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Bird Dispersal Techniques

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Figure 1. Photo of a frightened wild turkey (*Meleagris gallopavo*).

Human-Wildlife Conflicts

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Conflicts between humans and birds likely have existed since agricultural practices began. Paintings from ancient Greek, Egyptian, and Roman civilizations depict birds attacking crops. In Great Britain, recording of efforts at reducing bird damage began in the 1400s, with books on bird control written in the 1600s. Even so, the problem persists. Avian damage to crops remains an issue today, but we also are concerned with damage to homes, businesses, and aircraft, and the possibility of disease transmission from birds to humans or livestock.

Successful dispersal techniques should capitalize on bird sensory capabilities. If birds cannot perceive the dispersal technique, it will not be effective in dispersing birds.

Birds rely primarily on their vision and hearing to find food, avoid predators, and locate mates. Bird vision is quite different from human vision; birds can see colors that humans cannot perceive (including the ultraviolet range), and and they detect and use polarized light. Bird response to scare devices (Figure 1) that rely on vision

may depend on the visibility of the object to the bird, as "visual noise" could be ignored. With regard to hearing, birds generally are capable of hearing frequencies between 1,000 to 3,000 Hertz, which is narrower than normal human capabilities. Since this range does not include the ultrasonic range, ultrasonic devices will not scare birds. Birds also use tactile (touch) and olfactory (smell) senses, but to a lesser degree. Devices based on these senses are not generally used for dispersal.

Not only must birds be able to perceive a dispersal technique, they also must interpret the technique as a threat to their safety. A technique that worked initially may fail later as birds habituate to it and no longer perceive the technique as threatening. For some species, the introduction of limited lethal control reinforces non-lethal dispersal techniques, as the birds again perceive the non-lethal technique as potentially dangerous. For other species, changing techniques is necessary, because they may not react to the death of a flock member and therefore still not interpret the scare technique as a threat. In either case, changing techniques and using multiple techniques in an integrated manner are essential for deterring birds from sensitive areas.

No single technique or tool will deter birds in every instance or situation; there is no silver bullet. Successful bird dispersal involves a combination of tools and timing of use, as well as the skill and persistence of biologists and wildlife control operators (WCOs). The following sections offer overviews of various techniques that have been used to mitigate bird problems in various situations, as well as examples that highlight successful bird dispersal programs.

Habitat Modification

All birds need some combination of food, water, cover, and space to survive. Modify one or more of these features, and birds will often move to an area that better suits their needs. Management of vegetation can affect food, cover, and in some cases, space. Before starting to manage vegetation, survey the location to identify the species present. You must be aware of the birds in the area because the height and density of vegetation may attract or deter birds, depending on the species. Tall and dense vegetation may interfere with the birds' ability to capture prey. In addition, other species may avoid taller vegetation because it hinders their ability to detect approaching predators. For those species, tall vegetation may reduce some bird conflicts.

Some birds, however, prefer tall vegetation for nesting and feeding. For example, European starlings (*Sturnus vulgaris*) frequent areas with tall grass when in large flocks, but avoid these same areas when alone or in small flocks. On the other hand, brown-headed cowbirds (*Molothrus ater*) prefer short grass because, although there may be fewer insects available, the birds have easy access to them. Before modifying herbaceous vegetation, try to understand why a bird is using the area. For example, if birds are feeding on insects you may want to use an insecticide to remove the food source. If birds such as eastern meadowlarks (*Sturnella magna*) are nesting in taller vegetation, you could mow the vegetation to remove nesting habitat, but realize this may make the area attractive to those birds (e.g. American robin [*Turdus migratorius*]) that prefer feeding in shorter grass.

It also is possible to change the attraction of an area by working directly with the plants that attract offending birds. For example, not all herbaceous vegetation is equally desirable as a food source. Chemical makeup and mineral content of vegetation will influence the foraging on grasses by Canada geese (*Branta canadensis*). By planting turf grasses that are not desired by grazing birds (e.g., high-endophyte fescue, centipedegrass, St. Augustine grass, and zoysiagrass), a landowner can make an area unattractive for birds which, in turn, can make birds easier to scare away using an audio or visual scare technique. Likewise, a landowner can plant trees or shrubs that do not provide food for birds. In cases where long established trees are the attraction, thin or prune the vegetation back by about a third to make the area less desirable.

