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Commentary

Some successful methods to mitigate conflicts caused by common ravens in an industrial environment

ROD J. MERRELL, Supervisory Wildlife Biologist, USDA/APHIS/Wildlife Services, P.O. Box 367, Rock Springs, WY 82901, USA rod.j.merrell@aphis.usda.gov

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COMMON RAVENS (*Corvus corax*) are considered migratory birds and receive federal protection from the Migratory Bird Treaty Act, but few ravens in southwest Wyoming migrate (Boarman and Heinrich, 1999; personal observation). For many reasons, raven populations have grown exponentially during the last century in portions of the western United States (Sauer et al. 2004). Problems always occur when wildlife species become overpopulated. This article describes some of the common problems caused by an overpopulation of ravens and a few ways to help mitigate those problems.

Since 2005, seven of the 10 major industrial companies in southwest Wyoming, including coal mines, trona mines, gasification plants, fertilizer plants, and power plants, have registered complaints on raven damage. Many of the complaints involved serious human health and safety issues.

The most common complaint that USDA/Wildlife Services receives from industrial and commercial facilities is about the fecal material from ravens deposited on equipment, working surfaces, handrails, stairs, and other surfaces that workers contact constantly. The complaints are about the disease issues associated with those deposits. It is well-known that bacterial and viral diseases are prevalent in congregating bird species, including ravens (McLean 2003, Pederson and Clark 2007, McLean and Gupta 2008). Fecal deposits produced by ravens are generally created where the birds roost rather than feed. Roosts can sometimes contain as many as 150 to 300 birds (personal observation).

The second most common complaint is about nesting ravens. Not only is there an issue with the fecal deposits below their nests but also from

ravens' intense aggression toward workers who come near the nest. Aggression directed toward workers often occurs at dangerous elevations, on catwalks, stairwells, oil and mine derricks, and smoke stacks.

Because common ravens are a protected species, these facilities have virtually no effective methods available to themselves to help mitigate the problem of nuisance ravens. Shooting, harassing, and destruction of active nests are not allowed without a special permit from the U.S. Fish and Wildlife Service (USFW). Application for the issuance of permits can be confusing, and these permits can take a lot of time to acquire.

Mitigation of damage or conflicts related to roosts

Removing established roosts can be difficult. Ravens are intelligent, have remarkable eyesight, and, for birds, have a very acute sense of smell. Most methods used to remove roosts of other bird species work only marginally on ravens, because ravens habituate rapidly to frightening techniques. Examples of these techniques include lasers, sirens, scarecrows, and propane cannons. Ravens quickly learn that these tactics do not pose a danger to them, and they maintain their roosts. Probably the most important thing that one needs to realize and make the facility's staff aware of is that breaking up a roost is a process, often time-consuming, frustrating, and requiring follow-up. I have found, through trial and error, that using a combination of techniques and tools with perseverance will provide the best chance for success. Also, wildlife managers and service providers need to talk to the facility's staff about the techniques and tools available for

use. Some may be unacceptable to the facility due to company rules, personnel acceptance of certain techniques (e.g., shooting and effigies), and other factors.

I will next discuss the pros and cons and effectiveness of various techniques and tools available to disperse a roost, as well as practical suggestions to increase their effectiveness. The methods listed are for a commercial or industrial environment. Some tools that are effective elsewhere are not an option in an industrial or commercial environment. Effectively dealing with ravens will require the use of a combination of techniques and tools. I have found that a simple tool or technique will fail if used alone.

Effigies

Based on my experience, effigies are the most effective means to keep ravens from roosting on towers, tanks, cable trays, and other elevated structures. I have experimented with several types of effigies, including owl decoys, buzzards, and fake ravens. I found that only a dead raven hung upside down on about 30 to 120 cm (12 to 48 inches) of line or wire will effectively deter ravens for long periods of time. I tried the fake raven effigies used for movie props that are made from black feathers and styrofoam, with no success. Such props also are expensive and hard to find. I placed 3 of these effigies at a power plant dump. The first day the effigies seemed to deter the birds from the area. The second day, I found all three torn to pieces and left useless by the ravens. I attribute this behavior to the ravens' keen eye and sense of smell leading them to recognize that the dummies were not real (Harriman and Berger 1986). I have not encountered this type of behavior when using actual, dead birds. In Wyoming, dead ravens will last for many months, are extremely useful, and can be placed out again the following year to keep the birds from reforming the roost. The downside of dead ravens is that it may be offensive to the general public or personnel at the facility. Before using them, explain the down side of using real birds as effigies to facility personnel that requested the assistance. Remember when the effigies have either deteriorated or are no longer necessary, they must be disposed of according to the USFW guidelines on the permit.

