Conservation Canines in Canada:

Roles, Welfare & Environmental Impacts

By

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Abstract

People have been employing dogs to assist with conservation work for more than a century. While the literature documents the efficacy of using dogs in these roles, the welfare and experiences of these dogs has received little attention. I explored the lives of conservation canines in Canada through two case studies. My aim was to explore the roles, welfare, and environmental impacts of conservation canines in Alberta and Ontario in order to determine whether conservation canine programs offer humane and sustainable job opportunities – those that are good for animals, humans, and the environment. I employed qualitative research methods via interviews with canine handlers and participant observations, as well as quantitative methods to assess animal welfare using an ethogram. My findings suggest that conservation roles are good for dogs because dogs showed signs of enjoyment and little stress while working, and handlers primarily used reward-based training as opposed to punishment; however, aversive stimuli are used at times, thus welfare may be at risk in some cases. These roles are also good for people as handlers seemed proud of their work and showed strong connections with their canines. Finally, they are good for the environment as they help educate the public about conservation issues, such as invasive species, and deter natural resources-related crimes, such as poaching. This assessment is based on three major frameworks: animal studies, animal welfare, and sustainability. Based on my findings, I recommend implementing more rigid guidelines for the care of working dogs in order to ensure their long-term welfare in situations where welfare might be impaired. Future research should further investigate the handlers’ experiences and environmental impacts of this work and include physiological indicators of welfare. Other case studies should also be explored in order to provide a more complete representation of conservation canine programs and the extent to which they might be humane and sustainable.
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Chapter 1: Introduction & Rationale

The aim of this research is to explore the roles, welfare, and environmental impacts of conservation canines in Alberta and Ontario in order to determine whether conservation canine programs offer humane and sustainable job opportunities – those that are good for animals, humans, and the environment. I begin by discussing how animals were first domesticated, touching on the ways in which humans have used animals for various forms of labour for centuries. After explaining why dogs are significant in human history, I provide a summary of how the literature reflects dog labour to date; namely: the selection criteria used for working dogs, the benefits they offer humans, and the welfare of dogs in service and military roles. I then elaborate on the work dogs do for conservation, explaining that within the current literature there is a lack of scholarship focused on the experiences and welfare of dogs working in conservation industries, as well as their handlers’ experiences and the environmental impacts of their work – thus providing the rationale for my research. I conclude this chapter by outlining my research questions and explaining how the remainder of the thesis proceeds.

Domestication & Animal Labour

Humans and animals have a long history of interaction – as Susan Nance suggests, “There has never been any purely human space in world history” (Nance 2013, p. 7). Theories as to how animals were first domesticated are still under contention. The domestication of dogs, which occurred as long as 30,000 years ago (Thalmann et al. 2013), is particularly interesting as dogs are thought to have been the first animal ever domesticated (Larson & Fuller 2014). Francis Galton’s (1907) ethnographic research suggested that hunter-gatherer groups worldwide captured and nurtured wolf puppies to keep as pets, eventually resulting in the domestication of dogs. Some scientists do not believe this explanation is sufficient to explain the phenomenon (Serpell
1989), though many researchers agree that the variation in traits between wild and domestic animals was a result of human intent (Larson & Fuller 2014).

On the other hand, researchers like Morey (1994) and Coppinger & Coppinger (2001) argue that domestication of wolves was unlikely to have resulted from explicit human planning. They speculate that during the Mesolithic period, wolves scavenged for scraps around human settlements, and that tamer wolves were more likely to reproduce with other tame individuals in close proximity to humans. Then, through natural selection for docility, these wolves adapted to live in symbiosis with humans, a phenomenon which occurred around the globe (Price 2002). Manwell & Baker (1984) further speculate that while humans did not purposely domesticate wolves, they did have a greater interest in certain individuals with desirable traits such as coloration, companionship, hunting ability, and protection, which eventually resulted in the domestic dog. Moreover, to prove that domestication could have occurred without human intent, researcher Dmitry Belyaev conducted studies in the 1950s with a captive silver fox population over forty years, breeding one group of foxes randomly, and selecting for low aggression in another group. Ultimately, in the low-fear group, Belyaev produced foxes that possessed morphological traits that were never seen in wild foxes and were never directly selected for (Larson & Fuller 2014; Trut 1999; Trut et al. 2009). Regardless of which theory of domestication is accurate, the process was not sudden but gradual (Price 2002).

Humans have since benefited from the domestication of animals in many ways, including via the provision of protection, food, clothing, and companionship (Manwell & Baker 1984; Price 2002). Livestock domestication occurred simultaneously with the development of agriculture-based societies 10,000 years ago. At that time, cattle, sheep, and goats were domesticated in the Near East (Troy et al. 2001), while domestication of pigs occurred in Europe
and Asia approximately 9,000 years ago. Llamas and alpacas were domesticated about 6,000 years ago in South America (Wheeler 1995), and horse domestication occurred in the Ukraine around the same time, mainly for meat and transportation (Anthony et al. 1991). Rodents, such as guinea pigs, were also domesticated for their meat and for clothing, approximately 3,000-4,000 years ago (Kyle 1987; Weir 1974). Many other animals have been domesticated over the years, including mice, when their utility in scientific research was discovered in 1664 (Festing & Lovell 1981), as well as silkworms used for both silk and food in China, dating as far back as 2500 BC (Hamamura 2001).

Today, humans benefit from domesticated animals in many ways. For example, the livestock sector employs at least 1.3 billion people globally and directly supports the livelihoods of 600 million impoverished people worldwide (Thornton et al. 2006). A variety of animals, including pigeons, elephants, and horses, have performed tasks for humans during wars (Hediger 2012; Nocella et al. 2013). Some anthropologists argue that domestication resulted in the downfall of many species who would have been better off without human intervention (Nibert 2013). Other researchers claim that the co-mingling between humans and animals – dogs specifically – shaped each party profoundly (McCabe 2010), and even enabled Homo sapiens to evolve and persist; whereas Neanderthals, without the company of other animals close by, died off (Shipman 2011). Indeed, domestication can allow both parties to benefit – humans by receiving goods and services from animals, and animals by receiving care and protection from humans (Budiansky 1994; Budiansky 1999; Rindos 1980); however, it is clear that in some scenarios, the relationship is not symbiotic – for example, for animals who are treated inhumanely.
Humans’ history of using domesticated animals has always involved putting animals to work in one way or another – whether they were employed to transport materials and goods, transport people, provide protection, or supply their own products and flesh (Hribal 2003; Manwell & Baker 1984). Today, the relationship between animals and work can be considered in terms of work done for, by, and with animals (Coulter 2016). Work done for animals includes shelter and advocacy work performed by humans in the interests of animals. Work done by animals includes subsistence work, such as avoiding predators and searching for food; as well as work in agricultural settings, where animals work to produce goods for human consumption, or in some cases protect livestock. Finally, work performed by animals with humans includes roles in service, military, health, entertainment, agriculture, law enforcement, and conservation (Coulter 2016). Given the historically significant relationship between humans and dogs as described above, it is no surprise that dogs play a key role in humans’ lives as workers. We see dogs performing work alongside humans in various capacities – both emotionally (e.g. therapy dogs) and manually (e.g. search and rescue dogs) (Coulter 2016). In the following review I outline how working dogs have been discussed in the scholarly literature to date.

**Dog Labour**

Dogs perform various tasks for humans all over the world – in fact, documented cases date as far back as ancient Rome (Fishman 2003). Dogs have historically been used for protection and hunting, and eventually for herding livestock (Chestley & Whiting 2015; Manwell & Baker 1984). Today, dogs can be found in assistance roles all over the world, including in Australia, New Zealand, Japan, the UK, Spain, Germany, Switzerland, Sweden, Norway, the US, and Canada, among others (ADI 2018; Audrestch et al. 2015). The main types of assistance dogs are guide dogs for the blind, hearing dogs for the deaf, and mobility assistance dogs (Audrestch
et al. 2015). Guide dogs offer increased mobility for the visually impaired by leading them around obstacles and aiding them to arrive at their destination. This job is thought to be more difficult than other assistance dog roles as these dogs must learn to avoid objects that their owner may encounter even though the dog might not – for example, objects at a greater height (Whitmarsh 2005). Hearing dogs are trained to alert hearing-impaired individuals to various sounds, such as fire alarms, doorbells, and telephones, by nudging their owner with their paw or nose, and subsequently leading their owner to the source (Audrestch et al. 2015). Mobility assistance dogs allow individuals with mobility impairments to move around more easily by opening doors, turning on lights, and retrieving objects for their owners (Audrestch et al. 2015). In addition to guide, hearing, and mobility assistance dogs, service dogs also assist people who have seizures and/or epilepsy, and provide emotional support for individuals with mental health disorders (e.g. PTSD, depression), individuals undergoing psychological therapy (Lefkowitz et al. 2005; Stefanini et al. 2015), and individuals with autism (ADI 2018; Burrows et al. 2008b; LFC 2011).

Another common area in which dogs perform work for humans is in the military. Military dogs have been employed across the globe for centuries, with evidence of their use dating as far back as 4,000 BC (Kistler 2011). In 2014, an estimated 2,800 military working dogs served the US armed forces worldwide (Cruse 2014). Military working dogs are used for a variety of tasks, including sentry, messenger, and scout/patrol duties, as well as explosives and narcotics detection (Cruse 2014; Sinn et al. 2010). In fact, military working dogs are currently the most effective and versatile means of identifying explosives (Sinn et al. 2010). Despite the key role dogs play in the military, Cruse (2014) explains that the U.S. Armed Forces classifies military dogs legally as “equipment”. Cruse maintains that her preferred term “canine members” offers a
more accurate representation of dogs’ role and dedication in the army, and argues that given their circumstances, retired military dogs deserve to be provided with federally funded medical care to treat both physical and emotional injuries resulting from their work, just as people are afforded.

In the literature, service and military dogs have been explored in terms of their selection criteria (based on behavioural and physical traits), the benefits they offer humans, and their welfare. Because the average dropout rate for dogs selected for training for various roles is approximately 50% (Weiss 2002), many studies have sought to improve service and military dog selection and success by investigating dog behaviour and temperament. For example, Gazzano et al. (2008) assessed the behaviour of puppies in training to become guide dogs via participant questionnaires. The 80-item questionnaire was delivered to families who were fostering at least one puppy in training, and asked about their dogs’ behaviour. While the dogs’ success was not assessed later, the rationale for the study was that puppy walkers might be able to contribute to early identification of potential behavioural issues, which are a major reason for excluding dogs from the program. The results of this study led the authors to recommend that when necessary, puppy-walkers should intervene at the onset of undesirable behaviours, to decrease the number of dogs disqualified from the program, as well as decreasing the costs associated with rearing and training those dogs who do not end up making it through the program (Gazzano et al. 2008).

As another example of working dog selection in the literature, Foyer et al. (2016) were interested in identifying dogs that react favourably to potentially threatening situations, in order to determine which dogs would be the most appropriate candidates to become military and/or police dogs. They reasoned that, since military and police dogs are often exposed to stressful situations, an inappropriate response such as exhibiting fear could lead to reduced working efficiency and welfare. To assess dogs’ behaviour, the researchers analyzed video recordings of
the dogs’ behavioural responses to the standardized selection test used by the military. They also measured pre- and post-test salivary cortisol levels to determine stress (cortisol is a recognized biochemical marker of stress in dogs). The researchers found that, contrary to their hypothesis, dogs who were approved for future training as military working dogs exhibited greater emotionality and fear-related behaviours and had higher salivary cortisol levels both before and after testing, compared to nonapproved dogs. The explanation for this discrepancy was that selection tests might systematically misinterpret reactions of dogs or that there may be a bias in the selection procedure (Foyer et al. 2016).

Similarly, Haverbeke et al. (2009) investigated the causes of undesired aggression in military working dogs. The results showed that most dogs reacted to potentially aggression-inducing stimuli with aggressive behaviours (e.g. biting), but because these behaviours often occurred simultaneously with lowered posture, the researchers concluded that dogs responded to the test with fear-related aggression. Because fear-related aggression is a major cause of dog attacks (Borchelt 1983) and fearful behaviour is a major reason for working dog failures, it is an undesirable trait in working dogs as these behaviours can reduce efficiency, safety, and welfare (Foyer et al. 2016; Haverbeke et al. 2010; Rooney et al. 2016; Seiferle & Leonhardt 1984). The researchers concluded that measures must be taken to avoid this undesirable trait in working dogs (Haverbeke et al. 2009).

In addition to these studies, others have assessed the reliability of tests used to determine the suitability of dogs for service (Weiss 2002) and military (McGarrity et al. 2016; Sinn et al. 2010) roles based on behavioural traits. Each of the studies outlined in this section had an end goal of improving working dog selection procedures in order to improve success rates of selected individuals (Haverbeke et al. 2009), thereby saving staff and monetary resources required for
training and housing the dogs (Gazzano et al. 2008; Rooney et al. 2016) and increasing the number of people able to benefit from these dogs (Weiss 2002).

The apparent benefits to humans are one of the most common topics of focus in the literature on working dogs, as guide dogs are known to aid people with disabilities by providing independence, enhancing mobility, and improving self-esteem (Weiss 2002). For example, Stefanini et al. (2015) set out to determine the effectiveness of Animal-Assisted Therapy using dogs in child and adolescent psychiatric inpatients. They used clinical and observational methods to assess changes in patients over time. Patients in the treatment group, who underwent Animal-Assisted Therapy with dogs, showed a significant increase in global functioning, reduction in time spent in hospital, and increase in ordinary school attendance compared with control group patients. In addition, patients who underwent Animal-Assisted Therapy showed significant changes in social participation and interaction skills with adults and peers, more active and frequent interactions with their assistance dog, and more affective (emotional) behaviours towards the dog. The researchers reasoned that dogs in Animal-Assisted Therapy act as a catalyst in the therapeutic process, creating a more relaxed environment. More research is required to further explore the relationship between patients and animals in Animal-Assisted Therapy (Stefanini et al. 2015).

