



ASSESSMENT OF DETECTION AND TRACKING DOG PROGRAMS IN AFRICA

by Megan Parker, PhD



Working Dogs
for Conservation

workingdogsforconservation.org

COVER: *A Handler uses positive reinforcement to reward his dog with a game of tug during a training session.* M. JOHNSTAD

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TABLE OF CONTENTS

Executive Summary	Jump to page 4
Canine Programs in Africa	6
The Review Process	7
Site Visits	7
Online Survey	8
Assessment Findings	9
Program Size, Budget, and Operations	9
Funding	10
Program Achievements and Successes	11
Future Growth	12
Information Exchange and Trainings	12
Program Needs and Challenges	13
Africa's Poaching Crisis	15
Working With Working Dogs	17
Dogs and Scents	18
Tracking and Detection Dogs	19
Basic Needs and Best Practices for Canine Programs	21
Appendix A: Africa Dog Program Survey	26
Appendix B: Kennel Design, Equipment, and Dog Husbandry	29
Appendix C: Basic Resources Required by Conservation Canine Units	32
Appendix D: Veterinary Recommendations for Field Handling of Snake Bites, Trypanosomiasis, and Overheating	33
Appendix E: Using Dogs for Container Searches	36
Appendix F: Donor Guidelines	40

EXECUTIVE SUMMARY

With the rapid and unprecedented increase in wildlife poaching and trafficking in Africa, management authorities, non-governmental organizations and private wildlife and land managers are increasingly turning to detection and tracking dog teams to protect wildlife, catch poachers, and recover illegal weapons, ammunition and wildlife contraband. However, most of these programs are run without access to ongoing handler or dog training, and without the benefit of a community that can share best practices, provide support, and help individual programs build their capacity and effectiveness. Many programs also lack sufficient support to provide adequate facilities, equipment, vehicles, and veterinary care for the dogs.

With financial support from the Elephant Crisis Fund, and logistical and in-kind support from numerous partners, we assembled a review team to assess the state of dog conservation programs in Africa.

The Review Team conducted site visits at five canine programs in Kenya and four in South Africa. An online survey was sent out to an additional 35 practitioners at 17 other known canine programs in Africa, from which 16 responses were received. The review team used the findings from the site visits and online survey to assess challenges, identify markers of success, and determine best practices that could be adopted across programs, organizations, and regions.

TOP PROGRAM CHALLENGES:

- *Insufficient dog and handler training*
- *Inadequate veterinary care*
- *Lack of adequate, reliable transportation*
- *Staffing*

TOP MARKERS OF PROGRAM SUCCESS:

- *Motivated dogs and handlers*
- *Adequate Facilities*
- *Strong local relationships and collaborations*
- *Access to continuation training*

SUMMARY OF RECOMMENDED BEST PRACTICES:

- *Recruit and maintain motivated dogs and handlers*
- *Construct appropriate kennels with adequate security and infrastructure*
- *Recruit and maintain a support kennel staff trained in basic husbandry and veterinary care, and ensure access to veterinarians for emergency and evacuation care*
- *Invest adequate time and resources in training (including continuation training) to ensure effective performance over the life of program and the working life of the dog*
- *Provide trained dogs only to handlers who have completed satisfactory initial training and who can commit to continuation training*
- *Acquire and maintain good working equipment and dedicated transport where necessary*
- *Recruit and maintain capable operations staff, whose abilities and trustworthiness are unquestioned*
- *Invite external audits by experienced trainers to provide additional expertise and transparency*
- *Collaborate regionally on certification standards*
- *Foster good working relationships with national law enforcement agencies to facilitate use of evidence*
- *Pursue a long-term national commitment and funding plan*

With greater access to training and information exchange, the development of online resources to help these programs develop capacity and expertise, and by implementing the best practices outlined above, canine programs in Africa can do even more to protect wildlife and combat poaching. African programs would benefit from regional and site-specific trainings and workshops at which practitioners could share best practices, technologies, and techniques, and build curricula for initial and continuation training.

CANINE PROGRAMS IN AFRICA

Africa's wildlife is under the greatest poaching pressure in history. Elephant ivory and rhino horn have become two of the world's most valuable commodities, and bushmeat, spotted cat skins, pangolin scales, plants, live animals and lion bones are part of the growing traffic in African wildlife contraband. [*For more on Africa's poaching crisis, click here.*](#) As a result, conservationists have been forced to adopt new and sophisticated methods to stop wildlife poaching. Park rangers, reserve managers, and NGOs are increasingly turning to tracking and detection dog teams to apprehend poachers and intercept guns, ammunition, and wildlife contraband.

The last five years has seen a rapid increase in canine law enforcement programs in Africa; overall, these programs have had mixed success. There are no accepted standards for handler training, dog training, or dog care, and no best practices have been established for the field. Many programs work in isolation from one another, without the benefit of ongoing training, collaboration with other programs, or knowledge of what has led to success or failure for other canine programs.

Funders, implementers, and stakeholders seeking to establish or collaborate with these dog programs have a shared interest in learning from the programs currently operating in the field. With financial support from Save the Elephants and the US Fish and Wildlife Service, and logistical and in-kind support from numerous partners, Working Dogs for Conservation assembled and led a Review Team to assess the state of dog conservation programs in Africa, with the following objectives:

- To provide an overview of the range and variety of existing canine programs in Africa;
- To assess their strengths and weaknesses and identify the conditions that can promote success or failure; and
- To compile a preliminary set of best practices to maximize the chances of success for future dog-based conservation programs.

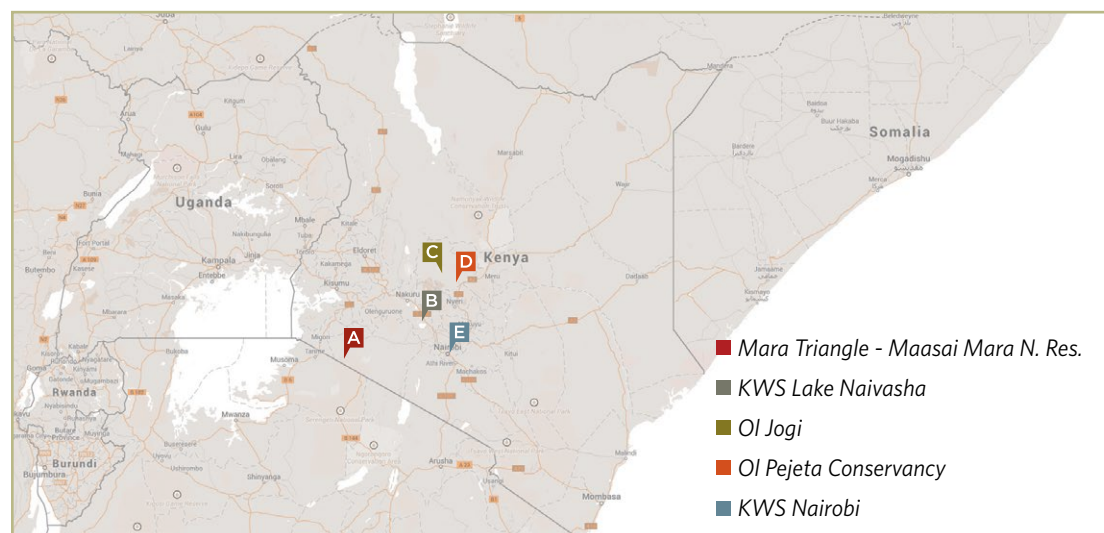
The Review Team consisted of the following individuals: Megan Parker, Ph.D. (Working Dogs for Conservation), Chris Aycock (American Society of Canine Trainers), and Matt Muir, Ph.D., (USFWS, Division of International Affairs).

THE REVIEW PROCESS

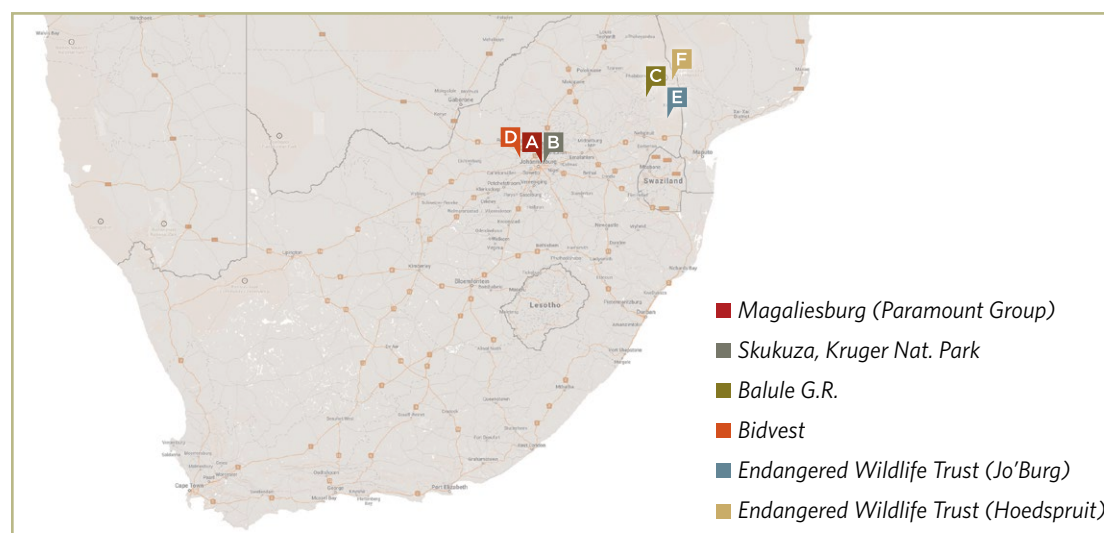
SITE VISITS

The review team selected a cross-section of canine programs, making sure to include old and new programs of a range of sizes that represent a variety of challenges and institutional circumstances. In August of 2014, the review team visited nine program sites:

KENYA:



SOUTH AFRICA:



During the site visits, the Review Team conducted structured interviews with staff in order to better understand their challenges and opportunities and to assess their facilities, handlers and dogs.



