terriers to inspect departing cargo for "hitchhiking" snakes and sets specially-designed snake traps around cargo areas. Since the BTS program began in 1993, an average of 10,000 snakes are removed from Guam's ports each year. In FY 2012, WS intercepted 12,000 BTS at or near Guam's ports of exit. Also, WS continues the use of the oral BTS toxicant, acetaminophen, resulting in a significant reduction of BTS.

Expenditure for Natural Resource Protection (Millions)



United States Department of Agriculture
Animal and Plant Health Inspection Service

BTS is not the only invasive animal threatening the Nation's natural resources. WS' mongoose control work has had a tremendous positive impact on the conservation of the entire Puerto Rican parrot population. Other projects conducted by WS are designed to protect critical species and habitat from invasive species. In California, WS protects the western snowy plover, California clapper rail, salt marsh harvest mouse, and other threatened and endangered species from various invasive carnivores.

Feral Swine—WS also cooperates with public and private agencies to control feral swine that harm endangered plants, tree snails, sea turtles, and forest birds. These non-native animals cause damage to agricultural crops and livestock and threaten native wildlife and habitats. Free-ranging populations of feral swine exist in at least 38 States, with a nationwide population estimated at approximately 5 million animals. Feral swine damage pastures, agricultural crops, lawns, landscaping and natural areas due to feeding, rooting, wallowing, grazing, and trampling activities. The cost of damage and control of this invasive species is estimated to be \$1.5 billion annually, with at least \$800 million of this estimate related to direct costs to U.S. agriculture.

Feral swine are reservoirs of many diseases and act as a host to parasites that can negatively impact agricultural animals, especially swine. A cooperative State, Federal, and industry program managed by the USDA's Animal and Plant Health Inspection Service (APHIS) has eradicated pseudorabies from commercial-production swine herds in the United States. Because commercial-production swine are now free of pseudorabies, reinfection via feral swine exposure would be economically devastating to the pork industry. Pseudorabies is a fatal disease in other farm animals, wild mammals, and in dogs and cats. Although people are not directly at risk of infection from pseudorabies, humans can contract swine brucellosis. That disease can be carried by feral swine, and people can contract brucellosis through handling infected tissues of wild swine.

Nutria—Through a cooperative agreement with the U.S. Fish and Wildlife Service, the APHIS WS program is spearheading efforts to protect Chesapeake Bay coastal marshes from the damaging effects of invasive nutria, a South American semi-aquatic rodent that has destroyed thousands of acres of sensitive marshlands. Between 2002 and 2010, the WS eradication team developed integrated wildlife damage management methods that allowed them to effectively remove nutria populations from more than 160,000 acres of infested coastal marshes.

Following recommendations in a program review by a panel of international invasive species experts in 2010, the team has prepared for eradicating nutria from the remainder of the Delmarva Peninsula by conducting an exhaustive search to define the boundaries of the remaining population. Completing that delimiting survey in 2013, the team is now poised to trap and remove the remaining populations detected in Maryland's Lower Eastern Shore. The team estimates it will take one to two years to remove the remaining populations and up to three additional years to ensure that eradication was successful.

European starlings (*Sturnus vulgaris*)—Starlings are an invasive exotic species that cause damage to agricultural resources, especially dairy and livestock facilities where they consume and contaminate feed. Because birds' eating concentrates on the high protein portion of dairy cow feed, they deprive cows of proper nutrition, resulting in decreased milk production. Starlings also carry a large number of diseases, such as Avian salmonellosis (primarily, *Salmonella enterica*), which are transmissible to humans, poultry, and livestock. Bird droppings in feed and water can transmit harmful diseases, reduce feed consumption and increase feed costs. Bird feces on buildings and equipment can shorten their useful life and increase cleanup costs.

Upon request, WS can provide on-site assistance to dairies and feedlots where over-abundant birds are causing damage. Plans to reduce damage may include recommendations for exclusion, harassment, or lethal removal. A variety of netting, repellants, and scaring devices may be tried to deter the birds.

Starlings and blackbirds often occur together in damage situations in agricultural and suburban areas, and at airports. The estimated annual damage to grain, fruit, and berry crops from blackbirds and starlings exceeds \$150 million in direct costs. Starlings are small, but the higher density of their bodies relative to other birds, their large populations, and flocking behavior increases the hazard they pose to aircraft for damaging strikes. Starlings have been involved in the most deadly civil and military accidents.

They may cause property damage due to accumulations of feces and other activities. Because they negatively impact property, agriculture, and natural resources many conservationists consider starlings to be an undesirable component of North American ecosystems. Starlings account for 40% of the wildlife lethally removed by WS although eight times as many are dispersed from areas where they are causing problems.

