Human Health and Ecological Risk Assessment for the Use of Wildlife Damage Management Methods by USDA-APHIS-Wildlife Services

Chapter XV

The Use of Dogs and Other Animals in Wildlife Damage Management

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THE USE OF DOGS AND OTHER ANIMALS IN WILDLIFE DAMAGE MANAGEMENT

EXECUTIVE SUMMARY

Trained dogs and other animals play a vital role in many USDA-APHIS-Wildlife Services (WS) programs. Dogs are used to track or trail animals, detect particular species or their sign, retrieve animals taken with another method such as firearms, haze animals from an area where they are not wanted such as birds in an aircraft operating area at an airport, and decoy or attract other species such as coyotes. Additionally, dogs are used to guard resources such as livestock from other predators. WS uses these working dogs trained for specific functions. WS also uses or recommends the use of other animals including raptors for hazing and burros and llamas for guarding livestock, but to a much lesser extent. Between FY11 and FY15, WS annually averaged the capture of about 2,300 animals using dogs. Following capture, WS killed or freed (typically for collaring individual animals) those animals. In addition, WS used dogs to haze about 40,000 animals per year from areas where damage was occurring or likely to occur.

Potential human health and environmental risks from the proposed use of dogs and other animals have been evaluated by APHIS and determined that the risks to human health and the environment are negligible. Dogs and other animals can take nontarget species, but take rates are low compared to overall take. Dogs and other animals have minimal risks to people, pets, and nontarget species. WS will continue to support and conduct research and education that supports more humane and effective use of dogs and other animals and will implement these measures in programs, where appropriate, to further reduce risk to nontarget animals.

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1 INTRODUCTION

U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program personnel may use trained dogs[1] and other animals to perform specific functions to assist with activities associated with wildlife damage management (WDM). This Human Health Risk Assessment and Ecological Risk Assessment provides a qualitative evaluation of potential risks and hazards to human health and nontarget fish and wildlife as a result of exposure to dogs and other animals from their proposed use by WS. Many WS personnel use trained dogs and other animals to perform multiple functions individually or in combination while aiding the WS personnel with alleviating wildlife damage. Trained dogs perform various functions, including tracking or trailing, snake and other animal detection, wildlife hazing, decoying, and retrieval. Another use of dogs along with other animals such as donkeys and llamas are for livestock protection (guard animals). Finally, raptors may be used for bird hazing at airports.

1.1 Wildlife Damage Management with Working Dogs and Other Animals

Dogs have long been used in wildlife management for a variety of activities (Zwickel 1971, Dahlgren et al. 2012) and for the last century by WS. To a lesser extent, raptors have been used in hazing wildlife and other animals such as donkeys to guard livestock. WS personnel train a variety of different dog breeds, but the breed selected is typically associated with the activity it will conduct and the species targeted. For example, tracking dogs are often a hound, detector dogs for snakes are generally terriers, beagles, or German shepherds, and decoy dogs are typically small Labradors, border collies, or Australian shepherds. The individual characteristics and qualities of each dog such as ability to use their nose and are of a size appropriate to do the activity, and the training each dog receives dictate success more than the breed of dog (Rowley and Rowley 1987, Coolahan 1990). In general, working dog breeds that have been traditionally used for hunting or herding, basically the general activity they will be conducting, are more likely to possess the individual characteristics and qualities necessary to perform appropriately than other dog breeds (Coolahan 1990). Additional considerations could become a concern depending on other factors; for example, WS personnel may prefer to use shorthaired dogs to avoid overheating in summer (Rowley and Rowley 1987) and year-round in areas such as Guam (Hall 1996). However, on the other hand, these characteristics may not be desired in colder climes.

In general, successful dogs must possess the desire to track or trail target animals by sight or scent, possess enough intelligence to learn the behavior expected of them, and follow the commands of the handler (Coolahan 1990). They must be the appropriate size to complete their tasks. For example, guarding dogs must be big enough to repel large predators. Different breeds are suited for different purposes and are selected for their general innate abilities. It is always strongly encouraged that overly aggressive dog breeds, especially towards people, not be used (Rowley and Rowley 1987, Coolahan 1990); the exception here is that dogs need nerve strength (boldness) and some aggressiveness towards the target animal. Beebe et al. (2016) assessed characteristics of dogs used for scent detection and described qualities of dogs needed to determine the desirability of a breed and individual dogs within that breed. Beebe et al. (2016) looked at morphology (e.g., nose length for scent detection possibly), keen olfactory, visual, or auditory systems, good personality characteristics (temperament), nerve strength, motivational

[1] WS Directive 2.445 defines a trained dog as a dog that is proficient in the skills necessary to perform specific functions in a manner that is responsive to its handler's commands. All WS Policy Directives referenced in this document can be found @ http://www.aphis.usda.gov/wps/portal/aphis/ourfocus/wildlifedamage under Wildlife Damage – WS Program Directives.

drive, and social intelligence as the key traits. Thus, depending on the tasks to be performed, typically a lot of options are available.

- **Tracking/Trailing Dogs:** Dogs that track animals from a scent trail are referred to as trailing or tracking dogs (often separated by the extent of scent differentiating training with trailing dogs getting more) and are used to facilitate the live capture of target animals. Once captured, the target animal can be lethally removed or captured with other techniques for research depending on the project. These dogs are trained to track the scent trail of the animal they are to track and respond audibly (howl, often referred to as a strike) or visually when they smell them. They can be very effective at detecting target carnivores (Long et al. 2007, McGregor et al. 2016). Tracking dogs are trained to follow the scent of target species and avoid tracking nontargets. Typically, several dogs are used to follow large target animals such as black bears[2] and mountain lions, whereas one or two may be used for smaller species such as raccoons. If the track of the target species is not too old, which depends a great deal on ambient conditions (cool moist air holds scent much longer than hot dry conditions), the dogs follow the trail of the animal until it seeks refuge in a thicket on the ground at bay[3], in a hole, in a tree, or on a cliff or rock pile. Target animals are typically bayed or confined by the dogs until the WS personnel can arrive and are euthanized humanely with a firearm or captured by use of immobilizing drugs or mechanical devices (*e.g.*, net gun, catchpole). Once immobilized, animals may be euthanized with an appropriate drug, or radio collared/tagged and freed.