Exclusion Techniques

Exclusion methods may be divided into two categories: area and ledge. The exclusion of birds from areas typically involves using nets or wires suspended to prevent bird access. The mesh size of the net depends on the species you are attempting to exclude. Netting with a ¾-inch mesh will keep most pest birds from accessing protected areas. Failure to install nets properly, however, can increase surface areas for nesting or loafing. In addition, poorly installed nets can trap birds, leading to the death of birds and increased damage to the protected area while birds try to escape. When nets are hung over high value crops such as blueberries or grapes, the manner in which birds are attacking the crop (e.g., from the ground up or from the top down) will influence how the net should be deployed and the ultimate success or failure of the netting.

Use overhead lines made of wire, nylon strings, or monofilament to prevent birds from using specific areas. The exact reasons why lines work are unknown but the placement of lines in grid, parallel, or random patterns has worked to prevent bird access to food, loafing, or nesting areas. Spacing of the lines varies by the species that is to be excluded. In general, wider spacing of about 10 feet is effective for birds with wingspans of around 2 feet, whereas narrower spacing has worked for birds of smaller wingspan. Various species of gulls (Laridae), geese, sparrows (Passeridae), and swallows (Hirundinidae) have been excluded from feeding or loafing areas. However, some species, such as mallard ducks (*Anas platyrhynchos*), have not been deterred from using protected areas as they are willing to pass through even narrow overhead grids.

Birds can be deterred from small water bodies such as retention ponds by covering the water surfaces with floating discs or balls. This technique will reduce evaporation, however, and may change water chemistry by preventing air from mixing with the water.

You can exclude birds from loafing or nesting on ledges in several ways using a variety of products (Figure 2). Metal flashing, wood, or stone placed on ledges at a 45° angle or more will exclude birds. Additionally, products are available

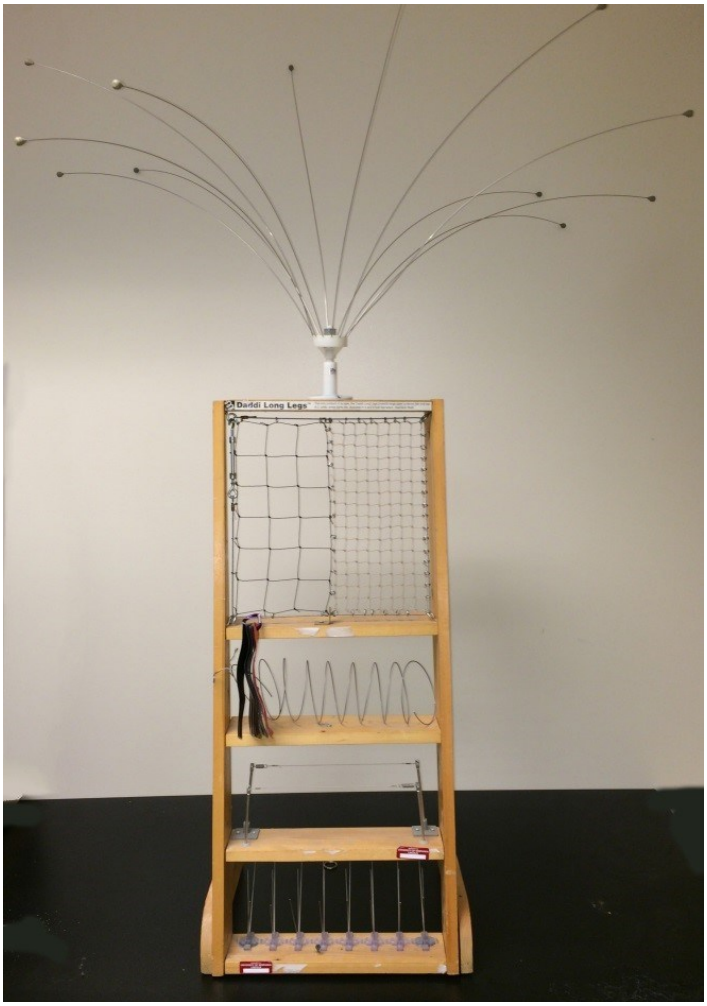

Figure 2. Top to bottom. Daddy long legs, netting (different mesh sizes), bird coil, bird wire, and bird spikes.

that make a bird uncomfortable when it tries to use a ledge or some similar perching area by causing minimal amounts of pain. A variety of anti-perching spikes are available that work (in theory) either by preventing birds from perching on the spike with their feet or by pricking birds that attempt to land on them.