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Conserving Wildlife and the Environment



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Wildlife Services (WS), a program within the U.S. Department of Agriculture's Animal and Plant Health Inspection Service, provides Federal leadership and expertise to resolve wildlife conflicts that threaten the nation's natural resources. WS works in every State to protect and preserve natural resources, such as wetland habitats, forests, and threatened and endangered (T&E) species that are vital components of America's natural heritage.

Protecting Threatened and Endangered Species

In FY 2012, WS efforts assisted 168 threatened or endangered (T&E) species in 38 States, Guam, the U.S. Virgin Islands, and Cuba. In more than 96% of the projects, T&E species populations either increased or remained stable. In addition to direct species-conservation projects, WS' beaver damage management in the eastern United States has also benefited approximately 200 listed fish, mussel, and plant species by maintaining natural riverbank habitats and improving the water quality and water flow. Beaver projects generally assist landowners by reducing flooding.

In 2008, for the first time in decades, the endangered Kirtland's warbler successfully nested outside of Michigan, with 10 young warblers surviving to leave their nests due to partnership of private, State and Federal agencies in Wisconsin. In 2012, reports suggest that 4 nesting attempts in Wisconsin were successful again, fledging an estimated 8-13 young. WS aids the project by constructing and monitoring traps to remove cowbirds, known to reduce successful warbler nesting.

Beginning in 2007, WS-Maine partnered with Federal and State agencies, private organizations, and homeowners to increase piping plover reproductive success. During the 2010 nesting season, WS expanded its involvement by increasing the number of beaches that were managed from two to seven. In the six years of this program, beaches where predation management was conducted had 32.5 % higher fledgling success than beaches without such efforts.

WS activities to aid T&E species can be categorized as either direct protection or recovery enhancement.

Direct Protection—Direct protection serves as a useful management tool on islands and in other isolated ecosystems. Examples include protecting the avifauna of Guam and Hawaii from the brown tree snake. To protect four species of nesting sea turtles in Florida, WS control efforts targeted coyote, raccoon, skunk, and fox predators on the turtles' beach nesting habitats. WS and Federal and State partners also work together to protect nesting sea turtles from fox and raccoon predation in North Carolina, and to protect threatened and endangered salmon and steelhead from gulls in the State of Washington.

Recovery Enhancement—WS plays a crucial role in the ongoing recovery of the gray wolf throughout the United States. As wolf populations expand or increase, WS works to limit or prevent livestock predation by packs, investigates depredations, and relocates or removes problem animals. By providing prompt and effective responses to wolf predation complaints, WS helps reduce the loss of livestock to wolves and promotes greater tolerance for wolves by ranchers and local communities.

WS consulted and cooperated with Federal and State wolf management agencies since the 1970s. All work is conducted in compliance with Federal or State wolf management plans, the Endangered Species Act, and the National Environmental Policy Act. Where WS has assisted in the Rocky Mountains and Great Lakes regions, the wolf population has reached and exceeded recovery goals set by wolf managers. The successful wolf reintroduction program in Yellowstone National Park can be directly attributed to cooperation among Federal and State agencies and local and regional landowners to enhance wolf recovery.



United States Department of Agriculture
Animal and Plant Health Inspection Service

A similar recovery enhancement effort is being implemented by WS in the southwest. There, reintroduction efforts for the Mexican wolf are continuing, and landowner cooperation is critical to program success. As a result of partnering with FWS, reintroduction management efforts have seen an increase in wolf numbers in FY 2012.

Habitat Conservation

WS activities can directly aid wildlife and habitat and can reduce the impacts of more abundant wildlife on rare species. WS work to control invasive species, especially feral swine, will benefit forest and wetland ecosystems and other natural resources. Feral swine can destroy river plants and topography as well as compete with native wildlife for limited food resources. In one direct assistance project, WS trapped river otters causing damage in Washington communities and assessed their health. In a cooperative partnership involving state, federal, local, and private agencies, WS transported and released the otters on tribal lands in New Mexico, part of their natural range where the mammals had not been seen in years.

Managing Beaver to Enhance Wildlife Habitat—Dramatic increases in beaver populations, associated with low demand for beaver products, have intensified the negative impact of beaver on hardwood timber, crops, and river habitats. Beaver activity can negatively impact bridges, roads, water control structures, municipal sewer systems, water treatment facilities, and even other aquatic species. Economists estimate beaver damage exceeds millions of dollars each year, greater than the costs caused by any other wildlife species in the United States. The economic damage due to beaver in the southeast alone is estimated to have exceeded \$4 billion over a 40-year period.

