NWRC headquarters in Fort Collins, CO

About Wildlife Services' National Wildlife Research Center

NWRC is a world leader in providing science-based solutions to the complex issues of wildlife damage management as related to agriculture, property, human health and safety, invasive species, and threatened and endangered species. NWRC scientists strive to find solutions that are biologically sound, environmentally safe, and socially responsible. NWRC employs more than 120 scientists and support staff at its headquarters in Fort Collins, CO, and at field stations throughout the United States. NWRC's scientists have expertise in a wide range of disciplines, including animal behavior, wildlife biology, wildlife sensory biology, chemistry, immunology, epidemiology, statistics, population modeling, genetics, toxicology, and veterinary medicine.

"Solutions to problems depend upon knowledge, which only research can provide."

~ Edwin R. Kalmbach, first Director for the predecessor of the NWRC (1940–1954)

More Information

NWRC's Economic Research Project was created in 2001, and staff consists of two scientists and a technician. To learn more about the use of economics in wildlife damage management, or to consult with an economist on incorporating economics into a research study, contact NWRC Economic Research Project personnel at (970) 266-6000 or visit our Web site at www.aphis.usda.gov/wildlife_damage/nwrc.

WS Office Phone Numbers

For assistance with wildlife damage issues in your State, please call WS' toll-free number at 1-866-4USDAWS (1-866-487-3297) or one of the numbers listed below.

- NWRC Headquarters (Fort Collins, CO): (970) 266-6000
- Eastern Regional Office (Raleigh, NC): (919) 855-7200
- Western Regional Office (Fort Collins, CO): (970) 494-7443
- Operational Support Staff (Riverdale, MD): (301) 851-4009

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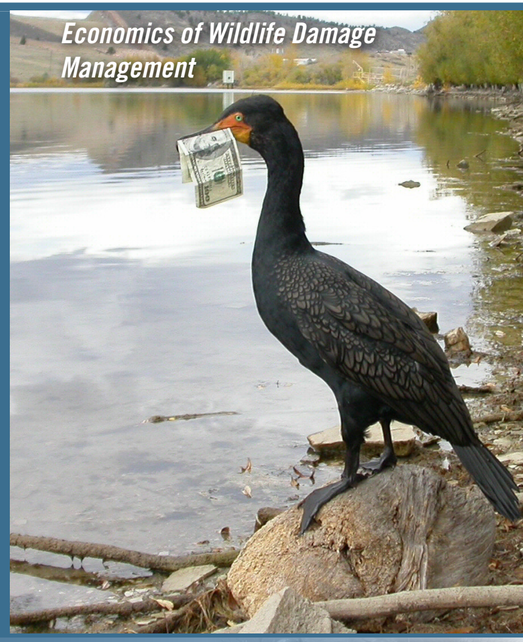
USDA

United States Department of Agriculture

Animal and Plant Health Inspection Service
Program Aid No. 1931

Solutions Through Science



Wildlife Services
NWRC
National Wildlife Research Center

The Problem

Wildlife is a public resource valued by all Americans. But when humans and wildlife live in close proximity, conflicts frequently occur. Wildlife cause damage to agriculture and natural resources and can transmit diseases that affect public health. To mitigate these conflicts, wildlife managers plan management actions based on the best biological information available. Often, the economic implications of these plans are unknown. Economic analyses are needed to help prioritize management efforts by identifying the most cost-effective management techniques.

Within the National Wildlife Research Center (NWRC)—the research arm of Wildlife Services (WS), a program at the U.S. Department of Agriculture's Animal and Plant Health Inspection Service—economics is an exciting and valuable tool for quantifying the benefits and costs associated with wildlife damage management. Experts involved in NWRC's Economics Research Project partner with WS employees, State and local governments, and universities to develop economic research and applications. This leaflet describes some of the strategies and methods used to integrate economic analyses into daily wildlife damage management and research activities.

Science-Based Solutions

NWRC economists utilize a variety of research techniques to quantify the economic impacts of wildlife damage management. Benefit-cost analysis (BCA) is one tool used by NWRC economists and others to evaluate government projects. In a BCA, the monetary benefits and costs of actions are identified and compared. Incorporating BCAs into research studies helps biologists direct resources to the most cost-effective projects with the goal of protecting resources and human health and safety.

The economic impacts of wildlife damage and management often extend to the local community in the form of employment and economic output changes. Regional economic analysis is used to estimate these effects, providing a picture of the way wildlife damage can affect industries other than agriculture.

