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Wildlife Translocation

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Figure 1. Squirrels can damage homes and other structures. This squirrel has been captured in a live trap near the damaged site.

Quick Links

Human-Wildlife Conflicts

Many people enjoy wildlife. It enriches their lives in many ways. Nationwide, Americans spend over $144 billion annually on fishing, hunting, and wildlife-watching activities. However, wildlife is not always welcome in or near homes, buildings, or other property and can cause significant damage or health and safety issues (Figure 1). In one study, 42% of urban residents reported experiencing a wildlife problem during the previous year and more than half of them said their attempts to resolve the problem were unsuccessful.

Many people who experience a wildlife conflict prefer to resolve the issue without harming the offending animal. Of the many options available (i.e., habitat modification, exclusion, repellents) for addressing nuisance wildlife problems, translocation—capturing and moving—of the offending animal is often perceived to be effective. However, trapping and translocating wild animals is rarely legal nor is it considered a viable solution by wildlife professionals for resolving most nuisance wildlife problems. Reasons to avoid translocating nuisance wildlife include legal restrictions, disease concerns, liability issues associated with injuries or damage caused by a translocated animal, stress to the animal, homing behavior, and risk of death to the animal.

Translocation is appropriate in some situations such as re-establishing endangered species, enhancing genetic diversity, and stocking species in formerly occupied habitats. The main focus of this publication, however, is to address nuisance wildlife issues that may be commonly encountered by homeowners and nuisance wildlife control professionals.

Relocation Versus Translocation

Relocation is defined as moving an individual animal (or family group) from one location within its home range to another location within the same home range. An example of relocation is moving a skunk trapped in a home's window well to the home's backyard.

Relocation, along with other appropriate activities (i.e., barriers, habitat modification, scare devices, repellents) to prevent re-entry of the offending animal to an area, may be appropriate under certain conditions.

Translocation is defined as capturing and moving a free-ranging animal (or group of animals) from one location to a new location significantly distant from their original home range or established territory. An example of translocation is driving a trapped squirrel 10 miles from its capture site and releasing it on private property with permission from the landowner.

With the exception of large carnivores (bears, mountain lions), translocation is rarely recommended as a method for solving human-wildlife conflicts because long-distance movement can result in negative consequences for the animal(s).

Translocation for Conservation Purposes

Captive breeding and the release of captive bred animals is an important conservation tool for restoring threatened and endangered wildlife populations. Additionally, free-roaming wildlife are sometimes captured and translocated

Figure 2. The endangered black-footed ferret is one species whose recovery has been helped by captive breeding and translocation.

with the goal of re-establishing populations in formerly occupied areas. Both are legitimate uses of translocation.

Declining or endangered species, such as the California condor (*Gymnogyps californianus*), black-footed ferret (*Mustela nigripes*) (Figure 2), gray wolf (*Canis lupus*), red wolf (*C. rufus*), Key Largo woodrat (*Neotoma floridana smalli)*, Allegheny woodrat (*N. magister*), and bald eagle (*Haliaeetus leucocephalus*) have benefitted from translocation efforts. Translocation also has been used to re-establish more common wildlife species, such as wild turkey (*Melagris galapavo*), white-tailed deer (*Odocoileus virginianus*), black bear (*Ursus americanus*), river otter (*Lutra canadensis*), beaver (*Castor canadensis*) (Figure 3), elk (*Cervus elaphus*), bighorn sheep (*Ovis canadensis*), and bison (*Bison bison*) into formerly occupied areas .

The translocation of animals for conservation purposes requires planning, a detailed analysis of the habitat, and consideration of the long-term prospects for survival of the released animals. The ecological, economic, and societal consequences of the release also are taken into account. This typically does not happen when a homeowner, rehabilitator, or nuisance wildlife control operator translocates a nuisance animal; the problem animal is simply caught and released in a place where people hope it will live peacefully and without conflict. This is rarely the case.

Public Perceptions of Translocation

Wildlife professionals recognize that wildlife populations are impacted when people and development expand into and occupy previously wild landscapes. Habitat loss can force animals to leave an area or die, and the animals that remain may cause nuisance or safety concerns. Other animals have simply adapted to urban and suburban environments.

Over the last few decades, attacks by urban coyotes (*Canis latrans*) involving people and domestic dogs and cats have increased; conflicts between gardeners and suburban deer are more numerous; and costs associated with property damage by squirrels, chipmunks, snakes, bats, raccoons (*Procyon lotor*), armadillos (*Dasypus novemcinctus*), and other species continue to rise. Yet people may be unsure of ways to effectively deal with these wildlife nuisance problems.