WS employs certified explosives experts who are frequently called upon to remove beaver dams that block water flow and flood forests and other wildlife habitat. For example, WS in Wisconsin continues to maintain more than 750 miles of trout streams, which had been seriously degraded by overabundant beaver populations and dam-building activities. WS manages beaver populations on these streams to eliminate the widespread flooding of forested land and to allow native trout to once again reproduce naturally.

Managing Cormorants to Conserve Sport Fish and Protect Habitat—The double-crested cormorant can cause significant damage to natural resources. Over time, concentrations of cormorant nesting colonies can denude a site of all vegetation, as dramatically demonstrated on some Great Lakes' islands, where cormorant populations have significantly increased in recent years. WS conducts damage management activities in several States to protect the nesting habitats of other colonial birds from cormorant damage and conducts research to determine the extent of the damage on native Great Lakes region sport-fish populations caused by the birds' feeding activities.

Responding to Contaminant Spills and Other Emergencies

The National Wildlife Disease Program (NWDP) provides leadership in disease monitoring, surveillance, and emergency response programs to safeguard public health, agriculture, and natural resources through domestic and international collaboration. NWDP participates in wildlife disease monitoring and surveillance in all regions of the United States. Active surveillance allows for a better understanding of many wildlife diseases and enhances the ability to respond to disease outbreaks in wildlife and domestic animals, as well as to prevent disease threats to humans. The program's Wildlife Disease Biologists are WS' first responders through the WS Surveillance and Emergency Response System (SERS).

WS protects natural resources and assists State wildlife and agriculture agencies. It currently conducts programs in eight states to bolster populations of game-species. For example, programs have been implemented to assist State agencies in recovering declining deer herds in several Western States. In the Southeast, work is underway to determine methods to restore bobwhite quail populations, which have steadily declined.

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National Rabies Management Program



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Major Cooperators

- Centers for Disease Control and Prevention (CDC)
- State Departments of Health, Agriculture and Fish and Wildlife
- County and Municipal Agencies
- National Park Service (NPS)
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Forest Service (USFS)
- Bureau of Land Management (BLM)
- Department of Defense
- Army Corps of Engineers
- Homeland Security – U.S. Coast Guard
- Tennessee Valley Authority
- National Aeronautical and Space Administration
- Federal Bureau of Investigation
- Navajo Nation
- Global Alliance for Rabies Control
- Canadian Food Inspection Agency
- Ontario Ministry of Natural Resources
- Ministère des Ressources Naturelles et de la Faune
- Mexican Departments of Health (SALUD), Agriculture (SENASICA/SAGARPA) and Natural Resources (SEMARNAT)
- Trent University
- Cornell University
- University of Georgia-SCWDS
- Ohio State University
- Tufts University
- Thomas Jefferson University
- Auburn University
- Colorado State University
- Texas A&M at Kingsville

Although the nature of rabies in the United States has changed dramatically over the years, rabies remains a significant wildlife management and public and animal health challenge in the 21st century. In 2011, and for at least two decades, greater than 90% of all reported animal cases have been in wildlife, predominantly wild carnivores and bats. Prior to 1960, reported cases were primarily in domestic animals. This change has elevated rabies to a core activity within Wildlife Services (WS) in its role of protecting people, agriculture, and wildlife.

The WS National Rabies Management Program (NRMP) aligns with the mission of the Animal and Plant Health Inspection Service to cooperatively manage diseases to protect animal and public health. WS collaborates with Federal, State, university and other partners to ensure rabies management is science-based. Collaborations often involve vaccine manufacturers and evaluations of vaccine-bait effectiveness and management strategies in order to improve oral rabies vaccination (ORV) efficiency and effectiveness.

Rabies is a preventable viral disease, almost always transmitted through the bite of a rabid animal. Untreated, rabies is invariably fatal. The rabies virus infects the central nervous system, often causing aggressive behavior that may result in the rabid animal biting another animal, transmitting the disease. Post-exposure treatment is nearly always effective, with human deaths occurring in those who do not seek timely treatment.

Human deaths attributed to rabies in the United States have dropped from 100 per year to 1 to 2 annually. The cost of living with rabies in America, however, continues to increase, exceeding \$300 million per year for disease detection, prevention, and control. The trauma of rabies exposure and treatment is also significant but difficult to quantify. Health care, education, human and pet vaccinations, and animal control are the primary costs and are expected to increase if wildlife rabies variants are not managed effectively.