Unfortunately, no single device will be effective against all species of birds. In general, larger birds require different devices than smaller birds due to the ability of different sized birds to fit within a series of spikes or grasp them in a manner that allows them to perch. Some larger hawks

(Accipitridae) have learned to grab hold of the spikes and use them as a perch.

As with any mechanical device, to be effective, spikes must be maintained and used against species for which they are intended. For example, when a series of ledges are involved, if spikes on lower ledges are covered with material dropping down from upper ledges, they will be ineffective. Some birds actually learn to drop nesting material onto the spikes so that the spikes help to form a base for the nest. Maintenance of the sites will prevent this from happening.

Shock strips produce a slight electrical shock to birds that land on them. They should remain effective as long the strips have electrical power and the area is kept clean enough to prevent the strips from shorting out.

Frightening Techniques

A wide variety of acoustical and visual tools and methods are available or under development to frighten birds. Not all devices have been through scientific testing, so the consumer must determine whether product claims are logical and whether the product is likely to work under the conditions of the problem facing the consumer.

Auditory Techniques

Birds are attuned to sounds in their environment, including bioacoustic sounds such as alarm or distress calls. Birds make alarm calls when they observe a predator that presents a threat. Birds make distress when they are injured or traumatized. Either call tends to be species-specific, although some birds in mixed flocks react to calls from other species within the flock. How a bird reacts to calls depends in part upon the time of year in relation to breeding, frequency of predation risk, distance to escape cover, approach of the predator, type of habitat, and behavior of flock members. When used at the correct time and place, both types of calls may cause birds to disperse, although many species are first attracted toward the call to learn what danger is present. High quality recordings of alarm and distress calls are available. Use them at a volume that birds are accustomed to hearing. It is not helpful to play calls louder than how the birds normally hear or perceive the call.

Birds habituate to repeated alarm and distress calls in the absence of any threat. Calls are more effective in dispersing birds when used with other methods (e.g., pyrotechnics, limited lethal control) that present a clear threat. Activating acoustic devices only when birds are present may prolong their period of effectiveness.

Generic sounds, whether recordings of actual events (e. g., gunshot, car horn) or synthetically made noises, may show immediate results, but birds tend to habituate quickly to them unless the sounds cause or are accompanied by pain or discomfort. As with bioacoustics, integrate other control activities that represent a threat into programs using sounds. Devices that produce ultrasonic sounds are not effective because birds do not hear within the ultrasonic range.

Pyrotechnics are a commonly used and effective bird dispersal tool. Pyrotechnics are specially designed explosives that may be fired from shotguns or adapted firearms (e.g., starter pistols) that shoot only pyrotechnics. Common pyrotechnics include shell crackers, screamers, bird bangers, and bird bombs. Each of these produces a loud sound; some also produce a flash of light and puff of smoke as they are fired or explode. Screamers usually make a wavering noise, leave a trail of smoke, and fly erratically. Bird bangers create a blast that mimics the sound of a shotgun. The most effective type of pyrotechnic for any given situation depends upon the location where it is to be fired, the types of birds to be scared, and the range that is required to reach the birds. Although mixing different types of pyrotechnics can slow habituation, eventually most birds become habituated, especially if the site being defended is highly attractive to the birds and the same style of pyrotechnics is used repeatedly. In such situations, some species of birds may again react to pyrotechnics if limited lethal control via a shotgun or rifle is used against the flock. Research has shown limited lethal control works well against gulls, but not as well against crows (Corvidae) or blackbirds (Icteridae). Local and

national restrictions on the purchase, storage, and transport of pyrotechnics may preclude use by some people. Local ordinances may also limit use of pyrotechnics. Care must be taken because pyrotechnics can cause fires and leave debris behind that can cause damage to equipment or aircraft.

Propane cannons or gas exploders generate a blast that sounds like a shotgun from a stationary location. Cannons may be timed to go off at specific intervals, or be remotely fired by observers when birds are near the cannons. Although propane cannons are effective in some situations, habituation is common, especially with cannons timed to go off at specific intervals. The time to habituation may be extended by moving the cannons periodically, by firing cannons only when birds are present, and by integrating other scare tactics to supplement cannons.