Surveys show that relatively few species are responsible for the majority of nuisance wildlife complaints. Between 1992 and 2002 in Illinois, 88% of nuisance wildlife complaints involved raccoons, tree squirrels, opossums (*Didelphis virginiana*), striped skunks (*Mephitis mephitis*) (Figure 4), and woodchucks. In a survey conducted in 2017 in Georgia, county cooperative extension service agents reported that eight species—deer, feral swine, armadillos, moles, squirrels, birds in general, voles and snakes—accounted for 63% of the calls they received in 2016. In Virginia, nuisance wildlife calls involving bear, deer, raccoons, and red fox (*Vulpes vulpes*) were the most commonly received complaints by the agency's Wildlife Helpline during 2017.

In addition to increases in urban and suburban wildlife conflicts, people's attitudes and perceptions toward wild animals and wildlife damage management have also changed. Urban and suburban residents often lack the same wildlife experiences that previous generations have had with animals and are more likely to oppose wildlife hunting, trapping, or other forms of lethal control. Live-trapping and translocation, along with other non-lethal management methods, such as fertility control, repellents, and behavior modification, are often preferred by the general public for reducing human-wildlife conflicts in urban and suburban areas.

Numerous public opinion surveys report that people believe translocation is an effective and humane method for addressing nuisance wildlife conflicts. However, research repeatedly shows that it is not. Similarly, it does not effectively control wildlife populations and rarely benefits the animal.

Figure 3. Beavers being translocated to a new habitat in Oregon in an effort to restore populations.

Reasons Against Translocation

There are many reasons against the use of translocation to resolve wildlife conflicts. These include legal and policy issues as well as concerns related to the spread of disease, liability, stress to the animal, homing behavior, and survival rates of translocated animals.

Legal and Policy Issues

Wildlife translocation is illegal in most States and generally discouraged by Federal and State wildlife agencies. Professional wildlife groups and most private conservation organizations strongly recommend against translocation as a method to address nuisance wildlife problems.

For example, Georgia law prohibits the transport of wildlife from one location in the State to another unless the animal is in possession of the trapper and the trapper has the appropriate licenses or permits. Although this prohibits most Georgia citizens from trapping, transporting, and releasing wild animals, translocation is still legal under some circumstances. To avoid spreading disease, Georgia wildlife officials also suggest euthanizing species that commonly serve as rabies vectors (i.e., raccoons, skunks, foxes, coyotes, and bats) rather than translocating them.

Figure 4. Striped skunks are one of the species most commonly involved in wildlife nuisance complaints.

In Massachusetts, it is illegal to capture a wild animal and release it anywhere but on the property owned by the original complainant. Rules and regulations governing nuisance wildlife control operators in Rhode Island, prohibit the translocation of any nuisance mammal captured alive (Rule 6.13, 2012).

The U.S. Department of Agriculture's (USDA) Wildlife Services (WS) program (WS Directive 2.501) and other wildlife professionals state that the translocation of wild mammals is not a biologically sound practice. Several national and international veterinary associations including the American Veterinary Medical Association, the National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologists, oppose the translocation of wildlife because of disease risks.

Numerous private organizations, such as The Fund for Animals and the Audubon Society of Portland, also oppose or discourage translocation of nuisance wildlife.

Disease Concerns

Scientists, wildlife managers, and public health professionals concerned about the spread of disease among wildlife and people do not recommend the use of translocation. When animals are moved, the worms, ticks, fleas, viruses, bacteria, and other parasites that commonly live on or in association with them are also moved. This can lead to diseases appearing in previously unexposed wildlife populations far removed from the native range of the disease. In 1977, the raccoon strain of rabies virus was first introduced into the Mid-Atlantic and Northeastern states from translocated raccoons from Florida. The concern is valid even when moving animals short distances.

While not all translocations result in disease outbreaks, moving animals may result in diseases being introduced into naïve populations. Or, translocated animals may be exposed to unfamiliar diseases at their release sites resulting in illness or death.

Examples of diseases moved as a result of animal translocations include rabies, plague, chronic wasting

disease, pneumonia, tuberculosis, brucellosis, and whirling disease in fish. Diseases encountered at release sites include tick paralysis, botulism, tularemia, avian pox, bovine tuberculosis, and trypanosomiasis.