  Dogs trained in trailing animals are controlled as soon as possible to prevent the dogs from attacking or otherwise injuring the bayed animal or getting the dogs injured. Tracking dogs are the most effective method for tracking an animal from a damage site shortly after an incident, such as a freshly killed calf, to ensure that the correct animal is taken. Tracking dogs occasionally might switch tracks to the fresher scent of a nontarget animal; for example, a tracking dog following a mountain lion could switch to that of a bobcat, but dogs are taken off the trail as soon as the WS dog handler has determined that this has occurred. Breeds of dogs typically used for trailing are hounds such as black-and-tan or bluetick coonhounds, and blackmouth or mountain curs.

- **Decoy Dogs:** Dogs are trained to search for coyotes, and to a lesser extent red fox, to get their attention, and return to their owner when they are being pursued. A coyote or pack of coyotes pursue the decoy dog as it returns to its owner where the coyote(s) can be shot. Australian shepherds, border and McNab collies, Norwegian elkhounds, and wirehaired terriers are common breeds that are suitable as decoy dogs (Rowley and Rowley 1987), as well as crosses of those breeds with hounds and curs (Coolahan 1990). Rowley and Rowley (1987) stated that color and physical appearance of dogs used as decoys had little or no relative effect on their ability to induce coyotes to chase the dog. Rowley and Rowley (1987) also stated that medium-sized dogs ranging from 25 to 50 pounds were the most appropriate when using dogs to decoy coyotes; basically, a size big enough to fend off coyote attacks, but not so large as to repel them. Decoy dogs are very effective in assisting with taking coyotes, especially when used in conjunction with calling and shooting.

[2] Scientific names for species are given in the text only for species not discussed in the Wildlife Damage Management Methods Risk Assessment Introduction.

[3] The term "*bay*", "*baying*" or "*keep at bay*" means to keep something away, in check, or under control. In terms of trained dogs, to bay or baying involves the dog or dogs trailing or tracking a target animal until the animal seeks a location where the dogs are unable to access (*e.g.*, up a tree, in a thicket, in a hole). The presence of the dogs holds the target animal at the location until WS personnel can arrive. In addition, baying can also refer to the act of the dog or dogs striking (*i.e.*, barking, howling) as they track or trail the target animal.

- **Detector Dogs:** WS uses detector dogs to search for the presence of various animals or their sign using their senses, but especially smell. They can be very effective at detecting rarely encountered animals, invasive species, and diseases and have become increasingly popular in the field of wildlife conservation (Long et al. 2007, Cablk et al. 2008, Reed et al. 2011, Vynne et al. 2011, Beckmann et al. 2015, Oh et al. 2015). Beebe et al (2016) reviewed research literature on this topic and discussed uses and research; they made suggestions for the qualities to assess in selecting a breed for detection work. Detector dogs can serve as aids following a detection by trailing and baying the target species so that WS personnel can capture it, which is a task for only some detector dogs. They can also find scat, which can be analyzed for DNA to determine the number of individuals using an area, genetic diversity in populations (Beckmann et al. 2015), and determine the specific individual responsible for a predation event.

  One WS program that uses detector dogs is the brown tree snake program on Guam (Hall 1996) and their effectiveness has been assessed (Engeman et al. 2002). Brown tree snakes are not native to Guam and their presence has had adverse effects on native wildlife populations that inhabit the island. WS personnel use the dogs to inspect cargo, vessels, aircraft, freight, household goods, and associated facilities and environments to detect and find brown tree snakes so they do not get shipped elsewhere where they could have similar adverse effects on native wildlife such as Hawaii. It was found that the brown treesnake detector dogs were good finding snakes in structures and closed areas whereas they were ineffective in forested or jungle areas (Savidge et al. 2011).

  Other detector dogs are used by WS to alert personnel to the presence of scent and sign of certain target species (*e.g.*, nutria, beavers, feral swine, and bullfrogs) in a search area from the animal directly, or its scat, hair, or other sign left behind. These dogs can be very effective monitoring for sign following an eradication program for invasive pests such as brown rats to ensure that none remain (Gsell et al. 2010, Shapira et al. 2011). Knowing that the target animal is present allows WS personnel to determine if and where further management activities such as trapping are warranted. For example, detector dogs trained to detect animal scent from scat, hair, or other sign are used to search for nutria, a South American aquatic rodent which is invasive in North America because it causes ecological damage to wetlands, in an effort to ensure eradication from particular areas of the United States where their activity has impacted the landscape. Nutria have possibly been eradicated from Chesapeake Bay since May 2015, and detector dogs have not detected any since, but are still monitoring the area to determine if eradication has been met. These same dogs have been cross trained for feral swine and have been used to search areas where feral swine eradication has been attempted to help determine if the project was a success.

  WS detector dogs are specifically trained in detection of a target species and validated by the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, National Detector Dog Training Center where they adhere to specific training protocols. Some dogs are cross trained on more than one species such as nutria and feral swine. The WS dog handlers and snake detector dogs are subject to annual proficiency testing and must meet minimal standards.

  Detector dogs have also been used to find invasive Burmese pythons in the Florida Everglades (Avery et al. 2014). Dogs were found to be 92% successful compared to people at 64%; an additional benefit was that dogs could complete searches 2.5 times faster. The only drawback was that dogs could only be used for a five-mile trek as overheating occurred. Overheating causes dogs to pant and when dogs are panting, they do not use their nose and

become poor at detection. However, it is possible that dogs could be used over water operations, similar to water cadaver detector dogs where they could be stationary in the shade on a skiff detecting snakes in water.

