2-2020

# Common Ravens

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U.S. Department of Agriculture
Animal & Plant Health Inspection Service
Wildlife Services
February 2020

Wildlife Damage Management
Technical Series

# Common Ravens

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Figure 1. Common raven *(Corvus corax).*

**Quick Links**



## Human-Wildlife Conflicts

Common ravens (*Corvus corax*; hereafter ravens; Figure 1) are native to the United States. They belong to the Family Corvidae which also includes crows, jays, and magpies. Ravens are very similar in appearance to the more widespread American crow, but can be distinguished by their slightly larger size, wedge-shaped tail, and hoarser call.

Highly intelligent birds, ravens cause a variety of conflicts with people and often become habituated to management tools and techniques used to prevent damage. Raven damage to agriculture includes feeding on corn and other grains, damage to fruit such as cherries, apples or melons, and preying on newborn livestock. They also prey upon endangered, threatened, and sensitive species, impacting the conservation and recovery of some populations. Their large roosts can be a nuisance in urban and suburban areas.

Figure 2. Ravens have been documented roosting on artificial structures, such as overpasses and heated industrial plants.

### *Livestock and Agriculture*

Ravens prey on newborn livestock, especially newborn lambs, calves, and goats, by mobbing and attacking an individual. Ravens also eat fowl and their eggs, including chickens, ducks, guineas, and geese. The amount of depredation varies from ranch to ranch, and multiple ravens are usually responsible. Losses are incurred from death and veterinary services to injured livestock.

Ravens also impact farming practices. Ravens pick out seeds in ground crops, such as alfalfa and wheat. Nut and fruit crops are also susceptible to raven damage. Ravens also have been known to peck and destroy irrigation piping and drip lines resulting in irrigation damage and preventing the flow of water to crops.

### *Sensitive, Threatened and Endangered Species*

Ravens impact the recovery of sensitive, threatened, and endangered species, including desert tortoises (*Gopherus agassizii*), California least terns (*Sterna antillarum browni*), snowy plovers (*Charadrius nivosus*), piping plovers (*Charadrius melodus),* California condors (*Gymnogyps californianus*), marbled murrelets (*Brachyramphus marmoratus*), San Clemente loggerhead shrikes (*Lanius ludovicianus mearnsi*), sandhill cranes (*Grus canadensis*) and greater sage-grouse (*Centrocercus urophasianus*; hereafter sage-grouse), through their depredation on these species' eggs and young. In all cases, the combination of fragmented habitats, limited endangered species populations, and large numbers of ravens creates situations whereby even a few raven depredations significantly impact recovery efforts. The northern spotted owl (*Strix occidentalis caurina*) is possibly another species affected by raven egg depredation; ravens have been observed harassing active nest sites.

Methods of raven depredation vary by prey species. Ravens kill juvenile desert tortoises by breaking the carapace and exposing the soft tissues underneath. Ravens depredate bird nests by eating nestlings and eggs. Ravens are highly successful at distracting the nesting females in order to steal eggs. Videography in Nevada has shown ravens working together to steal sage-grouse eggs; one raven causes the female sage-grouse to lunge at it as the other raven takes eggs from the nest.

### *Human Health and Safety*

Ravens, especially in the winter months, tend to roost in large numbers (hundreds of birds) on and near heated industrial plants and other artificial structures (i.e., overpasses, railroad trestles, powerlines; Figure 2). During the nesting season, ravens can be aggressive towards people that approach their nests. Ravens deposit fecal matter in high quantities (sometimes up to several inches deep) in areas where they roost and nest, as well as on or in machinery, creating a health hazard. Ravens, their nests, and feces can cause power outages on transmission

lines. In some instances, ravens have caused power outages that result in rangeland fires and/or loss of power to residents.

Ravens, like other corvids, are carriers of West Nile virus (WNV), a potentially fatal disease to humans. Mosquitoes spread WNV from infected birds to people. Ravens themselves are susceptible to WNV, and human outbreaks have been attributed to corvid outbreaks in the same location. The discovery of numerous dead ravens with no apparent alternative cause of death (e.g. damage management activities, predation, and electrocution) can signal a potential WNV outbreak in the local human population.