Scouts from the South Luangwa Conservation Society (SLCS) and the Zambia Wildlife Authority (ZAWA) accompany a detection dog during fieldwork. M. JOHNSTAD

ONLINE SURVEY

Working Dogs for Conservation also distributed an online survey to 35 individuals representing 17 conservation canine programs currently operating in Africa. [*The survey is attached as Appendix A.*](#) Responses were received from organizations in South Africa, Gabon, Republic of Congo, Democratic Republic of Congo, Kenya, Tanzania, and Zambia. Some programs were represented by more than one survey response. The responses came from a range of canine programs: ones that use only detection dogs, only tracking dogs, or both; programs that use tracking dogs trained to restrain targets, or “Track and Attack” dogs; and three programs that use detection dogs only for ecological monitoring. Sixteen responses were received, and the Review Team incorporated these responses into their assessment findings.

ASSESSMENT FINDINGS

The site visits and survey results were analyzed to assess challenges, identify markers of success, and determine best practices that could be adopted across programs, organizations, and regions. The findings of the assessment are presented below, along with recommendations from the Review Team, where applicable.

PROGRAM SIZE, BUDGET, AND OPERATIONS

- Program staff sizes range from one employee to 300 employees. (Some programs reported staff not dedicated exclusively to canine work.)
- Programs range in size from one to eight dogs and one to seven handlers.
- Dogs are deployed on missions anywhere from once a month to five days a week.
- Some programs provide maintenance training several days per week. Others offer no maintenance training, which results in a decline in dog performance.
- Programs use different strategies for keeping their dogs trained. Some employ on-site trainers, while others build partnerships with other organizations and use regionally-based trainers. Still others rely exclusively upon visits from the international expert trainers who initially trained the dog(s). Regardless of their training strategy, every program requested additional, updated and more comprehensive training.

***Recommendation:** Programs should network regionally to access additional trainers and leverage costs to work with international expert trainers.*

- Transportation is a significant program challenge. Half the programs mentioned that long transport times or the lack of a dedicated vehicle complicated their work. Delays in getting to the scene of an incident can let tracks go cold, allow the scene to become contaminated, or provide poachers with time to leave the area. Lack of readily available transportation can incapacitate a canine program.

***Recommendation:** The cost of a dedicated vehicle should be considered when developing a program, unless other forms of transportation can be relied upon.*

- It is not uncommon for a new program to work well for the first few months before the quality of its work and results decrease. This can cause both staff and dogs to lose their motivation, which can result in program failure.

***Recommendation:** Ensuring access to training, troubleshooting, and support for early-stage problems is essential, with special effort required the first six months and oversight/training support available for several years.*

FUNDING

- Of the programs assessed, most rely on private and international funding sources (governmental and NGO), several rely upon national government funding, and one program is shifting from international NGO funding to national government funding. Two programs are supported solely by private donations, although several receive some private contributions.
- The smallest programs (consisting of just one dog and one staff person) reported budgets of less than US\$25,000 annually. The budgets of larger programs ranged from between US\$25,000 - \$50,000 to over US\$100,000 annually.
- The assessment did not separate start-up costs from operational costs. Some early-stage programs may have high initial costs that may decrease over time. Start-up costs for canine programs can be quite high since acquiring dogs, staff training and infrastructure are significant up-front investments.



ZAWA and SLCS scouts show a wire snare found by a conservation detection dog.
M. JOHNSTAD

PROGRAM ACHIEVEMENTS AND SUCCESSES

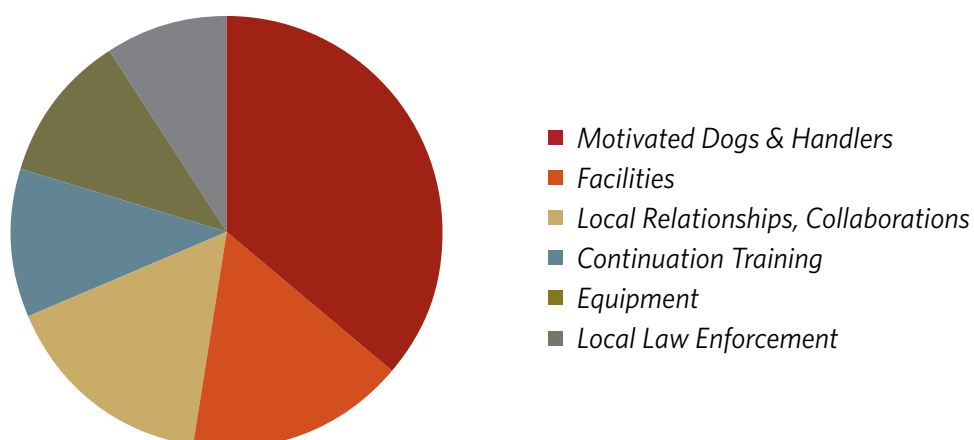
Confiscations and Captures: Rhino horn, ivory, pangolins in transport, bushmeat, weapons, ammunition, valuable ecological data, and poachers have all been detected through the canine programs reviewed. Many programs also reported successful confiscations and poacher captures. Some national airports and institutions were named as successful places for canine teams to work; others were deemed unsuccessful due to their individual management.

Motivated Dogs and Handlers: Motivated dogs and handlers are considered important by every single program the Review Team assessed. Having motivated dogs was identified as the single most important factor for a successful program.

Facilities and Equipment: Having access to adequate equipment and facilities was rated as a key marker of program success.

Community Relationships and Collaborations: Six programs listed positive community relationships as a factor in their success. Some programs invest in these relationships by using their tracking and detection dogs to help local communities solve crimes, find stolen objects, and locate thieves. Collaboration with neighbors, partners, and law enforcement was highly rated in helping programs succeed. Individual collaborations were also noted as one of the most important factors in determining a program's success or failure in working with institutions. Building good relationships with governments and law enforcement agencies are critical for canine program success.

MARKERS OF SUCCESS IDENTIFIED BY SURVEY RESPONDENTS



Outreach: Programs noted the value of having working dogs as outreach to demonstrate their worth and capabilities to national and international groups and organizations.

Deterrence: While hard to measure, the deterrence value of dogs was mentioned by every program contacted. Local peoples' fear of and respect for dogs, especially once they have helped confiscate contraband or apprehend poachers, is one of the most powerful tools available to deter wildlife crime.

FUTURE GROWTH

All but three of the surveyed programs expect to add both dogs and/or staff by the end of 2015. Most programs expect to expand the scope of their work by adding scent targets, adding new types of working dogs, or working in a larger area. One program would like to improve intelligence networking with the government, which will depend upon better operational support and national law enforcement training.

INFORMATION EXCHANGE AND TRAININGS

Every program surveyed reported that it would benefit from regional information exchanges, and several offered their own expertise to help other programs increase their capacity. Building networks and information exchanges can have far-reaching effects for everything from staff motivation to veterinary assistance to regional information on trafficking activities.

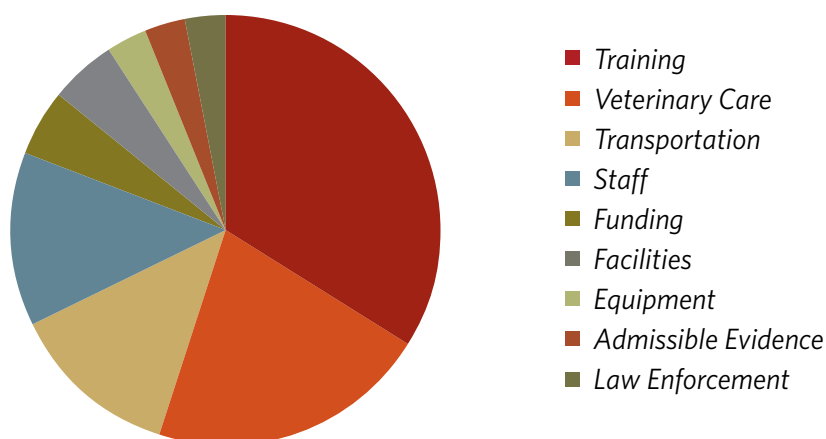
All but two of the responding programs want to work with expert trainers on site. Programs that use tracking dogs asked for additional tracking dog training, while those with detection dogs asked for additional detection dog training. Those programs that use or want to expand the types of dogs they use asked for both types of training. Operational training, field veterinary skill training and kennel husbandry were identified as needs by more than half the programs.

