Wildlife Services

Protecting People
Protecting Agriculture
Protecting Wildlife

Protecting People

FY 2008

Protection from Predators, Wildlife Collisions and Wildlife-Borne Diseases

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Overview

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 public health and safety. WS works in every State to reduce wildlife collisions with aircraft and vehicles, and to protect the public from attacks by mountain lions, bears, and other animals. Concern regarding the potential for human illness caused or carried by wildlife is steadily increasing. Preventing or minimizing the spread of wildlife-borne diseases is growing in importance in the wildlife damage management field.

Protecting People from Predators, Overabundant Populations

As a result of conservation efforts, wildlife populations are thriving across much of the United States, especially in the West. This has led to an increase in encounters between people and predators, such as mountain lion, coyote, and bear, sometimes with life-threatening results.

A man leaves his small-town Louisiana home to find a bear and her cub in his backyard tree, refusing to leave. WS responds with other animal control agencies to trap and relocate the bear. Coyotes accustomed to human presence, perhaps having been intentionally fed, bite suburban residents. A mountain lion in New Mexico attacks and kills an adult man. A bear attacks and kills a boy sleeping in a tent, the first such fatality in Utah. In the latter cases, WS expertise is requested by other agencies to locate and remove the animals.

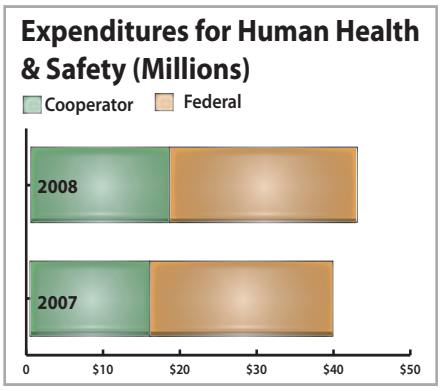
WS specialists are increasingly called upon to locate and capture dangerous animals that have attacked people or are spotted sniffing around residential areas and campgrounds. WS has responded to a growing number of requests to relocate or remove bears causing public safety concerns. WS has both the expertise and the equipment to respond to these threats and restore public safety. Also, WS has trained other Federal and State agencies how to respond to wildlife attacks on people. Advice is offered to citizens on how to discourage wildlife away from populated locations. When required, WS removes wildlife, such as coyotes and bears, which pose immediate and direct danger to human safety.

From feral swine on Texas prairies to deer on Pennsylvania mountain roads, wildlife collisions with motor vehicles can pose a risk to human passengers. When requested by local authorities, WS provides assistance to limit the danger to motorists. It has conducted research into contraceptives as a tool to control over-abundant populations.

Overabundant and/or concentrated populations of some species represent potential health and safety risks to people, as well as sources of property damage. Vultures roosting on power plant walkways, flocks of gulls at public beaches, or substantial congregations of European starlings can pose safety risks or as catalysts for diseases, such as E. coli and histoplasmosis. WS recommends an integrated wildlife damage management approach to each situation depending on circumstances. For example, for Canada geese WS recommends nest and egg treatment, habitat modification, exclusion and dispersal. WS' National Wildlife Research Center (NWRC) developed a contraceptive-type product, which reduces the hatchability of eggs. Sometimes WS recommends removal as the most effective and appropriate management technique when conducted humanely with all appropriate permits. In 2007, however, WS dispersed, or scattered, more than 15 million animals, six times more than it removed.

Protecting Air Passengers

Wildlife collisions with aircraft cost U.S. civil and military aviation more than $625 million annually and pose a serious safety hazard. Nearly 7,700 wildlife collisions with civil aircraft were reported in FY 2008, with an additional 4,900 strikes reported by military aviation. Increased air traffic, urban sprawl, enhanced noise suppression on aircraft, and more



concentrated populations of birds and other wildlife at or near airports contribute to wildlife strikes.

These incidents are cataloged in the National Wildlife Strike database maintained by WS for the Federal Aviation Administration. More than 85,000 wildlife strikes with civil aviation have been reported since WS began keeping records in 1990.