Detector dogs are trained to gather monitoring data and generally provide reliable surveys, especially for cryptic species (Smith et al. 2003, Browne 2005, 2006, Stevenson et al. 2010, Duggan et al. 2011, Reed et al. 2011, Leigh 2015, Beckmann et al. 2015). However, a drawback of detector dogs, especially for rarely encountered species, is the potential for them to strike when no animal is present, a false positive (Duggan et al. 2011). In those situations, two teams using detector dogs may be a good idea. Several strategies exist which are possible to use to remedy problems with false positives.

Detector dogs can also be trained to find disease and other maladies in animals and their scat (Richards et al. 2007) and insect vectors (Rolón et al. 2011). Scat detection dogs were much more successful than hair snares and remote cameras, other non-invasive methods (Long et al. 2007). However, costs were higher to use detector dogs.

Finally, other detector dogs are used to facilitate effective trap and other capture device placement by detecting scent marks. These dogs, often referred to as trapline dogs, typically accompany WS personnel while investigating damage or setting and checking methods. They are especially effective in finding sites to set equipment by alerting their owners to areas where a target animal has traveled, urinated, or defecated, which are often good sites to place methods such as foothold traps to capture them. In the range of the grizzly bear, many personnel from WS and other agencies have their dogs accompany them to alert them to the presence of the bears for personal safety. Detection dogs stay with personnel and most always have no effect on nontarget animals as the handler is with them. Detection dogs may also increase the selectivity towards target animals by identifying activities with high target animal activity.

- **Wildlife Hazing:** Trained dogs, and, to a lesser extent, raptors (falconry) are used to disperse birds and mammals away from sites where the target animals are or can damage property or other resources, where they pose threats to human health and safety, or where the target wildlife could be harmed (*e.g.*, due to oil or other contaminant spills, industrial operations). They are most frequently used at airports and parks to alleviate damage primarily by birds such as waterfowl. Dogs and raptors are allowed to chase the target animals as soon as they are observed but return to their handler as they are called. Hazing dogs and raptors may infrequently capture the target animal when they are chasing them. Due to their herding instinct and ability, border collies are a common dog breed that people use to disperse birds such as Canada geese and other birds at damage sites such as golf courses, airports, and natural areas (Smith et al. 1999, Castelli and Sleggs 2000, Preusser et al. 2008). When Canada geese had access to water, hazing dogs were only effective when combined with a method to harass them from the water (Preusser et al. 2008). Hazing dogs in combination with other treatment such as use of rubber bullets or pepper spray, were used to haze bears from an urban area (Beckmann et al 2004); in their study, Beckman et al. (2004) found that 70% of the bears returned to urban areas in less than 40 days while 10% took 6 months or more to return. Thus, for many situation additional methods may be needed to reduce use of an area by a damaging species such as habitat modification and refuse management along with traditional hazing methods for a long-term effect. Falconry was successfully used to reduce the presence of Egyptian geese (*Alopochen aegyptiaca*) at parks by 76% and the remaining geese remained vigilant (Atkins 2015). However, falconry at airports and other areas has drawbacks associated with it such as unforeseen animal behavior (e.g., not

returning to handler and becoming strike threat), limited use for all day because the raptors must rest and typically cannot be used at night, biological needs (i.e., food and water), and dependency on the falconer for use (Battistoni et al. 2008).

- **Guard Dogs and Other Guard Animals:** Guard animals, including dogs, burros, and llamas, are used to protect a wide variety of resources from damage. They are usually bonded to the particular resource intended to be protected, especially sheep and goats from predators, but also other livestock, crops, and property (Woodruff and Green 1995). They are used primarily as a repellent and can be quite effective. Livestock protection dog use and research is reviewed by Gehring et al. (2010) and can be a successful technique to protect livestock, including livestock protection from large predators. Guard dogs can sometimes be a risk to nontarget animals if not properly trained. Finally, large predators can kill livestock protection animals (Gehring et al. 2010, Urbigkit and Urbigkit 2010). WS personnel have not used guard animals but conduct research and provide information and recommendations to livestock producers regarding the use of guarding animals.

- **Animal Retrieval:** WS personnel can train dogs to retrieve birds and other small animals where they are targeted with lethal methods, such as shooting or toxicants, but difficult to retrieve such as in tall grass or aquatic environments (Homan et al. 2001); they were found to be significantly more effective at finding downed animals than a person searching, even when people searched for longer time periods than dogs. Retrieval dogs are trained to be "*soft-mouthed*" (*i.e.*, do not deliver a crushing bite to the retrieved animal) so that, where a retrieved target animal is still alive, WS personnel can humanely euthanize the animal. The MIS does not track the use of retrieval dogs rather the method that was used to take the animal such as a firearm is the method tracked.

1.2 Use Pattern

Dogs are used by WS in several program areas. WS did not record the use of other animals between FY11 and FY15. Trailing dogs and decoy dogs are mostly used to capture predators predating livestock, detector dogs for invasive species management, and hazing dogs for protection of airplanes from wildlife strikes (Table 1). As discussed previously, dogs and other animals can aid WS personnel with locating, detecting, and identifying target animals but are not used to intentionally kill target animals. WS personnel use dogs or other animals to locate and bay target animals before the target animal is euthanized or killed using other appropriate methods, such as shooting or euthanasia chemicals. From FY11 to FY15, APHIS-WS lethally took an average annual total of 2,253 target animals and captured and freed 6 target animals per year with the aid of dogs; this take consisted of 13 different species[4]. In addition, WS hazed an annual average of 40,088 target animals that involved 112 species, 1 group (mixed blackbirds[5]), and unidentified birds. The only unintentional targets taken were 2 American Coots from FY11 to FY15. Dogs actually caught the coots, which were euthanized as a result; the coots likely had a malady that predisposed them to capture. Considering these as nontarget species, the nontarget take for animals hazed was negligible (.0001%). Most animals (95%) were hazed from a damage situation and comparatively few (5%) were captured with the use of dogs by WS from FY11 to FY15.

[4] This is less than the cumulative total in Table 1 because coyote and red fox were taken with trailing dogs and decoy dogs.