PROGRAM NEEDS AND CHALLENGES

Training: The greatest need among the assessed programs is for current training and updated techniques for both handlers and dogs. The programs that are failing to meet their goals all cite poor or insufficient initial and/or continuation training, resulting in dogs that are not handled well, consistently, or with the most effective techniques. Poor or inconsistent handling can quickly affect a dog's ability to work. The review team received reports of dogs that were only trained for several weeks (as opposed to the months of training recommended) before being delivered to poorly prepared handlers. These teams failed almost immediately, since handlers require as much—if not more—training than their dogs. Poorly-chosen dogs that may have too little drive or that are too aggressive can also cause failure. If a handler fears the dog, their working relationship will quickly erode.

Veterinary Care: Disease, poor veterinary care, and substandard animal husbandry are responsible for the deaths and illness of many dogs in Africa. Prevention, identification, and treatment of dog injury and illness were listed as serious challenges by several programs. Trypanosomiasis (sleeping sickness), tick-borne diseases, distemper, rabies, leptospirosis, parasites, and larger threats such as scorpions, snakes and predators are risks that programs must address during field work and in well-designed kennels. [For more on field veterinary techniques, see Appendix D.](#)

CHALLENGES TO CONSERVATION CANINE PROGRAMS EXPRESSED BY SURVEY RESPONDENTS, BY CATEGORY



Poor nutrition, which can manifest as mange, poor coats, and low energy, can also promote disease in working dogs. *For more on kennel design and nutrition, see Appendix B. For more on field veterinary care, see Appendix D.*

Transportation: Tracking programs reported the need for reliable vehicles to allow dog/handler teams to get to crime scenes quickly and to access larger areas. A large coverage area was found to be a challenge in itself: three programs listed the difficulty of getting teams to crime scenes or work sites because of terrain or distance.

Insufficient Funding/Operational Support: Even well-trained dogs and handlers are ineffective without sufficient operational support. Non-working vehicles, inconsistent deployment coordination, and lack of support from law enforcement can be challenging or lead to program failure. These issues, along with poor coordination with local authorities and insufficient funding, negatively affect program outcomes.

Law Enforcement Support/Admissible Evidence: Lack of law enforcement support and difficulties in collecting and presenting admissible evidence were also cited as challenges. The site visits revealed that some programs also struggle with crime scene contamination. Contamination by wild animals is unavoidable in wildlife areas, but human contamination could be reduced through better communication with and training of national law enforcement agencies.

Motivation: Many programs reported difficulty keeping handlers motivated. Motivational problems can result from a lack of sufficient training and deployment opportunities, poor financial incentives, and inadequate equipment, facilities or operational support.

Information: Although these programs are on the front lines of conservation canine efforts, staff often lack information on the larger context in which they work, and need reliable sources of information on poaching in their countries and in Africa as a whole. In addition, programs requested background on detection and tracking dogs, including breed selection and the science behind tracking. (An overview of the poaching crisis in Africa is provided on the following pages, as is additional material on detection and tracking dogs.)

AFRICA'S POACHING CRISIS

The illegal wildlife trade is estimated to be worth US\$23 billion (UN 2013). A growing demand for wildlife products in Asia has caused an African poaching frenzy. Ivory and rhino horn have become two of the most valuable contraband products. While prices vary, rhino horn powder can sell for over US\$15,000 per kilogram, and the price of ivory has tripled over the past three years to over US\$1,200 per kilogram. Increased market prices have turned poaching into organized crime, carried out by better funded and better armed criminal and terrorist networks that are changing the very nature of conservation and species protection.

Poverty within many African communities is a strong incentive to poach, and local people who lack other economic opportunities are being exploited by high-tier traffickers and international organized crime. Organized crime has militarized poaching in many areas, which has forced African law enforcement, conservation management, and park rangers to operate as defense forces in national parks, game management areas and private reserves. People trained to protect wildlife are now trying to develop and maintain intelligence operations and tactical performance against well-funded and organized poachers. Ivory and rhino horn have reportedly become an important source of income for some of Africa's insurgency organizations.

Animals are poached across the continent and contraband is moved to ports and

shipping centers by internal airway, roads and rail. The majority of shipments leave East Africa, pass through various international ports, and end up in China, Thailand and Vietnam.

Rhinos: At the beginning of the 20th century, there were over 500,000 rhinos across Africa and Asia. Today only 29,000 remain. In Africa, rhino poaching rates have risen more than 1000% since the beginning of the decade. The white rhino population is in recovery: after hitting a low of approximately 50 animals, there are currently just over 20,000. Black rhino numbers are around 5,000 (www.stoprhinopoaching.org). Most of Africa's rhinos live in South Africa, where over 2,650 rhinos have been poached in the last six years; Over 1,000 of these animals were killed in 2013 alone. As of October 2014, over 900 rhinos had been poached in South Africa in 2014. Rhinos are even being killed in tightly guarded national parks and reserves.

Rhino horn has long been valued in traditional Asian medicine. Rhino horn is considered a status gift across Asia, but its largest consumer is Vietnam, where it has recently been touted as a cure for hangovers and terminal illnesses. (Contrary to popular belief, rhino horn was not historically believed to be an aphrodisiac, but it is now being sold as one.) Rhino horn is ground into powder, covered with hot water and consumed as a drink. There is a large and growing trade in fake rhino horn, with everything from



Confiscated Ivory just before it was crushed by the US Fish and Wildlife Service, November, 2013.

water buffalo horn to dust and even gravel being passed off as ground rhino horn.

Elephants: By the first century AD, ivory-loving Romans had hunted North

Africa's elephants to extinction. In the 1970s, Africa's elephant population was estimated at just over one million animals. By the 1990s, these numbers had dropped by half due to poaching, hunting, and conflict killing. International Fund for Animal Welfare estimates that 25,000 elephants (5% of the total population) were poached in 2011. In 2013, the forest elephant survey showed that 62% of the total population was killed in the previous decade, and poaching rates continue to increase annually. A continent-wide population survey planned for 2015 should offer more reliable estimates for extant and poached numbers of elephants.

Southern Africa is home to over half of Africa's elephants. East Africa has over 28% of the population, and Central and West Africa have 17% and 1.6%, respectively. While poaching is an increasing threat across populations, conflict, land conversion and loss of habitat continue to be long-term threats to the species. Both the number of elephants killed and large scale shipments of ivory have increased in the last decade, "indicating a highly-organized illegal ivory supply chain" (IUCN SSC AfESG, provisional update, 2013).

For more information on elephant and rhino poaching, visit:

<http://www.traffic.org/storage/W-TRAPS-Elephant-Rhino-report.pdf>

http://www.elephantdatabase.org/preview_report/2013_africa/Loxodonta_africana/2012/Africa

<http://www.fws.gov/wildlife-trafficking-questions-and-answers.html>

<http://stoprhinopoaching.org>

<http://unchronicle.un.org/issue/illegal-wildlife-trade/>

WORKING WITH WORKING DOGS

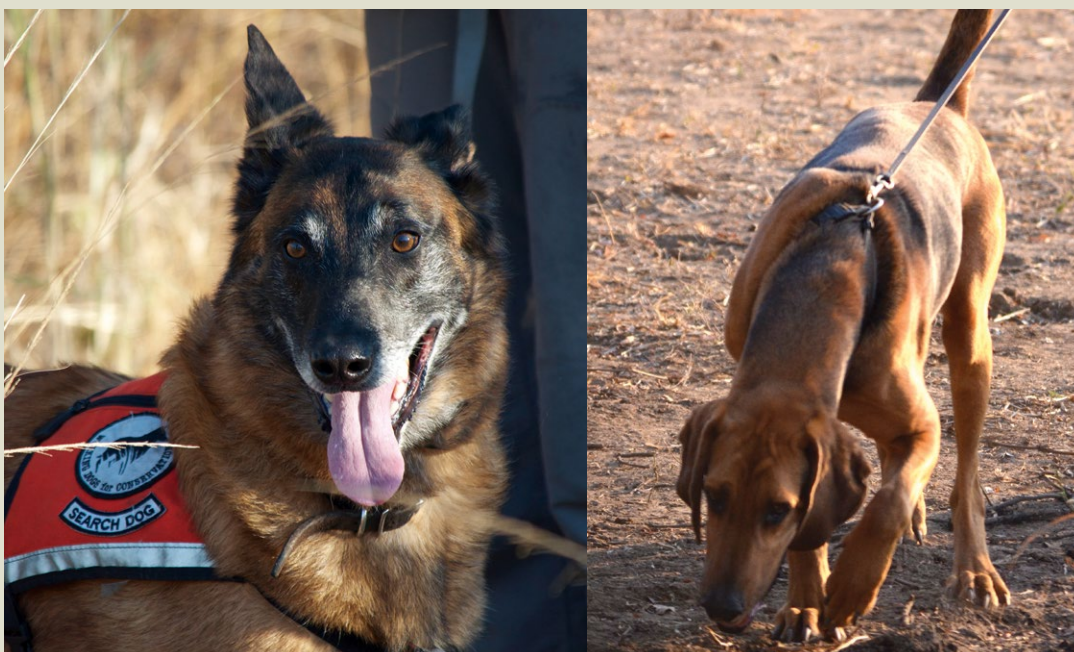
Dogs are being employed for an increasing number of forensic, detection and law enforcement activities. They can be trained to detect explosives, firearms, narcotics, human remains, accelerants, crime scene articles, and wildlife contraband. Dogs can also track lost humans, escaped criminals, and people leaving crime scenes.