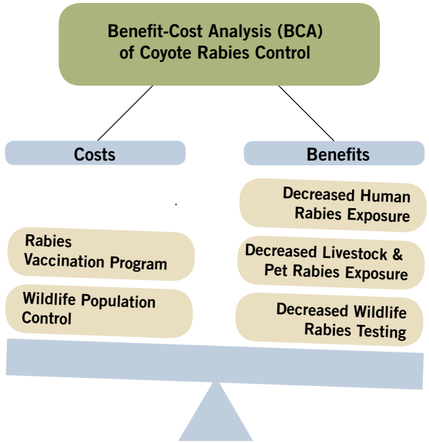
Benefit-Cost Analysis

To ensure an effective and insightful BCA, economists must first identify and assign values to measurable benefits and costs associated with the management activity of interest. In wildlife damage management, costs are often easier to identify than benefits.

For an activity such as the control and prevention of wildlife rabies, total costs may include the cost of vaccine baits and their distribution and the labor costs of vaccinating or removing wildlife. Benefits usually accrue from a reduction in wildlife damage over time. Several types of benefits exist:

- Direct (e.g., fewer people requiring vaccinations due to rabies exposure),
- Indirect (e.g., fewer pets requiring quarantine or euthanasia due to rabies exposure), and
- Intangible (e.g., people experiencing less fear of exposure to rabies through wildlife).

In rabies control programs, the benefits frequently outweigh the costs.



Economists help quantify not only the direct impacts of wildlife damage, such as damage prevention costs and crop loss, but also indirect impacts, such as lost income and jobs. *Netting to protect grapes from bird damage (above) and cedar waxwing damage to cherries (next page). Photos by Catherine Lindell, Michigan State University.*

Once benefits are identified, a monetary value must be assigned. This is the most difficult and sophisticated part of the BCA and is where economists play an important role. Market goods such as cattle or corn are bought and sold regularly, so they are easily assigned a monetary value. It is more difficult to determine the value of a wild animal, a decrease in the spread of a disease, or enhanced wildlife viewing opportunities. When markets for a benefit do not exist, its value must be estimated using nonmarket techniques.

Economists can estimate nonmarket value by using monetary figures derived from a variety of sources, including:

- Contingent valuation surveys, which elicit people's willingness to pay for a nonmarket good (such as reduced disease) to estimate use and nonuse values associated with wildlife species,
- Travel cost methodology studies, which use costs incurred for travel to quantify demand for recreational activities linked to a species of interest (e.g., visitors to a national park), and
- Benefit transfers, which assign values derived from contingent valuation surveys and travel cost methodology studies in one geographical location and species to another location and similar species.

Regional Economic Analysis

Regional economic analysis allows economists to estimate secondary benefits and costs associated with managing wildlife damage in units of measure that are important to the general public, such as revenue, income, and jobs. For example, projects that increase wildlife populations (the primary benefit) may generate measurable consumptive and nonconsumptive secondary benefits such as increased tourism. Increases in tourism have benefits to the regional economy that can be measured using regional economic models.

Alternatively, if fruit growers are suffering crop loss due to birds in their orchards, economists can estimate the monetary value of the lost fruit and the cost required to control bird damage (the direct impacts). Results will indicate how crop losses change gross domestic product (GDP) and impact employment in the region. These secondary impacts illustrate the broader implications of wildlife damage on the community and allow the public to better understand how damage mitigation efforts can benefit society.

Benefits of Economic Analysis

Collecting the right data and identifying and valuing costs and benefits are the foundation for credible economic analysis. NWRC economists work with biologists and wildlife managers to provide an overall picture of the costs and benefits of wildlife damage management and research. In short, economics is one of many tools that wildlife managers everywhere can use to enhance decisionmaking, look at long-term successes and trends, and maximize government efforts in resolving human-wildlife conflicts.

Case Study

Birds at dairy farms can consume and/or spoil large quantities of livestock feed, which can result in reductions in milk production and lost producer income. Less milk production causes a decline in producer income and reduces the incomes of businesses that depend on milk production for revenue. Ultimately, this leads to a decline in economic growth as losses ripple through the region.

NWRC economists worked with dairy operators and WS biologists to establish low, mean, and high estimates of bird damage at dairy farms in 10 counties in Pennsylvania to calculate the value of lost feed. This information allowed the economists to analyze the indirect regional economic effects of bird damage in Pennsylvania. Results indicated that revenue and employment dropped by between $4 million and $12 million and 43 and 128 jobs, respectively, as a consequence of bird damage (e.g., consumption and spoilage).

This type of analysis provides a broader understanding of the scope of damage that birds cause dairies, enabling producers and wildlife managers to target the most economically efficient methods of bird control.