Visual Techniques

Visual deterrents stimulate either an innate avoidance or a learned response that often is reinforced by another control technique. Bright lights such as spot lights, strobe lights, and flashing lights can be used to disperse birds for short periods of time. Products that use sunlight to create bright reflections also purportedly disperse birds. Although there have been reports of initial success in keeping birds away for a few days, numerous studies with a variety of species have failed to demonstrate success for human-made lights or reflected sunlight (except for lasers, see below) in continually dispersing birds.

Red or green lasers have been effective at scaring some species of birds. Red lasers work best in the dark while green lasers work both in dark and low-light conditions. It is unclear whether birds that do not react fail to see the laser (birds perceive colors differently than humans) or they do not recognize it as a threat. The reaction of some species, such as Canada geese and American crows (*Corvus brachyrhynchos*), may be diminished under increased ambient lighting or where there are no alternative roost areas. Use lasers with caution due to their range and potential to affect human vision. Be careful to keep laser beams from striking the cockpit of an aircraft as they can cause flash blindness. This could result in hazardous situations for people on the aircraft and the ground and a visit from law enforcement officers.

People of many cultures have used scarecrows, dead birds, predator-like devices, and effigies of various other types over the centuries. Simulated predators, like plastic owls and hawks, often are used unsuccessfully to keep birds from roosting or nesting in specific areas. Two-dimensional cutouts of coyotes (*Canis latrans*) have shown some initial success but birds quickly habituate to them. Taxidermy mounts of coyotes, when routinely moved around airports that also employ other control methods, have been effective against Canada geese. Birds quickly learn that effigies left in the same location over a prolonged period do not represent a threat. The use of effigies has met with mixed success. Canada geese initially may react to plastic goose effigies but usually habituate within a short period. Effigies consisting of actual carcasses and artificial decoy-like vulture effigies hung by their feet in conspicuous locations where they move in the wind have been used to displace turkey (*Cathartes aura*) and black (*Coragyps atratus*) vultures from roosts for extended periods. Gull effigies have repelled gulls from loafing areas but have shown limited to no success when used in nesting colonies or at highly desired feeding sites. Human effigies (scarecrows) have been used for hundreds of years, but usually are of limited value in deterring birds unless they are enhanced by adding movement or integrating additional control measures, such as limited lethal control.

Flagging and other materials that move in the wind have shown mixed effects as visual repellents. Mylar® ribbon or tape has effectively deterred some species of birds, including blackbirds, gulls, house sparrows (*Passer domesticus*), and Canada geese, from agricultural crops and loafing areas. However, other species, such as American robins, gray catbirds (*Dumetella carolinensis*), house finches (*Carpodacus mexicanus*), American gold finches (*Carduelis tristis*), and mourning doves (*Zenaida macroura*), have ignored this device. The reaction of gulls varies, as they avoid Mylar-style flagging when it is used in loafing areas but ignore it when it is used in established nesting colonies. In general, birds exhibit a neophobic response to flashing pie pans, aluminum foil, colored ribbon, plastic bags, and any other items suspended to blow in the

Figure 3. Balloons that have features similar to predators may frighten birds.

breeze. As with the other items mentioned above, unless birds recognize the object as a threat to their safety, they will ignore it or in some cases make use of a device. For example, gulls may incorporate Mylar flags within their nesting material.

Kites or balloon/kite combinations that take the form of simulated predators (Figure 3) have been reported to deter birds successfully from some areas, and they provide an option in areas that regulate noise levels from acoustic bird deterrents. However, kites and balloon/kite combinations are labor intensive to use, may be limited by weather conditions, and have a shrinking sphere of influence as birds habituate to them unless other techniques also are used.

Auditory-Visual Techniques

Remote controlled vehicles, including boats and aircraft, have successfully scared birds because they can be deployed in a threatening manner. Using these requires a level of skill (especially for aircraft), time and money to develop. Weather conditions may limit their use.

Dogs have been used successfully to disperse birds, especially waterfowl in urban and suburban areas (Figure 4). Properly trained dogs provide motivated harassment that birds recognize as threats. Dogs can be trained to remain within a given area and in some cases may be housed there to provide constant control. Dog handlers are required when dogs are taken to various sites where they chase away targeted birds. Birds often return after the dogs leave the site. Even where dogs remain, they may lose interest in chasing the birds; this allows birds to return to the site. As with any bird dispersal technique, dogs are most effective when used with other control activities.