Dogs have been used for millennia to help humans find things they value. Originally, we used dogs to help us find food and animals by chasing, hunting and herding. In very recent history, dogs began to be used for more specific searching, and it is only since the 1980s that dogs have been used by law enforcement to detect contraband. Dogs' extraordinary value

comes from their excellent sense of smell, ability to search large areas quickly, and, most importantly, from their desire to communicate with and please humans.

Some dogs have additional behavioral characteristics which enable them to work in the detection and tracking fields, such as: high energy, high drive, nerve strength (the ability to work in demanding environmental conditions without losing focus), physical agility, and willingness to work and communicate with a handler.

Practitioners establishing dog programs should consider a variety of criteria in choosing breeds and dogs, including temperament, heat and disease tolerance, size, the working environment,



Two popular detection breeds are the Belgian malinois (left) and hound dog (right). M. JOHNSTAD

transportation and housing constraints, and the abilities of individual animals. Male and female dogs work equally well, as do neutered and intact dogs, though intact dogs may be more distractible or difficult to handle. Many breeds of dogs are used for detection and tracking work, but the hunting and herding breeds tend to be most suitable. German shepherds, Labrador retrievers, Dutch shepherds, spaniels, Belgian malinois, hounds, border collies, Australian shepherds, and golden retrievers are all breeds with the potential to make good working dogs. Hounds, especially bloodhounds, are often chosen for tracking work, although shepherds and other breeds perform equally well and tend to be more heat tolerant. While specific breeds may be preferred for different reasons, many breeds and cross-breeds have proven effective at both detection and tracking work.

Special consideration should be given to how the public will react to different breeds. Shepherd-type dogs, for example, are often perceived as aggressive due to their erect ears and history of being used to restrain people, while dogs with soft ears seem more approachable. Some breeds are associated with particular colonial histories, and their presence can be charged with political or emotional meaning. These perceptions can impact public relations and the way both nationals and tourists perceive a canine program.

DOGS AND SCENTS

Every object releases a unique odor. Picture tiny particles rising from your hand and moving through the air, carried by currents and affected by wind, humidity, and temperature. These particles are what allow a dog to detect your smell from a distance. Scent can be thought to radiate out from an object like smoke, so that a dog smells it faintly at the distant edges and more strongly the closer to the object it gets.

Dogs can smell hidden people or objects, detect faint scents over long distances, and can discriminate between an enormous number of different scents. This is because their noses hold an extraordinary number of scent receptors, and their brains have a large area dedicated to processing scents. With each breath, a large volume of air flows across their nasal passages, allowing dogs to detect even the faintest smells.

Even objects hidden inside vehicles, shipping containers, buildings, and packages release scent, especially through seams, seals, vents, doors, and windows. The longer an object has been inside a container, the more scent is available further away from the object. The scent of an object cannot be disguised by other nearby scents, and dogs can detect the odors they are trained to find among many other strong smells. *For more on using dogs for container searches, see Appendix E.*

TRACKING AND DETECTION DOGS

Law enforcement dogs fall into two primary categories: detection dogs and tracking dogs. Both types of dogs are used for wildlife crime.

Tracking dogs are trained to follow the scent of an individual person. Dogs can be used to follow a poacher across a landscape, depending on factors such as terrain, temperature, humidity, wind, and the age of the tracks. Dogs can track scents for up to 10 km if conditions are ideal, and can also be used to hold tracked suspects by barking and/or force. Handlers can increase their dogs' chances of success if they are trained on how humans react when lost or after committing a crime. As a poacher leaves a crime scene, his odor will change from one charged with fear and excitement hormones to one closer to

his normal personal scent. As a suspect's scent changes and the team moves farther from the crime scene, dogs may temporarily lose and then rediscover the track; handlers should be aware of these transitions and ready to help the dog make them.

It is important to put a dog on a track as soon as possible, as scent deteriorates quickly in sunlight and wind. Chances of success are highest if a dog can access the track within an hour. To access tracks quickly and accurately, programs need a well-trained operations team, the ability to mobilize to the site quickly, and well-equipped and prepared handlers and searchers. As poachers are often armed, the safety of the entire team is of highest priority. The dog, likely first to the suspect, is at highest risk.



A conservation detection dog demonstrates his trained indication, by lying down when he detects his target.

D. HAMMAN



Dogs and handlers should train together in contexts similar to where they will work, whether vehicle searches (pictured above) or buildings or field environments. M. JOHNSTAD

Detection dogs are trained to air scent, meaning they search for targets by sniffing odor from objects (such as vehicles, vegetation, walls, doorways, and people) until they encounter the scent they are looking for. Once they have detected a faint scent, they attempt to find the strongest concentration of that odor. Dogs may be trained on multiple scents including ivory, rhino, various types of bushmeat, firearms, ammunition, and skins. They will search until they discover any one of the objects they are trained to find. Dogs may not always be able to access the object itself, but they will indicate where the scent is strongest. They are usually trained to sit or lie down and make eye contact with the handler when they reach this point. This is

called the “trained indication.” When the handler has located the object, he or she will reward the dog.

Detection dogs are intense and focused when they work and it is the handlers’ responsibility to keep them safe from sharp objects, hot engine blocks, dangerous animals, and other hazards. It is also the handlers’ job to use their knowledge of how scent moves in various environments and situations to help the dog encounter its target odor. During searches, it is very important that the dog/handler team work well with the overseeing law enforcement authority to ensure proper protocols for contraband processing, chain of command, and criminal arrest.

BASIC NEEDS AND BEST PRACTICES FOR CANINE PROGRAMS

Every canine program needs good technologies, infrastructure and information to succeed. Well-selected and motivated dogs and handlers are essential. Their training requires time and expertise, as well as continuation training over the life of the program. Tracking and detection dogs are expensive and can be extremely effective, but they must be maintained through experienced and supportive training programs over the course of their working lives. Trained dogs should be provided only to handlers who receive sufficient initial training and consistent continuation training thereafter.

Handlers who show promise and a desire to progress and learn more about canine scent work may eventually become trainers themselves, providing sustainability and self-sufficiency to their programs. Once programs become more independent, external audits by experienced trainers can provide additional expertise and transparency. Regionally agreed-upon standards should be considered to provide measures of effectiveness, safety, and success to funding organizations and external parties.

Good relationships with national law enforcement agencies are essential to effective conservation canine teams. For example, strong relationships between wildlife authorities and law enforcement can allow evidence collected by canine teams and wildlife law enforcement to be incorporated into criminal cases. Information from wildlife cases can inform other investigations and enforcement (e.g. drugs or human trafficking) and canine teams could be easily added to patrols or investigations. Good relationships with nearby communities can also enhance the effectiveness and safety of canine units.

Good kennel design, construction and security are crucial. All handlers and kennel staff should receive training in basic husbandry and veterinary care, and dogs should be checked daily for parasites and overall health. Kennels should provide shelter, shade, clean water, quiet, and privacy for all dogs as well as room for exercise and enrichment. Kennels should protect the dogs from excessive heat and cold, predators and intruders, and provide protection against insect infestations, snakes, biting flies, and rodents and other small mammals that may carry disease. [For more on kennel design, see Appendix B.](#) Consistent, high-quality food is important for working dogs to maintain energy and health and their diet should be high in protein (~24%) and fat (~16%). Both commercial and homemade diets can be excellent if they contain balanced nutrients. Programs without ready access to veterinarians should provide all staff with good training and preparation and have plans for emergency evacuation to a veterinarian at the ready. [For more on field veterinary techniques, see Appendix D.](#)



Good husbandry requires proper equipment and preparation, including a safe crate for transport, fan to prevent overheating, and plenty of clean fresh water provided regularly. M. JOHNSTAD

All programs require good working equipment, including leashes, harnesses, vests, transport crates, rewards and protective equipment. [*For more on the basic equipment required by conservation canine units, see Appendix C.*](#) Working vehicles and trained drivers are necessary for most programs; a dedicated program vehicle is optimal. If transportation and deployment are coordinated through a dedicated staff person, his or her abilities and trustworthiness must be unquestioned. Staff should work well with handlers and kennel staff as well as with administration and national law enforcement, so that all missions are carried out quickly, efficiently, securely, legally and in full cooperation with national agencies.