[5] The WS Management Information System (MIS), a computer system to track WS work effort, does not track all species individually, but may lump some species together such as blackbirds and starlings in mixed blackbirds, and unidentified birds (used for hazing when birds get up in flocks and birds are not identified to species). It should also be noted that several activities and incidences such as dog injuries are not documented in the MIS. The platform tracks the most common information

Table 1. The annual average number of target animals taken with an approved method in conjunction with trailing, decoy, and detector dogs or hazed with hazing dogs in WDM from FY11 to FY15 throughout the United States. No nontargets were recorded to be taken. Individual species are given only for those species that were taken with detector dogs, had a total average of 10 or more taken annually, 200 or more hazed, threatened and endangered (T&E) species, or the only species in that category.

SPECIES	TARGET		
	Killed	Freed	Hazed
Trailing Dogs			
Bobcat	14	0	0
Mountain Lion	205	5	8
Black Bear	138	0.6	7
Raccoon	48	0	0
Other Predator (4 spp.)	6	0	0
Feral Swine*	155	0.2	0
Total Trailing Dogs (9 spp.)	**566**	**6**	**15**
Decoy Dogs			
Coyote	1,673	0	0
Red Fox	2	0	0
Total Decoy Dogs (2 spp.)	**1,675**	**0**	**0**
Detector Dogs			
Beaver	7	0	0
Nutria*	2	0	0
Yellow-bellied Marmot	0.4	0	0
Brown Tree Snakes*	3	0	0
Total Detector Dogs (4 sp.)	**12**	**0**	**0**
Hazing Dogs			
Grizzly Bear[T&E]	0	0	0.2
Other Mammal (10 sp.)	0	0	133
Heermann's Gull	0	0	562
Western Gull	0	0	411
California Least Tern[T&E]	0	0	51
Canada Goose	0	0	18,331
Nene[T&E] (Hawaiian Goose)	0	0	11
Mallard (includes domestic*)	0	0	391
Northern Shoveler	0	0	207
Brown Pelican	0	0	332
American Coot	0.4#	0	1,185
Great Blue Heron	0	0	279
White-faced Ibis	0	0	221
Pacific Golden-Plover	0	0	3,999
Long-billed Curlew	0	0	669
Ruddy Turnstone	0	0	310
Other Birds Associated with Water (46 sp.)	0	0	1,558
Zebra Dove*	0	0	247
Mourning Dove	0	0	1,028
Bald Eagle	0	0	0.8
Hawaiian Hawk[T&E]	0	0	0.4
European Starling*	0	0	292
Horned Lark	0	0	3,111
Western Meadowlark	0	0	708
Common Myna*	0	0	2,559
Nutmeg Mannikin*	0	0	2,827
Other Birds Associated with Land (31 sp. + unid. birds)	0	0	650
Total Hazing Dogs (111 sp. + Unidentified Birds)	**0.4#**	**0**	**40,073**
TOTAL FOR WORKING DOGS (120 sp.[1] + Unidentified Birds)	**2,253 (0.4#)**	**6**	**40,088**

* Introduced Species # Unintentional Target 1 – Some species in more than one category, so this is not same sum of the above lists.

Of the animals killed or captured, most were associated with the use of decoy dogs, followed by trailing dogs, and then detector dogs. It should be noted that detector dogs are often used daily in most programs that use them. Hazing dogs are primarily used at airports and parks.

2 HAZARDS

2.1 Human Health and Safety

Human health and safety hazards that could be associated with the use of dogs or other animals in WS programs are minimal. Concerns are varied and include the possibility that working dogs could bite a member of the public or a WS dog handler, and possibly transmitting a disease in the process, the potential for a handler to be injured by an animal that is at bay, or that WS working dogs or animals they are pursuing could hit a vehicle if they cross a highway during the chase. Handlers often use radio collars to follow their tracking dogs and find them quickly. This along with the remoteness of the sites where tracking dogs are typically used, minimizes potential problems with dogs crossing roads. Finally, a dog or falcon being used at an airport may not return to their handler and could pose a strike risk to aircraft. WS personnel use dogs that are proficient in the skills necessary to perform specific functions in a manner that are responsive to its handler's commands. Pursuant to WS Directive 2.445, "*WS personnel shall control and monitor their trained dogs at all times. A trained dog is considered controlled when the dog responds to the command(s) of WS personnel by exhibiting the desired or intended behavior as directed*. *WS personnel shall ensure trained dogs do not pose a threat to humans or domestic animals, or cause damage to property*." To ensure proper monitoring and control, WS personnel use various methods and equipment, such as muzzles, electronic training collars, harnesses, and leashes.

In addition to being able to control dogs, WS personnel are required to obtain appropriate licenses and vaccinations for their trained dogs in accordance with applicable state and local laws. When in appropriate settings such as an urban area, WS dog handlers follow applicable leash laws when using trained dogs. Thus, these policies tend to minimize problems with dogs and potential risks to human health and safety.

2.2 Environmental

Dogs tend to focus on the wildlife or their scent that they are trained to target. However, nontarget wildlife could unintentionally be captured or harassed as dogs pursue the target species. This could happen especially if a nontarget animal was injured, unhealthy, or surprised and easily caught or scared by a dog. Wildlife hazed or chased are in a "flight" response, which could cause stress to the nontarget animals as they attempt to avoid the dogs. However, this is temporary for most nontarget wildlife as the trailing dog is generally focused on the target species. Another problem can occur when trailing dogs switch tracks, usually to a fresher scent, and nontarget wildlife may be pursued This may include the same species when trailing dogs are tracking directly from a livestock predation incident or discreet event. For example, dogs pursuing a target mountain lion might begin tracking a bobcat (usually they switch tracks to an animal similar to the target) instead. This occurs infrequently but does happen periodically. Dogs in training or improperly trained could pursue or harass nontarget wildlife such as a mule deer when they are trained to trail black bear. However, dog handlers monitor for this and continually train their dogs to ensure only the target animal is pursued. On rare occasions, dogs could possibly transmit diseases to wildlife but maintaining dog vaccines can reduce this risk significantly. One additional suggested issue associated with the use of detector dogs was that their use could lure more predators into an area, increase predation of species being detected, or modify movement

patterns of the species being detected; however, research did not find this claim true with dogs searching for desert tortoises (*Gopherus agassizii*) (Heaton et al. 2008).