As another example demonstrating the benefits that guide dogs offer humans, Burrows et al. (2008b) investigated the ability of service dogs to improve quality of life for families with autistic children, as well as for the autistic child. Through participant observations, video recordings of family-parent-dog interactions, and semi-structured interviews with parents, they found that families and parents of the autistic children benefited from the dog’s presence through an increase in family outings, a sense of security at home and in public, and an increase in
positive social acknowledgment. For many parents, the service dog effectively alleviated stress associated with raising a child with autism, as the dog’s presence was calming for the child, and prevented the child from having tantrums and running away. Finally, the dogs provided companionship, and even assisted with the development of the children’s fine motor skills. Overall, they found an improvement in the quality of life for both the autistic children as well as their families (Burrows et al. 2008b).

Similarly, Collins et al. (2006) set out to determine whether service dogs influenced the psychosocial well-being and community participation of adults with mobility impairments. Results from participant questionnaires showed that individuals with progressive disabilities who were partnered with service dogs had more positive affect (feelings/emotions) than those without service dogs. They also found that individuals with depression benefited more from the presence of the service dog than others, as the dog seemed to improve their mood. Overall, individuals with disabilities showed an improvement in psychosocial well-being as a result of the presence of service dogs; however, further research is required to determine whether a companion dog could provide the same results as a service dog (Collins et al. 2006).

Finally, Lane et al. (1998) conducted a study to assess the nature and extent of benefits a service dog may provide to individuals with disabilities via participant questionnaires. Questionnaires assessed four dimensions: the dog as a social facilitator, the dog as an affectionate relationship (extending beyond a working relationship), the dog as an emotional and self-esteem support, and the dog as an influence on self-perceived physical health. Participants reported an increased sense of social integration, enhancement to self-perceived health, and an affectionate and supportive relationship with their dog. While the authors discussed the importance of having a good relationship between humans and their service dog as it can ensure
that the dog receives adequate care, the study did not find any evidence of concern over service dogs’ welfare (Lane et al. 1998).

In addition to these studies which assessed the benefits working dogs provide for humans, other studies were concerned with improving the way dogs do work for humans. For example, studies that set out to improve the selection procedures for military and service dogs as outlined under Selection in this chapter, are mainly concerned with producing more effective canine workers and reducing costs (Foyer et al. 2016; Gazzano et al. 2008; Haverbeke et al. 2009; McGarrity et al. 2016; Sinn et al. 2010, Weiss 2002). More recently, researchers have investigated the use of Animal-Computer Interaction to facilitate communication between working dogs and their handlers (Byrne et al. 2017). Each of the studies outlined in this section focuses on how working dogs can simplify and/or improve life for humans, but they do not thoroughly – or in some cases, even remotely – touch on the dogs’ experiences.

Some studies have recognized the lack of acknowledgment of working dog welfare in the literature (Glenk et al. 2013; Serpell et al. 2010; Shubert 2012) and reported concerns that service dogs may not get to act like “normal” dogs due to their duties as workers (Yamamoto et al. 2015). For those reasons, some researchers have explored service and military dog welfare. For instance, Yamamoto et al. (2015) set out to determine how the welfare of guide dogs ranked in comparison to the welfare of companion dogs. They conducted a questionnaire consisting of four parts: demographics, participants’ walking activity and interaction with their dog, affection for the dog and whether the dog reduced humans’ discomfort in public, and the dog’s physical activity and interaction with other people and dogs. Results showed that many guide dogs have more optimal physical activity and social interactions than companion dogs, implying they have adequate if not superior welfare compared to companion dogs (Yamamoto et al. 2015).
Moreover, Burrows et al. (2008a) investigated the welfare of service dogs trained to support children with autism. They collected data via semi-structured and open-ended interviews with the autistic children’s parents, and subsequently follow-up interviews were conducted, in addition to observational data collection. The most commonly observed and reported physical welfare concerns included: inadequate time to urinate and defecate, being in the jacket (dog’s uniform) for long periods of time, and unprovoked negative attention from the child. In addition, they noted that it can be mentally and emotionally difficult for the dogs to receive mixed social signals from the child, as well as the fact that dogs are required to bond with the child but respond to commands from the parents. The authors concluded that studies of working dogs must acknowledge the impact of the work on the dogs, rather than solely focusing on the benefits to humans (Burrows et al. 2008a).

Furthermore, Lefebvre et al. (2007) investigated the relationship between military dogs and their handlers to determine the effects of their relationship on the efficiency and welfare of the dog. They used questionnaires filled out by military dog handlers, which asked about the dog-handler relationship and the handler’s perception of their dog’s behaviour and personality. They found that dogs who lived at their handler’s home and with whom the handler practiced sport presented fewer behaviours indicative of reduced welfare as opposed to dogs who were left in a kennel and with whom handlers did not practice sport. Additionally, suspicion of previous rough handling was associated with reduced obedience. The authors concluded that their results were consistent with other studies’ findings that the amount of time humans spend with their dogs can enhance dogs’ welfare (Lefebvre et al. 2007).

Finally, Glenk et al. (2013) evaluated the physiological and behavioural effects of Animal-Assisted Interventions on therapy dogs. They measured salivary cortisol of dogs at
home, as well as pre- and post-therapy sessions, and analyzed video recordings of dog movements and behaviours in order to determine stress levels. Results indicated that the salivary cortisol levels of dogs used in Animal-Assisted Interventions do not increase while working, but that dogs working off-lead showed significantly lower levels of salivary cortisol than those on-lead. And finally, video analyses did not indicate any welfare concerns for dogs used in Animal-Assisted Interventions (Glenk et al. 2013).

In addition to these studies of working dog welfare, some research has discussed how breeding and training practices can influence working dog welfare. Jeppsson (2016) pointed to the importance of selecting dogs who possess ideal traits for certain types of work as it can influence their welfare – for example, employing a dog with a high ball drive (high motivation to work for a reward) but who is heavier and experiences heat sensitivity can lead to reduced welfare when working outdoors (Jeppsson 2016). Furthermore, Jeppsson (2014) reported that there were no welfare concerns with regard to the breeding practices of good working dogs, as a breeder will typically be interested in producing a physically healthy dog if they are hoping to produce a “good” working dog. She did state that certain training methods can lead to reduced welfare, which is discussed below.

Traditional training methods involve the use of positive punishment, which refers to the application of an aversive stimulus in order to decrease undesirable behaviours (Haverbeke et al. 2008; Salgirli et al. 2012). For example, many police dogs and other working dogs are trained using electronic shock collars (e-collars) (Schalke et al. 2007; Schilder & van der Borg 2004). E-collars are worn around the dog’s neck, and consist of a battery and electrodes, paired with a remote control through which the trainer can deliver shocks of various durations and intensities to the dog (Schilder & van der Borg 2004). The use of e-collars is a controversial topic,
some literature suggesting that their use can cause pain and injury, can cause behavioural problems, is unethical, and is unnecessary regardless of the severity of the training situation or problematic behaviour (BSAVA 2003; Beerda et al. 1998; Hiby et al. 2004; Overall 2007; Schilder & van der Borg 2004). Some researchers even found that, in addition to the pain and fear caused by electric shocks and thus acute welfare concerns, dogs associated the presence of their handler with being shocked, resulting in long-term welfare concerns (Schilder & van der Borg 2004). Additionally, Schalke et al. (2007) evaluated the effects of e-collars on dogs in training sessions, and found that poor timing of the application of electric shocks caused insecurity and extreme anxiety, threatening dogs’ long-term welfare. On the other hand, some researchers argue that e-collars are safer than mechanical aids such as choke chains (Klein 2003; Lindsay et al. 2005), or that they have no adverse effects at all (Christiansen et al. 2001; Klein 2000). Similarly, Salgirli et al. (2012) found that e-collars induced less stress in dogs compared to pinch collars and the quitting signal (a form of negative punishment in which a reward is removed to decrease undesirable behaviour). They concluded that an important consideration in determining the safety and humaneness of training aids is the level of qualification of the trainer. Despite these welfare concerns, the use of e-collars is still prevalent in dog training industries today, and there are currently no guidelines for their use in Canada – though they are banned in nine European countries and three Australian states (Lysons 2015). To sum up, each of the studies outlined in this section is concerned with the welfare of service and military dogs or general dog training methods; however, the welfare of dogs performing other types of work, and associated training methods, such as in conservation roles is not addressed.
Conservation Canines

Conservation canines (CK9s) can be defined as detection dogs that are trained to assist biologists and conservationists with environmental and wildlife research (AEP 2016b; CC 2018a; WD4C 2015b). People have been employing dogs to assist with conservation work for more than a century (Reed et al. 2011; Zwickel 1980). Today, dogs can be found working for conservation all over the world, through programs such as the University of Washington’s Conservation Canines (CC 2018a; UW 2018), Working Dogs for Conservation (WD4C 2015b), the New Zealand Department of Conservation (DOCGNZ n.d.), the African Wildlife Foundation (AWF n.d.), New Hampshire Fish and Game (NHFG n.d.), and Cheetah Conservation Botswana (CCB n.d.), among others. The current literature reflects dogs as a useful tool for field biologists due to their scent detection abilities. Detection dogs have been employed to help locate various species, including reptiles (Cablk and Heaton 2006; Savidge et al. 2010), birds (Robertson and Fraser 2009), mammals (Gsell et al. 2010; Reindl-Thompson et al. 2006), and plants (Goodwin et al. 2010). Moreover, dogs have been employed to help locate the scat of various animals, including gorillas (Arandjelovic et al. 2015), black bears (Beckmann et al. 2015; Long et al. 2007; Wasser et al. 2004), grizzly bears (Beckmann et al. 2015; Wasser et al. 2004), cougars (Davidson et al. 2014), tigers (Kerley 2010), rhinoceros (Brook et al. 2012), koalas (Cristescu et al. 2015), deer (Oliveira et al. 2012), Indian mongoose (Fukuhara et al. 2010), kit foxes (Smith et al. 2003), bobcats (Harrison 2006; Long et al. 2007), fishers (Long et al. 2007), bats (Chambers et al. 2015), and right whales (Rolland et al. 2006), in order to assist with population size and range estimates. Dogs have also been trained to locate carcasses (Arnett 2006; Homan et al. 2001; Mathews et al. 2013; Paula et al. 2011) and detect other animals’ scent trails (Akenson et al. 2004).
Some studies have assessed the efficacy of utilizing dogs for certain field tasks. For example, DeMatteo et al. (2014) evaluated whether scat detection dogs could effectively survey for jaguars, pumas, ocelots, and oncillas. They determined that scat detection dogs, in combination with genetic analyses of scat, was an effective non-invasive method of surveying population data for multiple species. Reed et al. (2011) also conducted a study to determine how dogs’ success at detecting scat was affected by the distance of scat from a transect search line, as well as by six environmental factors: air temperature, vapour pressure, wind speed, wind variability, relative humidity, and precipitation. They found that scat detection rates declined with distance from the transect line, and that of the six environmental factors examined, only precipitation played a major role in affecting dogs’ ability to detect scat. Dogs’ detection rates increased as scat began to accumulate following the last substantial rain event of the year.

Other researchers have compared the detection rates of dogs with humans. Smith et al. (2001) compared the ability of detection dogs versus humans at locating kit fox scats. In their study, dogs found four times as many scats as experienced humans searching visually. Oliveira et al. (2012) evaluated the ability of a scat detection dog to locate deer feces compared to humans. The dog detected 29% of experimental fecal samples, while humans did not detect any fecal samples. They concluded that scat detection dogs are an underexploited resource for non-invasive sampling. Lastly, Heaton et al. (2008) were concerned that use of wildlife detection dogs might attract predators to search areas, increase risk of predation on target species (in their case, desert tortoises), and alter movement patterns of desert tortoises. They compared the use of detection dogs with human surveyors and found no significant effects for their concerns by using detection dogs as opposed to humans, implying that detection dogs are an appropriate alternative for conducting wildlife surveys.
Furthermore, some studies have compared the efficiency of using detection dogs versus equipment to survey wildlife. Harrison (2006) compared the detection rate, cost, and time required to survey for bobcats by automatic cameras, hair-snares, scent stations, and a detection dog. He found that the dog detected nearly ten times the number of bobcats as the other methods combined. He also found that the dog was the most expensive method and often required more time in the field than other methods, but that the detection dog only required one visit to each site, while other methods require multiple visits. Moreover, Duggan et al. (2011) compared the effectiveness and cost of live-trapping versus detection dog-handler teams for distribution surveys of a cryptic rodent. They found that the main advantage of using detection dogs was that about twice as many sites could be surveyed in a field season versus standard live-trapping protocols, at only a slightly greater cost. Finally, Long et al. (2007) compared the abilities of scat detection dogs, remote cameras, and hair-snares to survey for black bears, fishers, and bobcats. Detection dogs yielded the highest raw detection rate and probability of detection for each species, as well as the greatest number of unique detections (occasions when other methods did not detect the target). They concluded that while the cost of surveying with scat detection dogs was higher than that of remote cameras and hair-snares, the efficiency of using detection dogs rendered it the most cost-effective method of surveying wildlife.

In addition to these studies, some research has explored the preferred physical, psychological, and social traits for dogs working in conservation. For example, some researchers highlight the importance of tactile nerve strength due to the variable nature of search environments in conservation work. They also emphasize the importance of a high play/food drive so that the dogs are consistently motivated to work for their reward (Beebe et al. 2016; Hurt & Smith 2009; Rolland et al. 2006).
As rationale for employing dogs for conservation aside from their superior olfactory senses, some organizations boast their adopting of “unwanted” shelter dogs to be trained for these positions. Dogs with high energy and play drive are often unsuitable as family pets as they have too much energy and end up waiting to be adopted for longer periods of time, or are adopted and subsequently re-abandoned (Beebe et al. 2016; Miller et al. 1996; Shubert 2012). Conservation organizations that employ shelter dogs for their work argue that they are not only saving the planet through their environmental work, but also saving dogs’ lives (CC 2018b; WD4C 2015a). Unfortunately, as Hurt & Smith (2009) report, failure rates of dogs who are selected from shelters for roles in conservation are substantial: only one in 200-300 shelter dogs exhibit the degree of play drive necessary to be selected; of those, only 40% make it through training. On the bright side, dogs who are chosen are given a second chance at life, as these positions in conservation provide them with a purpose and a home (CC 2018b; Hurt & Smith 2009). Furthermore, Coulter (2016) argues that these roles may reflect “humane jobs”, wherein the animals and humans involved are happy and healthy, by arguing that conservation duties comprise work that dogs “naturally” enjoy doing, such as searching. The notion of humane jobs offers a conceptual foundation for this research, and is elucidated in Chapter 2.