## Damage Identification

*Livestock*

When attacking young livestock, ravens typically peck softer tissues and openings, including the eyes, tongues, anal and urogenital openings, and the umbilical cord (Figure 3). Raven predation can be distinguished from raven scavenging by looking for signs of hemorrhaging and blood loss on the carcass. Whitewash on the carcass and raven tracks may provide additional evidence of raven depredation.

*Sensitive, Threatened, and Endangered Species*

A sign of raven depredation on desert tortoises include carapaces with holes pecked out of them; these are often found below raven nests. Signs of raven depredation on least tern and other colonial nesting seabird eggs can be observed fairly easily due to the dense spacing and high visibility of seabird nests. Sage-grouse nest depredation is more difficult to identify due to the concealed and isolated nesting locations of sage-grouse, and raven depredation signs (eggshells) are similar to those left by mammalian predators.

*Human Health and Safety*

Identifying raven roosting and nesting sites for damage management purposes may help reduce potential disease spread and other human health and safety concerns. The best way to discover raven roosting locations is to identify flight patterns and follow ravens to the roosts during the last few hours of daylight. Night surveying with lights is also an effective method for locating raven roosts.

Finding raven nests can be challenging, but the presence of the raven pair usually gives away the nest's location; once disturbed, nesting ravens will cackle, circle, and dive at intruders. Copious amounts of excrement/whitewash accumulate on roosting and nesting structures, further identifying these sites. In some instances, raven nests are located near or within roosting structures.

## Management Methods

*Habitat Modification*

Raven populations are positively influenced by human development and resources; therefore, habitat

Figure 3. Lambs killed by ravens.

modification is often proposed to deter raven use and minimize conflict. Baling up and burying garbage, installing dumpsters with secure lids, and removing or burying dead livestock reduces the availability of human-related food sources for ravens. Removing abandoned and defunct houses, sheds, and barns eliminates potential nesting structures, and may be especially effective in areas devoid of alternative nesting substrate (e.g., contiguous sage-brush valleys).

### *Effigies*

An effigy is a full or partial representation or likeness of an object. Effigies are effective raven deterrents if used properly. The best effigy for dispersing ravens is a fresh raven carcass. Ravens are curious birds, and artificial effigies are eventually pecked at and rendered useless. Effigies should be hung upside down with wings outstretched from boundary fences, latticework, or other high, visible locations in the area needing protection. If possible, place the effigy in a discrete location to avoid observation and possible tampering by the public.

### *Exclusion*

Exclusionary devices, such as spikes and wires, on power poles are not effective at preventing raven use; ravens actually use these devices as nest substrate. It is also impractical to place exclusionary devices or netting on structures to prevent roosting due to the large surface area (I-beams, lattices, framework, etc.) that must be covered.

### *Frightening Devices*

Frightening devices modify bird behavior and discourage birds from feeding, roosting, or gathering. Novel sounds and visual stimuli may cause avoidance responses in birds and offer temporary protection from damage for a few days or weeks. Frightening devices used to disperse ravens include propane cannons, lasers, scarecrows, and flashing lights (Figure 4). Constant harassment of ravens may encourage them to disperse from a small area. However, constant use of frightening devices at industrial plants, landfills, and other areas will likely result in habituation, if the location, timing, and sounds for these devices are not changed frequently. Combining frightening devices with lethal means (shooting, etc.) may improve their effectiveness.

### *Fertility Control*

There are no registered fertility control products for use with ravens.


Figure 4. Frightening devices used to disperse ravens include lasers *(left)* and propane cannons. Modified soft-catch traps are also used to live trap the birds *(far right)*.

*Nest Removal*

Removing raven nests can help reduce raven damage in limited areas by eliminating the need for adult ravens to provision for chicks. Ravens typically do not re-nest, but when they do, their nests are rarely productive. The best time to remove nests is when eggs are present. Locating raven nests can be challenging. However, breeding ravens tend to stay within a few kilometers of their nest and will return to it often.

