

Wildlife Services

Protecting People
Protecting Agriculture
Protecting Wildlife

Protects Agriculture

FY 2012

Managing Wildlife Damage to Crops and Aquaculture



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Wildlife Services (WS) provides Federal leadership and expertise to resolve wildlife conflicts that threaten the Nation's agricultural resources. WS is a non-regulatory program of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS). WS has a presence in every State where its wildlife biologists and technicians work to protect agricultural crops and aquaculture from damage caused by wild animals.

In the United States, wildlife damage to agricultural resources is significant. The survey on wildlife damage by the National Agricultural Statistics Service (NASS) reported wildlife damage to U.S. agriculture at \$944 million during 2001. Field crop losses to wildlife totaled \$619 million and losses of vegetables, fruits, and nuts totaled \$146 million.

More than half of all farmers and ranchers experience damage from wildlife each year. WS works to reduce this damage by providing producers with both technical and direct management assistance to resolve wildlife conflicts. Technical assistance -- the information, advice, and materials to resolve conflicts on their own -- enables producers to independently reduce wildlife damage. WS provides information, training, and equipment, such as bird dispersal devices, that assist producers in managing their losses. For complex conflicts, however, WS specialists employ direct management assistance using their expertise and skill to reduce crop losses caused by wildlife.

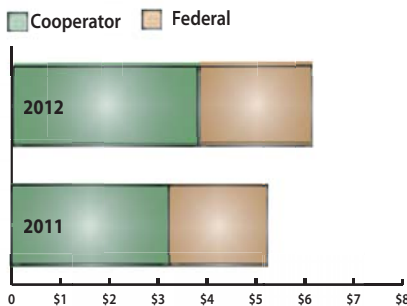
Protecting Crops from Bird Damage—Blackbirds, gulls, geese, and other birds cause severe damage to sunflower, rice, corn, winter wheat, fruit, nut, and other agricultural crops throughout the United States. Based on data collected in 7 major fruit-producing States, NASS estimated wildlife damage to apples, blueberries, and grapes exceeded \$41 million annually. Sunflower and rice crops are a favorite of blackbirds leading to yearly losses of \$5 to \$13 million. WS helps farmers disperse Canada geese from crops using pyrotechnics and other noise-making devices.

Blackbird damage has been identified as a key reason that growers abandon sunflower production. Blackbirds are responsible for millions of dollars in annual losses to sunflower and grain crops in the upper Great Plains every year. In North Dakota, WS specialists provide producers with varied options to manage blackbird damage. These include the use of desiccants to hasten sunflower harvest and the use of frightening devices to disperse birds from fields. WS also loans propane cannons and distributes pyrotechnics to producers to enhance their harassment programs. WS specialists also assist producers with the dispersal of extremely large concentrations of blackbirds from sunflower fields and roost sites.

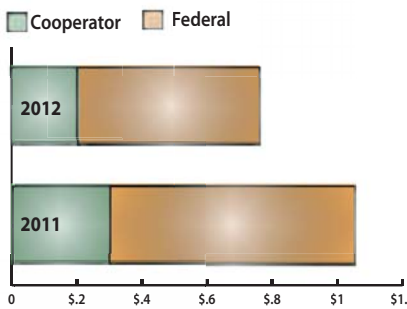
Sprouting rice is also vulnerable to blackbirds, especially red-winged blackbirds, common grackles, and cowbirds. Since the 1990's WS has worked to protect sprouting rice fields located near large winter roosts from blackbird damage. Loss estimates run as high as \$10 million annually in Louisiana. In Arkansas, blackbird damage to maturing rice crops tops \$3.5 million.

WS National Wildlife Research Center (NWRC) scientists routinely work with stakeholder groups to develop safer and more effective methods and tools to reduce bird depredation to crops. NWRC scientists conduct multifaceted studies using both captive and free-ranging birds to determine blackbird populations in various crops; estimate the economic impacts on crops; evaluate and develop nonlethal repellants for deterring birds; and improve the effectiveness and safety of avicides for reducing depredating populations. NWRC scientists have assessed the capacity of European starlings to spread salmonella to cattle, their feed, and water. Scientists found that salmonella contamination of cattle feed troughs and water troughs increased as more starlings entered feed troughs. Using starling management strategies may reduce the spread and strengthening of this disease with livestock production systems.