WS personnel ensure trained dogs have all the necessary care including appropriate housing, food, and all required licenses and vaccinations per applicable state and local laws. WS handlers attempt to keep trained dogs from having physical contact with other animals and do not allow them to attack, bite, or kill animals restrained in any device or animals that were free roaming that are not targeted. If a trained dog makes contact with any animal, WS handlers are required to intervene as soon as this is seen and practical. When training dogs, WS handlers muzzle or control their dog on a leash, as necessary, especially when it is near a restrained animal or nontarget wildlife. If dogs that WS personnel are training repeatedly attempt to contact restrained animals physically, WS personnel must discontinue use of those dogs. Pursuant to the Migratory Bird Treaty Act, a dog handler cannot allow their dog to catch or harm protected migratory birds unless they are targeted and being harassed or retrieved by working dogs under the appropriate permit. In some cases, a state permit may be required to harass wildlife using dogs. WS handlers consider the flightless period for birds that have a primary molt, which typically occurs in early summer when using dogs to harass Canada Geese and other birds that cannot fly. During those periods, WS personnel may leash dogs to prevent them from harming flightless geese; most Canada geese flee to water where they are safe from hazing dogs and make them fairly ineffective unless coupled with hazing devices to get them to leave the water (Holevinski et al. 2007). In addition, WS personnel follow applicable leash laws when using dogs to alleviate wildlife damage.

As part of the requirement of controlling trained dogs, WS personnel must ensure dogs do not pose a threat to domestic animals or cause damage to property. To ensure monitoring and control, WS personnel use various methods and equipment, including, but not limited to muzzles, electronic training collars, harnesses, leashes, voice commands, global positioning system collars, and telemetry collars. WS handlers understand that the presence of dogs around animals restrained in traps or other restraining devices can cause the restrained animal to sustain injuries associated with struggling to avoid the dog. At a minimum, the restrained animal is likely to experience an increase in stress. Injuries to a restrained animal in the presence of a dog are likely the same as those injuries addressed in the assessments associated with those methods, including lacerations, bruises, abrasions, and broken bones or teeth. By WS policy, WS handlers exhibit a high level of respect and professionalism in those situations and would address animals restrained in traps or other restraining devices quickly and would minimize the exposure of those animals to the presence of a dog while restrained.

On the other hand, dogs can suffer injuries including bites, scrapes, lacerations, and even death during encounters with other animals during WDM activities. This is especially true when the target animal is larger than the dogs in use. For example, bears and mountain lions may kill a dog, and if a decoy dog is caught, it could be injured by coyotes. People may also shoot trailing dogs when in pursuit of a target animal, especially if they cross private lands and are perceived to be chasing nontarget wildlife[6] (e.g., laws in most states allow to shoot dogs chasing nontarget wildlife such as deer). Interaction with wildlife also increase the theoretical risk of disease transmission from wildlife to dogs.

[6] Many states allowed the public to shoot dogs in the past if seen chasing and killing nontarget wildlife, particularly deer and elk. Most states, if not all, have changed their laws in the last 30 years to allow only authorized personnel such as peace or animal control officers to shoot dogs killing wildlife. Many states have hunting seasons that allow for the use of hunting dogs such as tracking, trailing, and pointing dogs.

3 RISKS

3.1 Human Health and Safety

Due to the requirements of training and the use of monitoring and control equipment by WS personnel, hazards to the health and safety of people, including WS personnel, associated with trained dogs has been minimal and not much different from those associated with normal pet ownership. From FY13 through FY15[7], members of the public and WS handlers were not bit by trained dogs, nor were any bit by bayed animals when using trained dogs. No documented occurrences of bites from trained dogs or bayed animals are known for the past ten years. Although bites could occur, they would be fairly rare. The last documented bite by an animal when using dogs occurred in FY98 when a dog handler was injured by a feral swine being chased by trailing dogs; the feral swine attacked the WS dog handler and injured his patella. WS personnel were injured by an annual average of 4 animals per year from FY13 to FY15 (1.3 dog bites per year with 0.67 from feral dogs and 0.67 from ranch dogs), but none of these injuries were associated with the use of trained dogs in WDM. Thus, it is possible for personnel to be injured by animals while in the field. No known diseases or illnesses or vehicle collisions were associated with the use of trained dogs from FY13 to FY15. Thus, it is believed that the use of trained dogs in WDM presents minimal risks to public and employee safety.

WS did not use other animals for hazing such as falcons or guard animals from FY11 to FY15. Thus, WS did not have issues from hazing animals escaping the control of their owner and posing a risk to people, such as at airports where they could cause an animal aircraft strike or having guard animals attack members of the public. WS personnel did report being chased by a few guard dogs used by livestock owners from FY11 through FY15, but no attack incidences were reported. Thus, these issues could occur, but are anticipated to be low should WS personnel be involved with them.

3.2 Environmental

As stated previously, WS handlers are required to control and monitor their trained dogs at all times. WS policies define control of a trained dog when the dog exhibits the desired or intended behavior as directed by WS handlers' commands. Dogs can get out of the handlers control especially when training dogs, but handlers attempt to minimize such occurrences and their dogs chasing or harassing nontarget wildlife animals; dogs, especially free-roaming dogs not in control, can be a disturbance (Weston and Stankowich 2013). From FY11 to FY15, WS supervisors did not receive reports of nontarget animals or wildlife that were injured or killed by working dogs being used in WDM, except for 2 targeted American Coots accidentally caught during hazing operations in California at airports; the coots were likely injured or suffering another malady allowing their capture. The coots were subsequently euthanized as a result of their capture by hazing dogs. No other known nontarget wildlife or animals were taken.

Guard animals, especially livestock protection dogs, could injure or kill wildlife, target and nontarget. However, WS did not use these from FY11 to FY15, and therefore did not have any incidents. WS role, primarily with guard animals, is in recommending their use.