The effectiveness of effigies is also determined by the size of the facility, the size of the roost

(number of birds), and amount of reinforcement of danger by other means (e.g., shooting, lasers, etc.). It has been my experience that a roost of 200 birds actually consists of several roosting groups, usually around 30 to 35 birds each. When a situation like this is encountered, it will require the use of numerous effigies, as each of the groups will utilize a slightly different area within the facility. On small roosts of 20 to 30 birds, 1 or 2 dead ravens will be sufficient. Be aware that on facilities of 2 to 3 ha, the birds may just move to a different location at the facility. When this occurs, place more dead ravens at the new site and leave the other dead ravens where they were. Make sure the effigies are hung in plain sight, upside down, and preferably from a hand rail or beam where the wind will create some movement. The movement adds to the appearance of a distressed bird. One must reinforce danger with other tools and techniques or the ravens will habituate to the natural effigies with time.

Hazing

Hazing ravens is a technique that is generally a waste of time when used alone. The birds will fly to another part of the facility or leave and return when the threat no longer concerns them. However, when used in conjunction with shooting and dead ravens, hazing is a valuable tool, as the birds eventually become uncomfortable and leave permanently. This may take time—sometimes weeks or even months.

Lasers

When used by themselves, lasers will scare the birds for only a short time, as the birds quickly realize there is no inherent danger and will only fly away a short distance, sometimes only a few meters. Lasers can be of value when they are used in conjunction with other tools. One of the best benefits of lasers that I have seen is with use of effigies and some lethal shooting, which reinforces danger. Lasers can be used by staff members of the facility during times when professional wildlife management personnel are not available. Lasers make the facility managers and staff feel that they are helping the situation and that all available nonlethal means are being employed to alleviate the problem. I have found that expensive, high-powered lasers are not needed; the small pen-type lasers used as pointers for presentations work well.

Scarecrows

Scarecrows are of limited value to remove ravens from a roost. Ravens quickly realize that there is no danger from a nonmoving, human form. Scarecrows can have some value when used in tandem with shooting and propane cannons. Scarecrows should be moved around on a regular basis, sometimes daily. While I have not used them, I believe that one of the air-filled plastic attractions used at car lots and grocery stores for advertising might be valuable because their movements are random.

Sirens and flashing lights

Sirens and flashing lights are totally ineffective. Many facilities have sirens that go off periodically, and all of the facilities where I have worked have a myriad of flashing lights. Hence, ravens have already habituated to them.

Propane cannons

I have found that propane cannons are of limited value when used alone. Ravens habituate rapidly to them, and then pay little attention to the noise. It may be that loud, sharp noises are such a common occurrence at many industrial facilities that ravens have already habituated to them. However, after ravens have been shot at and some have been killed with a shotgun or other loud firearm, propane cannons become much more effective. I have observed birds completely ignoring propane cannons located under their roosts until the ravens had been shot at with a loud firearm and some were killed. After that, the efficacy of the propane cannon was greatly increased.

Avicides

Only 1 avicide is registered for use on common ravens—DRC-1339. While DRC-1339 is very effective in reducing raven damage on livestock (Larsen and Dietrich 1970, Spencer 2002), its use to break up a roost at an industrial facility is very limited. These limitations include the following:

- DRC-1339 is not registered by the EPA for the control of ravens for human health and safety issues—only for livestock, nest, and fodder protection. Therefore, it cannot be used at other industrial facilities. Certain states, however, have obtained supplemental Environmental Protection Agency (EPA) registration labels, called

24Cs that allow taking birds when they are creating damage to livestock and feedlots, staging at or in a roosting facility). Check state regulations and all EPA registration labels available in your state.

- DRC-1339 is available for purchase and use only by trained, licensed applicators employed by USDA/APHIS Wildlife Services.
- Due to the use restrictions, the use of DRC-1339 may violate other restrictions on substances used within the facility.
- Ravens coming to a roost are not in a feeding state of mind. Generally they will pay no attention to baits placed at a roost. Placement of poison bait within the facility may create great concerns to workers and contractors within the facility.

DRC-1339 is of little use in breaking up a roost. Its only value would be when reducing the number of roosting birds also reduces the number of ravens causing livestock, nest, or fodder damage away from the roost.

Shooting

Shooting roosting birds is effective at dispersing a roost. It is, by far, the most effective means of reinforcing other, nonlethal methods. Ravens that see others in their flock being killed, immediately recognize the serious danger and associate that danger with the other tools being used.

There are many complications to shooting ravens at a commercial or industrial facility. Most industrial facilities do not allow firearms on the premises. Trying to shoot all the ravens at a large roost is next to impossible. After you have shot a few roosting birds, the others will fly at the mere movement of a human. Unfortunately, they will only fly out of range and not out of the facility, unless it is a small facility. Shooting works well in a situation where there are <10 birds and the facility is small enough that birds cannot select another area within the facility that is out of harm's way. Where there are >50 birds, shooting is the best way to reinforce danger. Shooting by itself will never mitigate the problem. For example, I remember a situation where 5 to 8 wildlife specialists placed around the outside of a facility tried to shoot the birds as they were coming into the roost. A few birds were killed with the first 2 days. After that, the birds still flew

into the facility, but they came in well after dark and at an elevation out of range of a shotgun.