Expenditures for Crop Protection (Millions)



Expenditures for Aquaculture Protection (Millions)



United States Department of Agriculture
Animal and Plant Health Inspection Service

Because no single solution exists for resolving bird damage, WS employs integrated management for both technical and direct management assistance. In combination with harassment and other dispersal techniques, WS may recommend that producers change cultural practices including altering planting and/or watering dates or planting alternate crops.

In addition to on-site assistance, WS is instrumental in helping producers obtain the necessary U.S. Fish and Wildlife Service (FWS) depredation permits to reduce migratory bird damage to their crops. Native migratory birds are protected by the Migratory Bird Treaty Act, administered by FWS, which implements the nation's commitment to four international conventions for the protection of shared migratory birds. Some protected birds, including Canada geese, cormorants, and vultures, cause significant economic and ecological damage in the United States. FWS recognizes WS' expertise on migratory bird damage prevention and management issues and values WS' recommendations when evaluating migratory bird depredation permit requests.

Protecting Crops from Mammal Damage—Each year, WS responds to requests for assistance to manage damage to fruits, nuts, cantaloupes, watermelons, vegetables, corn, milo, rice, peanuts, turf, wheat, and other field crops from deer, beaver, feral swine, coyotes, badgers, raccoons, and small mammals. WS provides technical and direct assistance to farmers experiencing crop damage from mammals' feeding, trampling, rooting, and wallowing activities. Feral swine can destroy large portions of fields and cause thousands of dollars in damage in just a few short nights. Feral swine break through fencing, trample crops, and eat their way through planted fields. In the Eastern United States, overabundant white-tailed deer populations often rely on agricultural crops as a source of food. Beaver dams can flood agricultural lands and destroy crops. Damage from flooding can reduce crop quality, and in many cases, affect future production levels.

As with bird damage, WS recommends an integrated approach to resolve problems caused by mammals. WS officials work collaboratively with State agricultural and wildlife agencies, county extension programs, industry organizations, and individual producers to develop methods to reduce mammal damage to croplands. After identifying the species causing the problem, WS biologists provide technical assistance and management recommendations, and can educate landowners to implement some solutions themselves. Integrated management, when actively applied, is usually successful in relieving mammal damage to row and field crops. Sometimes, WS' on-site assistance is necessary, especially when lethal management is required. For example, to manage beaver damage, WS may use water-level manipulation, exclusion, population reduction, and the safe and effective use of explosives by a WS certified explosives specialist to remove beaver dams that flood crops and farms.

WS Protecting Aquaculture—A nationally important industry in the United States, aquaculture is valued at more than \$613 million in processed product sales annually. Wildlife depredation, especially by fish-eating birds, can significantly impact production. A survey conducted by the NASS has indicated that 70% of the catfish producers from the top 13 catfish-producing States reported measurable losses to wildlife. In Arkansas, the rate of loss reported was 79%. Catfish producers lose \$12 million annually to double-crested cormorants in Mississippi alone. American white pelicans do not just consume catfish; they serve as a host for a trematode parasite of catfish. Heavy infestations of this parasite can be catastrophic, but even light fish infections can cause economic strain to farmers.

In FY 2012, WS provided wildlife damage management assistance to aquaculture producers in 42 States. This included assistance to anglers, baitfish and crawfish producers, catfish farmers, fish hatcheries, sport fish producers for pond stocking, and tropical fish producers. WS biologists and specialists review producers' problems related to cormorants and other fish-eating birds and validate their implementation of nonlethal methods. WS completes permit review forms and submits them to the FWS on behalf of producers so they can obtain permits and other authorizations to take migratory birds and protect their resources.

WS assists the industry in managing depredation by wildlife, specifically by reducing damage from fish-eating birds like cormorants, great blue herons, and pelicans. During the last 30 years, cormorant and pelican populations have grown significantly in the Lower Mississippi Valley, a major aquaculture-production area. Muskrat damage to dikes and roads at aquaculture facilities is also a common management issue. Each year, WS biologists provide technical assistance and equipment. Propane cannons, netting, and bird dispersal devices were provided to catfish farmers, tropical fish farmers, and bait fish farmers in the Southeastern United States to reduce bird damage.