An additional concern is human exposure to disease. For instance, a homeowner or other individual who moves a rabid animal puts themselves and others at risk.

Liability Concerns

Those who move wild animals may be liable for damages associated with that animal or diseases they spread. Consider if a state wildlife agency moved or sanctioned the translocation of a disease vector or dangerous animal, such as a bear or mountain lion. If the animal injured or killed someone near the release site, the state agency could be liable. Such an event occurred in Arizona when the state fish and wildlife department translocated a nuisance black bear (*Ursus americana*). The bear later attacked and mauled a young girl near the release site. The state settled the liability claim out of court for $4.5 million.

Federal, state, and local governments may elect to translocate nuisance wildlife, such as black bears, to reduce human-wildlife conflicts. However, such actions have an associated liability risk if the animal subsequently causes physical harm or property damage.

Stress to the Animal

Translocation, unlike dispersal, is not due to natural or deliberate behavior. Being captured, translocated, and released can be stressful to a wild animal. This stress may cause many biological, physiological, and behavioral changes. Acute stress can result in major changes to hormone levels and blood chemistry. The animal may forego feeding and/or use limited fat reserves, leading to poor physical condition. This further reduces the animal's chances of survival.

Research with farm animals shows that transportation in a motor vehicle can be stressful for animals. Research with wild animals shows that even indirect contact with people can be stressful. For instance, the noise and vibration from machinery, such as snowmobiles, are known to cause elevated levels of stress hormones in wild elk and wolves.

Few research studies have followed the survival of translocated animals. However, of those (see Appendix), most conclude that translocation results in high mortality rates due to predation and stress.

Animals maintain social relationships with members of their own species. When an animal is removed through translocation, trapping or hunting, these relationships are disrupted. At the original capture site, remaining animals may fight to establish dominance in the absence of the translocated animal. Similarly, at the translocation site the new animal must fight with residents to establish its place in the local hierarchy. The degree to which this occurs depends upon the species, habitat, and density of the species' existing population at the release site. A translocated animal has no knowledge of nesting or roosting sites, food, water, predators, or local hazards. All of these situations place stress on the translocated animal.

Translocation for conservation or management purposes usually involves several individual animals from the same social group. They may know each other as part of a group capture event. They are likely introduced into an area where the species' population is low or absent. When using translocation for conservation purposes, wildlife professionals consider the time of year; the animal's social status, sex, age, and behavioral traits; and the overall suitability of the release site. On the other hand, translocation of small animals by landowners for resolving human-wildlife conflicts often lacks these characteristics and considerations.

Homing

"Homing" refers to an animal's ability to return to the location where it was originally captured following translocation (Table 1).

Homing behavior has been studied extensively in red squirrels (*Tamiasciurus hudsonicus*) and eastern chipmunks (*Tamias striatus*). Upon release in a new

Species	Longest Recorded Homing Distance
American crocodile	157 miles (253 km)
California vole	0.1 miles (161 meters)
Coyote	30 miles (48 km)
Eastern cottontail	3 miles (4.8 km)
Indiana bat	199 miles (320 km)
Red fox	35 miles (56 km)
White-tailed deer	348 miles (560 km)

Table 1. Table shows the maximum recorded distance an animal traveled to return to their initial capture site (homing distance) by species following translocation.

Figure 5. Black bears often are translocated when they become a nuisance in campgrounds or near houses, or cause considerable damage to farms and crops.

environment, these small rodents begin by making a straight-line excursion in a random direction. They travel about the same distance they might travel when foraging within their home range. Upon realizing that they are not in their normal home range, most individuals make an abrupt U-turn and return to the release point, then move in another random direction.

Wildlife behaviorists believe the animals are searching for familiar environmental cues in order to orient themselves within their surroundings. When the animals do not find familiar cues, they continue to wander until they encounter an unoccupied home range or find resources such as food, shelter, and water. While wandering, they are subject to increased risk of predation and stress.

Young mammals disperse naturally as they reach sexual maturity and this natural dispersal distance may offer insight into the homing distance an animal might travel. Some research suggests that dispersal distance is related to the normal home range size of the species and its body size.