WS is recognized internationally for its scientific expertise in reducing wildlife hazards at airports and military bases throughout the United States and around the world. Through a balanced effort involving research and wildlife management, WS is reducing the risk to passengers and crews posed by wildlife. Wildlife hazard management assistance was offered to airports and airbases through the WS Airport Wildlife Hazards Program, made up of wildlife biologists specializing in bird identification, airport management, and wildlife control techniques. WS works at more than half of all U.S. airports certified for passenger traffic in the country. WS' NWRC complements WS field work by conducting research to develop better wildlife damage management techniques and equipment for airports. *(For more details, see the separate report "Protecting Commercial and Military Aircraft and Passengers.")*

Looking to the Future

If not treated, rabies is a fatal disease, spread through direct contact with an infected mammal. Once associated with dogs (still the primary reservoir worldwide), rabies in the United States is seen in bats and wild carnivores, such as raccoons, coyotes, and skunk. Rabies-associated costs range from $300 to $450 million annually in the United States, primarily for pet vaccinations, education, diagnostics, post-exposure treatment and case investigations. Costs are expected to increase if rabies strains in terrestrial wildlife are not contained.

To combat its spread, WS has implemented a Cooperative Rabies Management Program, focused on coordinated oral rabies vaccination (ORV) projects targeting raccoon rabies in 14 Eastern States, coyote and gray fox variants in Texas, bat-variant rabies in Arizona skunks, and other rabies-related projects. WS collaborates with a variety of organizations to carry out ORV projects in which oral bait, containing the rabies vaccination, is distributed within targeted areas to immunize specific wildlife populations against the disease. Currently ORV is the only available technology to strategically contain and eliminate specific strains of rabies in the United States. This innovative program will benefit the American public, livestock producers, pet owners, and wildlife.

A United States, Canada, and Mexico Navajo Nation partnership, through the North American Rabies Management Plan, was officially signed in 2008 to facilitate closer working relationships on border rabies issues, an important rabies management challenge.

In the Eastern United States, WS is focusing on preventing the spread of a raccoon variant of rabies. It hopes to prevent this strain from spreading west by establishing an ORV barrier along the Appalachian Mountains.

WS works in Texas with numerous partners on an ORV program to prevent two separate rabies variants (canine strain in coyotes and a gray fox strain) from spreading. More than 35 million baits have been distributed since 1995. WS provides critical expertise to collect blood and tooth samples from coyotes and gray fox to evaluate the program's effectiveness. Through efforts to contain the canine rabies variant in coyotes at the international border, reported cases of the disease in south Texas dropped from 166 in 1994 to zero in 2006, 2007, and 2008.

(For more details, see the separate report "National Rabies Management Program Seeks to Control, Eliminate Virus in Raccoons & Other Wildlife.")

Protecting People from Wildlife-Borne Diseases

Increasingly, wildlife diseases, such as West Nile virus (WNV), E. coli, and plague, are being transmitted to people, pets, and livestock. The spread of such diseases can be controlled more effectively if integrated with wildlife management. WS plays a crucial role in the area of wildlife disease surveillance, prevention, and eradication.

The goal of WS' National Wildlife Disease Program is the development and implementation of a nationwide system to survey for wildlife diseases and respond to emergencies, including natural disasters and disease outbreaks. WS will assist Federal, Tribal, and State agencies with wildlife disease threats and partner with other APHIS units and Federal agencies through the program. A nationally coordinated wildlife disease surveillance system supports existing programs with sample collection, information exchange, and additional laboratory infrastructure.

In addition to the national coordinator and staff, 44 wildlife disease biologists are located across the country. They conduct monitoring and surveillance activities and collect biological samples. To maximize efficiency, samples often are obtained in coordination with other WS operations, such as protection of livestock, aviation and aquaculture, or in research.

Wildlife disease biologists in the Surveillance and Emergency Response System are available to respond quickly to assist with disease outbreaks and other emergencies requiring WS expertise. In an emergency, biologists are required to mobilize immediately and arrive at the emergency site within 48 hours. WS' NWRC represents an important component of the program, providing research on disease organisms, their reservoirs, transmission cycles and ways to block transmission.