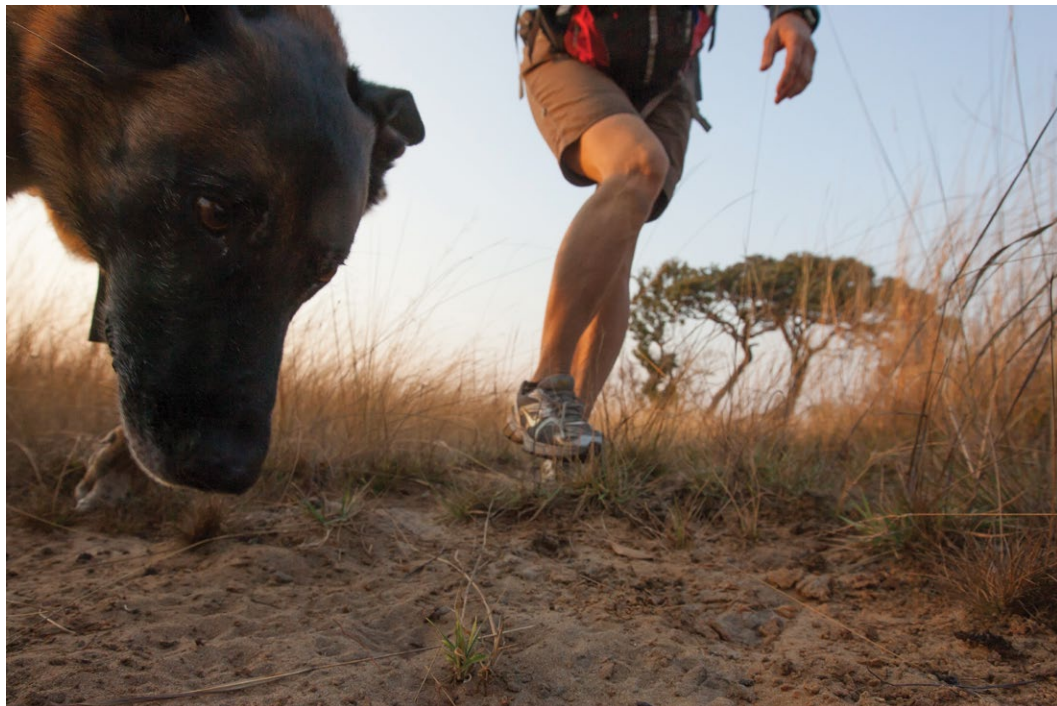
All canine programs require long-term national commitment and funding to operate successfully. Start-up costs can be quite high, since they need to include kennel and other infrastructure construction, staff training, and the acquisition of dogs, trainers and support staff. Operational costs should be estimated to ensure adequate fundraising expectations. Appropriate national law enforcement agencies should be involved at every level. Law enforcement personnel may require extra training to provide effective search support for canine tracking and detection teams. All canine units and support searchers need to be trained in search and seizure protocols.

RECOMMENDATIONS FOR BEST PRACTICES

It is important to note that, even within their current structural limitations, the programs we surveyed have experienced successes. With greater access to training and information exchange, and by implementing the best practices outlined below, canine programs in Africa can do even more to protect wildlife and combat poaching.

NOTE: All existing programs are encouraged to implement Recommendations for Best Practices #1-13. Start-up programs should be able to demonstrate the capacity for #1-9 and a commitment to pursue #10-13 as the program develops.

We have provided information on field vet care, kennel design, and other key topics in the appendices to this report, and look forward to providing more information and support to canine programs across Africa.



Dog and handler during fieldwork. D. HAMMAN

1. *Recruit and maintain motivated dogs and handlers*
2. *Construct appropriate kennels with adequate security and infrastructure to provide for dogs' needs, including shelter, shade, clean water, quiet, privacy, room for exercise and enrichment, and protection from excessive heat and cold, predators, other wildlife (e.g., snakes, insect infestations, rodents and other small mammals that may carry disease), and human intruders*
3. *Recruit and maintain support kennel staff, trained in basic husbandry and veterinary care, that can conduct daily health checks for parasites and health and provide dogs with consistent high-quality food*
4. *Secure ready access to veterinary care beyond what is available on staff, and prepare an emergency evacuation plan*
5. *Invest sufficient time and resources in training, including continuation training over the life of program and the working life of the dog*
6. *Provide trained dogs only to handlers who have completed sufficient initial training*
7. *Support handlers who show promise and a desire to improve and learn more about the theory of canine scent work; develop opportunities for handlers to become trainers who can select and train dogs and future handlers*
8. *Acquire and maintain good working equipment, including leashes, harnesses, vests, transport crates, rewards, protective equipment, and dedicated transport where necessary*
9. *Recruit and maintain operations staff person(s), whose abilities and trustworthiness are unquestioned, to coordinate deployment, transportation, training, and relationships with handlers, kennel staff, administration, and law enforcement*
10. *Invite external audits by experienced trainers to provide additional expertise and transparency*
11. *Collaborate regionally on certification standards to establish measures of effectiveness, safety, and potential for success to funding organizations and external parties*
12. *Foster good working relationships with national law enforcement agencies to facilitate use by legal authorities of evidence collected by canine teams, and to better integrate canine teams into existing patrol and investigation efforts*
13. *Pursue a long-term national commitment and funding plan to ensure that start-up and running costs are met and align with adequate fundraising efforts*

SUMMARY

African tracking and detection dog programs show promise in their mission to slow poaching and illegal wildlife traffic. They are often successful in building relationships and goodwill by working with community law enforcement to help track suspects and find stolen objects. The deterrence value of a conservation canine unit may also provide significant local benefits.

Despite the enormous potential benefits of canine programs, many are falling short of their conservation mission. A common challenge is insufficient access to current information, techniques and training. One of the greatest program weaknesses identified in this assessment is a lack of transparency and information within and among programs.

During the site visits and on the online survey, programs asked for help in building regional and continent-wide information-sharing networks to help increase the capacity of their handlers, trainers and staff. Regional workshops, external training audits, on-site trainings, and training exchanges between programs would build skills, help programs share knowledge and experience, and increase the credibility of canine programs with local and national law enforcement partners and communities. Regional certification of handlers and programs would allow for additional networking and create standards by which donors, clients, and programs could measure capacity and capabilities. Models for certification can be developed regionally or nationally, allowing all programs involvement and a stake in certification standards. Online continent-wide and international expertise are readily available. Access to these resources could be developed in the short and medium term to help provide current information on veterinary care, equipment, operations, new tools, training, and searching.

It is important to note that, even within their current structural limitations, these programs have experienced successes. With greater access to training and information exchange, and by implementing the best practices outlined in this report, canine programs in Africa can do much more to protect wildlife and combat poaching.

ACKNOWLEDGMENTS

Thanks to the many people and organizations that helped make this review happen. Special thanks to Chris Aycock, Matt Muir, Marissa Bueno, Jamie Gaymer, Kirsty Bebner, Bruce Leslie, and to everyone who took time out of your busy schedules to show us your programs, share your knowledge, and fill out surveys. We are grateful to all of you who are working hard to save wildlife with dogs.

APPENDIX A: AFRICA DOG PROGRAM SURVEY

This survey is collecting information to provide insights into challenges, successes, best practices and what is wanted for dog programs across Africa. Respondents will be entered into a raffle to receive canine equipment or free training consultations.

Your answers will remain confidential and the data collected will be pooled, but not released for any other purpose except in a report, which will be emailed to you.

If you know of other dog programs or people that can participate in this survey, please forward this email. More than one person is welcome to fill this survey out for a program.

Your Name

Your Position

Name of your program

Area Served -- Where does your program work?

How many dogs are in your program?

What work do your dogs do?

- ☐ Detection
- ☐ Tracking
- ☐ Track and Attack
- ☐ Other:

How many handlers are there in your program?

How many staff total are there in your program?

4. How often are the dogs deployed? If you deploy different dogs different number of times, please use more than one answer (for example if one dog goes out every day and one goes only once a week, check both).

- ☐ Every day
- ☐ Several days per week
- ☐ Once per week
- ☐ Once per month
- ☐ Other:

4b. How often are the dogs trained? If you train different dogs different number of times, please use more than one answer. For instance if you train young or green dogs more often than veteran dogs, include both training times.

- ☐ Every day
- ☐ Several days per week
- ☐ Once per week
- ☐ Once per month
- ☐ Other:

5. Who conducts your training?

- ☐ You have a trainer on staff
- ☐ You use a trainer who is in the region

- You use an international trainer
 - Other:
6. Where does your dog program funding come from? Please use more than one answer if your funding comes from various sources.
- National government
 - International sources
 - Foundations
 - Private donations
 - Other:
- 6a. (Optional) If you feel comfortable sharing this information, what is the annual total budget for your dog program?
- Over \$100,000 USD
 - Between \$50,000 - \$100,000 USD
 - Between \$25,000 - \$50,000 USD
 - Under \$25,000 USD
 - Other:
7. What are the most important challenges facing your program? Please choose as many as apply to your program.
- We do not have the facilities we need
 - We do not have the type of canine equipment we need
 - We do not have current training available
 - We do not have sufficient veterinary care
 - We can not keep the dogs motivated
 - We can not keep handlers motivated
 - We have too much handler / staff turnover
 - We can not get to an incident fast enough because we do not have a vehicle available
 - We can not get to an incident fast enough because we do not have a good communication system
 - We can not get to an incident fast enough because we do not have sufficient law enforcement support
 - We can not get to an incident fast enough because our area is so large, transport time is long
 - Other:
8. What has been your greatest success?
9. What have been the most important factors for success in your program? Please choose as many as apply.
- Great facilities
 - Good canine equipment
 - A good intelligence network

- Positive community relationships
 - Rapid transport and access to incidents or crime scenes
 - A good relationship with national law enforcement
 - Highly motivated dogs
 - Highly motivated handlers
 - Collaboration with neighbors and partners
 - Continuation training and current techniques
 - Other:
10. Within the next year, do you expect your program to...(check all that apply)
- End
 - Grow in number of dogs
 - Grow in number of staff
 - Train dogs more frequently
 - Deploy dogs more frequently
 - Decrease in size
 - Work in a smaller area than we do now
 - Expand how dogs are used, adding targets to detection dogs
 - Expand how dogs are used, adding types of dogs for different activities
 - Expand the region where we work
 - Maintain the size and scope of how we work
 - Other:
11. Do you have interest in working with other trainers and handlers to exchange information across your region? Please check all that apply
- No, we are working well without additional training
 - We would benefit from attending regional workshops and trainings
 - We would benefit from trainers coming to our site
 - We would benefit from informal information exchanges across our region
 - Other:
12. What skills, if any, would you like to gain in a workshop? Please check as many as apply.
- None, we are working well without additional training
 - Tracking dog training
 - Track and Attack dog training
 - Detection dog training
 - Operational training
 - Field veterinary training
 - Kennel and animal husbandry training
 - Other:
13. Please share any other information about your program you think is important

APPENDIX B: KENNEL DESIGN, EQUIPMENT, AND DOG HUSBANDRY

KENNEL DESIGN AND CONSIDERATIONS

Below is a basic kennel design that has been used by several canine programs with modifications according to local temperatures, wildlife concerns, and security.