In a review of 25 publications on the topic of maximum distance moved after translocation, a positive relationship was found between the distance the animal moved and its home range size. For example, if an animal had a perfectly square home range of 10 acres, the linear dimension of the home range would be 660 feet. The formula for maximum distance moved after translocation is 40 times the liner dimension of the home range (40 X 660 feet) or 26,400 feet, which is 5 miles (8 km). This simple formula can be used to determine the minimum translocation distance needed to avoid an animal returning to its capture site. Human activity and physiographic barriers (i.e., rivers, mountains, canyons) can also affect the movements of translocated wildlife.

Fate of Translocated Animals

Numerous studies investigating the fate of translocated animals report low survival rates for moved animals or the eventual return of translocated animals to the area where they were captured (See Appendix).

While research generally shows that the success of wildlife translocations can be improved when an animal has time to acclimate to the release site prior to release (known as a “soft release”), this option is rarely available in wildlife nuisance situations. Even with a soft release, a translocated animal’s survival is not guaranteed.

Conclusion

Urban and suburban wildlife, such as raccoons, squirrels, coyotes, bears (Figure 5), deer, and Canada geese, are becoming more abundant. Subsequently, both professional and public attitudes towards managing wildlife and wildlife nuisance problems are evolving.

People have complex attitudes toward wildlife. Their views are shaped by many experiences, including where they spent their childhood; where they currently reside; attitudes of their parents, friends, and the media; and more. Generally, non-lethal methods for wildlife damage management are considered more humane by the public. As such, translocation of problem wildlife is often perceived as humane, safe, and effective, but the vast majority of wildlife professionals do not agree. An exception may be the case of translocation for large carnivores whereby management options are limited to either translocation or euthanasia.

Rarely should translocation be recommended as a method for addressing wildlife conflicts. Reasons to avoid or not allow wildlife translocation include stress to the animal, risk of injury to the handler, legal restrictions, risk of moving a disease, an increased risk of death to the animal, the animal potentially returning to the capture site, moving the conflict issue elsewhere, liability from injury caused by a translocated animal, and more.

Wildlife professionals can help educate the public about alternative wildlife control strategies, such as habitat modification, exclusion, scare devices, repellents, and humane euthanasia for addressing nuisance wildlife issues.

The wildlife profession, including nuisance wildlife control practitioners, must be sensitive to changing public attitudes. Additional outreach efforts are needed to explain why translocation is generally not an acceptable solution to human-wildlife issues and that euthanasia may be the most practical alternative when nonlethal options are not feasible.

Acknowledgements

Figure 1. Photo by Tomahawk Live Trap Company
Figure 2. Photo by George Andrejko, Arizona Game and Fish Department
Figure 3. Photo by USDA-APHIS-Wildlife Services
Figure 4. Photo by USDA-APHIS-Wildlife Services
Figure 5. Photos by Sharon Baruch-Mordo

Scott Craven, Thomas Barnes, and Gary Kania proposed the idea of a professional position on translocation of problem wildlife in an article published in the *Wildlife Society Bulletin* in 1998. Such a formal position has yet to be written. Numerous professional societies have position statements recommending against translocation of nuisance wildlife.

Glossary

Hard release: A release method that simply turns a captured animal loose at a release site. The animal is not allowed to acclimate to the new environment and no additional resources, such as food, are provided.

Homing: An animal's ability to return to the location where it was originally captured following translocation.

Reintroduction: Releasing captive bred animals into a wild population, especially with reference to threatened or endangered species. Also used by state fish and game agencies to describe management activities that restore a native species to its formerly occupied habitat or range.

Relocation: To move an animal or family group from one location within its home range to another location within the same home range for the purpose of resolving a human-wildlife conflict. For example, a squirrel caught in an attic would be relocated to the backyard of the same home.

Soft release: A release method that involves an animal being maintained in an enclosed area or pen at the release site for a period of acclimation before release. After the animal is released, it may be given additional assistance, such as food provisions at or near the release site.

Translocation: The intentional capture and release of animals to the wild to establish, reestablish, or augment a population. Often synonymous with restock, augment, supplement, or reintroduction, especially from captive breeding efforts, but does not apply to nuisance wildlife or wildlife damage management situations.

Key Words

Homing, Nuisance wildlife, Relocation, Translocation

Disclaimer

Wildlife can threaten the health and safety of you and others in the area. Use of damage prevention and control methods also may pose risks to humans, pets, livestock, other non-target animals, and the environment. Be aware of the risks and take steps to reduce or eliminate those risks.

Some methods mentioned in this document may not be legal, permitted, or appropriate in your area. Read and follow all pesticide label recommendations and local requirements. Check with personnel from your state wildlife agency and local officials to determine if methods are acceptable and allowed.