Some WS dogs used in WDM were injured by the target animals being pursued. However, WS does not have a system in place to track the number of dogs injured or killed while they were

[7] Workman's compensation claims for injuries or other maladies was collected nationally beginning in FY13. Thus, data was only available for three years.

being used in WDM. However, it is believed that these occurrences are rare and the number is minimal. WS personnel can No damage to the environment was documented. Thus, overall environmental risks were determined to be low.

WS dog handlers were as humane as conditions allowed with target animals taken with tracking dogs. Once the tracking dogs “treed” animals, those slated for lethal removal were euthanized mostly with firearms as soon as conditions were safe (usually dogs rounded up and public safely out of the way). No negative incidents with dogs were documented to occur. Many people have the perception that dogs kill target or nontarget animals commonly, but this rarely occurs (Elowe 1990). Trespass by the dogs was minimal as well. Most dogs were run on public lands or on leashes on small acreage of private lands. Dogs in many states can be shot by authorized personnel only (e.g., animal control or peace officers, under state law if seen chasing and killing nontarget wildlife such as deer, but no WS dog was known to go after nontarget wildlife (this can happen when dogs are not properly trained for target wildlife and switch tracks while in pursuit of the target animal); this has occurred in the past, primarily where people believe they are harassing nontarget wildlife, but this has been a rarity. WS personnel that use tracking and trailing dogs are knowledgeable about state laws and consider this issue when using dogs. Typically, WS personnel try not to use tracking and trailing dogs during hunting seasons where people are afield or in high recreational use and residential areas.

4 UNCERTAINTIES AND CUMULATIVE IMPACTS

Uncertainty in this risk assessment is negligible as WS has over 100 years using dogs for WDM activities and understands potential risks of using dogs for tracking, trailing, detecting, wildlife hazing and retrieval. The knowledge gained from this experience has helped reduce uncertainties associated with the use of dogs especially in regard to human safety and limiting the number of incidents to nontarget animals.

Cumulative impacts could occur to target and nontarget animals. However, cumulative impacts are addressed in National Environmental Policy Act documents such as WS (2017) and found not to be significant to any native species population. Additionally, the “Introduction to Risk Assessments for Methods Used in Wildlife Damage Management” looks at all take from all WDM activities by WS and none shows a significant level of take for any native species. WS use of dogs poses very little risk to humans because policy and associated precautions are in place to minimize risk and no known reports of injuries has occurred.

5 SUMMARY

Trained dogs and other animals perform various functions to assist WS personnel with accomplishing various activities. Training and maintaining suitable dogs require considerable skill, effort, and expense. WS personnel used trained dogs to track (566) and locate wildlife species such as black bears and mountain lions after they had killed livestock or threatened or injured people, and feral swine that had caused agricultural or natural resource damage, to decoy (1,675) mostly coyotes into close range to assist in taking them with a firearm mostly where livestock had been predated, to detect animals to determine their presence (e.g., beaver and yellow-bellied marmots) or slated for eradication from an area (e.g., brown tree snakes and nutria), and to haze animals (40,088) such as Canada Geese, Pacific Golden-Plovers, and European Starlings from airport environments. Other uses such as retrieving are not tracked. From FY11 to FY15 WS dog handlers lethally took an annual average of 2,253 target wildlife with authorized methods in conjunction with dogs, captured and released 6 target wildlife mostly for research, and hazed 40,088 wildlife. These dogs are highly effective at tracking and hazing the wildlife species they

are trained to seek. From FY11 to FY15, only 2 target American Coots were accidentally captured with hazing dogs. Animals that were slated for removal were removed as humanely and quickly as possible for the given situation. WS was unaware of any issues that arose while carrying out this goal. No problems were reported to have occurred with WS dogs from FY11 to FY15 but have occurred very infrequently. Therefore, it has been determined that risks associated with the use of trained dogs for WDM to human health and safety and the environment are minimal.

Dogs and other animals provide versatile methods for WDM. Additional uses of WS dogs and other animals may be identified through WS personnel including research or others and, if so, a determination would be made regarding its use as a WDM technique for WS, along with the appropriate policy. Risks at that time would be analyzed and determined if it falls within the scope of this risk assessment. If not, this risk assessment may be amended.

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7 PREPARERS

7.1 APHIS WS Methods Risk Assessment Committee

Writers for "Use of Dogs and Other Animals in Wildlife Damage Management Risk Assessment":

Writer: Thomas C. Hall
Position: USDA-APHIS-WS, Operational Support Staff, Staff Wildlife Biologist, Fort Collins, CO
Education: BS Biology (Natural History) and BA Psychology – Fort Lewis College; MS Wildlife Ecology – Oklahoma State University
Experience: Special expertise in wildlife biology, identification, ecology, and damage management. Thirty-five years of service in APHIS Wildlife Services including operations and research in CO for research and OR, GU, CA, OK, and NV for operations conducting a wide variety of programs including bird

damage research and management, livestock protection (predators and birds), invasive species management, wildlife hazard management at airports, property and natural resource protection including waterfowl, brown tree snake, feral swine, rodent, and beaver damage management. Expert in preparing environmental documents for WS programs to comply with the National Environmental Policy Act and the Endangered Species Act. For the use of dogs specifically, have used all types of dogs in WDM and supervised employees that used them in their duties.

Writer: Ryan Wimberly
Position: USDA-APHIS-WS, Operational Support Staff, Staff Wildlife Biologist, Madison, TN
Education: BS Wildlife Management and Ecology – Northwest Missouri State University
Experience: Special expertise in wildlife biology, ecology, and damage management. Seventeen years of service with APHIS Wildlife Services, including operations and research, conducting a wide variety of programs, including bird damage research and management, livestock protection, invasive species management, wildlife hazard management at airports, property, and natural resource protection. Expert in preparing environmental documents for WS programs to comply with the National Environmental Policy Act and the Endangered Species Act.