In Canada specifically, dogs perform a variety of jobs in the field of conservation. The following information was gathered via key informant interviews as part of this research. In Alberta, dogs are employed to assist with invasive species detection with the Government of Alberta Environment and Parks (AEP) division. Their primary function is to detect mussels on watercrafts at inspection stations, but recently their team has begun exploring the dogs’ ability to detect *Thesium arvense*, an invasive weed currently found in one provincial park in Alberta. Other projects and specific targets may be considered in the future. Alberta also currently
employs one Karelian bear dog who assists a Fish & Wildlife Officer with bear aversion in certain neighbourhoods and parks. In Ontario, Manitoba, and Saskatchewan, dogs are employed as enforcement units for natural resource protection branches of the provincial governments, such as Ontario’s Ministry of Natural Resources & Forestry (MNRF), working alongside conservation officers. These dogs are typically trained to detect the odour of gunpowder, in order to assist with evidence recovery for crimes like poaching. British Columbia (BC) has two different conservation canine programs currently in place. One team works with two canine units to help track and protect against “problem” cougars in the area (typically those who have attacked livestock or posed a threat to the local community). These cougars are considered dangerous to nearby farms and neighbourhoods and are thus subsequently killed to prevent them from posing any future threats to locals. The team is looking into adding two more canine units to assist with these initiatives. BC has also recently added a canine, Kilo, to their Ministry of Environment team to assist with invasive mussel detection at inspection stations, similar to Alberta’s team. Kilo is employed more so as an enforcement dog, and unlike the Alberta canines, can also serve in court cases for evidence recovery. In 2015, Quebec employed two dogs to help detect wood turtle nests. This program greatly assisted field biologists with their population estimates, but lasted only for as long as it was funded and did not continue past the 2015 field season. Other provinces, such as New Brunswick, also employ dogs with conservation issues being their secondary tasks. These dogs are trained to RCMP standards and typically work with police, but if ever necessary, they can be deployed to search for evidence of poaching or other conservation-related issues (in the same way they might search for evidence in a police investigation unrelated to conservation). Because Alberta and Ontario currently have the largest conservation canine teams in Canada, and due to proximity and willingness of participants as
well as the variety of activities performed by each team, Alberta’s AEP team and Ontario’s MNRF team were chosen as case studies for this research.

**Research Aim & Questions**

It is evident that people benefit by employing dogs for conservation work – but is this relationship symbiotic? The current literature emphasizes the utility of dogs in conservation work due to their superior olfactory capabilities. But while dogs working in service and military positions have been investigated for their welfare in these roles, very little research has examined the experiences and welfare of dogs working in conservation roles. And while we know that humans can benefit from the efficiency of using dogs in conservation work, the individual experiences of handlers in these roles are underexplored, as are the environmental impacts of this work.

My aim was thus to explore in-depth the lives of conservation canines in Alberta and Ontario in terms of their roles, welfare, and environmental impacts in order to assess the extent to which conservation canine roles offer humane and sustainable job opportunities – those that are good for dogs, humans, and the environment. I addressed this aim by answering the following questions:

1. What work are canines doing for conservation in Alberta and Ontario, and why?
2. How are these dogs selected, bred, and trained for this work?
3. With which legal and/or policy mandates must these programmes comply, if any?
4. What is the welfare status of conservation canines as a result of this work?
5. How do the handlers perceive their work?
6. What are the positive and/or negative environmental impacts of this work?

7. What steps should be taken next to improve the lives of conservation canines in Alberta and Ontario?

By exploring these questions, I provide an in-depth description of dogs working for conservation in Alberta and Ontario and address my research aim: to determine whether conservation canines offer a role that is good for animals, humans, and the environment.

This thesis is organized as follows: following from Chapter 1, in which I have introduced the topics that inform this research and identified the gaps in the literature on conservation canines and thus the rationale for this research, Chapter 2 reviews the conceptual framework. The framework provides the literary basis for this research, including an overview of the animal rights literature; animal studies concepts, including interspecies solidarity and how that might be achieved through the creation and preservation of humane jobs; animal welfare science literature, in particular dog welfare and how it has been assessed in previous studies; and finally, the idea of sustainability, and how the One Welfare model includes an environmental component, which can help achieve sustainable animal labour. Chapter 3 outlines the methodology employed throughout this research, explaining how animal welfare science techniques and qualitative research methods were combined to conduct this research. Chapter 4 details the key findings for each major case study, including a thorough description of each study site and raw answers to research questions 1-6. In Chapter 5, I summarize my findings, comparing and contrasting the two case studies, and discuss the significance of the research findings in relation to three major frameworks: animal studies, animal welfare science, and sustainability. I close with
recommendations to improve the lives of conservation canines in Canada (addressing research question 7), as well as identifying the limitations of this study and areas for future research.
Chapter 2: Conceptual Framework

Chapter 2 offers an overview of the scholarship in which this research is grounded. I begin with a brief summary of the animal ethics literature to establish the broad philosophical literature and schools of thought that provided inspiration. I then provide an overview of three central frameworks that I engage in this work. First, the animal studies perspective, drawing on the idea of ‘humane jobs’ – those in which the animals and humans involved are happy and healthy. Second, animal welfare science theories and practices – specifically the Five Freedoms as well as empirical assessments of dog welfare, which provided the foundation for the welfare assessment protocol in this research. Finally, I incorporate the concept of sustainability, explaining how the One Welfare model adds an environmental component to the humane jobs concept, and can help to achieve sustainable animal labour.

Animal Ethics

The animal rights movement is thought to have begun in the early 19th century, with the establishment of the Society for the Prevention of Cruelty to Animals (SPCA), concerned namely with urban work horse treatment (Beers 2006; Hribal 2003; Kirkby 2012; Wrenn 2014). The recognition of the hardship of work horses was further exposed with the publishing of the novel Black Beauty in 1877 (Wrenn 2014). Around that time, animal activists were recognizing the similarities between the treatment of slaves and animals. As Wrenn (2014) puts it,

Antislavery mobilization inspired and validated human activists in applying natural rights to other species. The subhuman label and property status given to slaves justified their unequal treatment, and this had important implications for nonhumans as well.
Many critics argue against the comparison of the plight of African Americans with the circumstances of animals, maintaining that these comparisons are racist and insulting towards African Americans. This stems from both feelings that the level of suffering is incomparable, but also as a result of a contentious history of African Americans being compared to animals (Kim 2011; Wrenn 2014). Still, proponents of this comparison argue that those who disagree with or are offended by the analogy are speciesist, in that they are only uncomfortable as a result of their feelings of superiority over animals (Wrenn 2014).

The women’s rights movement is yet another social movement with which links can be drawn to animal rights activism (Hovorka 2015). Many feminists also reject comparisons between women and animals because the oppression of women has been historically justified by likening women to animals, a supposedly lower class of beings (Adams & Donovan 1995; Birke 1991; Gaarder 2011). Furthermore, some feminists worry that a focus on animals might divert attention from pressing human concerns such as violence against women, poverty, and racism (Adams & Donovan 1995; Gaard 1993). Resisting these objections, ecofeminists believe that there are significant links between the oppression of women, animals, and the environment that must be acknowledged (Gaarder 2011). Ecofeminism brings to light the patriarchal thoughts that identify women as being closer to nature and men as closer to culture. Because most Western societies view nature as inferior to culture, this contrast serves to condone the oppression of women, animals, and the environment (Gaarder 2011; Merchant 1989). For example, as women are likened to animals, meat-eating thrives in a society that reduces animals – and thus women – as objects to be consumed (Adams 1990). By positioning animals as a focal point, ecofeminists and feminist political ecologists have drawn links between the oppression of various groups.
resulting from sexism and speciesism, and advocated against the suffering of animals (Gaard 2012; Hovorka 2015).

Given these disputes, it is important to understand the philosophical theories and schools of thought that inform animal rights movements. Philosophers play a major role in exploring the status of animals and their relative position to humans (SEP 2017). The animal rights movement is largely grounded in the science of animal sentience (Proctor 2012). Sentience refers to an animal’s ability to experience pleasurable feelings such as joy, and unpleasant emotions such as pain and fear (Broom 2007; Proctor 2012). Studies have shown that certain animals can experience intricate emotions, including grief and empathy (Douglas-Hamilton et al. 2006; Langford et al. 2006). Thus, many people believe that if an animal is sentient, it can experience suffering, which implies it deserves moral consideration, or has the ability to be wronged (Bernstein 1998; SEP 2017). This concept is illustrated in the famous words of philosopher Jeremy Bentham (1823): “The question is not, can they reason? Nor, can they talk? But, can they suffer?” Because animals are incapable of communicating their feelings with humans in our languages, we must make an effort to understand animals, and use our own judgments to determine an animal’s emotional state (Coulter 2016, p. 99; Wrenn 2014).

The animal rights movement is divided into two main factions: animal rights liberationists (or abolitionists) and utilitarian liberationists (or welfare reformists). Tom Regan is an American philosopher who developed the theory of animal rights. He believes that animals have beliefs, desires, memories, and emotions, all of which affords them inherent worth. This inherent worth implies that they must possess rights – most importantly, the right to respect. Therefore, animal rights liberationists are considered abolitionist – they advocate for the complete liberation of animals from human ownership and control, which prohibits: the
consumption of meat or animal by-products, hunting (whether for consumption, sport, or conservation), experimentation on animals, and the keeping of animals as pets (Michalski 2016; Munro 2012; Regan 1983; Sandøe and Christiansen 2008; Wrenn 2014).

On the other hand, utilitarian liberationists believe that because animals are capable of suffering, their preferences must be taken into consideration – but that does not necessarily prohibit their use or our interaction with them (Cochrane 2009). Peter Singer is the most renowned proponent of this view. Singer (1975) argues that because animals are not self-aware, they are incapable of expressing their desire to continue living. It is therefore acceptable to kill animals for food under the following conditions: they have a good life in which all of their needs and preferences have been met, they are replaced by other animals who then have a chance at a good life, and they can die painlessly without suffering. Singer believes that modern farming methods do not allow these criteria to be fulfilled, and thus opposes the consumption of animals. Utilitarian liberationists can be considered welfare reformists in that they accept the use of animals under certain conditions – namely if the benefits outweigh the consequences. Proponents of this view seek the development of new policies and technologies to reduce animal suffering and create more humane environments in which humans and animals can interact (Guither 1998; Sandøe and Christiansen 2008; Singer 1975; Wrenn 2014).

This thesis necessarily takes the position of welfare reformist, despite the controversy surrounding each side (Wrenn 2014). Abolitionism can be considered “safe” in that it simply ignores the essential human-animal relations that are prevalent in our society (Coulter 2016, p. 148). As discussed in Chapter 1, humans and animals have a history of close interaction, which some researchers argue shaped each party irreversibly (McCabe 2010). In addition, abolitionism is a privileged view in that it ignores the fact that many people in underdeveloped countries share
close relationships with animals and could not survive without them. By calling for the total abolition of human ownership of animals, it limits – and in many cases, completely eliminates – our interactions with animals in everyday life, regardless of the circumstances. It also assumes that all interactions between humans and animals are fundamentally unjust, which many animal researchers argue is untrue (Cochrane 2009; Coulter 2016). As Coulter (2016) puts it, “Being a worker is not necessarily a ticket to a better or worse life for animals: the context matters” (p. 146). Acknowledging the importance of context, I am interested in exploring whether some jobs, like conservation work, can be good for the animals involved – thus I am accepting the use of animals for labour on the basis that they may benefit from the work, too.

**Animal Studies**

In her book “Animals, Work, and the Promise of Interspecies Solidarity”, Kendra Coulter (2016) takes several labour concepts developed for humans and applies them to working animals. For instance, she argues that certain neo-Marxist concepts, including Marx’s labour process theory, are applicable to animals. The core elements of Marx’s labour process theory are (1) purposeful activity, (2) objects of work, and (3) instruments of work. Coulter uses the example of a donkey performing work in a mining area to explain that each of these elements is present in animals’ contributions to humans’ work: the donkey moving in and out of the mine shaft as the purposeful activity, the coal being the object of work, and the bags the donkey carries as the instruments of work (p. 68-69). Given this example and the fact that the labour process certainly applies to other instances of animals’ contributions, Coulter argues that “We cannot simply dismiss animals’ roles as passive or see animals as mere instruments of humans’ work” (p. 70).

Building upon anthropological approaches to livelihoods and feminist political economy, Coulter (2016) proposes three main categories of animals’ work: subsistence, voluntary, and
mandated by humans. Subsistence work is performed by animals for themselves as well as for others, such as finding food and water or avoiding predators. Subsistence work is largely shaped by human settlements – for example, the way that hunting traps might impact an animal’s ability to find food, or human-induced climate change may influence an animal’s environment and available resources. Voluntary work is performed by animals for others (both humans and other animals) and includes care and protective work, such as that provided by companion animals in homes. Finally, work mandated by humans is performed by animals for humans; this is the category in which animals can most clearly be considered “workers,” because humans have given them a task that they must perform (p. 60-62)

Coulter (2016) also discusses how feminist political economists have highlighted the unpaid work people perform and that these concepts are “applicable across species lines” (p. 62). For example, she points to the contributions animals make to social reproductive labour – the unpaid work that sustains humanity and society – arguing that animals also provide care work, whether through the guarding, monitoring, or comforting of individuals, or by helping to transport people and goods. She writes, “Undoubtedly, the emotional and care work animals do in families providing joy, comfort, and compassion is immeasurable” (p. 63). In addition to the care work animals provide, Coulter extends the ideas of body work, dirty work, communication work, and emotional work to animals. Examples of body work range from the manual labour required by horses who move carriages to the olfactory senses used by detection dogs. Dirty work includes the acts a search and rescue dog must perform, such as searching for human remains – though the implications of this type of work may be on a different level for humans and animals. The communication work animals perform includes scenarios in which police dogs are required to read and understand their handlers’ commands, as well as clearly communicate
their findings to their handler. Finally, emotional work is required when, for instance, police dogs must ignore their natural instincts (e.g. food, other animals nearby) in order to focus on the task at hand. The work animals perform can range from pleasant to exploitative, similar to humans’ work; as Coulter writes, “What is socially acceptable is contested, fluid, and context-specific” (p. 81).