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Appendix

Fate of Translocated Animals by Species

Species	Fate of Translocated Animals
American beaver	Researchers in Wyoming translocated beavers with the intent of establishing new populations. Mortality was 30% and dispersal from the release site was 51% within 6 months of release. Survival rates were 49% and 43% for 180 and 360 days post-release, respectively. Animals less than 2 years old had 100% mortality and dispersal loss within 6 months of release. Predators caused a high number of the deaths. *(McKinstry and Anderson, 2002)*
Black bear	Black bears often are translocated when they become a nuisance at campgrounds or near houses, or if they cause considerable property or crop damage. Black bears rarely remain close to their release sites. The longest post-release movement recorded for a black bear was 248 miles (400 km). The longest homing distance was 142 miles (229 km). Reportedly, adult males return home most frequently, followed by adult females. Translocated juvenile black bear have low survival rates and homing abilities. One study suggests that bears translocated more than once show more rapid homing behavior. Between 1987 and 1997, the Virginia Department of Game and Inland Fisheries translocated 221 nuisance black bears. During 1990-1992, 43 were radio-collared and 19 died. A study in northern Wisconsin captured 520 nuisance (crop-raiding) black bears in 2006 and 2007. Of the 520 bears, only 4% were recaptured suggesting that capture deterred further problems. Of the 21 bears that were recaptured, most (71%) returned to within 10km of the original capture site *(Linnell et al., 1997; Comly-Gericke and Vaughan, 1997; Shivik, et al., 2011)*
Canada geese	From 1993-2002 in Georgia , nearly 5,600 geese were caught, banded, and translocated to another watershed more than 100 miles (160 km) away. The average return rate of banded birds to the original capture site was 2.4%. *(Stephens et al., 2007)*
Grizzly bear	Grizzly bears are translocated from areas where they are abundant, especially in western national parks, campgrounds, and near farms or ranches. At least two reviews concluded that grizzly bear translocations were not successful, mainly due to high homing rates. Over 50% of adult grizzly bears translocated between 45 to 62 miles (75 to 100 km) returned to their capture sites. In Yellowstone National Park and Montana, 40% and 66%, respectively, of grizzly bears studied were involved in a second conflict event within 2 years of their translocation. In Alaska, 60% of 34 monitored bears returned to their capture locations. Researchers did not report the time to return, but the average translocation distance was 125 miles (200 km) and the maximum distance from which a bear returned was 160 miles (258 km). Like black bears, adult grizzly bears returned to capture locations more often than juveniles. *(Linnell et al., 1997)*

Appendix, *continued*

Gray squirrel	In Kentucky, nuisance wildlife control officers translocate more than 1,700 gray squirrels annually. Researchers found that over 70% of the release sites used consisted of poor or marginal habitat and suggested that such misguided translocation efforts doomed the released animals to certain death. In another study conducted by the Human Society of the United States, 38 adult male gray squirrels were captured over 3 years in urban-suburban backyards, fitted with radio transmitters, and translocated to a rural forest. Ninety-seven percent of the squirrels died or disappeared from the release site within 88 days. Predation was suspected as a major cause of observed mortality. *(Adams et al., 2004)*
Nine-banded armadillo	In a Georgia study, 12 armadillos were fitted with radio transmitters and released at least 0.9 miles (1.4 km) from their capture locations. Ninety-two percent of the translocated animals dispersed from their release site. Most disappeared and some returned to the original capture location. Of the six whose fate was known, two died within 50 days, two returned home, and two moved a great distance never to be located again. *(Gammons et al., 2009)*
Raccoon	A 1973 South Carolina study translocated 10 raccoons nearly 250 miles with the goal of establishing a population. The raccoon population at the release site was known to be low. Researchers concluded that translocating raccoons into areas with low populations can be successful. In all but one case, released animals remained within 0.6 miles of the release site for up to 50 days. However, few areas in the U.S. have low raccoon numbers and the translocation of raccoons is often illegal due to disease concerns. In a 1989 study in Ontario, Canada, 24 urban raccoons were fitted with radio collars and translocated 15 to 28 miles (25 to 45 km) north of Toronto. While none returned to their original capture site, mortality was near 50% during the first 3 months following release. The authors suggest that homing behaviors are poor in raccoons and that mortality may have been as high as 75% based on their evaluation of the condition of re-captured individuals. A 1988 study in North Carolina suggested that it may cost $50 per animal to relocate a raccoon and survival may not exceed 16%. *(Frampton and Webb, 1973; Rosatte and Macinnes, 1989; Boyer and Brown, 1988)*