Highly Pathogenic Avian Influenza (HPAI H5N1) — remains a feared animal disease worldwide, in part due to the potential for the disease to mutate into a virus that could lead to a human pandemic. Currently the disease is serious in humans, who contract it through extremely close and direct contact with infected poultry or other birds. To date, no highly pathogenic H5N1 avian influenza has been found in North America despite the unprecedented surveillance effort for a wildlife disease on the continent.

WS has participated since 2006 in a national multi-agency effort for the early detection of highly pathogenic avian influenza in wild birds in North America and several foreign countries. More than 125,000 samples from wild birds and 75,000 environmental samples were collected and tested in 2006 and 2007. In 2008, WS and its partners collected more than 81,000 samples from birds and the environment in every State and flyway, as well as territories and other jurisdictions.

Other diseases of interest include chronic wasting disease (in cervid, or deer-type, animals), classical swine fever, brucellosis, pseudorabies, tularemia, bovine tuberculosis and West Nile virus. In addition to the continuing concern regarding HPAI H5N1 in migratory birds, WS anticipates increased interest in the risk that feral swine pose to humans due to brucellosis and the domestic swine industry due to several diseases.

West Nile Virus (WNV) — This disease has enormous potential to impact public health, livestock, and wildlife. Wildlife often serves as a natural host for the virus, which is mainly transmitted to people and animals through mosquito bites. According to the Centers for Disease Control (CDC), 42 states reported avian or animal infections from WNV in 2008, a significant geographic expansion from when the first documented case in the United States was discovered in New York in 1997, the first documented case in the United States. CDC reported that 34 people succumbed to the virus and 1,301 people have become ill throughout the United States in 2008 alone. Since 1999, 506 people have died from complications associated with WNV in the United States and approximately 17,000 people have become ill.

WS worked cooperatively in several States to provide operational and technical assistance related to WNV. In addition to monitoring wildlife populations for disease exposure, WS provided educational assistance and data management for State health agencies. For example, in Alabama, a WS disease biologist coordinates WNV surveillance in wild birds and domestic livestock for the State's public health department providing testing kits to country health departments and maintaining a database. The work includes following surveillance in horses, sentinel chickens, dead birds and mosquitoes for all mosquito-borne viruses, including WNV, Eastern equine encephalitis and St. Louis encephalitis.

Bovine Tuberculosis—Tuberculosis (TB) is a contagious respiratory disease of both animals and humans. Bovine TB can be transmitted among livestock, people and other animals. Wildlife and cattle can pass the infection to each other under certain circumstances. Unless eradicated, it will continue to impact human health, animal health, and livestock production. Traditional control strategies greatly reduced bovine TB in the United States but eradication has been complicated due to discovery of bovine TB in a wildlife population: white-tailed deer in Michigan and Minnesota.

WS has been involved in bovine TB eradication in several ways. At Michigan's request, WS employees depopulated TB-positive captive cervid herds. WS wildlife disease biologists assist in addressing concerns such as testing for the disease in wild deer, removing wild deer that threaten livestock with infection, observing wildlife patterns on farms with TB-positive cattle, providing fencing to farms to exclude deer from feed storage areas to prevent transmission, and providing assistance in sampling and monitoring the disease.

WS' NWRC has undertaken studies to understand the movement of bovine TB, methods to detect bovine TB, and techniques to prevent transmission between deer and cattle.

Plague—Plague is a bacterial disease which, like the rats and rat fleas through which it travels, is not native to North America. Given modern medical care and living conditions, plague need not be fatal in humans, although prompt treatment is important. Established in the Western United States, sylvatic plague is deadly in rodents, such as prairie dogs, and wildlife that associates with rodents, such as the endangered black-footed ferret (BFF).

Federal departments have expended substantial resources to re-establish the BFF, with one promising location for their resurgence in South Dakota, on the northern border of the Pine Ridge Reservation. In early 2005 in response to local requests, WS collected burrow swabs and carcasses in prairie dog colonies and the CDC tests confirmed the first verified incidence of sylvatic plague in the State. The relationship between prairie dogs and BFF, and the proximity of the colonies indicated the BFF population was in jeopardy.

Through the Surveillance and Emergency Response System, wildlife disease biologists were mobilized and treated burrows in nine prairie dog colonies covering 5,000 acres to reduce flea infestations within the colonies. WS returned in 2008 to assist other agencies in further burrow treatment.