In order to fully understand animals’ work, Coulter (2016) emphasizes the importance of considering the bigger picture with regard to animal labour – that is, not just the act (the work they are doing) and the actors involved (both the animals and humans), but also the context. Her continuum of suffering and enjoyment (Figure 1) provides a framework for addressing the context of animal work.

![Figure 1. Continuum of Suffering and Enjoyment (Coulter 2016).](image)

The words “suffering” and “enjoyment” reflect the idea that animals are sentient and can experience both long-term pain as well as positive experiences and joy. Where work is placed on the continuum depends on the type of work being done, the individuals involved (e.g. coworkers) and their interactions, the species performing the work, and the animal’s own agency. For example, while farm animals, who are often confined and abused, are more likely to be placed on the suffering end of the spectrum, the work of scat detection dogs would likely be placed on the enjoyment end, since these roles often involve tasks that are innate and pleasant, such as searching (p. 84). These factors alone are insufficient to determine an animal’s place on the continuum; individual and context-specific details play a significant role, such as an animal’s personality and preferences. It is also important to recognize the fluidity of the scale – that is, an animal may experience discomfort in their work on one day but feel joyful the next (p. 84-85).
The continuum of suffering and enjoyment can help us account for these contextual details when determining a working animal’s welfare status.

Finally, Coulter (2016) asserts that as humans increase the involvement of animals in work spaces and roles, there is a greater need to reflect on the ethical and practical implications of this work, what steps should be taken to ensure the well-being of animals, and whether/which animals should be working for people (p. 81). By doing this, Coulter argues that we are working towards “interspecies solidarity”, which is both a “promise people should make to animals, and an approach to humane animal work with significant promise” (p. 152). In order to move towards this notion of interspecies solidarity, Coulter developed the idea of “humane jobs” which, as mentioned in Chapter 1, are jobs that are good for the animals and people involved (p. 163). Coulter’s work on humane jobs and interspecies solidarity has influenced and informed research in posthumanism (Smart & Smart 2017), organizational theory (Sayers 2016), ethnographic studies on animal activist organizations (Boyacioglu 2017), anthropological studies concerned with violence against animals (Kopnina 2017), and studies focused on fostering interspecies empathy (Drew 2016). My research works towards Coulter’s concept of interspecies solidarity by exploring conservation canine programs through her framework and ethical considerations in order to determine the humaneness of these jobs.

**Animal Welfare Science**

In order to assess the extent to which conservation canine jobs are humane, I employ animal welfare science tools and techniques. While concerns over animal welfare have been prevalent for centuries (Beers 2006; Hribal 2003; Kirkby 2012; Wrenn 2014), animal welfare science is a relatively emergent field of study (Broom 2011). Researchers of animal welfare claim that because welfare is measurable, it is a scientific concept (Broom 1991, 2011). Ian
Duncan (1993) argues that welfare is exclusively about an individual’s feelings; whereas other researchers – often those with a medical or veterinary background – believe that the health of the animal and other factors are also important. Broom (2011) agrees with the latter – that feelings are only one facet of welfare. He argues that poor welfare means having difficulty or failure coping with one’s conditions or circumstances, and because coping can involve multiple strategies (e.g. behavioural, physiological, and immunological), a variety of indicators must be used to assess welfare (Broom 1991).

Many animal welfare researchers use the concept of the Five Freedoms (Table 1) as parameters for judging animal welfare (Harrington et al. 2013; Houpt et al. 2007; Molomo & Mumba 2014; Rahman & Reed 2014; Rooney et al. 2009; Rushen et al. 2008; Shubert 2012; Sonntag & Overall 2014). The Five Freedoms were developed in 1965 in response to a UK Government report on livestock husbandry (FAWC 2009). Some researchers argue that the Five Freedoms cannot be achieved in full for animals under any circumstances, but rather they offer a guideline to identifying welfare issues and a direction to move towards in order to improve welfare in the long-run. Others argue that the Five Freedoms only cover the negative end of the welfare spectrum – focusing on alleviating suffering – and not the potential for positive experiences (Yeates & Main 2008). In addition, the Five Freedoms fundamentally allow for the use of animals under certain conditions, and thus are not a liberationist concept – they can be considered a “use but not abuse” approach (Coulter 2016, p. 107). By using the Five Freedoms as a guideline, the intention is to prevent or mitigate any indicators of acute stress that may lead to long-term or chronic stress, and thus reduced welfare (Rushen et al. 2008). Acute stress involves pain, discomfort, or poor welfare that lasts a short period of time (seconds, minutes, or hours), while chronic stress affects welfare over a longer period (weeks, months, or years).
(Ibid.). According to some researchers, acute stress does not necessarily imply poor welfare in the long term, and thus indicators of acute stress must be assessed for their validity in determining chronic stress (Beerda et al. 1997). Furthermore, Broom (2011) notes that the Five Freedoms may offer a good starting point for assessing animal welfare, but they are insufficient if scientific measures regarding an animal’s needs are available. While there has been consensus among most researchers over general approaches to animal welfare (Main et al. 2003; Whay et al. 2003), there are disagreements over the relative importance, validity, and reliability of various welfare criteria, including behavioural, physiological, and immunological measures (Beerda et al. 1998; Beerda et al. 2000; Mason & Mendl 1993; Rushen 1991; Rushen et al. 2008).

Table 1. The Five Freedoms of animal welfare and how they may be achieved (FAWC 2009).

<table>
<thead>
<tr>
<th>Freedoms</th>
<th>Provisions</th>
</tr>
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<tbody>
<tr>
<td>Freedom from hunger and thirst.</td>
<td>By providing ready access to water and a diet to maintain health and vigour.</td>
</tr>
<tr>
<td>Freedom from discomfort.</td>
<td>By providing access to an appropriate environment.</td>
</tr>
<tr>
<td>Freedom from pain, injury, and disease.</td>
<td>By prevention or rapid diagnosis and treatment.</td>
</tr>
<tr>
<td>Freedom to express normal behaviour.</td>
<td>By providing sufficient space, proper facilities, and appropriate company of the animal’s own kind.</td>
</tr>
<tr>
<td>Freedom from fear and distress.</td>
<td>By ensuring conditions and treatment, which avoid mental suffering.</td>
</tr>
</tbody>
</table>

Animal welfare scientists divide welfare criteria into two main categories: those associated with the animal’s environment (input-based), and those associated with the state of the animal (outcome-based) (Mench 2003). Input-based criteria are often focused on the animal’s environment, such as the way they are kept, fed, and managed. Outcome-based criteria reflect the state of the animal, including behavioural, physiological, and immunological measures, as well as production levels (Rushen et al. 2008; Rushen et al. 2011). Some researchers argue that, because welfare refers to the actual condition of the animal rather than its environment, outcome-
Input-based criteria are commonly used to assess farm animals’ welfare status. For example, researchers might investigate factors such as the features of the enclosure, space allowances, group size, and use of tethering (Rushen et al. 2008). Input measures have also been assessed in some dog welfare studies, such as Beerda et al. (2000) who considered the space allowances and level of enrichment of dogs’ kennel environments as one factor affecting their welfare. Others have included dogs’ daily routines and interactions with other dogs and people as contributors to their welfare status (Ibid.; Cafazzo et al. 2014; Yamamoto et al. 2015).

A range of assessment methods have been used to measure outcome-based welfare in dogs. Some literature has demonstrated success in using physiological measures to assess acute welfare, including salivary cortisol (Beerda et al. 1998; Glenk et al. 2013; Pastore et al. 2011; Schalke et al. 2007) and heart rate (Beerda et al. 1998; Schalke et al. 2007; Vincent & Leahy 1997). These procedures are often invasive which may induce stress in the animal, increasing their cortisol levels, thereby impacting the integrity of the study and impairing the animal’s welfare (De Palma et al. 2005). Some studies have employed non-invasive physiological techniques to measure cortisol levels, for example in dog urine (Beerda et al. 1999a; Beerda et al. 2000) or feces (De Palma et al. 2005 – note that this paper argues that collecting urine samples may also be invasive, albeit to a lesser extent).
Another way to assess dog welfare is through behavioural data. There are a variety of behaviours that are associated with stress, and thus reduced welfare. These include lowered posture, paw-lifting, yawning, auto-grooming, vocalizations, body shaking, coprophagy, and stereotyped/repetitive movements and behaviours such as pacing and tail chasing (Beerda et al. 1998; Beerda et al. 1999b; Hetts et al. 1992; Hubrecht et al. 1992). These behaviours can either be assessed via questionnaires (Lefebvre et al. 2007; Yamamoto et al. 2015) or interviews (Burrows et al. 2008a; Piva et al. 2008) with dog owners or handlers, or observed via direct observation of individual animals by the researcher (Haverbeke et al. 2010; Pastore et al. 2011; Rooney et al. 2007; Schilder & van der Borg 2004; Stephen & Ledger 2005).

While these forms of welfare assessment are sufficient to assess dog welfare in general, there are some specific concerns for working dogs (Rooney et al. 2009). Working dog welfare varies from companion dog welfare primarily because working dogs are often homed in a kennel environment, which is typically quite different from the living environment of a companion dog and can induce stress (Hiby et al. 2006; Rooney et al. 2007; Rooney et al. 2009). For example, many kennel environments limit dogs from experiencing social contact, obtaining adequate exercise, and expressing natural behaviours – all of which are requirements according to the Five Freedoms (Rooney et al. 2009). Another concern for working dogs specifically is the breeding and training procedures involved in animal labour industries. While some research has discussed the best traits to select for when breeding dogs for various jobs (McGarrity et al. 2016; Weiss 2002), the ethics of selecting certain traits and how this is done (e.g. inbreeding) are important considerations (Shubert 2012), but do not seem to be scrutinized extensively in the literature on working dogs. Additionally, Jeppsson (2016) points out that it can be inhumane to employ dogs who do not possess the best traits for certain tasks because, for example, a dog who is prone to
heat stress will suffer in a position working outdoors in high temperatures. Because there are proven links between welfare status and working ability in working dogs (Rooney et al. 2005; Vincent & Leahy 1997), handlers may be particularly interested in ensuring that proper welfare standards are met (Rooney et al. 2009).

Different training procedures and equipment can also affect dog welfare. Dog training is divided into four major types: positive reinforcement, negative reinforcement, positive punishment, and negative punishment. Positive reinforcement and negative punishment are the two major types of reward-based training methods (Todd 2018). Positive reinforcement involves the presentation of a reward in response to desirable behaviour, and negative punishment is the removal of a reward in response to undesirable behaviour. These methods do not involve making any negative contact with or inflicting any stimuli upon the dog. Negative reinforcement and positive punishment are the two major types of aversive training methods (Todd 2018). Negative reinforcement involves the removal of a negative stimulus in response to desirable behaviour, and positive punishment is the application of a negative stimulus in response to undesirable behaviour. These aversive methods are considered “traditional” training methods, but many researchers are urging the movement towards more positive and reward-based training methods (Adams & Johnson 1994; Haverbeke et al. 2008; Hiby et al. 2004; Miller 2007; Salgirli et al. 2012; Schilder & van der Borg 2004). This is because studies that have analyzed training methods for working dogs report that aversive training methods, including the use of e-collars as discussed in Chapter 1, pose risks of acute and chronic stress (Beerda et al. 1998; Haverbeke et al. 2008; Schilder & van der Borg 2004) and can result in a number of behavioural issues (e.g. stereotyped behaviour, fear, and aggression) (Hiby et al. 2004; Roll & Unshelm 1997; Tortora 1983). Finally, through literature review (Adams & Johnson 1994; Hiby et al. 2004; Johnston
and field observations, Haverbeke et al. (2008) propose that positive training is more efficient than aversive training, and reduces threats to dog welfare.

Some countries have greater welfare standards and guidelines to protect pets and working animals than others. In Canada, animals are protected under section 445.1 “Cruelty to Animals” of the Criminal Code of Canada, such that a person who “wilfully causes or, being the owner, wilfully permits to be caused unnecessary pain, suffering or injury to an animal or a bird” can be sentenced to imprisonment or required to pay a fine (Criminal Code, RSC 1985, c C-46). Furthermore, Canada’s Justice for Animals in Service Act (Quanto’s Law) deems it a criminal offence to injure or kill a(n) enforcement, military, or service animal (Criminal Code, SC 2015, c 34 s 445.01). Individual provinces also have legislation regarding animal cruelty. In Alberta, Section 2 of the Animal Protection Act states that “No person shall cause or permit an animal of which the person is the owner or the person in charge to be or to continue to be in distress”, with “distress” defined as:

(a) deprived of adequate shelter, ventilation, space, food, water or veterinary care or reasonable protection from injurious heat or cold,

(b) injured, sick, in pain or suffering, or

(c) abused or subjected to undue hardship, privation or neglect. (Animal Protection Act, RSA 2000 c A-41 s 2).