Appendix, *continued*

Raptors	Translocation of raptors (hawks, eagles, and owls) is considered more socially acceptable than lethal control, and the technique has been used widely at U.S. airports. For example, from 2008 through 2010, USDA Wildlife Services biologists translocated more than 600 red-tailed hawks (*Buteo jamaicensis*) from 19 airports. A 2018 study of radio-collared red-tailed hawks translocated from Chicago O'Hare International Airport showed older birds (> than 1 year) were 2.4 times more likely to return than younger birds. Odds of returning to the capture site went up 4 times when translocations occurred during the breeding season. The odds of a hawk returning again increased to almost 12 times for each subsequent translocation event involving the same bird. The cost of one translocation event to the release sites that were 81, 121, 181, and 204 km from the airport was $213, $284, $362, and $426, respectively. Researchers suggest that management programs using release sites 80 km from an airport minimize translocation events to include only younger birds during the non-breeding season and undertake only one translocation event for each individual hawk. Such changes would increase the program's efficacy and greatly reduce implementation costs. *(Pullins et al., 2018)*
Reptiles	The impact of translocation on timber rattlesnakes was assessed experimentally by moving 11 individuals distances between 8 km and 172 km away from their native populations and releasing them into a study area with a resident rattlesnake population. All translocated snakes, as well as 18 resident snakes, were equipped with radio transmitters and monitored. Fifty-five percent of the translocated snakes died compared to 11% of the resident snakes. The authors do not recommend the translocation of adult snakes for conservation purposes. Another review paper examining the effectiveness of translocating Gila Monsters, western diamond-backed rattlesnakes, and Sonoran desert tortoises for mitigating human-wildlife conflicts concluded the efforts were unsuccessful due to increased movement, mortality and homing by translocated animals. *(Reinert and Rupert, 1999; Sullivan et al., 2014)*
White-tailed deer	In one study in New York, researchers translocated 12 female white-tailed deer from a single social group and another 5 randomly-caught females. Individuals in each group dispersed an average of 14 miles (23.5 km) from the release site. Translocated deer had significantly lower survival than resident deer at the release site. Resident deer showed no measurable response to the new individuals. At the end of the 5-year study in Wisconsin involving 47 translocated white-tailed deer, the fate of 30 of the deer was unknown. Of the 17 deer whose fate was known, mortality exceeded 82%— 8 were killed by hunters, 5 were killed by cars, 1 was euthanized due to an injury, and 3 were alive. *(Jones, et al., 1997; Diehl, 1988)*

Appendix, *continued*

Wild cats	In New Mexico, 14 mountain lions were translocated to address nuisance or damage issues. Mountain lions were translocated an average of 296 miles (477 km) from the capture locations. Nine of the 14 lions (64%) died during the two-year study. Annual survival rates were 55% for females and 44% for males. Translocation was most successful for lions between 12 and 27 months old. Mountain lions have been translocated from Texas to Florida to augment the genetic diversity of the endangered Florida panther population. Four Texas lions translocated to Florida moved an average of 19 miles (32 km) from their release sites. One killed exotic livestock on a game ranch and was translocated an additional 19 miles away. It returned to the ranch within 5 days. In one study, 83 Canadian lynx were translocated from the Yukon, Canada, to New York. Most of the individuals traveled widely following their release. One individual was shot 447 miles (720 km) from its release site. Of 32 known mortalities, most were linked to large-scale post-release movements. *(Ruth et al., 1996; Belden and McCown, 1996; Ruggiero et al., 1999)*
Wolf	In Minnesota, 104 wolves were captured near farms that experienced livestock depredations. The wolves were translocated 31 to 195 miles (50 to 314 km) away. The authors note the translocations were unsuccessful at reducing livestock-wolf conflicts and that extensive movements of translocated wolves should be expected. They recommend restricting translocation efforts to 6-9 month old wolves. *(Fritts et al., 1984; Fritts et al., 1985)*
Woodchuck	A study in Chicago marked 27 nuisance woodchucks and moved them to exurban release sites to mimic "typical" nuisance control activities. The translocated animals moved farther than resident woodchucks and most left the release site. *(Lehrer et al., 2016)*