Kennels often have concrete flooring with drains, which are easy to wash out and disinfect, and can extend from indoors to outdoors. The indoor dog room should be large enough to allow the dog and a person to enter and move around. This is often where dogs' beds are kept and where dogs are kept at night. Locking doors for security may be appropriate.

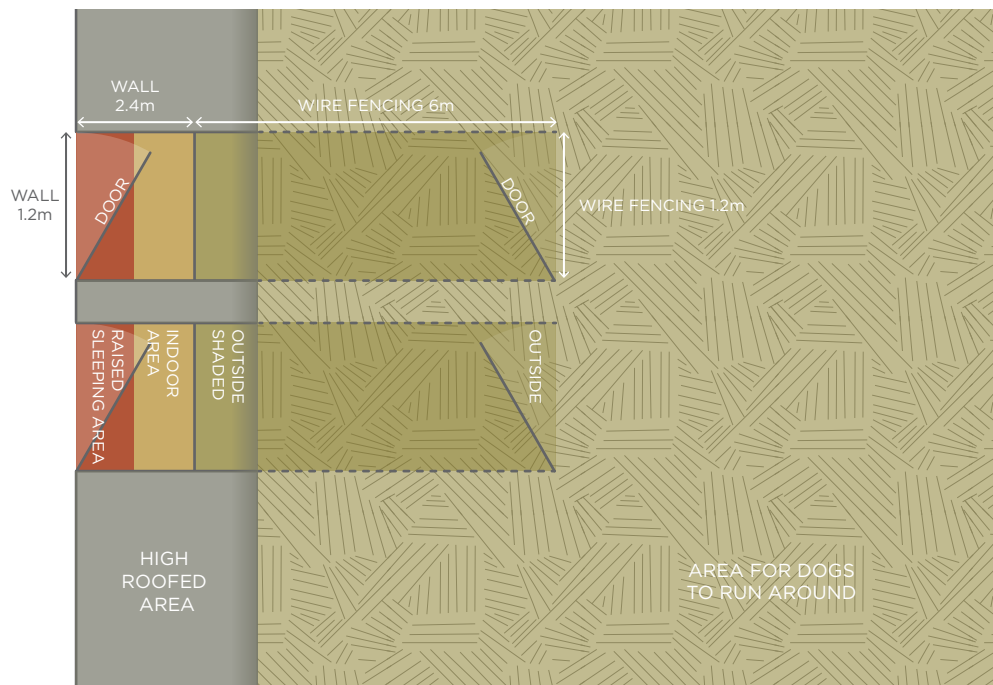


FIGURE 1: *Simplified kennel design. Kennels can stand alone or be attached to a building at the high roofed area.*

Kennel walls need to be metal mesh at least 3.5 m high. If the wire gauge available is narrow, then two layers of mesh may be necessary and wired together to keep the walls stiff and the dogs from climbing or distending the kennel walls. Outdoor runs should be partially covered for shade and rain protection. If security is an issue, then outdoor runs need to be covered to prevent anything being thrown in from outside. A second fence and security wire may also be necessary for security. The lower walls of outdoor kennels should be protected with shade cloth or fine wire to prevent snakes, rodents and other small animals from getting in. This is to prevent scavenging and disease transfer.

Kennel walls should be buried or set in cement to prevent dogs or other animals from digging under. Branches and any overhanging objects should be considered if snakes, baboons or other animals can climb over into the kennel.

Walls need to be high in the building to allow air circulation for cooling and it is useful to have a tub or small pool of water for dogs to cool themselves if the unit is based in a hot area. Otherwise, dogs can be washed elsewhere inside the kennel. This should be done frequently to avoid ecto-parasite infestations.

In addition to individual runs, dogs require a large, fenced, outdoor play area where they can exercise and possibly where initial socialization for dogs, handlers and kennel staff can occur.

A kennel building needs a food preparation and storage area that is free of insects and rodents. Dog and handler equipment needs to be stored in safe, dry areas.



A completed kennel building.

BASIC DOG EQUIPMENT NECESSARY FOR WORKING DOGS:

<i>Metal or plastic shipping crates also to be used in vehicle and during searches</i>	<i>1 per dog</i>
<i>Crate fans</i>	<i>1 per crate</i>
<i>Crate pads</i>	<i>1 per crate</i>
<i>Collars</i>	<i>2 per dog</i>
<i>Harness / working vest</i>	<i>2 per dog</i>
<i>Dog leads</i>	<i>2 long, 2 short per dog</i>
<i>Dog booties</i>	<i>4 per dog</i>
<i>Dog wet /cooling vests</i>	<i>1 per dog</i>
<i>Dog beds</i>	<i>1 per dog</i>
<i>Dog cooling pad</i>	<i>1 per dog</i>
<i>Training rewards</i>	<i>Several per dog</i>

Of primary concern is the long term care and welfare of the dogs. The handlers and support staff need to be trained to care for the dogs, and rely upon the responsible agencies or organizations to remain committed to maintain care of these dogs. The dogs are valuable tools and should be treated with respect for the duration of their lives.

The handlers should be trained to assess the health of the dogs daily and to look for current or impending problems. The handlers should carry a full first aid kit in their vehicle and a small field first aid kit and water while working so they can immediately address small concerns such as splinters, cuts, overheating, and the like.

Dogs don't sweat except through their footpads, so they can only cool themselves by panting or submerging in water. Fresh water should be available to the dogs at all times, and while the dogs work the handlers should give the dogs water. Dogs do not smell as well when they pant, , and when they pant heavily, they can't smell at all.

NUTRITION

Working dogs require high quality dog food with nutrients at the levels shown below, which are generally accepted as optimal for working dogs. The volume of food has to be constantly adjusted to maintain the dog's optimal weight during intense work or rest periods. Commercial foods may have to be rotated for some dogs as they will develop allergies or sensitivity to some ingredients over time. Food sensitivities may appear as diarrhea, excessive itching chewing or licking, vomiting or refusing to eat. Handlers and kennel staff will have to be vigilant in observing the dogs' health for food sensitivities. Home-made diets can be excellent for dogs and can include rice, mealie meal, meat, oil, eggs, fish, other grains, fruits and vegetables, balanced to reflect the percentages below. Raisins, onions, garlic should never be fed to dogs.

- *Crude protein (min.) = 24%*
- *Crude fat (min.) = 16%*
- *Crude fiber (max.) = 6%*
- *Moisture (max.) = 10%*
- *Omega 6 fatty acids (min.) = 2.7%*
- *Omega 3 fatty acids (min) = 0.4%*
- *Total microorganisms (min.) = 100 million CFU/lb*

APPENDIX C: BASIC RESOURCES REQUIRED BY CONSERVATION CANINE UNITS

MINIMAL RESOURCES INCLUDE:

Kennels

- Secure kennel with shade, quiet, clean water and room for dogs to exercise, room for privacy and surfaces that can be cleaned easily.
- Kennel supplies for cleaning, grooming, feeding dogs and maintaining a safe, secure kennel.
- Veterinary supplies for minor injuries, parasites, etc. and a trained kennel guardian and handlers, able to care for dogs.
- Access to steady power and water.
- Security, often 24 hours a day.
- Veterinary care available with possible evacuation to a veterinarian in emergencies.
- Staff able to care for dogs 7 days / week

Training

- Handlers and backup handlers with months of initial training.
- Training and continuation training, recommended at least 4 x year to begin.
- Access to training samples so dogs are exposed to an adequate number of samples during training and refresher training.
- Rewards for training and deployment.

Operations

- Dog equipment, including traveling crates, food and water bowls, collars, leashes, harnesses or vests, booties, water vessels to make water available to dogs while working, shade cloth for covering crates if a vehicle doesn't have shade.
- Access to a vehicle for training and transport to sites
- Good relationship with national law enforcement
- Secure and reliable coordination for teams to interact with national law enforcement and for deployment.
- Training for teams in proper and legal search and seizure techniques in accordance with national law enforcement, including chain of command for confiscated contraband.