WS' NWRC current research seeks information about the abundance, distribution, and foraging behavior of fish-eating birds; economic impacts associated with their foraging; and diseases transmitted by birds to aquaculture. The information gathered provides a basis for developing new strategies, techniques, and tolls for reducing damage. Aquaculture producers and wildlife managers also are using two depredation orders issued by the FWS to reduce local damage by double-crested cormorants.

Protection of Crops & Aquaculture

- NASS reported wildlife damage to U.S. agriculture at \$944 million during 2001. Field crop losses totaled \$619 million and losses of vegetables, fruits, and nuts totaled \$146 million.
- Annual loss estimates to sprouting rice from birds run as high as \$10 million in Louisiana. In Arkansas, blackbird damage to maturing rice crops tops \$3.5 million.
- Nearly 70% of catfish producers reported some losses to wildlife. Arkansas reported a loss rate of 79%.
- American white pelicans consume catfish and serve as a host for a trematode parasite. Heavy parasite infestations can be catastrophic. Even light infections can cause economic strain.

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Developing New Management Methods, Preventing Predation and Wildlife-Borne Diseases



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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 livestock. WS works in every State where livestock are raised to reduce predation, prevent the transmission of wildlife-borne diseases, and safeguard this important agricultural industry.

Understanding the Economic Impact of Livestock Predations

Coyotes, mountain lions, bear, and wolves kill thousands of lambs and calves each year. Livestock losses attributed to predators cost ranchers and producers nearly \$138 million annually, according to recent surveys by the National Agriculture Statistics Service (NASS). A NASS survey found that cattle and calf losses from animal predators totaled nearly 220,000 head. Sheep are the most frequent victims of predation. A 2009 NASS survey recorded 247,200 sheep and lamb lost to predators, representing 39% of losses from all causes and costing farmers \$20.5 million.

Coyotes are responsible for the majority of livestock predation. The 2010 NASS survey on Cattle Death Loss reported that coyotes accounted for 53.1% of all cattle and calf predatory losses. The 2005 NASS survey attributed 60.5% of sheep and lamb predation to coyotes. These losses occurred despite the use of multiple management tools and techniques to safeguard livestock. Without these protection measures, livestock losses could be as much as two to three times higher.

Some ranchers and livestock producers experience only minimal livestock losses to predators. Others must deal with serious predation. In Western states, such as Idaho, where livestock usually graze on open range lands, lambs and calves are especially vulnerable to predators. Furthermore, small farmers and ranchers often feel the impact of livestock predation more significantly than larger livestock operations.

Managing Livestock Predation

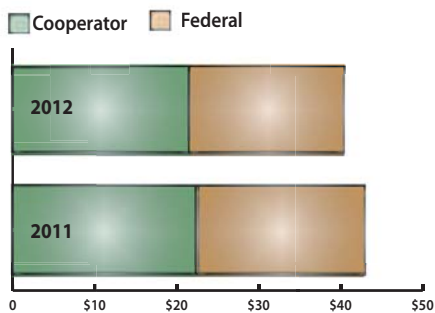
According to a Government Accountability Office (GAO) report on wildlife damage, by the time livestock producers and ranchers request WS' assistance they have already employed a variety of nonlethal management measures but continue to experience livestock predation in spite of these efforts. Before beginning any type of damage management program, WS ascertains whether the producer was properly utilizing nonlethal management measures, such as scare tactics, fencing, and animal husbandry practices. In many cases, however, these measures by themselves are not sufficient to prevent livestock predation.

WS has the knowledge and skill, as well as the equipment, to track, capture, and remove predators from locations where they are causing serious damage. These efforts can significantly reduce predation in targeted areas, saving thousands of dollars in losses.

WS specialists also provide information and guidance to help producers better manage livestock predation. For example, WS regularly recommends the use of livestock protection dogs and llamas to protect sheep flocks and new lambs. Many nonlethal methods work well, but only in certain situations or locations, and some work only temporarily. When nonlethal methods prove ineffective, impractical, or unavailable, however, the GAO report concluded that lethal management methods are a legitimate means for effectively resolving wildlife conflicts. In these cases, the GAO report noted that WS strives to select the method that will kill the predator in the quickest and most humane way possible.

