Information Crossfile

Synopses of selected publications relevant for natural resource management

ARTICLES

Dogs detect elusive wildlife better than other methods

SIT! DOWN! COME! STAY! These four words comprise the vocabulary of every "good dog." Some special dogs, however, have added "find it" to their vocabulary, with beneficial outcomes for wildlife conservation, particularly of elusive carnivores such as grizzly bears (*Ursus arctos*), black bears (*Ursus americanus*), wolves (*Canis lupus*), and fishers (*Martes pennanti*). Controlled behavioral tests indicate that domestic dogs (*Canis familiaris*) can distinguish the odors of different species of animals, males or females of a species, and even different individuals within a species (Smith et al. 2001). Additionally, trained dogs can detect taxonomically diverse species simultaneously (Long et al. 2007b). With the DNA extracted from scat, scientists can identify not only species and sex but also population size, home range, paternity, and kinship (Socie 2007).

Investigators and handlers choose dogs for their strong object orientation, high play drive, and willingness to strive for a reward (Wasser et al. 2004). In addition to honing dogs' scent-detection skills, handlers trained them not to chase wildlife (Wasser et al. 2004) (see Banks and Bryant 2007, abstracted on page 19, for the effects of dog walking on native birds). Dogs perfect for scat detection may be considered "crazy" with their off-the-charts energy, drive, and object obsession, but these traits are necessary for a scat-detection dog's work (Socie 2007). One German shepherd recovered 435 (presumed) kit fox (*Vulpes macrotis*) scats along 87 miles (140 km) of transects in the Carrizo Plain Natural Area, California, in 16 days. Investigators were able to isolate DNA from 329 of the samples. Mitochondrial DNA tests developed in the National Zoological Park's Molecular Genetics Laboratory in Washington, D.C., revealed that all 329 scats were indeed from kit foxes (Paxinos et al. 1997). Thus, this dog was 100% accurate in identifying kit fox scats, even in the presence of scat from coyote (*Canis latrans*), skunk (*Mephitis mephitis*), and badger (*Taxidea taxus*) (Wasser et al. 2004). Smith et al. (2001) describe another detection dog—originally trained to find grizzly bear scat but moved to a program to detect scat from kit fox—who could detect kit fox scat at four times the rate of trained (human) observers. The impressive scent discrimination of canines, coupled with the treasure trove of genetic, physiologic, and dietary information contained within scat, makes this method worth considering, particularly for confirming the presence of a species or collecting fecal DNA and hormone information.

Because this method requires virtually no setup, it is "ideal for population monitoring on an annual basis as well as for cross-sectional monitoring of wildlife over large, new areas" (Wasser et al. 2004). Additionally, it does not require the use of attractants, allowing sampling to occur quickly and efficiently across an entire region and potentially minimizing sampling biases. However, if detecting actual animals is important for a study, detection dogs are not used for doing so. As stated in Long et al. (2007a), "the ability of dogs to detect scat long after deposition may confound comparisons between dogs and other methods, such as remote cameras, which detect species presence at the actual time of the survey."

Another consideration for using scat-detection teams—consisting of dog, handler, and orienteer—is cost. Long et al. (2007a) estimate that using a leased detection dog requires approximately 1.5 times more funding ($316 per site) than camera-based surveys ($214 per site) (see Fiehler et al. 2007, abstracted on page 20, for information about "security boxes" for remote cameras) and twice the funding necessary for hair snare surveys ($153 per site). When comparing costs, however, investigators should factor in the relative effectiveness of each method. For many applications (e.g., surveys for endangered species), researchers require a high probability of detecting the target species, and detection dog teams have superior results as compared with remote cameras and hair snares. In a study that covered the entire state of Vermont and a small portion of adjoining New York, scat-detection teams found scat from all three target species (i.e., black bears, fishers, and bobcats [*Lynx rufus*]) at a rate of 3.5 times that of remote cameras alone; hair snares recorded neither fishers nor bobcats. According to Long et al. (2007a), "detection dog teams were also responsible for the majority of unique detections of all three species, yielding the only detections of bears at 65.3% of sites, fishers at 74.5% of sites, and bobcats at 78.6% of sites." As pointed out by MacKenzie et al. (2002), "low probabilities of detection decrease the accuracy and precision of occupancy estimates." Hence, detection dogs are clearly the more cost-effective method if potential users account for the effort necessary to achieve a relatively high probability of detection (Long et al. 2007a).

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