WS works with cooperators to protect livestock and endangered species from predation through direct and technical assistance. It will continue to work with military and civilian airports to reduce wildlife hazards through education and direct assistance. Providing Federal leadership in managing wildlife damage remains the program's mission, particularly damage related to human health and safety and agricultural industries.

Wildlife disease biologists applied insecticide to protect prairie dog colonies and the endangered Black footed ferret.

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Protecting Property, Infrastructure and Transportation in Rural to Urban Settings

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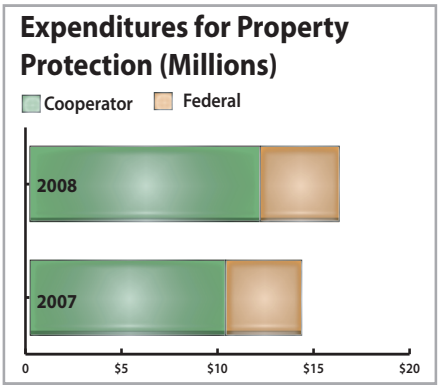
Wildlife Population and Property Protection

- Wildlife Services (WS) conducts research on contraceptive vaccines for mammals and birds, and removes animals in over-populated and strike-probable locations and donates meat as appropriate
- WS conducts beaver damage management programs in more than 20 states and researches control of beaver populations and damage
- A current study suggests for every $1 spent in managing beaver damage by WS, $12.2 in resources was saved on roads, bridges, dikes and dams, sewer and water treatment facilities, and landscapes.
- WS currently has 73 trained explosive experts operating in 20 states to handle beaver damage
- More than 70% of funds for property protection comes from cooperators



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 public and private resources. WS works in every State to prevent wildlife damage to property, roads and bridges, aircraft, and other important man-made resources.

Protecting Property in Urban and Suburban Areas

Each year, wildlife cost property owners millions of dollars in damage, underscoring the need for responsible wildlife damage management. WS protects homes, lawns, landscaping, golf courses, parks, pets, equipment and machinery, industrial facilities, and other property against wildlife damage.

In FY 2008, WS conducted more than 67,580 technical assistance projects to reduce wildlife damage to property in urban, suburban, and rural locations as well as at airports across the country. Technical assistance enables property owners to work on their own to resolve wildlife conflicts. WS provides critical information, guidance, and, sometimes, equipment to assist property owners in their efforts. When the conflict is more significant, however, WS specialists employ direct assistance, using their knowledge and expertise to disperse, remove, or relocate problem wildlife, such as vultures, raccoons, and bears.

WS expended more than $16.1 million to protect property from wildlife damage in FY 2008 and $14.1 million in FY 2007. Damage may be relatively minor or it may result in significant economic loss and inconvenience. Wildlife can damage foundations, structures, and even internal wiring as it attempts to gain entry into a property. The excrement from roosting birds or bats is not only foul, but also can corrode machinery and vehicle paint, and can create a slipping hazard on walkways. Grazing wildlife, such as geese, deer and feral pigs, can destroy golf course greens, fruiting plants, lawns, and other landscaped areas.
In addition to causing damage, overabundant wildlife populations can create quite a nuisance. The excrement and noise from a roost of vultures or crows can be so severe that backyard swing sets, grills, lawn furniture, and outdoor business properties become useless.

Protecting Infrastructure in Urban and Rural Areas

Roads, bridges, airport runways, dams, water drainage systems, and utilities are also vulnerable to wildlife damage. WS is frequently called upon to relocate or remove wildlife that threaten vital urban and rural infrastructure. Aquatic and burrowing animals, such as beavers, ground hogs, gophers, ground squirrels, and armadillos, often weaken foundations and accelerate erosion damage, causing structures to crack or even collapse. Birds and other wildlife frequently are responsible for electrical power outages that can result in thousands of dollars in damage and lost revenue. Monk parakeets, hawks, and vultures are well known for causing damage to urban infrastructure when they nest, roost, and perch on telephone poles and electrical and communication towers.