Be sure to obtain the proper U.S. Fish and Wildlife Service (USFWS) permit to destroy active nests; active nests can be removed with a Special Purpose (50 CFR 21.27), or Depredation (50 CFR 21.41) permits, depending on the circumstance(s). Inactive nests can be destroyed without a permit.

*Repellents*

Chicken or quail eggs infused with a repellent (e.g., methiocarb) have successfully deterred ravens from eating eggs of endangered California least terns. Treated eggs are made accessible to ravens by placing them within the tern colony's nesting grounds prior to the start of the terns' nesting season. After eating treated eggs, ravens no longer forage on eggs in the treated colonies. In such cases, territorial ravens that eat methiocarb-treated eggs also defend their territories from intruders, further preventing nest depredation. Such aversion measures are impractical for some species, such as sage-grouse, whose nesting ranges cover large areas.

Other repellents being explored include the "techno-tort"™ (Hardshell Labs) which is an artificial replica of a juvenile desert tortoise. When pecked by ravens, the replica emits methyl anthranilate, a chemical derived from grape juice, that deters ravens.

*Toxicants*

The toxicant compound registered as 3-chloro-4-methylanine hydrochloride (also known as DRC-1339) is the only legal toxicant currently registered by the U.S. Environmental Protection Agency (EPA) for use with ravens. DRC-1339 products are restricted use pesticides and are available only for use by USDA Wildlife Services employees or others under their direct supervision. The pesticide consists of 97 percent active ingredient powder mixed with warm potable water into either egg or meat cube baits. Baits not listed on the product's label need Section 24(c) exemptions, which require approvals from individual states.

DRC-1339 may be used to control ravens in the following locations:

- Rangelands and pasturelands where ravens prey upon livestock.
- Refuges or other areas where ravens prey upon the eggs and/or young of federally-designated threatened or endangered species, or upon the eggs and young of other species which federal or state wildlife agencies have determined to be in need of protection from nest predators due to documented declines and/or declines in nesting success.
- Within 7.6 meters (25 feet) of silage/fodder bags that have been damaged or are likely to be damaged by ravens.

Ravens are highly sensitive to the effects of DRC-1339 (LD50=5.6mg/kg; LD50 refers to median lethal dose). DRC-1339 is a slow-acting toxicant, and a lethal dose causes a period of listlessness followed by unconsciousness and death from kidney damage.

The risk of DRC-1339 to non-target species is limited by the selection of various baits allowed on the label, treatment dilutions, and the number of bait sites. Selective baits, such as soft-boiled chicken eggs, can prevent consumption by certain non-target species. Many non-target species, such as diurnal raptors, are not particularly sensitive to DRC-1339 (LD50=100 to 500mg/kg).

Ravens that eat DRC-1339 bait typically die at roost sites 1 to 3 days following consumption. Ravens have been known to travel many miles from a DRC-1339 treatment site to roost sites.

Once DRC-1339 baits are prepared, they should be kept out of direct sunlight, heat or cold and used within the time constraints listed on the label to ensure their effectiveness.

Before DRC-1339 baits can be applied, treatment sites must be monitored for evidence of any non-target activity and pre-baited (see specific DRC-1339 label instructions for these activities). Do not apply treated baits where there is a danger that threatened or endangered species will consume baits unless special precautions are taken to limit such exposures. Such precautions include monitoring baited sites and frightening away threatened or endangered species that otherwise might feed upon baits. Ravens tend to cache surplus food, so do not use more eggs than are needed for effective control.

Figure 5. USDA Wildlife Services biologists attach a radio-transmitter on a raven. The bird will be released and followed to help locate foraging and roost sites.

Pre-baiting

Pre-baiting involves placing placebo (or nontoxic) chicken eggs or meat-cube baits at proposed raven treatment sites to encourage the consumption of baits by targeted birds. Once ravens are consistently accessing and eating placebo baits at the sites, the placebo baits can be replaced with the DRC-1339 baits. Pre-baiting is crucial for an effective DRC-1339 raven program as outlined in the DRC-1339 label.