Similarly, Section 11.2 of Ontario’s Prevention of Cruelty to Animals Act states that “No person shall cause an animal to be in distress”, “distress” meaning:

The state of being in need of proper care, water, food or shelter or being injured, sick or in pain or suffering or being abused or subject to undue or unnecessary hardship, privation or neglect. (Ontario Society for the Prevention of Cruelty to Animals Act, RSO 1990, c O-36).
It should be noted, however, that both provinces except these standards if the distress results from an activity carried on in accordance with “reasonable” and “generally accepted practices” of agricultural animal care, management and husbandry (in Ontario), as well as hunting, fishing, trapping, pest control, or slaughter (in Alberta). All other provinces and territories in Canada have their own laws regarding animal cruelty but are generally similar to those noted above.

In animal labour industries, private welfare standards are not always clear or available, thus compliance is variable, and some conservation canine programs are more transparent with their standards than others. For example, the New Zealand Department of Conservation has clear guidelines in place to ensure the welfare of their conservation dogs in accordance with the Animal Welfare Act 1999, and their standard operating procedure is available for public access (DOCGNZ 2016). On the other hand, there is no publicly available information regarding the guidelines, standards, and operating procedures for conservation canines working with the government of Ontario. In Canada, the Canadian Council on Animal Care (CCAC) is responsible for setting, maintaining, and overseeing the implementation of high standards for animal ethics and care in science throughout Canada (CCAC 2015). These regulations are only mandatory for certain institutions that receive tri-council funding, such as universities, while private organizations may choose to opt-in or not (AIS n.d.; CCAC 2015). Because there has been so much scrutiny over animal welfare in various industries in recent years (EC 2007; Rooney et al. 2009), some researchers in Canada and Sweden are expressing interest in creating a union for working animals (CBC 2016). The researchers’ primary interests lie in ensuring canine workers receive breaks every ‘x’ number of hours and appropriate days off. Currently, the union’s concerns are focused on animals working in welfare industries such as child care, elderly care, and health care (CBC 2016). Thus, at this time, there are no publicly accessible guidelines for
ensuring the welfare of conservation canines in Canada, other than the general animal welfare legislation with which all citizens must comply.

**Sustainability**

This research is grounded in promoting animal welfare while sustainably conserving nature – and thus sustainable roles are required. Sustainable development depends on the health and well-being of humans and animals, as well as the environments in which they live (Forget & Lebel 2001; Lebel 2002; Rapport et al. 1999). A movement in the public health industry called One Health encompasses these three components. Healthcare practitioners developed the concept of One Health to acknowledge the interconnections between the health of animals, humans, and the environment (AVMA 2008; OHI n.d.; Zinsstag et al. 2011). According to the Public Health Agency of Canada (PHAC), the One Health approach consists of three key themes – prevention, detection, and response – and is “primarily preventive, seeking to address public health threats at the source” (PHAC 2013). To do this, they use surveillance programs to monitor zoonotic diseases (those spread between humans and animals). For example, one of the programs PHAC currently runs is the Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS). This program monitors trends in antimicrobial use and resistance in bacteria found in human, animal, and food sources and the associated health impacts (GC 2007). In addition to public health concerns, the One Health model has also been employed by wildlife conservation organizations to establish an integrated approach to maintaining ecosystem integrity and wildlife health (OWOH 2009).

While One Health initiatives have typically focused on zoonotic issues and other medical concerns, a new movement called One Welfare (OW 2018) has recently emerged (Figure 2) (Fraser 2016; Jordan & Lem 2014). The term One Welfare “emphasize[s] the many links
between animal welfare and human welfare, and acknowledge[s] that both depend on a well-functioning ecological environment” (Fraser 2016).

**Figure 2.** One Welfare model themes and links (OW 2018).

For example, the mental well-being of people who work with animals often has an influence on their treatment of such animals (Coulter 2016; Fraser 2016). Similarly, the welfare of working animals is an important determinant of their ability to provide services to their human counterparts. Furthermore, both human and animal welfare depend largely on the quality of the
environments in which they live (Fraser 2016). The concept of humane jobs partially embodies a One Welfare approach in that it unifies animal and human well-being, acknowledging the interconnections between the two. I argue that environmental health should be a third facet of the humane jobs concept, as jobs that are good for animals and humans but detrimental to the environment are not sufficient for overall health and welfare. By including the environment in my approach, the concept of humane jobs results in sustainable development. Thus, by exploring the idea of conservation canines as a potentially humane job, I apply a One Welfare approach to sustainable animal labour. That is, if dogs working for conservation and their human handlers have adequate welfare status, and their work promotes the health of the environment through their conservation efforts, they have fulfilled the One Welfare model, and their work can be considered sustainable in this context.

This chapter has offered an overview of the scholarship that provided inspiration and a foundation for this research. First, I discussed how the animal rights movement began, including the philosophical schools of thought that informed the movement. Second, I explained the two main factions of animal rights advocates – abolitionism and welfarism – justifying why this research takes a welfare reformist approach. Next, I discussed how the concept of humane jobs provides the basis for this research. Then I outlined the predominant animal welfare science methodologies and provided an overview of how dog welfare has been assessed in previous studies, which guided this research. Finally, I discussed how the One Welfare model complements the humane jobs concept by assessing the environmental impacts to promote sustainable animal labour. In the next chapter I explain my research approach and design, provide a description of the study areas, and explain how data was collected and analyzed – through interviews, welfare assessments, and secondary documents.
Chapter 3: Methodology

This chapter outlines the research approach and design, study areas, and data collection and analysis techniques. First, I explain that throughout this research I worked within two methodological paradigms, employing animal welfare science techniques and qualitative research methods. This approach revealed important contextual details and allowed me to address the context of conservation canines in Alberta and Ontario. Next, I explain how participants were gathered for the study and why Alberta and Ontario were selected as case studies. Finally, I explain how data was collected, using interviews, welfare assessments, participant observation, and secondary documents; and analyzed, using content analysis and descriptive statistics.

Research Approach & Design

The purpose of this research was to explore the lives of conservation canines in Alberta and Ontario; as such, I took a case study approach to this research. For each case study I worked within two methodological paradigms, employing both animal welfare science and qualitative research methods. In animal welfare science, behavioural observations can reveal valuable insights as to how an animal is feeling, and thus are indicative of welfare (Broom 2011; Rushen et al. 2008). Input-based measures, such as the animals’ living conditions, can identify potential threats to welfare, and thus are another important means of welfare assessment (Beerda et al. 2000; Rushen et al. 2008). Thus, based on my research on prevalent dog welfare assessment techniques as outlined in Chapter 2, I chose to conduct interviews with dog handlers, as well as conduct welfare assessments of the dogs at work, which are described below, in order to address my research aim. In addition, I chose to use qualitative methods because I was interested in learning about the context of the conservation canines’ and handlers’ roles. As discussed earlier,
contextual details are important when assessing an animal’s well-being (Coulter 2016). And because dogs’ personalities and behaviour can vary widely (Rooney et al. 2009), context and narratives from handlers – the people who spend the most time around the dogs – are valuable. Finally, during participant observations, I was embedded in the context of each scenario as a researcher, thus my perceptions and supplementary notes are as much a data source as my interviews and assessments. This study was granted clearance according to the recommended principles of Canadian ethics guidelines and Queen’s University policies (see Appendix A), as well as clearance from the University Animal Care Committee (see Appendix B).

**Study Area**

I initially gathered participants for this research by contacting each provincial (n=10) and territorial (n=3) government via contact information on their websites, specifically within the departments concerned with natural resources and/or environment, inquiring as to whether or not their region employs dogs for conservation purposes. Two regions responded that they do not employ dogs for conservation (New Brunswick and Northwest Territories), five did not respond, and six responded that they do have conservation canines working in their jurisdictions. I conducted key informant interviews with willing participants in charge of those programs (see Appendix C for interview questions), which included the governments of Alberta, Ontario, BC, Manitoba, and Saskatchewan. The sixth province who responded affirmatively was Quebec, but they only employed dogs for conservation in the 2015 field season, so there was no team supervisor available for interviewing. Based on the key informant interviews, I selected two case studies – Alberta’s AEP team and Ontario’s MNRF team – as they were the largest and most active teams in their regions, and they presented a variety of activities to observe. While this research does not necessarily offer a comprehensive illustration of the work of conservation
canines in Canada or in Alberta and Ontario, it does offer a cross-section of activities, local/provincial contexts, and handler-dog relations through in-depth focus of two specific teams. Field research took place between the months of May and September of 2017 at various locations within the provinces of Alberta and Ontario, as well as in Fort Worth, Texas during a research trip with the Alberta team in this locale. Site visits were planned based on the schedules of the teams and depending on opportunities to observe a variety of activities (see “Study Site Details” under Alberta and Ontario case studies in Chapter 4 for further details).

**Data Collection & Analysis**

**Handler Interviews**

Interviews were conducted with all handlers and the supervisor on both the Alberta (n=3; three handlers, one of whom is the team supervisor) and Ontario (n=7; six handlers and one supervisor) teams. I employed narrative-style interviews in a semi-structured format (Kvale 2007) in order to learn about the roles, welfare, and environmental impacts of conservation canines (see Appendix C for interview questions conducted with supervisors; see Appendix D for interview questions conducted with handlers). All interviews were recorded and later transcribed, and finally analyzed with qualitative content analysis (Kvale 2007) to draw conclusions. For the initial analysis of the data, I read through the transcripts and answered my research questions to the extent possible based on the information provided by participants. Subsequently I read the transcripts a second time, this time coding the data by writing down the key themes that emerged while reading through the transcripts (Kvale 2007) – for example, “dog is happy/relaxed/content/healthy”, “handler avoids use of punishment”, “handler shows strong connection with dog”, “dog is hard on handler’s personal life”, etc. Finally, as a third pass through the data, I read through the list of unique themes from the second pass and highlighted
and categorized themes associated with my broader conceptual framework of humane and sustainable jobs – for example, whether the handler discussed the dog as being happy/sad; the handlers themselves as enjoying the work or not; and any positive or negative impacts on the environment their work might have.

Handler interview data was ultimately used to assess dog welfare, handlers’ experiences and perceptions of their work, and environmental impacts of the work. To address dog welfare, I asked questions about the dog’s personality and behaviours while working and while at rest, the dogs’ home environment and work environment, the dogs’ interactions with people and other dogs, their daily exercise and activities, and details about their work schedule. In order to address handlers’ experiences (fulfilling the human component of the humane jobs concept), I asked questions about their interests and career path leading up to becoming a conservation canine handler, and their perceptions of their work, including the best and most frustrating aspects of their job. The happiness of people and animals working together often goes hand-in-hand (Coulter 2016), so at times answers to questions directed at one revealed important insights about the other. In addition, an important component of assessing handlers’ perspectives was taking into account their tone of voice during interviews and body language during field visits. Tone of voice was recorded based on factors such as whether the interviewee stuttered when they spoke at times, made a long pause, or changed the subject; body language was noted depending on whether the handler seemed to be confident and proud, or frustrated and uncertain. Finally, I asked about the environmental impacts of conservation canine work. These questions were exploratory as I had no prior information of environmental impacts of this work. When questions about environmental impacts were met with hesitation or confusion, I provided hypothetical
examples such as harm caused to other animals by the dogs, or pest transfer (e.g. ticks, invasive species, etc.).

**Welfare Assessments & Participant Observation**

Welfare assessments were conducted while dogs were working (n=300 total assessments) and while at rest (n=17). Eight dogs were assessed in total (n=3 for Alberta; n=5 for Ontario), but only five dogs were assessed at rest (n=3 for Alberta; n=2 for Ontario). The selected minimum number of trials required for to be included in analyses was ten per dog; thus, assessments recorded at rest were not included in analyses. In order to assess welfare, I reviewed the most common and reliable methods of assessing dog welfare in the literature. While previous literature has demonstrated success in using physiological measures to assess welfare (e.g. salivary cortisol, Glenk et al. 2013; heart rate, Vincent & Leahy 1997), these procedures can be invasive and were unfeasible for my research. There are some methods of measuring physiological stress non-invasively, such as extracting cortisol from feces (De Palma et al. 2005); however, there were technical issues preventing me from using this method. Cortisol can only be used as a measure of stress when compared with cortisol levels between treatments – that is, there is no clear cutoff of cortisol that indicates a welfare issue (Niel, personal communication, 19 May 2017; Rushen 1991). This meant that I would have to compare cortisol samples from the dogs at rest versus while they were working; however, the dogs’ schedules and lifestyle made it difficult to collect samples at an appropriate time, and my research mainly took place while they were working – plus, lines between work time and down time were often blurred during my visits. Fortunately, behavioural observations minimize disturbance towards the subject and can provide information about an animal’s internal states (Dawkins 2006; Rooney et al. 2007). For these
reasons, I decided to perform observational behavioural assessments using an ethogram (catalogue of behaviours), as described below.

My behavioural ethogram (Table 2) was constructed based on the most common, reliable outcome-based criteria (i.e. indicative of the state of the animal) for dog welfare in the literature (Houpt et al. 2007; Rooney et al. 2009; Sonntag & Overall 2014; Stellato et al. 2017). I selected behaviours exhibited by both the dogs as well as performed by the handler towards the dog. Dog behavioural indicators were posture, avoidance, paw-lifting, yawning, panting (light or heavy), lip/nose-licking, and tail wagging; handler behaviours were physical contact/correction, raise voice/yell at dog, and praise dog (verbal/toy/treat). Physical contact/correction included leash pops, which is when the handler tugs the dog’s leash abruptly and firmly, putting pressure on the dog’s neck via the collar, to encourage the dog to react appropriately. Posture was recorded at the beginning and end of each trial, and at five-minute intervals if applicable. Handler behaviours were selected to reflect whether handlers were using reward- or punishment-based training methods, since training tactics have been linked to welfare status (Haverbeke et al. 2008). During participant observations I also recorded supplementary notes including input-based criteria (i.e. details about the dog’s environment), such as the weather conditions (recorded throughout the day based on AccuWeather), work environment, home environment, and work schedule (e.g. breaks, shift length). See the ethogram (Table 2) for a detailed explanation of each behavioural criteria, and Appendix E for the detailed checklist that was used to conduct welfare assessments in the field.
Table 2. Ethogram of dog and handler behaviours that were used to assess dog welfare.