Brown tree snakes in Guam regularly cause electrical shortages and power outages that result in more than $1 million in damage. WS engages in a successful damage management program to prevent large scale outages with cost savings of more than $500,000 annually to the local power authority.

Resolving Beaver Damage—Beaver, one of the most destructive wildlife species, cause millions of dollars in damage to roads, bridges, dikes and dams, sewer and water treatment facilities, and landscape plants. Many experts believe the cost of beaver damage is greater than that caused by any other U.S. wildlife species. WS personnel across the contiguous States, from Maine to Arizona and from Florida to Washington, respond to beaver damage reports. In Mississippi and North Carolina, the problem's severity led State agencies to provide major funding for WS to conduct statewide beaver damage management programs. WS also provides large-scale programs in more than a dozen additional States, and responds to individual requests for assistance on a case-by-case basis.

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For years, WS has collected beaver damage data reported by private individuals and state agencies; the economic damage caused by beavers in the southeastern United States alone is estimated to have exceeded $4 billion over a 40-year period. In 1999, WS began collecting data on damage prevented by its management efforts. In FY 2008, WS prevented an estimated $81.7 million in beaver damage in 15 states. Even though WS provides beaver management assistance to about half of the State's counties in Mississippi, the aquatic rodent still causes an estimated $100 million in damages to public and private property.

To prevent beaver damage, WS specialists break apart beaver dams that clog waterways and flood roads and timber resources. Beavers are removed from areas experiencing high levels of damage. WS has identified multiple research needs relevant to beaver damage management: information on attractants, search dogs, electronic frightening and detection devices, habitat modification, mechanical barriers, "natural/home-made" remedies, non-target concerns, repellants, toxicants, trap development, and basic biology. WS' National Wildlife Research Center (NWRC) is currently conducting research on a number of methods that could be used to prevent beaver damage. Increased wildlife populations in the last decade have coincided with increasing numbers of wildlife collisions with airplanes, trains, and automobiles. High-speed or mid-air collisions not only result in serious damage, they can be deadly. WS plays a significant role in helping to prevent birds, deer, coyotes, feral hogs, and other wildlife from causing such accidents. Collisions, however, are not the only threat posed to transportation. Rats, mice, and other rodents can also chew through engine wiring creating potentially dangerous consequences.

Deer Collisions with Automobiles – As wildlife populations increase and adapt to more urban settings, wildlife-vehicle collisions also increase. Deer are the largest wild animal most often involved in such accidents; other wildlife associated with vehicular collisions are elk, antelope, bear, feral hogs and moose.

The U.S. deer population is at an all time high. The white-tail deer population has increased from 300,000 in 1900 to 17 million in 2008. Overabundant deer populations, urban and suburban, lead to countless collisions each year. Although difficult to quantify because many accidents go unreported, one study estimates more than 1.5 million deer collisions with vehicles occur annually, resulting in repair costs of more than $1.1 billion. Auto insurance claim statistics show eight of the top 10 states for the most deer/automobile accidents are east of the Mississippi River. WS works to reduce deer populations in heavily populated areas in order to increase public safety.

WS' research arm, the NWRC, has given high priority to research on the reproductive management of deer. NWRC researchers have successfully tested contraceptive vaccines on white tail deer. Research data shows the contraceptive is safe for the vaccinated animals with no associated danger to humans or wildlife eating vaccinated animals. Not intended to replace other management tools, the contraceptive vaccine is a tool for use in conjunction with other management methods. The vaccine can be used to help manage overabundant deer herds in urban and residential areas where other methods, such as hunting, are not always an option.

Wildlife/Aircraft Collisions – Wildlife can pose a serious threat at airports across the United States. The majority of wildlife strikes are caused by birds, although large mammals are also involved. Through a balanced effort involving research and wildlife management, WS is reducing the incidence of damage to aviation caused by wildlife. WS is recognized internationally for its scientific expertise in reducing such hazards at airports and military bases across the Nation and around the world. In FY 2008, 772 airports and military airbases received assistance, increasing 97% from 1990 when WS' involvement with airport wildlife hazard management began. In FY 2008, WS provided services to mitigate wildlife hazards to aviation at over 60% of the Nation's airports that are Federally regulated for public service. (See the separate report "Protecting Commercial and Military Aircraft and Passengers.")