Falconry, the use of live raptors under the control of a handler, has been used in a variety of places to scare birds away. Many raptors present an innate threat to birds, which either hide or disperse when a raptor is visible and hunting. Falconry is expensive and requires extensive training, permits are required, multiple raptors are needed to cover large areas, weather conditions can restrict when raptors can fly, and dedicated personnel are necessary to make a system work. Due to some of the limitations inherent with a falconry program, other techniques to frighten birds should be integrated into any falconry program.

Compressed air may be used directly or indirectly to displace birds from roosting, loafing, or feeding areas. Air blown directly onto birds through a tube or hose may initially force them to move. Compressed air may be used indirectly by causing hoses to move erratically within sight of the birds. Air forced through lightweight hoses causes them to move unpredictably, making birds avoid the area. Some birds, however, quickly learn to vacate the protected area temporarily when they hear the noise of the air compressor or air coming out of the tube, only to return when the air is turned off. As with other devices, birds may learn to avoid only the points where the air or hoses are applied, therefore air or hoses should be used as part of an integrated system.

High-pressure water sprayers have been used effectively to disperse roosts. Some birds learn to associate the sound of the sprayer pump with being sprayed and will leave the roost before being sprayed. If the sprayer cannot reach portions of the roost due to dense vegetation and other obstructions, use other scare devices as well.

Repellents

Most chemical bird repellents are irritants. Avitrol® (4-aminopyridine) is listed by the U.S. Environmental Protection Agency as a chemical frightening agent, although the chemical is lethal to any birds that ingest it. Before dying, affected birds make distress calls, engage in irregular flight, and/or show other signs of distress that frighten the rest of the flock away from the area.

Polybutene-based products are marketed as tactile repellents. When in contact with the feet of birds, these products make them uncomfortable. Gels, tars, or similar material should be used with caution because some break down in high heat and stain or run. They are less effective when dirt or other material coat the surface of the products.

Application of repellents to grass can help disperse birds from areas where they are a problem. A variety of products are available on the market, but only two active ingredients, methyl anthranilate (MA) or anthraquinone (AQ), are registered for use on turf. Products that have MA elicit an immediate response, as MA is a chemical irritant that produces pain when it contacts the eyes, nostrils, or mouths of birds. Products containing AQ are secondary repellents because birds experience intestinal discomfort after eating treated food and then associate the food with the discomfort, leading to avoidance of the food. In controlled studies, both MA and AQ have shown promise as bird repellents, although results have been mixed since repellency is impacted by a variety of factors such as availability of alternative food, distance to escape cover, or weather. Additionally, because changes in formulation and application techniques may affect efficacy of repellents, applicators should check current literature to determine if their intended application is likely to succeed.

Figure 4. Border collie herding Canada geese (*Branta canadensis).*

MA also may be used as an irritant when it is used as the active ingredient in foggers. A bird that contacts MA through its nose, eyes, or mouth experiences distress and often leaves the area to avoid the chemical. Napthalene (moth balls or moth flakes) has been suggested as a means to keep birds from enclosed areas, but when tested, birds (especially starlings) were not discouraged from using treated sites.

Sulfur-based products repel mammals, but their effectiveness as bird repellents is unclear. Snow geese (*Chen caerulescens*) appear to avoid fields treated with high concentrations of the sulfur-based Deer Away® Big Game Repellent, but starlings were not deterred from nest boxes treated with the same product.

Bird Management Examples

Urban Crow Roost Management

Thousands of American crows may congregate in urban winter roosts that create large amounts of fecal contamination of walkways, cars, and other property, as well as night-long cacophony. In some instances, as many as 70,000 crows have been recorded in a single winter roost. Before efforts at reducing the impact of the crows begins, it is critical to set an objective that all parties within the affected area agree with. In the case of crow roosts, the objective may be to splinter the flock into small groups, or to move the crows to alternate areas largely uninhabited by people. It also is necessary to be sure that the birds are not moved to an area in which they could become a significant threat to human health and safety (e.g., moving birds into areas with increased risk of striking aircraft or vehicles).

Dispersing urban crow roosts requires coordination from multiple entities, including city management, law enforcement, public relations, and the agency conducting the work. The media are likely to be interested, and it is wise to provide a media spokesperson on the first night of harassment.