In agreement with the livestock industry's desire for greater assistance in broadening the use of a wide range of wildlife management practices (especially nonlethal methods such as guarding animals), WS created a Resource Management Specialist (RMS) position. The RMS position has national responsibilities, and provides informational resources for WS personnel, producers, the media, and the public. Although initial efforts will focus on reducing livestock losses to predators through multiple techniques, the RMS will also provide informational resources for other wildlife damage management challenges.

Expenditures for Agriculture Protection (Millions)



United States Department of Agriculture
Animal and Plant Health Inspection Service

Developing New Management Methods

While lethal management is necessary in certain situations, opportunity exists for developing effective nonlethal means of managing wildlife damage. The 2001 GAO report, prepared for Congress, found that WS' National Wildlife Research Center (NWRC) has contributed significantly to knowledge about coyote ecology and behavior and development of nonlethal tools. WS NWRC is the only Federal research facility devoted exclusively to resolving conflicts between people and wildlife. The majority of WS NWRC's annual research funding is spent on efforts relating to developing or improving nonlethal wildlife damage tools and methods.

Capture technology has relied largely on tools and materials developed hundreds of years ago. Although effective, they have raised concerns about animal welfare. In response, NWRC scientists have developed and tested new and alternative capture devices and restraining methods to safely restrain captured animals. Behavioral research is also underway to study visual, mechanical, and odor-cue attractants, which will improve capture technology. In addition, experts are testing whether lures and rubbing posts can be used to monitor coyote and wolf populations. Such techniques can be used to gather hair and other samples for genetic analysis. Researchers note that rub stations can be strategically placed in the environment in accordance with specific sampling designs and provide an inexpensive way to monitor populations, estimate abundance, and explore genetic diversity.

NWRC researchers are also investigating whether select breeds of livestock protection dogs, such as the larger breeds still used in Europe, are effective at reducing livestock losses to larger carnivores, such as wolves and grizzly bear. Field work began in January 2013 and will continue for several years. The goal of the study is to identify the best breed(s) of livestock protection dogs to guard herds from grizzly bears and wolves and maintain this non-lethal tool for producers.

Given the societal concerns around the use of the traditional predacides the NWRC is investigating new compounds in a search for safer, more humane predacides. In 2011, NWRC began collaborating with a private Australian company to investigate the possibility of developing the compound para-aminopropiophenol (PAPP) as a predacide. PAPP was originally developed in the 1960s as an antidote for human radiation poisoning. In historical pharmaceutical trials, PAPP was found to be specifically more toxic to carnivores than to birds and humans. PAPP is currently registered in New Zealand for the control of stoats and feral cats. Initial product development efforts on PAPP in the U.S. are ongoing.

Protecting Livestock from Wildlife-Borne Diseases

Although a serious problem for producers and ranchers, predation is not the only challenge to livestock health. Wildlife-borne diseases also pose a serious threat to livestock. In FY 2003, WS began assigning wildlife disease biologists to conduct wildlife disease surveillance and provide assistance to Federal, State, tribal, and other entities.

Bovine tuberculosis (bTB) is a respiratory disease that can infect most mammals. Significant progress had been made in the 20th century to eradicate this contagious, bacterial disease. Where it is found, restrictions can be placed on interstate transportation of cattle, a significant impact on producers. The presence of bTB in white-tailed deer puts people, livestock, and wildlife at risk. Captive and free-ranging cervids (members of the deer family)

can serve as reservoirs for the disease. WS provides support for wildlife testing in states that have discovered bTB in livestock. Many wildlife disease biologists have been deployed to provide assistance in wildlife bTB testing in Minnesota and Michigan, where spillover into white-tailed deer has occurred.

WS is also developing research, disease management, and educational tools to complement the bTB control efforts of other Federal and State agencies. For instance, WS and APHIS-VS have developed English and Spanish versions of the Guidelines for Surveillance of Bovine Tuberculosis in Wildlife, which is available in print or electronic form. The program introduced these guidelines to the United States/Mexico Bi-national Tuberculosis Committee at the 2012 winter meeting in Nashville, TN. WS and collaborator research recently identified the presence of two volatile organic compounds associated with a bTB infection in the exhaled breath of infected cattle. This technique could form the basis for a real-time cattle monitoring system that allows efficient and non-invasive screening for new bTB infections on dairy farms.