Wildlife Population and Property Protection

- More than one million collisions occur annually between vehicles and deer, the largest wild animal most often involved in accidents.
- The direct cost of a deer-motor vehicle strike ranges from $2-2,800 per collision in insurance claims
- The estimated total cost associated with such collisions were $7,870 for deer, $17,100 for elk, and $28,100 for moose.
- Pennsylvania, the top ranked state for deer-vehicle collisions, estimates between 12,000 and 40,000 collisions, annually. Numbers are difficult to assess due to the non-reporting of less serious crashes.
- WS provided wildlife damage management assistance to 772 commercial and military airports in FY 2008.
- Highly successful conservation and environmental programs have resulted in population increases for almost all species of large flocking birds in recent decades.
- In all, 380 different species of birds have been reported struck by civil aircraft from 1990-2008.
- Wildlife strikes annually cost U.S. civil aviation more than $625 million and cause approximately 600,000 hours of downtime.

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Protecting Commercial and Military Aircraft and Passengers

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Major Cooperators

- Federal Aviation Administration
- Department of Defense
- National Transportation Safety Board
- Smithsonian Institution Bird Identification Lab
- National Association of State Aviation Officials (NASAO)
- 700+ airports and airbases
- BirdStrike Committee USA
- Universities and private industry concerned with aviation and air safety

Accomplishments in FY 2008

- 772 airports and airbases received assistance to mitigate wildlife hazards to aviation compared to 42 airports in 1990.
- WS staff provided a total of 160 staff-years of assistance at requesting airport
- Presented technical training in identification and management of wildlife hazards to aviation to 2,195 airport personnel, up from 1,133 in FY 2002.

In January 2009, the country watched the national news amazed at the skill and professionalism of the crew of Flight 1549 as it safely landed a jetliner on a river in New York City and evacuated all aboard. This “Miracle on the Hudson” was a striking example of the serious threat that wildlife can pose at airports across the United States. While large mammals are responsible for some collisions, the vast majority (97%) of wildlife strikes are caused by birds. In this strike, Wildlife Services (WS) recovered materials from the engines and examined the aircraft itself for signs of possible bird-strike damage. The recovered matter was identified as the remains of Canada geese.

Wildlife/aircraft strikes cost the Nation’s civil aviation industry more than $625 million per year (1990-2007) and military aviation about $100 million. At least 195 people died and 170 aircraft were destroyed worldwide as a result of bird strikes with civil and military aircraft from 1988-2006.

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 public and private resources. WS staffs professional biologists in all 50 states available for consultations and services. The program is recognized internationally for research and management programs in wildlife damage control.

More Air Traffic, More Wildlife

Although it may seem like a bird could not cause much damage, a single bird has the potential to take down a major jetliner, threatening the lives of passengers and destroying the aircraft. In September 1995, the U.S. Air Force lost 24 airmen and a $190 million AWACS aircraft which collided with Canada geese on takeoff.

The birds don’t have to be big, either. In 2005 after ingesting mourning doves during lift-off, a Falcon 20 aircraft lost power to both engines, resulting in an aborted take-off in Ohio. Sliding through an airport fence, across a highway, and into a cornfield, the aircraft sustained major structural damage beyond economical repairs. In Virginia, an Airbus 320 was struck by more than 300 European starlings in 2006. Birds were ingested in both engines during the approach for landing and one engine required replacement at a cost of more than $1.3 million. Mammals, from coyote to deer, can find their way to airport runways. At least 18 civil aircraft have been destroyed by deer strikes in the United States since 1983.

A combination of expanding wildlife populations and increasing numbers of aircraft movement contributed to increased wildlife/aircraft strikes in the past 20 years. Certain North American bird species are recognized hazards to aviation, such as Canada geese, brown pelicans, bald eagles, vultures and cormorants, among others. Populations of these birds have increased dramatically; for example, Canada goose populations have more than tripled. Many species have adapted to urban environments. Commercial aircraft movements have increased at about two percent per year since 1980. Simultaneously, turbofan-powered aircraft currently in use prove quieter than older aircraft, so birds are less able to detect and avoid them.