Vaccination remains the primary method of rabies prevention and control in domestic animals, especially companion animals. To address growing concern about rabies in wildlife populations, WS has implemented a national program to combat the disease. With raccoon rabies accounting for 33% of rabies cases reported to the Centers for Disease Control and Prevention (CDC) in 2011, WS coordinated ORV to control this rabies variant in 14 eastern States in 2012. WS also continues to conduct ORV targeting coyotes in Texas to maintain canine rabies free status as well as to control a gray fox rabies variant in west Texas. Additionally in 2012, WS cooperated with the Texas Department of State Health Services to distribute 37,500 ORV baits targeting skunks near Houston. Rabies control in skunks and gray foxes has also been conducted in the Flagstaff, Arizona, area. Research exploring ORV in free-ranging dogs has been conducted collaboratively with the Navajo Nation in Arizona.

To achieve NRMP objectives, WS collaborates with its partners to conduct ORV bait distribution. Through these programs, ORV baits are strategically distributed to immunize specific species. Currently, orally administered rabies vaccines represent the only technology that can be applied at the landscape scale to manage and eliminate specific variants of rabies in wildlife in the United States. Generally, oral rabies vaccine-baits are distributed from aircraft in sparsely populated areas. The American public, livestock producers, pet owners, and wildlife benefit from these programs.

WS continues research into using ORV for rabies control in free-ranging dogs on the Navajo Nation, which has global potential for canine rabies management. Several studies have been conducted to determine bait preference in free-ranging dogs to improve bait consumption with the Raboral V-RG® coated sachet outperforming other baits in 2003-04 and 2008-09. In 2012, a bait flavor study was conducted with captive dogs using several flavors: bacon, cheese, dog food, hazelnut, marshmallow, peanut butter, and fish. Dogs preferred cheese and fish-flavored baits. Bait flavor and uptake studies are critical to the success of a vaccination strategy for protecting dogs with little veterinary care against rabies.

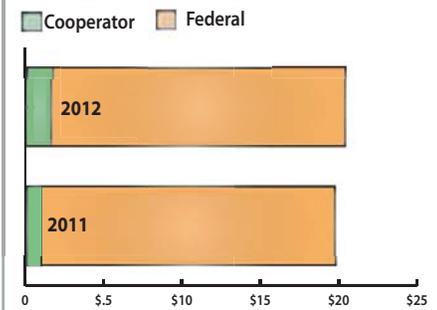


United States Department of Agriculture
Animal and Plant Health Inspection Service

Major Cooperators (Continued)

- Pennsylvania State University
- University of New Hampshire
- West Virginia University
- Artemis Technologies, Inc.
- Merial, A SANOFI Company

Expenditures for National Rabies Management Program (Millions)



Rabies Management in the Eastern United States

Since 1995, WS has coordinated the distribution of more than 138 million oral rabies vaccine baits in 19 states. Nearly 70% of these baits have been distributed to successfully prevent the westward spread of raccoon rabies in the eastern United States from Maine to Alabama, and tied to higher elevations in the Appalachian Mountains. These mountainous habitats do not generally support high raccoon populations and may serve as physical obstacles to raccoon rabies spreading west. In 2012, approximately 5.4 million baits were distributed in 14 states to reinforce the integrity of the ORV zone. Enhanced surveillance in these areas is critical to monitor the effectiveness of this approach.

In cooperation with the CDC and State agricultural and health agencies, the NRMP continued to use of the direct Rapid Immunohistochemistry Test (dRIT), which can be used to diagnose rabies in 50 minutes in the field. This allows for sound surveillance-based wildlife management decisions in real-time. From 2005 through 2012, WS tested approximately 58,000 enhanced rabies surveillance samples using the dRIT, or 82% of USDA-collected enhanced surveillance specimens during that time. Since 2005, 15 of the 21 states using dRIT confirmed 1,029 rabid animals that likely would not have been tested through exposure-based public health surveillance. This leads to more accurate allocation of resources for effective rabies management.

Field Testing a New Oral Rabies Vaccine in the United States

The only oral rabies vaccine currently licensed for use in the country is Raboral V-RG® (Merial, A SANOFI Company, Duluth, GA, USA). The vaccine-bait has been successful in eliminating a canine variant of rabies in coyotes in Texas, reducing to zero the number of cases of gray fox rabies in Texas since May 2009, and preventing the westward spread of raccoon rabies in the East. However, a limitation with the current vaccine-bait has been the inability to achieve the desired population immunity in raccoons (>60%). Although the achieved level of immunity in raccoons (30-40%) when integrated with high elevation habitats has created a barrier effect to prevent the spread of raccoon rabies west of the ORV zone. In addition, from 2001-2008 virtually no detectable antibody response in skunks (2%) was observed during ORV projects targeting raccoons. This led the NRMP to seek alternative and potentially more effective vaccine-baits for testing.