Pre-baiting helps the applicator determine a number of important factors including:

- The number of offending ravens present at the treatment location.
- The number of meat/egg baits needed to effectively treat problem birds.
- The optimal time of the day for bait consumption.
- The amount of time it takes for birds to eat the bait.
- Whether there are any non-target species in the treatment area.

Once treated egg baits are placed at a treatment site, the area must be observed continuously from a distance (approximately 914 meters or 3,000 feet) in order to detect threatened or endangered species and other non-targets or protected animals likely to eat baits.

*Trapping*

Trapping ravens for damage management is impractical. However, live trapping and radio-tagging ravens can help gather information on foraging areas, nesting sites, and roost sites for damage management plans (Figure 5).

Trap ravens using soft-catch #1½, #2, or #3 coil-spring traps (Figure 4). To minimize the risk of leg damage, removed the trap springs and replaced them with weaker ones. Applying heat to the springs will also weaken them. Pad the trap jaws with rubber, foam, or similar materials to reduce abrasion.

Ravens can be trapped in areas where they congregate, such as near dead animal pits, road-kill, or landfills. Observe common perching areas (fence posts, high ridges, etc.) in the area and set traps at these locations. If no suitable site is found, take a large bait, such as a road-killed deer or livestock carcass, and place it in a known flight path of ravens. Allow the bait to be found and partially eaten by ravens, then set traps nearby. Trap placement is critical. Traps should be concealed and blended-in with the surroundings, and pan tension should be set low. Set traps 1 to 2 meters (4 to 6 feet) away from

the carcass and guide ravens to step on the traps using existing vegetation, rocks, sticks, and other structures. Ravens typically land away from a carcass and walk to it. This trap placement also minimizes catching magpies and eagles, which typically land on or next to the carcass.

Traps should be staked when on a perch or ledge or in a pole trap design to prevent falling and breaking of the raven's leg. On level ground, traps can be weighted versus staked.

Traps should be checked often, but constant monitoring is encouraged to minimize leg damage and the chance of predation. Traps should be set in low light conditions before ravens arrive to minimize disturbance and detection. If traps are set the day before, cover the traps with plywood or similar material to prevent other animals from getting captured or setting off the traps. When raven abundance is low (< 25 ravens), trapping is most productive in the twilight hours. When raven abundance is high, trapping can be conducted throughout the day with high capture probability.

Raven trapping is most effective during the winter, when ravens are congregated at roosts, carcasses, and landfills. When concealing traps in snow, make sure to use a dirt sifter that remains at outdoor temperature (i.e., outside of an enclosed vehicle) when sifting dirt over the traps; otherwise, the traps may freeze down and not catch ravens.

### *Shooting*

Lethal removal of ravens requires a USFWS depredation permit. Raven removal may also require additional state and municipality permits. The USFWS depredation permit requires that non-toxic/non-lead ammunition is used for the removal of problem birds. The USFWS depredation permit also states that ravens cannot be decoyed, called or coaxed to damage sites for removal.

Shooting ravens requires the use of non-lead ammunition. Non-lead shotgun shells are effective for removing ravens at close distances (<45 meters or <150 feet ). Larger steel shot sizes of 4, 5, and 6 are recommended. Because of the raven's uncanny ability to stay out of shotgun range or other human activity, centerfire rifles loaded with non-lead bullets can be an effective method for targeting ravens at long distances. Shooting is not practical or desirable as a method for reducing large numbers of ravens.

Disposal

Check local and state regulations regarding carcass disposal.

### *Disease Surveillance*

Because ravens, crows, and other corvids are susceptible to various diseases and their territories encompass large geographical areas, the birds make good sentinels for disease surveillance. Ravens collected as part of wildlife damage management efforts have been tested for the presence of West Nile virus, and St. Louis and western equine encephalitis. Research at Wildlife Services' National Wildlife Research Center indicates that American crows may play a role in the spread of infectious chronic wasting disease prions since the pathogens can pass through the birds' digestive systems and be deposited via their excrement in new locations.