Mitigation of aircraft wildlife strike hazards are focused around airports because more than 74% of reported bird strikes occur in the airport environment at less than 500 feet above ground level.

WS Provides Consultation and Direct Services

Through a balance of research and wildlife management, WS is addressing the incidence of wildlife-caused damage to aviation. In recognition of WS’ expertise and accountability, the Federal Aviation Administration (FAA) entered into a Memorandum of Understanding (MOU) with WS, which encourages airports to “request technical and operational assistance from Wildlife Services to reduce wildlife hazards.”

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Animal and Plant Health Inspection Service

The Department of Defense executed a similar MOU to address wildlife conflict issues at military installations. In 2006, an MOU between WS and the National Association of State Aviation Officials (NASAO) was signed, fostering cooperation between WS and NASAO to reduce wildlife hazards at airports in every state.

The number of civil and military airports assisted by WS has steadily grown since the program began working on wildlife damage management at airports since 1990 when 42 airports requested assistance. In 2008, 764 airports sought WS assistance and WS biologists provided 160 staff-years of assistance at airports in every state as well as three U.S. territories and two foreign countries. Of the 575 U.S. airports certified for passenger traffic (under the FAA's 14 CFR Part 139), WS assisted at 387 airports which served 556 million commercial passengers.

In the United States, airports initially assess wildlife hazards. Based on the assessment, the airport may need to develop a wildlife hazard management plan to minimize the likelihood of catastrophic or major-damage strikes. WS staff can provide an assessment and/or a management plan to airports, or assist an airport completing those.

WS provided direct services at 336 airports in FY 2008 including population management through harassment, habitat modification, or wildlife removal. Technical assistance, such as initial consultations and wildlife hazard assessments, was provided at 738 airports.

Training, however, is expected to remain an integral part of WS' airport work. WS provides airport personnel with critical training on identification and management of certain wildlife hazards. In FY 2008 the training was provided at 296 airports involving 2,195 personnel. WS currently employees more than 300 active personnel who have completed training to meet the requirements outlined in FAA Advisory Circular on Qualifications and Training for Airport Biologists.

The work undertaken by WS at airports is conducted under cooperative service agreements with the airports or their managing agencies.

Research Seeks New Methods, Materials

The WS' National Wildlife Research Center (NWRC) complements WS field work by conducting research to develop better wildlife damage management techniques for airports. For example, WS NWRC scientists are studying exclusion devices on storm ponds and airport storm water management and the attraction of food-waste composting sites to birds hazardous to aviation. Other NWRC experiments resulted in development and commercial marketing of a hand-held laser for dispersing birds from airport environments.

Experimental work continues on the use of colored lighting and frequency of light pulsation as a way to help birds detect and avoid aircraft. Recent research indicates that radar may provide information to supplement visual observations by wildlife biologist on airfields. Investigation of this small mobile radar continues.

Research continues on the height and type of vegetation to determine how to minimize bird and wildlife populations at and near airports. Also under study are the movement and migration of vulture, translocated osprey, and bald eagle.

Most significantly, WS has developed a U.S. database containing more than 85,000 records of wildlife strikes between 1990 and 2008. This database provides airports with an objective assessment of the nature and magnitude of wildlife strikes, and provides aircraft and engine manufacturers with critical information to improve aircraft components.

Technical and operational (direct management) assistance provided by USDA/APHIS/Wildlife Services biologists to reduce wildlife hazards at airports, FY 2008

Category and Type of assistance to reduce wildlife hazards	Number of airports	% of total airports assisted (n = 772)
Technical		
Consultation regarding wildlife issues	738	97
Training of airport personnel	296[a]	39
Wildlife Hazard Assessment	174	23
Wildlife Hazard Management Plan	132	17
Environmental Assessment	102	13
Total Technical Assistance	**738**	**97**
Direct management		
Lethal control of hazardous wildlife	256	34
Non-lethal dispersal of hazardous wildlife	242	32
Habitat modification	193	25
Live-trap/ translocation of wildlife from airport	81	11
Total Direct Management Assistance	**336**	**44**

[a] *Number of airports where training took place; personnel from additional airports attended some of these training courses*