Editors/Contributors for "The Use of Dogs and Other Animals in Wildlife Damage Management Risk Assessment":

Reviewer: Nikeeya Ali
Position: USDA-APHIS-Wildlife Services (WS), Summer Intern 2017
Education: BS in Communications, Journalism, South Carolina State University
Experience: Three years as a staff writer for The Collegian Newspaper, one year as Editor-in-Chief. Skilled in production, video editing. Previously edited two Risk Assessments for USDA-APHIS-WS.

Reviewer: Michael Green
Position: USDA-APHIS-Wildlife Services (WS), Environmental Coordinator, Fredrick, MD
Education: BS Wildlife and Fisheries Sciences, University of Tennessee
Experience: Special expertise in wildlife biology, ecology, and damage management. Eleven years of work experience with WS in MD and VA. Experienced in a wide range of program activities including nutria eradication, airport wildlife management, and wildlife damage management to protect livestock, aquaculture, public safety, and natural resources. Served as staff biologist in WS Headquarters for two years.

Editor/Contributor: Andrea Lemay
Position: USDA-APHIS-Policy and Program Development (PPD), Environmental and Risk Analysis Services (ERAS), Biological Scientist, Raleigh, NC
Education: BS Plant and Soil Science (Biotechnology) - University of Massachusetts; MS Plant Pathology -North Carolina State University
Experience: Thirteen years of service in APHIS conducting risk analysis. Four years of experience in preparing environmental analyses in compliance with the National Environmental Policy Act.

Reviewer: Fan Wang-Cahill
Position: USDA-APHIS-Policy and Program Development (PPD), Environmental and Risk Analysis Services (ERAS), Environmental Health Specialist, Riverdale, MD
Education: B.S. Biology and M.S. Hydrobiology - Jinan University, Guangzhou, China; Ph.D. Botany (Ultrastructure/Cell Biology) – Miami University
Experience: Joined APHIS in 2012, preparing human health risk assessments and providing assistance on environmental compliance. Prior experience before joining APHIS includes 18 years environmental consulting experience specializing in human health risk assessments for environmental contaminants at Superfund, Resource Conservation and Recovery Act (RCRA), and state-regulated contaminated facilities.

Reviewer: Jim Warren
Position: USDA-APHIS-Policy and Program Development (PPD), Environmental and Risk Analysis Services (ERAS), Environmental Toxicologist, Little Rock, AR
Education: B.S. Forest Ecology and M.S. Entomology – University of Missouri; Ph.D. Environmental Toxicology – Clemson University
Experience: Eight years of experience working for APHIS preparing ecological risk assessments and providing assistance on environmental compliance. Prior experience before joining APHIS includes other government and private sector work regarding ecological risk assessments related to various environmental regulations.

Data Contributor: Joey Millison
Position: USDA-APHIS-WS Information and Technology (IT), Junior Applications Developer
Education: Information and Technology coursework from various sources
Experience: Eleven years of experience in APHIS, WS Management Information System (MIS) Group. Retrieves WS field data from the MIS for writers, reviewers, and editors.

7.2 Internal Reviewers

USDA APHIS Wildlife Services

Reviewer: Kevin Christensen
Position: USDA-APHIS-WS Assistant State Director, Portland, OR
Education: BS Fisheries and Wildlife Management (emphasis on wildlife damage management) – Utah State University
Experience: Special expertise in wildlife biology and damage management. Worked 20 years as wildlife technician and biologist, district supervisor and assistant state director for WS. Have worked with and supervised the use of dogs in WDM.

Reviewer: Glen J. Golden, PhD
Position: USDA-APHIS-WS-NWRC- Research Scientist, Canine Disease Detection Program, Fort Collins, CO
Education: BS
Experience: Special expertise in detector dogs. …

Reviewer: Michael Marlow
Position: USDA-APHIS-WS Wildlife Biologist – APHIS National Feral Swine Program, Fort Collins, CO
Education: BS Wildlife and Fisheries Ecology and MA International Agriculture – Oklahoma State University
Experience: Special expertise in wildlife damage management. Twenty-one years of service with APHIS Wildlife Services including field work with dogs and resource development focused upon use of livestock protection dogs and other guarding animals.

Reviewer: Alan May
Position: USDA-APHIS-Wildlife Services (WS), State Director, New Mexico
Education: BS Wildlife and Fisheries Sciences, Texas A&M University
Experience: Special expertise in wildlife biology, ecology, and damage management. Thirty-three years of field work and supervisory experience with WS in TX, NH, VT, MS, and NM in a wide range of program activities including predator damage management and the use of guarding animals and dogs.

Reviewer: Margaret A. Pepper
Position: USDA-APHIS-WS District Supervisor (MD/DE/DC), Annapolis, MD
Education: BS and MS Wildlife Conservation – University of Delaware
Experience: Special expertise in wildlife damage management. APHIS canine handler, field trainer and supervisor for detector dogs on the Chesapeake Bay nutria eradication project.

Reviewer: Kevin J. Sullivan
Position: USDA-APHIS-WS State Director - Maryland, Delaware and District of Columbia, Annapolis, MD
Education: BS and MS Wildlife Biology – West Virginia University and Mississippi State University
Experience: Special expertise in wildlife damage management. Supervised use of dogs in WDM including the Chesapeake Bay nutria eradication project.

Reviewer: Julie K. Young, PhD
Position: USDA-APHIS-WS-NWRC- Superv. Research Wildlife Biologist/Field Station Leader, Millville, UT
Education: PhD Utah State University
Experience: Special expertise in wildlife damage management and research, including us of livestock protection dogs.

7.3 Peer Review

The Office of Management and Budget requires agencies to have peer review guidelines for scientific documents. The APHIS guidelines were followed to have "Use of Dogs and Other Animals in Wildlife Damage Management" peer reviewed. WS worked with the Association of Fish and Wildlife Agencies to have experts review the documents.