Agencies responsible for disease surveillance and monitoring, such as state wildlife agencies, animal disease testing laboratories, USDA Wildlife Services and Veterinary Services, and Centers for Disease Control and Prevention, should be notified if encephalitis or other diseases are detected in sampled birds. Safety gloves and appropriate personal protection equipment (PPE) should be worn at all times when handling birds, and the handler should avoid contact with blood.

### *New and Developing Methods*

Advancements in technology allows the use of unmanned aircraft systems (also known as drones) to inspect raven nests. Drones can be equipped with high resolution video cameras and small, high-pressure spray guns to spray raven eggs with food grade corn oil (Figure 6). The coating of corn oil prevents oxygen from permeating the egg shells, thus preventing eggs from hatching. Using drones to oil raven eggs could be an effective method, especially for nests located hundreds of feet above ground around electrical power transmission towers or building structures.

Figure 6. Unmanned aircraft systems or drones may be useful for inspecting and treating raven nests.

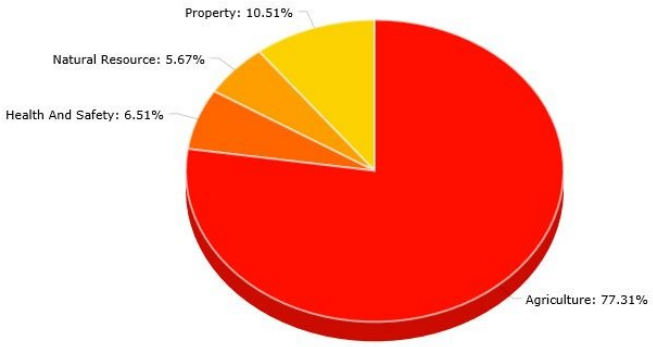


Figure 7. In 2018, USDA Wildlife Services' records show more than 70% of reported raven damage impacted agriculture.

## Economics

Raven damage reported to USDA's Wildlife Services program in 2018 was estimated at $5,328,456. From 2014 to 2018, the estimated cost of reported damages was $15,169,129; however, not all raven damage in the United States is reported to Wildlife Services. Damage costs associated with raven predation to various threatened, endangered, migratory and upland game birds is often not reported. Raven damage reported in Wildlife Services' management information system (MIS) indicates most damage by ravens is associated with livestock. For example in 2018, 77.31% of reported raven-related damage was to agriculture (Figure 7).

## Species Overview

*Identification*

Ravens, crows, jays, and magpies belong to the Family Corvidae in the Order Passeriformes (songbirds). More than 120 corvid species occur through the world.

*Physical Description*

Common ravens are stocky, compact birds weighing between 650 and 1,700 grams (1.4 to 3.75 lbs.), making them the largest songbird species. Males and females look similar and identifying gender can be difficult. Males are slightly larger than females. Their wingspan is between 115 and 120 cm (45 to 47 inches).

Common ravens are entirely black as adults. Juveniles are identified by a brownish hue on their feathers and a pink mouth lining. Rarities, such as albinism, do occur (Figure 8). Shaggy mane feathers line the throat, and become more prominent with age. A raven's bill is thick, curved, and strong.

Differentiating between crows and ravens is relatively easy at close distances, and with practice, at long distances. Ravens are much larger (about 1.5 times larger) than crows (Figure 9). The bill of a raven is thicker, longer, and more curved than a crow. In flight, ravens have a wedge shaped tail, whereas the crow has a more rounded tail (Figure 10). Ravens tend to soar more and flap less than crows.

### *Range*

The common raven is one of the most widely distributed birds in the world, and is found on every continent, including the Arctic and Antarctic.

In the United States, raven populations have increased dramatically in the past few decades. For example, in the Central Valley of California, trends show population increases of more than 7,600% in less than 30 years. Ravens are notably absent from the Great Plains and much of the Midwestern United States (Figure 11).