APPENDIX D: VETERINARY RECOMMENDATIONS FOR FIELD HANDLING OF SNAKE BITES, TRYPANOSOMIASIS, AND OVERHEATING

SNAKE BITE PROTOCOLS

Prepared for Working Dogs for Conservation, by Liz Layne DVM, March 2013

First Rule of First Aid: Do No Harm

For a dog bitten by a snake:

1. Stop activity and try to calm the dog. Slowing heart rate slows absorption of venom from the bite and slows distribution through the body.
2. Assess: location, pain level, degree of swelling, to improve monitoring.
3. If medical attention is close (i.e. 30-60minutes), get there asap.
4. If medical attention is further (less than 8 hours), administer pain medication and antibiotics orally if possible, and subcutaneous (or IV) fluids, and proceed to nearest medical assistance.
 - a. Fluids: improve low blood pressure from cardiovascular shock and maintain/return hydration both of which maintain organ function
 - i. Volume to administer: shock doses of fluids around 90ml/kg/hr IV, given in dose increments. General rule:
 - a. Large dog (80+lbs): give 1L
 - b. Medium dog (40-80lbs): give 500ml
 - c. IV fluids can be overdosed, shock dose is given over 5-10 minutes.
 - d. SQ fluids it is hard overdose, limit is on tightness of skin/comfort.
 - e. Pain: opioid vs. NSAID; give according to label.
 - f. Antibiotic: broad-spectrum antibiotic like enrofloxacin (Baytril), or cefpodoxime (simplicef) given by mouth (if feasible, i.e. if bite is not on face).
 - g. Cooling: this is NOT icing the wound, but trying to reduce heart and respiratory rate if the dog is hot and anxious; move to shade, encourage drinking, wet mucous membranes/ear flaps/paw pads with water. Be conservative as too rapid cooling can be dangerous.
5. If medical attention is more than 8-12 hours away, do above and repeat fluids every 4-8 hours, pain medication and antibiotic according to label, keep dog as calm and cool as possible.
 - a. What NOT to do: ice, cutting/sucking wound, steroids, antihistamines.

OPTIONS FOR TRYPANOSOMIASIS (SLEEPING SICKNESS) PREVENTION AND TREATMENT

Below are general recommendations regarding Trypanosomiasis prevention and treatment. There are multiple strains of trypanosomes and different species of tsetse flies that carry the disease. Every program must identify the local diseases and parasites that put their dogs at risk, and use this information to establish a mandatory health-monitoring protocol.

The best way to deal with Trypanosomiasis is to prevent it. Insect repellent, insecticides, screens, and fans can all be used to keep dogs from being bitten by tsetse flies. Practitioners have had varying degrees of success with fly and flea collars.

It is important for handlers to become familiar with what is normal for their dog. Body checks (in which a dog's mouth, ears, toes, and lymph nodes are examined) should be conducted regularly. If there are tick- or fly- borne disease in the program area, handlers must learn the symptoms of exposure. Temperature elevation may be the best sign of illness in working dogs, who can mask other symptoms with their high energy and nerve strength.

A normal temperature for a dog is 37.9°-39.9° C (100.2°-103.8° F). In areas with fast-acting strains of Trypanosomiasis, it may be necessary to take temperatures frequently to notice a sudden elevation. If dogs are at risk, take their temperature twice a day. If a dog has an elevated temperature and slow capillary refill, **call a veterinarian immediately**. (To check capillary refill, press your finger against the dog's gum, then pull away. Watch the gum color change from pale to darker pink. If this change is slow, or the dog's gums are pale, consider this a sign of ill health.)

Some canine programs use a preventative or prophylaxis treatment drug, under the trade name, "Triquin" on a quarterly basis, injecting dogs with this canine trypanosomiasis treatment. One program believes this preventive is proving successful at keeping dogs healthy, but warns that the injection site may become irritated and ulcerate.

Some veterinarians express concern that all drugs for treating trypanosomiasis are highly toxic and the margin for error is quite small for the amount of drug to a dog's body weight. The calculation of dosages must be precise.

Drugs with trade names, 'Berenil' and 'Samorin' are used for treatment of dogs with trypanosomiasis. The time between detection and treatment must be very short, and knowledge of the dog's exact weight is essential. These drugs have proven effective, but the difference between a therapeutic and fatal dose is quite small. Note that Samorin can be irritating and depressing to some dogs and when one drug is ineffective, the other can be effective.

Work with your local veterinarian to prevent disease and have an emergency plan in place in case you suspect one of your dogs has trypanosomiasis.

HEAT AND OVERHEATING IN DOGS

Working dogs in hot temperatures can put both handlers and dogs at risk. It is very important to give dogs water often. Handlers and kennel guardians should be trained to recognize signs of overheating and know the treatment options for overheated dogs.

Clean water should always be available to dogs in their kennels.

Clean water should be offered to dogs while they are working and resting. Water bowls should be available in their crates after working. Often, a dog is too excited and hot to drink immediately after or during work, but as the dog calms down and cools down, it needs to drink water.

If dogs show signs of overheating, such as extended, wide and dark-colored tongue, the dog should immediately be taken to shade and immersed in water, or at least water poured over its feet and belly (where skin is showing). Heat exhaustion is the next stage, and the dog is likely to collapse and go into organ failure. Overheating is a serious concern, so the handlers need to know when the dogs are hot and when they are too hot.

Remember that dogs do not sweat except through their paws, so they get rid of heat through panting. Cooling down a dog quickly is important, and immersion in water is the best and quickest way to bring down its body temperature.

APPENDIX E: USING DOGS FOR CONTAINER SEARCHES

Thanks to Chris Aycock, president of American Society of Canine Trainers (ASCT) and ASCT trainers for the study summarized and reported below.

This study was conducted because canine units searching shipping containers need better information, techniques and training to accurately identify those containing wildlife contraband:

The American Society of Canine Trainers (ASCT) conducted shipping container testing for odor detection capability using trained detection dogs in October of 2014. The purpose of the test was to determine:

1. The reliability of a detection canine on shipping containers.
2. The reliability of the canine detection capability when being presented to a container seal, without seal manipulation, and with contraband inside.
3. The comparisons of the canine detection capability when the container seal is expressed, allowing gas escape, vs. non-expression.
4. The temperature changes of environment vs. detection capability.
5. Detection capability comparisons between the usages of small, handheld vacuum devices to increase air withdraw from container vs. larger, forced air devices.
6. The overall canine detection change that is apparent when the canine is detecting narcotic vs. human remains at different amounts and times stored.

The testing included two groups of ten (10) ASCT certified and proven reliable canine teams. The containers were standard ship based containers with heavy seals for weather protection. The tests were conducted on three levels: ground level container, stacked container, and third level (high) container. Both the stacked and high-level containers tested by the operator/canine team were lifted by platform to the container doors.

LOGISTICS:

- Canine teams did not have any prior information regarding what the test was designed to determine. Each canine team was tested on all six (6) testing points.
- Each team was tested on each testing point three (3) times. Each canine team had a total of eighteen (18) searches.
- No container was utilized more than once.
- Contraband-free containers were utilized in the testing.
- Canines conducted a maximum of 9 container scans per day.
- All searches were double blind (handler and facilitator were unaware of the contents).
- Due to the lack of either Rhino horn or ivory (not the number of canines properly trained to detect these odors) the facilitators determined that the containers should hold two distinct odors that express gasses at volatile rates but have different headspace products. Further, it was determined that the closest headspace odorant, behaving similar to that of the anti-poaching contraband, would be human remains.

SAMPLE AMOUNTS

All samples represented different sample amounts for both narcotic and human remains: 2 Kilo, 4 Kilo, 6 Kilo, and 10 Kilo (human remains only as narcotic amount unobtainable).

VACUUM SYSTEM SET-UP

All vacuums were utilized in the same manner in that the hose intake (2") was fit over the top of incrementally smaller PVC pipes (each length 4") until the container entry point of the hose was approximately 1/4 inch and 2 foot long.

The common filter was a 4x4 sterile medical cloth. The cloth was chosen because it is larger than the 2-inch hoses. The cloth was secured to the hose/PVC insertion point so that it would fold inward upon the PVC insertion and form a marginally tight seal.

The hose point attachment was carefully inserted into the seal of the container at different points (low middle, low right, low left, high right, high left) depending upon the temperature and sun position (insertion always made at location of most shaded seal).

The vacuum was turned on and allowed air intake for 20 minutes. Afterwards, the filter was removed, bagged, and taken to scent boxes on site where a canine team scanned clean cloths vs. container cloth. New cloths were used for every search and box searches. All boxes were all cleaned thoroughly with cleaning wipes after each search.

After the vacuum filter was removed, the hose was removed from the container and a separate canine team was brought to search the entry point where the PVC had penetrated the seal.

Vacuum Systems Used:

- HAFCOVAC - 30-gallon compressed air industrial vacuum used with both 1 1/2-inch hose and 2 inch hose
- Dust Buster
- Bissell Deluxe Handheld

FINDINGS

All of the canines detected the larger sources (6 kilo and 10 kilo) by simply scanning the seal (i.e. without having to manipulate the seal itself).

The canines were overwhelmingly successful when detecting human remains in all aspects of the searches. The narcotic teams suffered some weakness unless the seal was manipulated and even then there were remained a few weaker source alerts.

Presenting the canines to odor in the mornings and late evenings presented significant problems with detection, unless the source was large (10 kilo). However, presenting the canines during the mid-morning with sun shining on top of containers produced a significant increase in the presentable gases.

Containers that were left to bake in the sun for a full day, when canines were presented about an hour before dusk, offered the highest success for both the non-manipulated seam scans, as well as vacuum scans where the canine was allowed to simply scan the PVC tube that was detached after the vacuum was used.

The vacuums were successful if the PVC tube was inserted in the container at a more shaded spot, as opposed to the direct sun. This seems to be the result of the odor gases escaping to the least pressure of the shaded (cooler) spot of the seam.