A combination of tools such as recorded crow distress calls played through loud speakers, pyrotechnics, red-beam lasers designed for bird harassment, and spotlights can be used to break up roosts. During the first few days of the roost dispersal program, biologists and technicians should set up any specialized equipment at the principal crow roost before the crows begin to arrive at dusk. As the flock begins to trickle in, use a battery of tools to harass (scare away) the crows. Visit the principle roost each night until the birds abandon the site or splinter into smaller roosts (usually after 5 to 10 nights). During the first winter or two of roost dispersal at the main sites, it may be necessary to conduct routine hazing every night for several weeks. Once the crows abandon the original roosting site, hazing may be reduced to several nights every 2 to 3 weeks.

Beginning with the first night of hazing, it is important that mobile teams drive through nearby neighborhoods to search for the formation of new roosting locations. When pursued and harassed, crows tend to seek the cover of coniferous trees. Because they can hide more easily in pines, listening for crows can be as effective as visual searches. Once a roosting location is found, you can use the same tools to harass the crows until they disperse. Encourage residents to report the locations of crow roosts directly to the agency conducting the work. Persistence is fundamental to a successful management of urban crow roosts.

Urban Canada Goose Management

Canada geese, when congregating in large numbers within public areas or on lawns, can create problems due to their droppings and, in some cases, their aggressive behavior towards people. All concerned parties should agree on the goal(s) of any management program before it is initiated. In the case of a non-lethal control program, the goal simply may be to reduce but not eliminate all geese within the area. Studies have shown that when local geese are harassed, they often travel less than 2 kilometers (1¼ miles) from the site and regularly return within hours of harassment.

Once objectives have been determined, a goose harassment program should use a number of methods, such as chases by border collies, remote control boats, kayak chases, and pyrotechnics. Goose behavior, and the effectiveness of any control program, is dependent on breeding condition, migration, and molt. A pair of geese is much more difficult to scare away once an active nest is established. Trained personnel must visit each site of concern multiple times each week from May through October to prevent habitual use by geese. Initially, multiple visits each day are necessary to ensure that geese do not return. When conducting the hazing program, make sure that all geese have left the area and do not merely circle back to the site. If the person hazing leaves too quickly, the geese will return within minutes. Geese always should be hazed away from busy roadways or airports.

Curious bystanders often inquire about the hazing. When using a dog, it is helpful to fit the dog with a flotation vest with a logo or other marking that will let people know that the dog and hazer are authorized and will prevent the dog from tiring as quickly when swimming.

Repeat non-lethal goose management as often as necessary from year to year to make the site as inhospitable as possible to the geese. No-feeding ordinance, low fencing or wires around ponds, and vegetation or rip rap at the water's edge can enhance the effectiveness of goose harassment efforts.

Conclusion

Bird dispersal techniques are a vital part of safely and efficiently reducing bird conflicts with humans. The bird must perceive a technique as a threat if it is to be effective. No single technique can solve all bird conflicts, but an integrated use of multiple techniques, each enhancing the other, generally provides relief. When

possible, decreasing the attractiveness of the site by removal of food, water, or shelter helps to reduce conflicts as well as enhance the effectiveness of dispersal tools. Engaging municipal leaders and public agencies facilitates obtaining permissions, special authorities, and budgetary decisions from communities and organizations. Municipal leaders also can aid in establishing no-feed ordinances and positive public relations. Ultimately, the skill, knowledge, and persistence of those charged with reducing the conflict, and patience of the public will play a key role in successfully dispersing birds.

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Figure 1. Photo by T.W. Seamans, USDA-APHIS-WS and Reconyx
Figure 2. Photo by Stephen M. Vantassel
Figure 3. Photo by John Humphrey, USDA-APHIS-WS
Figure 4. Photo by Stephen M. Vantassel

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Glossary

Bioacoustics: The study of biological sounds that combines the fields of biology and acoustics.

Effigies: A three-dimensional figure or dummy of a person or animal

Habituate: A degradation in response to repeated stimulation such that the animal no longer reacts to the deployment of a scare tactic.

Innate: Existing in, belonging to, or determined by factors present in an individual from birth.

Neophobic: The tendency of an animal to avoid or retreat from an unfamiliar object or situation.

Ultrasonic: Of or relating to acoustic frequencies above the range audible to the human ear (above approximately 20,000 hertz).

Key Words

Auditory techniques, Chemical techniques, Frightening techniques, Habitat modification, Scare tactics, Visual techniques

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.

Mention of any products, trademarks, or brand names does not constitute endorsement, nor does omission constitute criticism.

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