### *Voice and Sounds*

The typical call of a raven is a throaty *croak* repeated multiple times. Dominant female ravens make popping noises. During the mating season, raven pairs warble at each other. Ravens emit a higher pitched shrill call when chasing intruders. When disturbed, ravens make deep, raspy, honking sounds.

### *Reproduction*

Ravens start their courtship displays in the fall and winter seasons. Courtship behavior includes bill knocking and preening with mates, aerial displays, and numerous vocalizations. Pairs then build a nest in a suitable area or use a nest built in prior years. Nest locations include, but are not limited to: isolated trees/stands of trees, rock outcroppings, abandoned buildings, communication towers, power substations, billboards, and bridge trestles. Nests are constructed from a suite of materials, such as sticks, baling twine, wire, net wrap, bones, mud, and animal fur. The nest bowl is 22 to 30 cm (9 to 12 inches) in diameter and 12 to 15 cm (5 to 6 inches) deep. Ravens also steal nesting sites from raptors (e.g., Ferruginous hawks) for their own use.

Raven eggs are often laid in clutches of 3 to 10 eggs. Replacement clutches occur if the first clutch is damaged, but they are not usually successful. Incubation lasts between 20 to 25 days, and upon hatching, the chicks are naked, blind, and helpless. The chicks gain weight exponentially with time, become fully feathered within five

Figure 8. A rare albino raven.

Figure 9. A Common raven *(left)* and American crow.

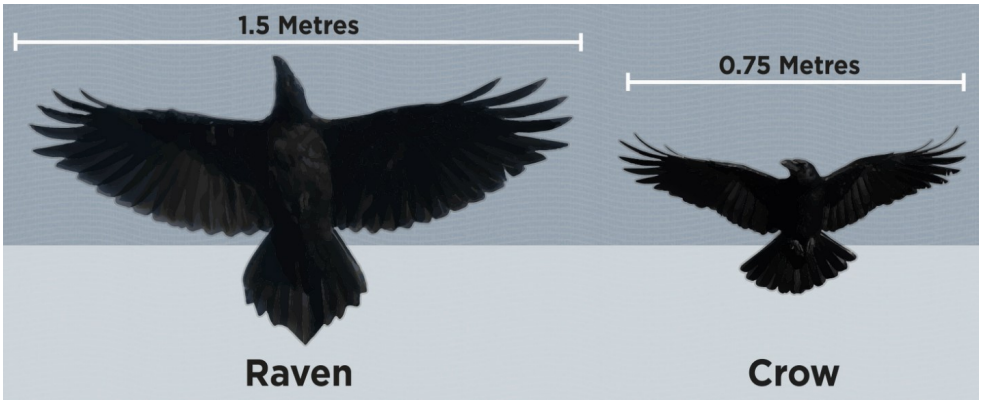


Figure 10. Size comparison between common raven and American crow.

weeks, and leave the nest shortly thereafter (Figure 12). Raven family groups tend to remain together until the fledglings' first winter. Ravens defend nests from intruders by cackling and diving, and they have been known to even drop projectiles at intruders.

*Population Status*

Common raven populations are currently increasing throughout the majority of the species' range and its International Union for Conservation of Nature (IUCN) conservation status is of "least concern."

Ravens typically live between 10 to 15 years in the wild. The longest living, banded wild raven was 23 years old. The oldest known raven in captivity lived to be 80 years old. One raven at the Tower of London lived to be 44 years old.

Ravens have few natural predators. Golden eagles opportunistically take ravens, along with owls, hawks, and other birds of prey. Reports of attacks by mammalian predators are few and include species such as coyotes, lynx, and mountain lions. Most successful predation events are on juvenile ravens. More common mortality sources are human related, and include vehicle collisions and powerline surges.