ONRAB (Artemis Technologies, Guelph, Ontario, Canada) met the criteria for testing, based on results from comparative border studies and rabies control results in Canada. A 2011 field trial in West Virginia tested ONRAB in raccoons and skunks for safety and ability to produce an immune response. Post-baiting tests showed antibodies to rabies in raccoons at 49%, the highest observed in the United States after (at 75 baits/km²) first baiting in a new area. These results warranted repeating this trial in 2012. The trials were expanded to New Hampshire, Vermont, New York, and urban-suburban habitats in Ohio. In anticipation of continued positive outcomes, WS began early planning to further expand trials in 2013.

Rabies in the Southwest

Since 1995, WS has filled an important cooperative role with the TDSHS and several other Texas agencies and organizations to prevent the spread of canine rabies in coyotes, which emerged from dog sources in Mexico. No cases have been reported since the last rabies-positive dog near Laredo in 2004. The United States was officially declared canine rabies-free in 2007. In west Texas, the goal of eliminating a unique variant of rabies in gray foxes has nearly been met through coordinated ORV, with no cases reported since 2009. In 2012, more than 1.8 million baits were distributed over 76,500 square kilometers of Texas. Nearly 45 million baits have been distributed since the program's inception in 1995. ORV was also used in gray fox rabies management efforts in Arizona and New Mexico in 2010 and 2011.

In 2005 and 2006, WS distributed 1,875 and 3,000 ORV baits respectively, via ground operations in Flagstaff, Arizona to target skunks. Although small in scale, these were the first field trials of their kind specifically targeting skunks. In 2012, WS cooperated with the TDSHS to distribute 37,500 ORV baits targeting skunks near Houston. Most of the baits (36,300) were distributed by air and this marked the first large-scale ORV effort in the United States specifically targeting skunks.

Wildlife Services in Arizona also continues work on a research project exploring the use of ORV as a vaccination strategy for free-ranging dogs on the Navajo Nation that has global implications for canine rabies management. Placebo bait studies were conducted in 2003-2004 to help determine which bait type was more appealing to free-ranging dogs to ensure



the most efficient bait consumption. In 2009 and 2010, ORV baits were directly distributed to dogs to measure bait uptake and the usefulness of this vaccination strategy for protecting dogs against rabies.

In 2010, an ONRAB study on the Navajo Nation showed promising results, with higher potential immunity shown than in previous studies using Raboral V-RG®.

Research is underway to help determine if GonaCon™, a wildlife contraceptive, can be combined with rabies management strategies to manage both population and rabies for dogs in Mexico or elsewhere. Trials for GonaCon™ in captive free-ranging dogs occurred on the Navajo Nation in 2008 and 2009. An improved formula of this immunocontraceptive vaccine was tested in captive dogs in Mexico in 2011.

International Efforts

The NRMP continues to work closely with its counterparts in Canada and Mexico to enhance rabies surveillance in wildlife and prevent the spread of rabies across international borders. In October 2008, the United States, Canada, Mexico, and the Navajo Nation signed the North American Rabies Management Plan to strengthen existing working relationships among the nations by focusing on increased rabies surveillance, coordination of control, research, and communication.

Future

The NRMP is dedicated to coordination, cooperation, and collaboration in rabies management for raccoons, coyotes, and gray fox to protect public health, agriculture, and wildlife.

Canine rabies in Texas has decreased from a high of 166 confirmed cases prior to ORV to zero cases since April 2004. However, it could reemerge from Mexico, where it continues to occur in dogs outside urban areas. Therefore, a 25-mile wide ORV zone is currently being maintained to prevent reintroduction of canine rabies. This zone has been challenged twice near Laredo, Texas, underscoring the importance of a barrier zone for disease management until alternate, effective strategies become available. Alternatives include more aggressive rabies surveillance and rabies control in wildlife and free-ranging dogs in Mexican border States.

ORV is being used to contain and eliminate a unique variant of the rabies virus in gray foxes in the west-central part of Texas, with no cases detected since May 2009. The success in Texas has shown that elimination of a wildlife rabies variant is possible. To ensure the continued success of rabies management, WS' NRMP has prioritized research on more efficient baiting methods, improved vaccines, and a more comprehensive understanding of wildlife that can contract rabies.