Chronic wasting disease (CWD) is a fatal neurological disease carried by deer and elk, which can be transferred from wild populations to captive cervid herds. WS' wildlife disease biologists assisted with CWD surveillance by sampling more than 1,000 deer in 26 states during FY 2012. WS also has the expertise to assist with depopulation efforts and to help landowners obtain permits to remove deer from their property in order to protect their herds from potentially diseased wildlife.

Feral swine are a subject of increasing concern as potential carriers of, or catalysts for, a variety of diseases that could impact livestock, domestic pork producers, ranchers, farmers, and the general population. Diseases such as pseudorabies, swine brucellosis, classic swine fever, *E. coli* contamination and others have been linked to feral swine. WS wildlife disease biologists working with APHIS-VS monitor feral swine for the presence of more than 10 diseases. Disease surveillance continues to grow as control efforts intensify.

Range expansion and massive population growth are occurring throughout the United States, with current feral swine estimates at 5 million animals in at least 38 States. Control activities primarily include trapping and aerial shooting. During FY12, 28,519 swine were taken in WS control activities, and 2,894 of those animals were sampled for disease. As the feral swine population continues to increase and expand geographically, disease surveillance and control activities will need to expand proportionally to even attempt to keep disease threat and economic losses at current levels.

One disease of particular interest is pseudorabies, also known as Aujeszky's disease. Pseudorabies, a viral disease, has economically important consequences in domestic swine. Endemic in most parts of the world, it has been eradicated from commercial swine in the United States. However, feral swine in the United States are known reservoirs of the disease and could potentially serve as a source for reintroduction into commercial swine. Feral swine populations often overlap with domestic swine operations, which could lead to disease transmission opportunities. In FY 2012, more than 2,800 feral swine samples were screened for pseudorabies virus, with 497 testing positive.

Livestock also are threatened by diseases, such as salmonella, that can be spread through bird feces where large numbers of birds are present. In feedlots and dairies, infected livestock frequently lose weight and dairy cattle can experience a significant drop in milk production. WS works with producers to test birds for pathogens such as salmonella. Efforts focus on reducing the attractiveness of feedlots to birds by making feed more difficult to obtain, and to reduce bird populations when appropriate. Such control activities benefit not only livestock, but also agricultural workers who can contract the diseases. Ultimately American consumers benefit through economic efficiencies and safer foods.

Livestock Protection & Disease Statistics

- Livestock loss to predators, predominantly coyotes, reaches about \$138 million annually; WS spent \$25.9 million in FY 2012 directed toward livestock protection.
- Mountain lions, bears, wolves, foxes, bobcats, and eagles also prey on livestock.
- Sheep and lamb losses to predators in the United States totaled 247,200 in 2009; a National Agricultural Statistics Study (NASS) study valued the losses at \$20.5 million.
- Cattle and calf losses to predators in the United States totaled 220,000 head in 2010; a NASS study valued the losses at \$98.5 million.
- According to a 2010 NASS report, 180,000 goats and kids, valued at \$18.7 million, were lost to predators in 2009.
- In the absence of a professional, accountable damage management program, livestock losses to predators could be as much as two to three times higher.
- According to the National Commission on Small Farms study in 1998, approximately 94% of all U.S. farms are considered small (those with sales less than \$250,000 annually). These producers especially feel the impact of livestock predation.
- According to a 2011 NASS report, U.S. farmers and ranchers spent \$188.5 million on nonlethal measures to prevent predation of cattle and calves in 2010.
- WS initiated a national Resource Management Specialist position to assist producers, WS staff and others to understand and implement nonlethal predation management methods.
- A majority of WS' research funding is directed toward the development of nonlethal damage management tools and techniques.
- Every \$1 spent by producers on WS services to reduce livestock damage, protects \$3.00-6.75 in livestock.
- In FY 2012, WS wildlife disease biologists sampled 2,894 feral swine for diseases that could impact the pork industry and other livestock.