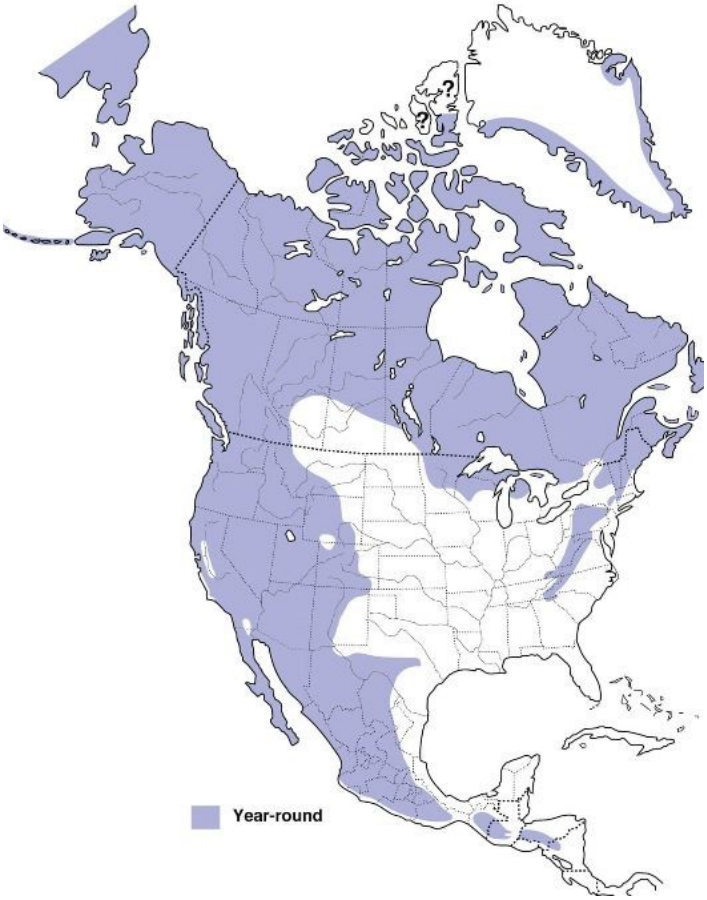


Figure 11. Range map for common raven.

*Habitat*

Ravens occupy a wide variety of habitats, including coniferous and deciduous forests, sagebrush, beaches, tundra, and desert areas. Ravens are usually residents of a particular area as adults; juveniles may establish their territories away from where they were raised. Ravens' territories expand in the spring and summer months and contract during the winter months.

*Behavior*

Ravens are very acrobatic in flight performing barrel rolls, flying upside down, and taking steep dives. Ravens oftentimes exhibit play-like behavior. They have been documented repeatedly rolling down hills and slanted rooftops, and they also drop and catch items in mid-air with other ravens. Ravens cache food once a large source is located, and fake cache to mislead other ravens and protect the true cache.

Ravens typically roost together at night. Roost sites include bridges, industrial plants, abandoned buildings large stands of trees and brush, cliffs, and mining towers. Roosts are used throughout the year, yet they are most heavily used during the winter, likely due to the shelter and heat that roosts provide. Communal raven roosts vary considerably in size, ranging from tens of birds to more than a thousand individuals. Research shows that ravens communicate information, such as food locations, to one another at common roost sites. Roosts remain in the same location year after year unless they are disturbed, and even then, new roost locations are typically within a few miles of the old one. If multiple roost sites are within 50 miles of each other, ravens are known to frequently switch roosts sites.

Ravens are highly intelligent, adept learners and problem solvers. Ravens have "reeled in" food suspended with string from a branch, and they have constructed hooks from wire to retrieve food in concealed locations. Ravens cache food and hide it from other ravens. They are also capable of being taught words when rewarded with food.

*Food Habits*

Ravens are opportunistic foragers, eating a wide variety of food items. Their diet includes small mammals, eggs, birds, insects, human garbage, plant matter, reptiles, road-killed ungulates, and livestock carcasses. Ravens are bold enough to attack in groups and kill newborn livestock. Ravens also kill and eat other predators. In Canada, an entire den of artic fox kits was killed and taken away by a pair of ravens. Individuals employ several methods of

Figure 12. Common raven nest with chicks showing progression of growth over approximately 3 weeks .

obtaining food, including frequent scanning for dead animals, stealing from conspecifics (e.g., eagles and coyotes), and following predators and farm equipment. Seasonality also determines forage availability. Ravens cue in on agricultural activity (e.g., calving, lambing, planting) and congregate in these areas due to increased foraging opportunities. Also, harsh winter conditions force ravens to congregate at highways and landfills in western states to obtain easier meals.