The vacuum systems worked well when enough time was allotted (at least 20 minutes) to draw the gases. This was particularly evident during cloudy days and at night. During day/sunshine, the canine scans without manipulation of seams or with a PVC tube inserted appeared to offer just as much odor.

All participants were impressed that the compressed air vacuum system did provide more gas draw when the outside temperature was low or no sun was present. However, the unit was cumbersome and did not seem to make a marked difference during the day/sunlight searches.

There seems to be a slightly higher risk of false alerts when using filter/vacuum systems (detailed in the following section). It appears as though the cause of the false alerts has more to do with the canine becoming desperate for a reward and possibly being slightly bored with the routine of box searches.

A problem associated with vacuum systems is the dirt and dust being pulled into the filter. This was more likely at lower insertion points but also did occur when using higher insertion points. The stronger units (compressed air specifically) were more prone to this.

The cost associated with the compressed air vacuum does not warrant the difference of usage which is minor as compared with smaller vacuum systems.

ALERTS AND FALSE ALERTS

- There were a total of 360 containers searched. 260 containers were loaded with a specific measure of detection material while 100 were deemed clear of contraband odor.
- There were no false alerts on any of the containers whereby the canine directly checked the container - with the exception of handler/facilitator errors.
- Two (2) of the false alerts were unexplainable and are assumed to be canine error.
- Two (2) false alerts occurred as the canine was presented to odor boxes containing 3 clean and 1 vacuum drawn filters.
- Seventeen (17) false alerts were caused by mistakes from either the facilitator or the assistants who set the hides.
- Fifteen (15) of the false alerts were due handler cuing error.
- In total, there were thirty-six (36) total false alerts made by combined seventeen (17) canine teams.

CONCLUSION/SUGGESTION

Canine teams dedicated for odor of rhino horn, ivory and bushmeat are likely to have high success in the detection of the odors within shipping containers. Containers that are housing large amounts (≥ 6 Kg) of illegal materials will very likely result in the canine team able to detect and alert to a particular container.

For smaller amounts of illegal materials, the detection team will need to follow a set of guidelines that should apply in order to maximize the availability of odor. The following guidelines dramatically increase detection capability:

GUIDELINES:

1. The searches should be conducted mid-morning (sunny days) or just prior to dusk (exceptionally hot days).
2. The canine should be very well rested prior to the searches.
3. Temperatures of 85 degrees F and above are suitable for the canine to scan a stack of containers with significant success in isolating the odor to a few containers. The further isolation can then be conducted by utilizing the tubing, with ample success.
4. Temperatures lower than 85 degrees F will likely require an insertion of some form of tubing and an area where the gases will likely escape more forcefully.
5. All tubing inserts should sit in place for at least 1-2 hours prior to the scan.

Vacuum systems may be beneficial particularly at night or early morning but do not perform significantly above the capability of a simple inserted tubing and canine scan. When used, the vacuum should be allowed to draw for at least 20 minutes but more likely 1 hour.

APPENDIX F: DONOR GUIDELINES

Prepared by Matt Muir, USFWS.

DEFINITION OF STRATEGY

Use of domestic dogs to contribute to conservation goals by detecting and interrupting illegal wildlife harvest and/or trade.

HOW SUCCESS IS DEFINED

A conservation dog program contributes to anti-poaching and wildlife trafficking efforts by successfully detecting and interrupting illegal wildlife harvest and/or trade, leading to better law enforcement outcomes. The high-level theory of change, as illustrated below, assumes that if a functional program is established (including functional dogs, handlers, and management), and applied under appropriate working conditions where poaching and wildlife trafficking is occurring, then incidents of these threats will be successfully detected and interrupted (i.e., interdiction). Quality control, including refresher training and certification assessments, help maintain performance of dogs and handlers over time, and help programs adapt to changing conditions and challenges. Ancillary benefits, independent of better law enforcement outcomes and not shown below, include better relationships between conservation projects and local communities if dogs are perceived to strengthen overall security, and deterrence of poaching and trafficking.

THEORY OF CHANGE:

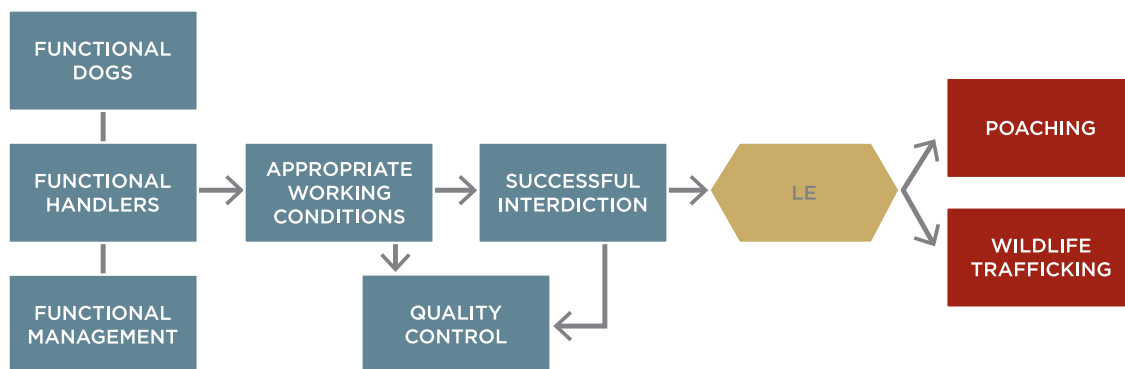


FIGURE 2: A THEORY OF CHANGE outlines how detection dog teams are expected to aid in law enforcement (LE) and consequently reduce threats to wildlife poaching and trafficking.

PRE-EXISTING CONDITIONS FOR SUCCESS

The following conditions should be considered necessary for donors to consider a funding request for conservation dogs: (1) a demonstrated project capacity for ethical handling and husbandry, (2) the capacity to commit and maintain commitment of human and financial resources to a canine project to maximize performance of dogs, handlers and operational staff for the life of the dogs; and (2) evidence that the problem and context is an appropriate use of dogs (e.g., alternative methods not as effective or efficient).

QUESTIONS FOR APPLICANTS

Once these pre-existing conditions are demonstrated, donors are encouraged to request answers to the following questions to help inform funding decisions:

Functional Dogs

- How many dogs are needed to improve conservation outcomes? Applicants should be able to provide information on how dogs will be or were selected and/or acquired, how the dogs will be trained, how the handlers will be trained and what types of continuation training are planned. Also necessarily identified are roles (i.e., detection, tracking, mixed), and anticipated work/training/rest schedule.
- [Detection dogs only] What is the target odor(s)? Applicants should be able to articulate how better odor detection will lead to better conservation outcomes, and to identify a source for training samples.
- What are the health and safety concerns for dogs in the project area? Applicants should provide information on veterinary care, dog nutrition and diet, kennel conditions, kennel staff training and how the project plans to mitigate risks to dog and handler safety while working and kenneled.

Functional Handlers

- How many handlers are needed to improve conservation outcomes? Applicants should provide information on how handlers were selected for the role, expected turnover, and capacity status and interest of existing staff to become handlers. What incentives will there be for people to become handlers? What are the limitations (religion, etc).
- Who will be training the dogs and handlers? Applicants should provide evidence of trainer qualifications, and anticipated schedule for training and refresher training.

Functional Program Management

- How will the program be overseen? Applicants should be able to articulate how handler and dog motivation be maintained over time, anticipated human resource challenges, and how issues related to corruption or poor dog health will be addressed.
- How will the maintenance costs of a dog program be supported over time? Applicant should be able to estimate running costs to ensure expectations match future needs.
- What is the relationship between the canine unit and the relevant law enforcement authority? Between the canine unit and existing project staff involved in anti-poaching or trafficking efforts? Applicant should be able to provide information on anticipated challenges, and a strategy to overcome barriers to better law enforcement outcomes.

RECOMMENDED PERFORMANCE INDICATORS

Once the questions above are answered to the donor's satisfaction, the following indicators are recommended to help monitor performance:

Functional Dogs & Handlers

- Number of working dogs and handlers (compare as percentage to numbers identified above as "needed to improve conservation outcomes")

Appropriate Working Conditions

- Average response time (hours) (including between estimated incident and arrival of canine unit to scene; and between report received by canine unit and arrival to scene)
- Percentage of crime scenes where target not intercepted (segregated by suspected cause: human and/or wildlife contamination, dog health, restricted, no or late access to scene)
- Duty cycles for the dogs are appropriate for consistent performances across time and these are stated and manipulated if dog performance suffers.
- Veterinary care is available and all staff are trained to optimize the health of the dogs.

Successful Interdiction

- Number of targets detected and intercepted (including percentage of overall incidents responded to by canine units)

Quality Control

- Percentage of functional dogs and handlers (relative to numbers acquired and trained, respectively)
- Training and deployment frequency (days per month)
- Number and percentage of dogs & handlers with current certification (including proposed certification systems, how and where teams are certified and with whom)

Improved Law Enforcement Outcomes

- Dog program is contributing to improved law enforcement outcomes [qualitative 1-5 scale: strongly agree to strongly disagree] (including why/why not, evidence used to support claim)
- Confiscations, arrests, indictments and incarcerations are recorded and tracked to see whether canine units are affecting Law Enforcement over time

For more information, please contact:
Megan Parker, PhD, Director of Research Working Dogs for Conservation
406.546.4530 megan@workingdogsforconservation.org

[Back to TOC](#)