7.3.1 Peer Reviewers Selected by the Association of Fish and Wildlife Agencies

New Mexico Department of Fish and Game
Nevada Department of Wildlife
Ohio Division of Wildlife

7.3.2 Comments

Peer reviewers provided editorial comments on the manuscript. These were appreciated and incorporated into the final document. Following are the comments regarding concerns with the risk assessment and a response:

1. **Comments:** In the method risk assessment it mentioned that there is no system in place to track the number of dogs injured or killed while they are being used in WDM. This needs to be addressed so injuries or deaths of dogs being used in active WDM activities can be tracked. If the number is low as described this would only serve to support the continued use of dogs and further identify where potential hazards may exist for dogs being used.

   Section 3.2 notes "WS does not have a system in place to track the number of dogs injured or killed while they were being used in WDM". If dogs are to be used, I would expect it responsible to track those incidents just as the agency would track injuries to employees. Many would perceive a WS dog to be equitable to an employee in this regard. I would expect this document to do a better job in noting this.

   Response: Currently, no system is in place to track dog injuries. It should be noted that WS personnel can put in claims for reimbursement of veterinary bills for injured dogs, but these have been relatively few and are kept at the state level with no national system to gather this information. Not all injuries require veterinary assistance, though. Thus, more injuries likely occur than just veterinary assisted. This happens so infrequently that other issues are much more important to monitor, like personnel injuries, which became a national database in FY14. This will be noted to the National Injury Tracking system. Additionally, the MIS is being upgraded to a new system. This will be mentioned to the MIS Working Group. We are unsure if the new platform could or could not track this information, but the current platform does not. However, this is a great suggestion and will be relayed through the appropriate channels.

2. **Comment:** One correction, regarding the citation for Beckmann et al. (2004) in the section on wildlife hazing. The MRA states that “all bears returned within 40 days.” This is incorrect. Less than three-quarters of the bears (70%) in that study returned to an urban area in less than 40 days and over 10% took more than 6 months to return

   Response: This statement was corrected.

3. **Comment:** There is a statement in the risk assessment that suggests that in most States dogs can be shot if seen chasing wildlife. This statement needs to be further researched and clarified. In most states it is illegal to shoot a dog unless it is chasing or damaging livestock. Some states do allow dogs to be shot chasing “nontarget” wildlife but not for chasing wildlife that is allowed by law.

   Response: This was pointed out as a risk because it is a possibility and a concern, but further clarification was added to the Sections 2.2 and 3.2 because it is only legally allowed by authorized personnel such as a peace officer, animal control official, or WS personnel under agreement with state and county officials. This has been corrected to note that legally most states have laws that allow authorized personnel from agencies with jurisdiction can take dogs that kill wildlife. However, dogs are more likely to be killed illegally by people who may feel that dogs are chasing wildlife. Laws, including citations for dog owners that have dogs that kill wildlife vary by state and we are unaware of any state that currently allows the public to kill dogs chasing wildlife. Thirty years ago, many states had such laws, but these have been changed with New York one of the last to change this. WS dog handlers are aware of the risk that they could be shot illegally and try to minimize this by not using trailing and tracking dogs, primarily, in areas where hunters or the public are expected. This has occurred rarely and mostly because people think they are chasing nontarget wildlife. A common scenario would be for a pack of hounds to be trailing a bear that killed livestock the night before, a deer wanders onto the trail, gets into the path of the dogs, and is spooked. A hunter sees the deer, which appears to be chased by the hounds, and shoots a dog.

4. **Comment:** Within the Summary section, should a note be made that in the future, additional uses of WS dogs may be identified and if so the policy for determining its use as a management technique. This probably falls under the researching side of dog use, but little is mentioned in the research component of dog use by WS.

   Response: Section 5, the Summary, has been amended to include this statement. Thank you for the comment.

Comments received not requiring a response. We appreciate these comments.

1. **Comment:** All procedures for the safety, training, handling and use of dogs for specific purposes seemed appropriate as described in the method risk assessment.

2. **Comment:** Overall the method risk assessment was complete and thorough in describing methods, consequences and successes.

3. **Comment:** All uncertainties and assumptions were adequately considered and described.

4. **Comment:** The list of references presented in the MRA seemed appropriate.

5. **Comments:** The MRA does a good job of covering the wide array of usages for trained dogs by WS personnel. It appears to be a complete list of the various methods, and it is written with satisfactory detail. The pros and cons of each method are discussed in a thoughtful way, and the authors adequately explained the inherent hazards and risks associated with each use, along with giving some basic scenarios.

Appendix 1. "Other Species" Included in Tables

Table 1

TRAILING DOG

Other predator = feral cat*, coyote, red fox^ and gray fox,

HAZING DOG

Other mammal = feral cat*, bobcat, small Asian mongoose*, coyote, feral dog*, feral swine*, mule deer, white-tailed deer, pronghorn, and eastern cottontail

Other bird associated with water = Bonaparte's gull, laughing gull, mew gull, ring-billed gull, California gull, glaucous-winged gull, American herring gull, greater white-fronted goose, snow goose, brant, cackling goose, wood duck, gadwall, American wigeon, blue-winged teal, cinnamon teal, northern pintail, green-winged teal, canvasback, redhead, lesser scaup, bufflehead, common goldeneye, hooded merganser, common merganser, ruddy duck, pied-billed grebe, double-crested cormorant, American bittern, black-crowned night-heron, green heron, western cattle egret, great egret, snowy egret, black-necked stilt, American avocet, gray plover, killdeer, Wilson's snipe, marbled godwit, whimbrel, greater yellowlegs, lesser yellowlegs, willet, spotted sandpiper, and western sandpiper

Other bird associated with land = red-winged blackbird, Brewer's blackbird, common grackle, [mixed blackbirds], rock pigeon*, Eurasian collared-dove*, spotted dove*, black-billed magpie, American crow, northwestern crow, fish crow, common raven, turkey vulture, western osprey, sharp-shinned hawk, northern harrier, Swainson's hawk, red-tailed hawk, ferruginous hawk, American kestrel, burrowing owl, short-eared owl, scaled quail, wild turkey, barn swallow, eastern kingbird, American pipit, savannah sparrow, northern mockingbird, house finch^, saffron finch*, house sparrow*, and [unidentified bird]

* Introduced species ^ Introduced populations