## Legal Status

Common ravens are classified as a migratory bird species and are protected by federal and, in most cases, state laws. In the United States, ravens may only be lethally removed or live trapped with a permit issued by the USFWS. Occasionally, an additional permit is required from the state wildlife management agency. Permits are issued only after dispersal and other non-lethal damage management methods have been employed and proven ineffective at resolving the conflicts. No federal permit is needed to frighten or mechanically exclude ravens. However, always check state and federal regulations for updated before beginning research or management activities.

## Acknowledgements

Figure 1. Photo by Jack Spencer Jr., USDA-APHIS-Wildlife Services
Figure 2. Photos by Luke Peebles, USDA-APHIS-Wildlife Services
Figure 3. Photo by USDA-APHIS-Wildlife Services
Figure 4. Photos by USDA-APHIS-Wildlife Services, Daniel Lile (U.S. Air Force), and Brian Washburn (USDA-APHIS-Wildlife Services)
Figure 5. Photo by Luke Peebles, USDA-APHIS-Wildlife Services
Figure 6. Photo by Mark Lutman, USDA-APHIS-Wildlife Services
Figure 7. Graphic by USDA-APHIS-Wildlife Services
Figure 8. Photo by Ben Miller, USDA-APHIS-Wildlife Services
Figure 9. Photo by Jack Spencer Jr., USDA-APHIS-Wildlife Services
Figure 10. Graphic by Canadian Wildlife Federation
Figure 11. Map by The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology
Figure 12. Photos by Luke Peebles, USDA-APHIS-Wildlife Services

We thank Jimmy Taylor, Michael Yeary, and Patrick Ryan for providing critical reviews of this manuscript.

## Glossary

**Addling:** Shaking of a fertilized egg to prevent embryo development.

**Corvid:** A bird belonging to the Family Corvidae; stout-billed songbirds including crows, ravens, magpies, and jays.

**Effigy:** A likeness of a animal. An effigy can be an actual animal carcass, a carcass that has been taxidermically prepared, or an artificial likeness.

**Mobbing:** When a group of birds surround and attack a predator or other threat to drive it off.

**Roost:** Location where birds rest or sleep either during the day or at night.

## 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.

## Keywords

*Corvus corax*, Least tern, Livestock, Predation, Raven, Sage-grouse, Tortoise

## Citation

Peebles, L.W. and J.O Spencer Jr. 2020. Common Ravens. Wildlife Damage Management Technical Series. USDA, APHIS, WS National Wildlife Research Center. Fort Collins, Colorado. 17p.

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# Appendix

**Damage Management Methods for Common Ravens**

| Type of Control | Available Management Options |
|---|---|
| Exclusion | Often ineffective or impractical |
| Fertility Control | None available |
| Frightening Devices | • Effigies<br>• Pyrotechnics and propane cannons<br>• Lasers and flashing lights |
| Habitat Modification | • Bale and bury garbage<br>• Install dumpsters with secure lids<br>• Remove or bury dead livestock<br>• Remove abandoned houses, sheds, and barns to eliminate nesting structures |
| Nest Treatment | Allowed with proper Federal and State permits; Egg oiling or addling and nest destruction |
| Repellents | • Methiocarb (EPA Reg. No. 56228-33)<br>• Methyl anthranilate (food-grade grape flavoring agent) |
| Shooting | Allowed with proper Federal and State permits; Requires use of non-toxic/non-lead ammunition |
| Toxicants | Compound DRC-1339 Concentrate (EPA Reg. No. 56228-29, 56228-63); May only be used by USDA Wildlife Services employees or people working under their supervision. |
| Trapping | Allowed with proper Federal and State permits; Live-trapping with modified soft-catch #1½, #2 or #3 coil-spring traps |