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posture</td>
<td>Ranked as follows for back, ear, and tail separately:</td>
</tr>
<tr>
<td></td>
<td>0: neutral flat back, ears erect, tail carried naturally</td>
</tr>
<tr>
<td></td>
<td>1: curved back/ears side/tail lowered</td>
</tr>
<tr>
<td></td>
<td>2: lowered back, ears back, tail tucked</td>
</tr>
<tr>
<td>Avoidance</td>
<td>Dog appears disengaged, either by looking away or moving away from the target</td>
</tr>
<tr>
<td>Paw-lift</td>
<td>Lifts paw up</td>
</tr>
<tr>
<td>Yawn</td>
<td>Wide opening of mouth</td>
</tr>
<tr>
<td>Pant</td>
<td>Lightly: mouth open, audible exhalations</td>
</tr>
<tr>
<td></td>
<td>Heavily: mouth open, audible and frequent exhalations, tongue hanging out</td>
</tr>
<tr>
<td>Lip/nose lick</td>
<td>Portion of the tongue is shown and moved along the upper lip</td>
</tr>
<tr>
<td>Tail wag</td>
<td>Tail moves swiftly from side to side</td>
</tr>
<tr>
<td>Handler makes contact (negative)</td>
<td>Handler uses physical contact to discipline dog</td>
</tr>
<tr>
<td>Handler yells (negative)</td>
<td>Handler raises voice towards dog as a form of discipline</td>
</tr>
<tr>
<td>Handler praises (positive)</td>
<td>Handler praises dog, whether by rewarding or petting dog, or using words of encouragement/positive tone</td>
</tr>
</tbody>
</table>

For most activities, I broke up observations into “trials” wherein a trial began when the handler commanded their dog to search for a target, and a trial was considered complete when the dog alerted to a target. Throughout the trials I employed an all-occurrence observation style (Altmann 1974; Lehner 1992) in which I sampled continuously (except for posture, which was sampled on interval as explained above), because trials were short enough that intervals were not necessary, and I would be losing potentially valuable data if I chose to sample instantaneously (on pre-determined time intervals). Certain activities were recorded for a set limit of five minutes, such as when the dog was kenneled or when the dog was off duty and interacting with his/her handler. These activities did not necessarily have a clear beginning or ending and were therefore observed for a set limit of time in order to obtain a uniform amount of assessment time for each dog. These activities were assessed with the intention of obtaining a control sample of
each dog’s behaviours for comparison with the working trials; however, it was not possible to obtain assessments for each dog at rest or while off duty, so this data was excluded from analyses. In addition, one Ontario dog’s trial assessment data was excluded from analyses as only two trials were observed for that dog.

Welfare data was collected by recording counts of behaviours during each trial, thus data was analyzed using descriptive statistics to explain the major patterns found in the data (Marshall & Jonker 2010; Shi & McLarty 2009). For each occurrence of a criterion, the percentage of trials in which the dog or handler performed the action was calculated for each dog. Then, the average percentage of trials in which the action occurred across all dogs was calculated. Supplementary notes, including notes on input-based criteria and other participant observations, were not analyzed but acted as supporting evidence for conclusions drawn from interview and welfare assessment data.

**Secondary Documents**

In addition to interviews with handlers and welfare assessments of working dogs, secondary documents provided valuable information about conservation canine programs. For example, information about the success of Alberta’s Aquatic Invasive Species program was found in their annual report (AEP 2015, 2016). Moreover, media reports were available for both case studies (see Appendix F), providing information about the programs and pointing to the importance of the public’s perception of these programs. This data was used to address the environmental impacts of conservation canine programs, in addition to information gleaned from handler interviews as described above.

In this chapter I have explained how, throughout this research, I employed both animal welfare science and qualitative methods. By approaching this project through case studies using
participant observation, combined with handler interviews, dog welfare assessments, and secondary documentation, I was able to account for the context of conservation canines in Alberta and Ontario. In Chapter 4, I present a detailed description of each study site and the major findings for each case study, including raw answers to research questions one through six as outlined in Chapter 1.
Chapter 4: Case Study Findings

In this chapter I outline the key findings of this research. First, I provide a thorough description of the case study sites, including a detailed account of each activity observed during each site visit. Within these descriptions I address research questions one through three, outlining the work dogs do on each team; the selection, breeding, and training procedures for the dogs; and the programs’ mandates. Finally, I provide raw results regarding the welfare assessments, handlers’ experiences, and environmental impacts (addressing research questions four through six), a more detailed analysis of which is provided in Chapter 5.

Alberta Case Study

Study Site Details

Alberta was one of two major case studies for this project. The Alberta’s main conservation canine team is run by the Environment and Parks (AEP) division of the provincial government, through the Aquatic Invasive Species (AIS) unit, and is composed of three dog-handler pairs: Cindy (the program supervisor) and Hilo, Heather and Diesel, and Hannah and Seuss. The Alberta team was initiated via partnership with Working Dogs for Conservation (WD4C), a Montana-based organization that trains dogs for various types of conservation work. As such, the dogs on Alberta’s team were acquired by WD4C, who obtains their dogs from shelters, boasting that this allows “unwanted” dogs a second chance at a good life (WD4C 2015a). These dogs are often too energetic and excitable as pets but make the ideal conservation dog, as high ball drive (high motivation to work for a reward, such as a toy) is the most important quality. Thus, no breeding information for these dogs is available. Most of the training of the Alberta team’s dogs is conducted by WD4C, but once a handler is paired with a canine, they train together. Training activities involved teaching dogs to recognize a target scent via
positive reinforcement (usually a toy), as well as obedience practice (sometimes with the use of negative reinforcement), such as training the dog to listen to the handler’s commands, or not become distracted by a nearby dog. Handlers on this team are not specifically certified to handle dogs, and their educational backgrounds vary (there is not set requirements to become a handler for this team, but the interview process was lengthy and in-depth.

Due to the partnership with WD4C, research trips with the Alberta team involved collaboration with other individuals, such as trainers and supervisors from WD4C, as well as trips to locations outside of Alberta. The main function of the Alberta team’s canines is to work with human inspectors at watercraft inspection stations, searching all watercrafts that pass by (typically just before a provincial border) for zebra mussels and quagga mussels. Alberta currently does not have zebra mussels anywhere in the province, and they are hoping to keep it that way for as long as possible (AEP 2017; AP 2017), as the estimated impact of the introduction of this invasive species to the province would cost the province over 75 million dollars annually (AEP 2016a). In an effort to prevent the spread of zebra mussels from infected provinces such as Ontario and Quebec (CCIS 2014), watercraft inspection stations have been set up across the province of Alberta near all of the provincial border crossings, such that anytime a watercraft is passing through, the driver must stop for inspection. If a mussel or still water is found somewhere on the boat, the boat must be thoroughly flushed with hot water and air dried before proceeding. This program is mandated by the Fisheries (Alberta) Amendment Act (2015) and the Ministerial Order as per Section 32 (14) of the Fisheries (Alberta) Act (AEP 2016b). The team spends their summers working at the inspection stations, and throughout the fall and winter months they perform office work, including data analysis of the season’s inspection data and other administrative tasks, as well as preparing for the following inspection season. During off-
season, dogs accompany their handlers to the office. Finally, the team also conducts several research trips throughout the year, often to (re-)train dogs on detection. During regular duties, dogs’ shift lengths are set at 7.25 hours per day, with breaks as needed and two days off per week; however, working hours vary during research and training trips.

I first joined the Alberta team on a research trip to Fort Worth, Texas in May/June 2017, where the team was conducting a study to determine their dogs’ ability to detect veligers – the larval form of the zebra mussel – in various concentrations in water. This study was led by Aimee Hurt, the co-founder of WD4C. I observed three types of activities during this trip that are described below: bucket trials, watercraft trials, and shoreline searches. Because this was the first research trip with the Alberta team, data collection was preliminary and exploratory, and thus assessments from these trials were not included in analyses; however, data was useful for understanding the context of these dogs’ roles and forming relationships with the team.

Bucket trials involved placing six buckets in an arc formation in the study room. Each bucket contained something different – tap water, water inoculated with various concentrations of other plankton, an empty bucket, or the “hot” bucket containing veliger water. The dog-handler teams would then take turns doing trials to test their ability to detect the hot bucket. Aimee would call out to a dog-handler when it was their turn (usually they went in the same order, or at least they always followed the same order in a single day). The handlers were considered “blind” in this study, unaware of what was in the buckets, and only knew that at least one bucket contained veliger water (this was to ensure that handlers did not subconsciously bring their dogs to the correct bucket). Aimee was watching the dogs and keeping track of the number of times a dog would sniff an incorrect bucket with a counter. Chris, Aimee’s colleague kept track of where the hot bucket was, recording the number of times a dog would sniff the hot
bucket before alerting to it. An alert was signified by the dog sitting down and waiting for the handler to confirm the alert. The handler would then decide whether they trusted that the dog was alerting correctly (sometimes the dogs were overly excited and would alert for no/another reason, and the handlers were able to sense the false alert). If they decided it was a true alert, they would say “alert” and look to Aimee for direction. If incorrect, Aimee would say “no,” and the dog-handler team would continue searching. If correct, Aimee would say “yes,” and the handler would praise the dog, rewarding them with a toy and sometimes a treat. Any other humans nearby were also allowed to praise the dog. The dogs showed great success and were rewarded frequently during these trials, especially considering that the dog would be given multiple chances to find the hot bucket; thus, they received a reward after every trial during this activity.

During watercraft trials, the dogs were tested for their ability to detect the veliger water on a watercraft (rather than in one concentrated area, as with the bucket trials). Aimee poured water over various watercrafts – some containing veligers, and others just tap water. In addition, Aimee also placed some adult mussels on some of the boats, which is what the dogs are used to searching for during their full-time jobs at the inspection stations. The dog-handler teams would again take turns searching the watercrafts. Some teams would search all six boats that were prepared for the trials, and others would only search a couple at a time before taking a break. It was up to the handler’s discretion whether they took a break or continued searching. During this particular activity, the dogs were out in the heat and sun and thus became tired very quickly, whereas the bucket trials took place in a shaded, garage-like room and were finished so quickly the dogs did not have a chance to become tired. This activity was a lot more difficult for the dogs, and had lower success than the bucket trials. The lack of success combined with the
extreme heat seemed to be discouraging for the dogs, and they appeared more stressed than with the bucket trials.

The last activity during this trip was the shoreline searches. This activity was much less structured, and the purpose behind it was to have the dogs look for mussels in a natural setting, and reward them for their efforts after enduring a couple days of lower success (and thus fewer rewards). The dogs didn’t take specific turns; sometimes a couple of dogs would be out at the same time, and handlers gave the dogs a break after having been out for about half an hour. The shoreline searches took place on a riverbank, so the dogs were able to cool off whenever they wanted, simply by taking a quick dip in the nearby water. We walked along a strip of land that was surrounded on either side by water, and there was lots of vegetation and rocks surrounding us as well. The dogs were in their element during this activity because they were able to roam freely and search for mussels (their usual task), and were highly successful, thus received many rewards. As a result, they seemed quite happy doing this type of work despite the heat; being able to cool off in the water also helped.

In June 2017 I visited the Alberta team again, this time in the Calgary region where they were conducting weed searches. This activity was part of a project to assist with the detection of the invasive weed *Thesium arvense* in Fish Creek Provincial Park – its only known location in Canada. Most of the day was spent outside searching through grassy fields for the weed, and the weather was warm but breezy, thus the dogs did not seem too stressed by the weather. *Thesium arvense* was not very abundant, but there was enough present that the dogs were rewarded regularly and maintained motivation.

Next, in July 2017 I took another trip to Alberta to visit Heather’s and Hannah’s respective inspection stations, to observe their canines’ main job duties: real watercraft
inspections. First, I visited Heather & Diesel at the Burmis inspection station in Crowsnest Pass, AB during their three busiest days of the week: Friday through Sunday. Next, I visited Hannah & Seuss at the Vermilion inspection station in Vermilion, AB for three and a half days: Friday through Monday (with Saturday being a half day as Hannah had some office work to complete). The inspection stations were both situated in the parking lot of a commercial scale house along the side of the highway. The Alberta government has an agreement with the peace officers such that the officers allow the inspectors to use their space (including entering their building/office for lunch, bathrooms, and occasional office work). The space was essentially a large parking lot, with multiple signs on the side of the highway that boaters can (hopefully) see as they are approaching the station, indicating that there is a mandatory watercraft inspection station there. Inspection stations are mandatory for all types of watercrafts, including boats, canoes, kayaks, and even water skis – anything that gets taken into a waterbody. Interestingly, the team places a sign at each inspection station at which dogs are working stating that the dogs are looking for mussels, and are not looking for anything else – including drugs, alcohol, or firearms. In this setting, the handlers had to put in a great deal of effort to keep the dogs motivated because the mussels are rarely found on any of the watercrafts – there was not a single occurrence for the time I was there, and only 19 mussels were found on watercrafts in 2017 across 11 stations and 30,957 inspections (734 of which were inspected by canines) (information pending publication in AIS 2017 Annual Report; Heather McCubbin, personal communication, 17 January 2018). In order to keep the dogs motivated the handlers would plant a mussel on a watercraft every so often (with the permission of the boater), so that the dog could search for it and be rewarded, reminding them of their goal and how much fun their jobs could be. While the dogs seemed to enjoy searching boats overall, factors like the heat seemed to affect their interest in working.
During the trip with Heather and Diesel, the minimum temperature was 18 degrees C, and maximum was 32 degrees C; with Hannah and Seuss, the minimum was 21 degrees C, and the maximum was 26 degrees C. During these inspections, dogs were worked a maximum of 7.25 hours per day, were given breaks when needed (e.g. when the dog appeared tired or unmotivated), and were brought into the air conditioned office during hot temperatures.