Probably the biggest problem with using shooting as a deterrent method is that no industrial facility that I am aware of will allow firearms on the premises. However, facilities that have suffered a lot of damage over a period of time will usually relax their policies and allow the use of an air rifle. Permission is sometimes granted if you explain to facility personnel how important the reinforcement of danger is in successfully dispersing the roost. When the use of an air rifle is appropriate and allowed, I suggest a minimum of a .22 caliber with a minimum velocity of 1,000 feet per second. It is necessary to use a high-quality, match-grade pointed pellet. Ravens are large, tough birds, and the heavier pointed pellets can penetrate through the wing feathers into the body better, making for clean, humane kills. Also, a close but missed shot makes for a good hazing technique; but, always before pulling the trigger, think about where a missed shot may go. Take appropriate safety precautions. If you are not sure, do not take the shot! If a shotgun can be used, one must use nontoxic shot and shot the size of BBs or #2 shot.

Mitigation of damage or conflicts related to nests

Nesting raven problems are much easier to solve than problems caused by roosting ravens. With a nest, you are dealing only with a nesting pair and their eggs or fledglings. The biggest problem I have encountered in removing a nesting pair and the eggs or hatchlings is more an ideological hurdle than a biological one. Euthanizing a nesting pair of ravens and their offspring is often unpalatable to the management or employees of the facility. If this proves to be the case, understand that the nest is their problem, and leave it up to them to weigh the pros and cons of lethal control, then let facility personnel make the determination on how bad they want the problem solved. Inform them of the options, and then let them make the decision themselves.

In my experience dealing with active nests, the most important thing to remember is to use good judgment and common sense and be very cognizant of the sensitivities of others. Most facilities that have problems with active raven nests want the nest removed but none of the

birds harmed. This is virtually impossible. By explaining raven behavior and the impracticality of relocating adults, relocating eggs or fledglings, the cooperators usually will see the logic and accept the necessity of euthanasia, especially if the adults are creating an immediate safety hazard to workers.

When practical, remove the adult birds first, using an air rifle. This makes removing the nest much easier and safer. Nesting adults can be very aggressive to intruders who are around the nest, and nests are often located in difficult to reach, dangerous places. Use a hydraulic man-lift if possible. Use safety lanyards and tie-offs when working at high elevations. If the adult birds cannot be removed, use a 2-man team to remove the nest, eggs, or fledglings. Have 1 person ward off attacks from the adults and the other remove the nest. If there are fledglings in the nest, put the birds in a paste-board box and remove them to a private location for euthanasia. Remember to dispose of the carcasses as outlined in your permit from the U.S. Fish and Wildlife Service.

The easiest way to deal with nests is to not let them become active in the first place. Continued removal of the nest as it is being built will usually deter the adults from nesting at that particular location. This can be done legally by facility personnel before the nest eggs are laid.

Conclusion

Conflicts caused by ravens can be difficult and frustrating. One of the best remedies for a problem roost or nest is that once the roost has been dispersed or the nest removed, do not allow it to form again the next year. One should follow up; doing will save a lot of time and spare a lot of heartache.

The intent of this article was not to be all-inclusive of the available methods and tools, but to provide a compilation of methods and tools that I have used with success. I am aware that there are methodologies not covered in this article, but that is because I have not used them. Remember that a combination of methods and perseverance will create your best chance for success in mitigating damage caused by roosting and nesting ravens. Adhere to all applicable laws and regulations, and make sure you carry the proper permits on your person to do the work. For information on permits, laws and regulations pertaining to raven damage control,

contact: U.S. Fish and Wildlife Service, 1-800-344-9453, <<http://www.fws.gov>>. For information or assistance on raven damage management contact: USDA/APHIS/Wildlife Services, 1-866-487-3297, <http://www.aphis.usda.gov/wildlife_damage>.

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ROD J. MERRELL began his career working with wildlife at a very early age. He has long been a



professional trapper, hunter, and wildlife enthusiast. He began working for USDA/Wildlife Services in 1997 as a wildlife specialist in Carbon County, Wyoming. In 2004 he received his “486” qualifications as a federal wildlife biologist from the School of Hardknocks, University

of Wyoming, and Utah State University. At that time, he became a staff biologist in the Western District of Wyoming. Currently, he is a supervisory wildlife biologist in the southwestern district of Wyoming where he spends his time mitigating damage caused by predators, large carnivores, and different avian species, especially magpies and ravens.