Finally, in September 2017 I had my last visit with the Alberta team and joined them in Gimli, Manitoba. This trip was focused on re-training (or practicing) the dogs on zebra mussel detection. Gimli’s waterbodies are already infested with zebra mussels, making it an appropriate site to practice detection with the dogs. Most of the trials thus took place on the shoreline of the lake, where there was an abundance of mussels, which meant that dogs detected mussels frequently and were thus rewarded frequently. As a result, dogs seemed motivated and excited to work during these trials. In addition, temperatures were much colder (minimum 10 degrees C, maximum 14 degrees C) so dogs did not overheat. Other trials during this trip took place outside an old warehouse, where there were boats present to practice searching for mussels. In addition, on this trip, one of WD4C’s trainers also joined to help train the dogs and work through some of the dogs’ behavioural issues using an e-collar. The major behavioural issues handlers were concerned with were certain dogs’ tendencies to become distracted by other people or dogs, or certain dogs’ social capacity to deal with humans nearby. The e-collar was used to stimulate the dog when they performed an undesirable behaviour; for example, when they became distracted by the presence of another, non-working dog. These obedience activities seemed to induce the most stress out of all the activities I observed because, while only two trials were observed in total for obedience, one of the dogs yelped at the stimulation, both licked their nose/lips, and both exhibited lowered posture. Throughout this trip the dogs were rewarded regularly due to the
abundance of mussels on the shorelines, so the dogs maintained motivation to work despite these stressful activities.

Results – Dog Welfare

Exploring the circumstances of the dogs on the Alberta team helps to assess their welfare status as these factors act as input-based criteria. Dogs on the Alberta team are technically provincial government property, though the handlers care for them 24 hours per day, seven days per week and may adopt them upon retirement of the dog. In situations where the handler retires before the dog, it is uncertain what might happen – the dog may be given to another handler to continue her/his term, or the handler may be allowed to adopt the dog depending on the age of the dog and other factors. The Alberta dogs live inside their handlers’ homes and can roam freely through their houses. Their shifts are 7.25 hours long, with breaks as deemed necessary by handlers (dependent upon dogs’ behaviours), and two days off per week. During the summer months, dogs accompany their handlers to the inspection stations. At the station they either sit outside with the handler and other inspectors waiting for boats to arrive, or on hotter days, handlers will keep their dog inside the office while they wait for boats, to avoid overheating. Sometimes the handlers keep their dog inside a kennel in the trunk of the work van rather than allowing them to sit outside, so that they do not get distracted by the inspectors. During research trips, dogs were housed inside kennels in the trunks of their handlers’ work vehicles. Vehicles were parked in shaded areas to keep the dogs cool, and water was always readily available. Work shifts during research trips varied in length, and at times one could argue they were always working (in the same sense that humans are always working when they travel for work, since they are away from home). Depending on the location of the research trip, dogs might spend several hours in the work vehicle at a time during travel. Once they arrived at their final
destination, dogs were housed inside the handler’s hotel room with them. During off-season, handlers bring their dogs to the office where the dog sits beside their desk, and in some cases is allowed to roam freely through the office. During their down time, I witnessed some handlers take their dogs on walks and hikes in the local neighbourhoods. Most dogs on this team have little interaction with other people besides the handler, except for one handler whose partner lives with her, and therefore the dog interacts with them as well. Dogs on this team do not have a lot of interaction with other dogs, except for one handler who has two of her own companion dogs at home, so her conservation canine would interact with her other dogs during walks and time at home.

Dog welfare was assessed quantitatively using an ethogram (catalogue of behaviours) (Table 2) and qualitatively via interviews with handlers. Welfare assessments provide direct evidence as to the dog’s emotional states and thus welfare status. As explained in Chapter 3, data on dogs at rest was collected and intended to act as the control was not useable because there were insufficient samples and I was only able to observe some dogs while at rest. For that reason, it is difficult to make firm statements about the welfare status of these dogs based on the behavioural assessments alone; however, the data demonstrates some interesting patterns (Table 3). Dogs on the Alberta team were praised in 93% of trials on average – via food, a toy, or verbal/physical praise – and were punished (e.g. leash pops) in an average of 3% of trials. Interestingly, dogs showed at least one sign of stress in 58% of trials, but dogs exhibited stress excluding panting (to account for when panting was unassociated with stress) in only 33% of trials on average. This discrepancy conveys the fact that panting was very common, and that if panting is unrelated to stress – as in some cases it may be (Beerda et al. 1998; Smith et al. 2003) – then dogs showed no signs of stress in 67% of trials.
As noted in Table 3, the signs of stress most commonly expressed by the Alberta dogs aside from panting were lip/nose-licking (27% of trials on average across the three dogs) and avoidance (14%). Lip/nose-licking is a known indicator of stress and submission, often occurring as a result of harsh training methods (Beerda et al. 1997; Beerda et al. 1998; Schwizgebel 1982). Avoidance refers to when a dog would either turn, look, or move away from the subject (Schilder & van der Borg 2003) – for example, if the trial were taking place at an inspection station, if the dog looked away from the boat or tried to turn/move away instead of searching, this would be considered avoidance. Based on my participant observations it seemed as though dogs were most stressed out in hot temperatures and when handlers used negative contact or aversive stimuli. The welfare assessments somewhat support these observations. Dogs showed signs of stress (excluding panting) when temperatures were 25 degrees Celsius or higher (n=59 trials) in an average of 40% of trials. Out of these trials, dogs licked their lips/nose in 33% of trials and showed avoidance in 38% of trials on average. Dogs showed stress (excluding panting) when handlers used negative contact (n=3 trials) or e-collars (n=2) in 100% of trials. One dog also yelped loudly during a trial using an e-collars. While yelping was not an assessment criterion in this research, vocalizations are a known indicator of pain (Conzemius et al. 1997; Hellyer 1999; Noonan et al. 1996), so the fact that the dog yelped in reaction to the aversive stimulus implies he might have been in pain. Moreover, from my perspective via participant observations, handlers on the Alberta team tended to respond to their dogs’ stress consistently by giving them a break. They would frequently recognize when their dog became disengaged – usually because they would show avoidance or other signs of stress – and would either take them inside or for a walk. This was more common during watercraft inspections than during other activities, because other activities took place on a stricter schedule in which the team was working away from home.
and had a set list of tasks to complete each day, and therefore there was less time for breaks.

Overall, dogs seemed to enjoy the work despite the 33% of trials in which signs of stress were apparent. This is illustrated by the fact that dogs wagged their tails in 80% of trials on average.

Moreover, of the trials in which dogs showed stress, they also wagged their tails in an average of 59% of trials, which could imply that despite some stress dogs still enjoyed their work (or that assessment criteria were not indicative of stress in those particular trials). In addition to tail-wagging, dogs generally seemed to enjoy their work as they showed high energy as soon as it was time for them to work.

**Table 3. Welfare assessment statistics for Alberta dogs and all dogs (Alberta and Ontario combined).** Percentages were calculated for each dog across all trials, and then the average of those percentages was calculated and is presented for each team as well as for all dogs. The minimum and maximum percentages across dogs is also presented for each team. Each colour corresponds with a specific dog (grey indicates that two or more dogs had the same result); colours are displayed to show patterns and variability within dogs. Total number of trials for Alberta dogs \( n=197 \), three dogs; and for all dogs \( n=298 \), seven dogs.

<table>
<thead>
<tr>
<th>Welfare Indicator</th>
<th>AB Dogs</th>
<th>Min</th>
<th>Max</th>
<th>All Dogs</th>
</tr>
</thead>
<tbody>
<tr>
<td>dog showed lowered body posture</td>
<td>4.6%</td>
<td>3.2%</td>
<td>7.3%</td>
<td>6.2%</td>
</tr>
<tr>
<td>dog showed avoidance</td>
<td>14.4%</td>
<td>2.4%</td>
<td>21.1%</td>
<td>10.2%</td>
</tr>
<tr>
<td>dog lifted paw</td>
<td>0.0%</td>
<td>0%</td>
<td>0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>dog yawned</td>
<td>3.4%</td>
<td>2.1%</td>
<td>4.9%</td>
<td>2.2%</td>
</tr>
<tr>
<td>dog panted lightly or heavily</td>
<td>52.0%</td>
<td>26.8%</td>
<td>75.4%</td>
<td>76.4%</td>
</tr>
<tr>
<td>dog panted heavily</td>
<td>12.1%</td>
<td>0%</td>
<td>31.2%</td>
<td>25.5%</td>
</tr>
<tr>
<td>dog licked lips/nose</td>
<td>27.3%</td>
<td>8.4%</td>
<td>39.3%</td>
<td>24.0%</td>
</tr>
<tr>
<td>dog showed any signs of stress</td>
<td>58.0%</td>
<td>39.0%</td>
<td>77.1%</td>
<td>79.0%</td>
</tr>
<tr>
<td>dog showed signs of stress excluding panting</td>
<td>33.2%</td>
<td>29.5%</td>
<td>36.1%</td>
<td>30.7%</td>
</tr>
<tr>
<td>dog wagged tail</td>
<td>80.3%</td>
<td>62.1%</td>
<td>100%</td>
<td>81.1%</td>
</tr>
<tr>
<td>handler made negative contact with dog</td>
<td>2.0%</td>
<td>0%</td>
<td>4.9%</td>
<td>8.7%</td>
</tr>
<tr>
<td>handler yelled at dog</td>
<td>1.2%</td>
<td>0%</td>
<td>2.5%</td>
<td>0.5%</td>
</tr>
<tr>
<td>handler praised dog</td>
<td>92.8%</td>
<td>80%</td>
<td>100%</td>
<td>96.9%</td>
</tr>
</tbody>
</table>

It is interesting to note the variation in behaviours demonstrated by each dog, as illustrated by the coloured blocks in Table 3. On the Alberta team, the dog that most frequently showed signs of stress was also the dog whose handler used the fewest negative verbal and physical cues towards them (orange blocks) – however, it should be noted that it was uncommon
for any handler to use negative verbal (max=2.5%) and physical (max=4.9%) cues towards the
dogs. The other two dogs on the Alberta team seemed to be relatively equal regarding which one
showed the fewest signs of stress depending on the criterion. This variation goes to show how
individual dogs manifest stress in different ways (Beerda et al. 2000; Malmkvist et al. 2003;
Mason & Mendl 1993; Rooney et al. 2007), and that signs of stress may be related to their work
or not – sometimes behaviour and stress can be related to the dog’s personality (thus genetic),
rather than their environment (Horwitz & Mills 2009; Saetre et al. 2006; Storengen et al. 2014;
Zapata et al. 2016).

In addition to welfare assessments, handler interviews also revealed important
information about dog wellbeing. The major themes revealed during interviews on the Alberta
team were: dogs love their work, dogs perform innate/natural activities, dogs are better off
working than not, handlers have a strong connection with their dogs, handlers show concern for
their dogs’ well-being, dogs have some behavioural issues, dogs sometimes show signs of
stress/fear, and handlers are generally skeptical about the idea of a union for working animals.
These themes are further detailed below with handlers’ quotes.

During interviews, every Alberta handler (n=3) referred to the dogs being happy in some
way, at least once. For example, when asked about her dog’s experiences at work, one handler
responded:

_They LOVE it; it’s the most fun thing in their lives._

Another explained, referring to her dog:

_I think he really – he’s proud of what he does. In the sense that when he finds [the
target], he knows it’s something special._
Furthermore, interviewees spoke about the frequency with which their dogs performed activities that were beneficial for them—e.g. getting plenty of exercise and interaction with other dogs and people. For example, one handler said that during her dog’s downtime:

*He’s got a good herd of other dogs that we go on walks with, whether it be every day or every couple days. He has doggy friends.*

Another handler explained that her dog generally spends at least half the day interacting with other dogs, since she has two others (non-working) at home.

In addition to expressing how much their dogs love their work, handlers frequently showed concern for their dogs’ well-being, and explained how their lives have been improved through their work roles. One handler explained:

*Two out of three of our dogs were in shelters. So, I mean now they have a job that they love, they get to be with their human every day, to go to work every day, and you know, their health and safety is our utmost concern. So if the dog is panting and tired, time to go in the air conditioning, you know, take a nap.*

She further explained that, despite that the dogs seem to love their jobs, they lead quite different lives than house pets. That being said, she stressed that handlers do their best to make the work fun for their dogs:

*That was also a switch, too. Our dogs don’t go to the dog park every day and hang out and play with all the dogs in the forest, you know what I mean? They’re working dogs and so we have to make sure that going to work is the most fun thing in their lives.*

Another handler explained, referring to the fact that her dog came from a shelter and now lives amongst other dogs and people:

*That whole network of other dogs and people and everything else, you can tell that he’s living a much happier life than he was before.*
Another handler echoed this idea:

*He gets a lot of exercise, he gets a lot of attention. And then I think it’s really great because he has this job, and so he doesn’t get left at home for long periods of time ... So I think he’s kind of, health-wise, he’s taken care of.*

Interviews (and participant observations) also revealed that handlers had a strong connection with their dogs. For example, one handler explained:

*We really believe in the handler bond with the dogs, so we live full-time with our dogs and our dogs are fully integrated into our families and our lives at home. We find that really important for trust because if I ask the dog to do something, he needs to be able to trust me that I want him to look there or do that. And you know same thing, if he’s trying to tell me something I need to know what he’s trying to tell me out in the field.*

Another explained how much time she spends with her dog both at and outside of work:

*We live together, work together, train together, and recreate together. I always add that in because people are like ‘what do you do on your days off?’ and like I said, [my dog] comes with me. We go to the river, we go canoeing – him and I went fly fishing last summer ... So it’s that aspect that we are partners together.*

Another handler also stressed the idea of her and her dog being partners. When asked about the best part of her job, she said:

*I think the best part is just being able to work as a team with him, and seeing him – I don’t know, just how independent he is, and kind of contributing to that, and learning about him. And seeing the different responses he has to things. Yeah, I guess just seeing his success and being able to be a partner with him.*

At times, handlers spoke about their dogs’ behavioural issues and the steps they take to alleviate them. For example, one handler explained:
[My dog] either developed it in the first season, or it wasn’t shown until the end of the season that he has separation anxiety. So, you know, realizing that wherever I go, he comes with me. Or I have to figure out a solution.

Another handler explained about her dog:

He kind of struggles with his social skills sometimes, so then I’ve kind of been struggling with how to work with him on that. And it’s not always kind of clear what to do or what’s gonna work. So that could be challenging. And I feel like sometimes, you know, there’s a bit of a social stigma associated with a barking dog that looks aggressive, regardless of whether he is or isn’t aggressive.

Despite these issues, handlers showed the utmost concern for their dogs’ welfare, working around these problems in their daily lives. For instance, the handler whose dog has separation anxiety said:

I’m working on it at home and that’s a location that is comfortable, it’s known, he knows it. And so I can slowly build up to things at home … It was either because he was a rescue – there could’ve been something that happened in that first year and a half and that’s why he was surrendered. Or, because he was surrendered, and he didn’t have anybody to attach to when he got attached to me, and then we worked an entire summer … So that’s something I would’ve never expected. I knew that we were getting rescues, but you never really know what their issues could be or are going to be. And I think that’s the hardest for other people to understand as well … And so, yeah they’re work dogs, but they’re also rescues. I think that’s hard.

She then elaborated on some of the steps she takes to mitigate her dog’s separation anxiety, such as taking small steps and leaving him alone for gradually longer periods of time, and ensuring he feels safe when she is away from him. The handler whose dog has issues with sociability said:

And it’s funny because I spend a lot of time worrying about what other people think, I want him to be a good ambassador for his breed and our program. But I
think a lot of it is actually me unnecessary worrying. Because I think a lot of people, I mean they still think he’s really handsome and they wanna meet him and they think he’s cool. And so I don’t think that they actually have sometimes the thoughts that I worry they’re going to have, you know?

She further elaborated on the ways in which she has tried to improve his social skills, for the sake of everyone’s safety and happiness – the dog, the handler, and the public – for example, by focusing her spare time on socializing him with people.

Moreover, handlers were asked whether their dogs exhibit signs of fear while working, and how they respond to such behaviours. One handler explained her dog’s fear of staircases and surfaces and how she responds to that:

One of the things is he’s quite afraid of different surfaces, or stairways ... like those concrete stairs, or any stairway that you can see through. He’s not cool with that. So the way I deal with that is, usually I’ll just kind of like encourage him to investigate it ... I’ll just walk up to the beginning of it and take a few steps on it. He’ll usually be interested but concerned, and so then I’ll just stand there, and he’ll just kind of check it out. So I wouldn’t drag him onto it ... I try to be kind of supportive but, you know, “this isn’t a big deal, it’s okay.” Sometimes I’ll use food to kind of encourage him, so like with [a dock, like maybe toss it a little bit farther than what he can reach and let him go get it. So he’ll figure out that like, “I went there, it wasn’t that bad.” But when he’s really stressed he doesn’t really want food, and I don’t also want to kind of lure him with food beyond where he’s comfortable and then he kind of panics. So we kind of just go slowly.

Another handler recounted a time when her dog experienced terror when he saw a snake:

I didn’t see the snake, but he was on the leash, and it wasn’t the long line, just the leash – he jumped upwards and backwards. Boots came off. So that was you know, a safety thing. I didn’t know if it was a rattlesnake or what, and just from that moment on not taking him places to go to the washroom ... in places with
long grass. Right, so I went closer to the building from then on for the rest of the season.

Lastly, handlers were asked their opinions on the idea of creating a union for working animals (a concept discussed towards the end of Chapter 2). One handler laughed, explaining:

*I have never heard of that! That’s hilarious! Because I work for a union, right? ... I don’t [have any comments], I’d have to look into what the union would be proposing for the dogs. But I mean at the end of the day, this dog is my partner, and no one cares more about the dog than I do ... Like I said, I work for a union, so by default so does he. We have a very good retirement package lined up for him [laughter].*

Another handler sounded skeptical, responding:

*Um, I don’t know. I mean I think that’d be interesting. Because if you think about like a union, how it works for people, a bunch of people get together and decide what kind of conditions they want, and then they, you know, advocate for those. And it seems strange in a way that, you know, humans would determine what was appropriate for working animals, and then they would somehow force that on other handlers of working animals. ... Well what if like I don’t agree with that group of humans, like how do you become part of the people that determine what the union of working animals wants? So I guess I don’t know, I certainly think it’s a good idea, but then it becomes difficult like, who advocates for the animals, and how do you trust them to kind of have the best interests of the animals kind of at the forefront. I guess, I mean, that’s kind of maybe the role of what legislation and law is, like animal welfare, that kind of thing. Sort of, we’ve already done that, I guess.*

Finally, the last handler was skeptical as well, and replied:

*I don’t know if it’ll change anything that we’re doing, because I think our dogs are all treated humanely and cared for. The network that we have with each other*
and with the other handlers really helps to make sure we’re always on the right
track, if we have any questions or anything like that. But I’m not saying that it’s a
bad thing, because there might be some organizations that might need the
assistance with a union or something like that.

**Results – Handlers’ Experiences**

While this study is focused on dog welfare in conservation roles, the human handlers’
experiences are an important component of the humane jobs model. The main themes revealed
during interviews with Alberta handlers were: handler loves their work, handler is proud
of/confident in their work, dog is hard on handler’s personal life, and handler insists on adopting
dog after retirement. These themes are further detailed below.

Every handler interviewed on the Alberta team (n=3) mentioned or implied that they love
the work they do as conservation canine handlers. With regard to the handlers’ perceptions of
their work overall, one interviewee said:

*We* love the work. *I mean, it’s really opened up a whole new area ... It’s really
opened up all this amazing opportunity.*

Another handler explained why she loves her job:

*Partially because of the fact that I love educating kids and the public in general. I
love to see how [my dog] is a tool to see the education. Sometimes you can’t
educate somebody, and then they see a dog, and then all of a sudden, they’re a
dog person, so they’re gonna be more open to what you’re trying to say.*

In addition, every interviewee expressed pride and/or confidence in the program and the work
they do. When asked about the best part of her job, one handler said:

*And then the other part is seeing how [my dog] gets excited, right. And not just in
the training, but in working and showing off to people, and you know, he’ll go up*
to a total stranger and squeak his ball. You know, he’s happy and in the moment, and I think that makes me feel happy, too.

And while at times, handlers expressed the negative impacts their dogs have had on their personal lives – for example, being unable to socialize away from home due to having the dog, handlers consistently expressed or implied that the benefits outweigh any consequences of the job. This notion was conveyed in different ways, but one example is when asked what would happen to the dog when either the handler or the dog came to retirement. When asked if she would keep her dog, one handler replied:

Oh for sure. I would never turn my back on that dog ... That dog’s going with me forever.

Other handlers also conveyed how important their dogs are to them, stating that once their dog’s working years came to an end, they would certainly adopt them as pets.

Results – Environmental Impacts

The health of the environment is the third component of the One Welfare model and thus sustainable animal labour; as such, environmental impacts were assessed via interviews with conservation canine supervisors and handlers, as well as secondary documentation. Handlers were thus asked about the impacts of their work on the environment, whether positive or negative. In terms of positive impacts, the program manager explained that the efficiency of the dogs is what attracted their team to including them in the first place:

We set up a trial at a used boat shop, and I brought in trained watercraft inspectors and I said “okay, treat this as you would any high-risk boat as if you were inspecting it for mussels.” And I compared the accuracy and the efficiency of the trained watercraft inspectors versus the canines that Working Dogs for Conservation had trained to do this. And it probably won’t surprise you to hear the results: the dogs outperformed the humans in both categories – they were
much quicker, and they were able to detect 100% of the fouled watercraft in that trial; the humans came in at about 75%.

In addition to the dogs’ efficiency, the most common response regarding positive impacts for the Alberta team was how the dogs act as ambassadors for public outreach and education, improving the public’s perception of their program. The program manager elucidated:

[The dogs] are also just amazing ambassadors, and I honestly think that’s one of the greatest values we’re finding, is the PR potential with them. You know, when you have people by law having to stop at a watercraft inspection station now, and they’ve already been in traffic for eight hours and construction for two of it in the hot summer, it really helps when they see a dog at the watercraft inspection station. I mean I’ve worked them myself and I’ve seen – like one night I saw 17 out of 19 passengers all got out of their vehicles to watch the dog inspect their boat. We just don’t see [public interest without the dogs present]. And so, it’s really helping to educate people who might otherwise not be as interested.

Another handler touted the dogs as ambassadors:

Education and outreach is a huge part of it. So even at the boat stations, for example the receptiveness to the public ... Our inspectors [are] gauging if people come out and want to see the dogs work, then we can see how much education we’re actually passing on. Yeah, we have pamphlets and [promotional merchandise] that our inspectors give the boaters, but you get more people asking more questions when the dog is right there, the kids are petting the dog, they’re giving out [K9 identification cards].

One of the other handlers also had experience with her dog improving public perception and awareness of the Aquatic Invasive Species program:

When we were in Texas over the May long weekend, lots of people stopping at the station were asking, ‘where’s the dog?’ And so again, I think that’s awesome ... because I think it kind of just means they’re excited about it, and it gives [us] lots of opportunities just to talk to people because they want to talk about the dogs,
and then you can talk about the different conservation [initiatives] that the dogs are involved in.

Regarding the negative consequences on the environment that their work might have, respondents on the Alberta team stated that there were minimal to no negative impacts. All handlers acknowledged the concern that their dogs could potentially be vectors for the invasive species they work to prevent from entering the province – for example, if they are searching for an invasive plant species, seeds could potentially be spread via dogs’ paws and fur. Despite these concerns, all handlers expressed confidence in their program and ability to ensure that the dogs (and handlers) did not act as vectors for invasives.

In addition to interview data, environmental impacts can be assessed via statistics available for the success of the program. Alberta’s Aquatic Invasive Species Program offers annual reports in which they outline their inspection stations season’s success (Table 4) (AEP 2015, 2016).

Table 4. Number of mussels detected at watercraft inspection stations by the Alberta team (AEP 2015; AEP 2016a). Information for 2017 is unpublished, but acquired from an Alberta team handler. The data will be published in the 2017 Annual Report, at which point the number of canine-assisted mussel interceptions will also be revealed (TBD = to be determined).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td># Watercraft inspections</td>
<td>30,957</td>
<td>16,779</td>
<td>21,449</td>
</tr>
<tr>
<td># Canine-assisted watercraft inspections</td>
<td>734</td>
<td>970</td>
<td>606</td>
</tr>
<tr>
<td># Mussel interceptions</td>
<td>19</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td># Canine-assisted mussel interceptions</td>
<td>TBD</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

In 2017, 734 watercrafts were inspected with the help of canines; the number of canine-assisted mussel interceptions is to be determined (McCubbin, pers. comm., 2018). In 2016, canines assisted with 970 watercraft inspections, four of which were intercepted for mussels. In addition to these inspection statistics, the annual reports also state that in 2016 the team was covered in 23
media events (AEP 2016a), and in 2015 their campaigns were estimated to have reached an audience of over 2 million people (AEP 2015). Finally, during watercraft inspection trials, the public showed interest in the working dogs (either by asking questions, taking pictures, or observing the dogs work) in 30% of the trials I observed.

**Ontario Case Study**

**Study Site Details**

Ontario was the second major case study of this project. Ontario’s main conservation canine team is run by the Ministry of Natural Resources & Forestry (MNRF) division of the provincial government, and is composed of one supervisor, Grant Rieder, and six canine-handler pairs across the province: Nick and Maya, Mike and Rebel, Sean and Timber, Colin and Gauge, Megan and Colt, and Andy and Rex. Ontario’s team is not mandated to employ canines as part of their enforcement team, but they have been a valuable addition according to the supervisor. With regard to the acquisition of their canines, two of the team’s older canines came from shelters; however, their new manager (Grant) prefers to purchase dogs from brokers, as he finds it takes a lot more time and effort to find a dog from a shelter with the right traits for their work; whereas brokers will specifically breed dogs for certain desirable physical and personality traits. Handlers on this team do not have any special certifications to handle dogs; generally speaking their educational backgrounds involve a two-year program in Fish & Wildlife and another two years in Natural Resources Law Enforcement (with a couple of exceptions).

I made four visits to observe the Ontario team’s activities throughout the summer and fall of 2017. I first visited Grant in May to introduce myself and learn more about his team and their work. During this visit Grant explained to me some of the methods they use and his training philosophies, which he was very passionate about and which he teaches all handlers on his team.
While Grant and his handlers do not have any official certification for training dogs, Grant has a history of working with dogs, both in his personal life and with the police department. The Ontario team’s training entails a 16-week course in which dogs and handlers are trained together as a pair, and involves four main components: obedience, tracking, detection, and agility (and sometimes a fifth; bite work). Before that, though, Grant does some initial training with the dogs alone – prior to allowing the handlers to work the dog. Grant had just recently purchased a new dog for his team, named Maya, so I was able to observe some of his interactions and training with her. Grant is no longer a handler (but was in the past) – he now supervises the team and trains the dog-handler pairs for their work. As such, Maya would be given to their newly hired conservation officer, Nick, in the coming weeks. Grant practiced various detection and tracking scenarios with Maya, as well as some obedience lessons. I performed welfare assessments for each of these activities using the trial method described earlier (e.g. a trial was complete when Maya was rewarded or praised for positive behaviour). Grant also showed me the e-collar he uses for training dogs on his team, and allowed me to feel the different power settings, allowing me to get a sense of what the dogs feel when wearing the e-collar during training. The e-collars used on his team have a range of 0 to 21 shock power, and when placed in my hand, I was unable to feel more than a very light buzz until around level 12 (at which point the sensation still was not painful but was noticeable). Grant informed me that he and his handlers usually do not exceed level 5 when training the dogs, as it is a highly effective tool even at low power. He discussed how he uses the e-collar at a power that is high enough to discourage the dog from performing an undesirable behaviour, but low enough not to harm the dog. At the same time, he explained that the e-collar must not be used at too low of a power that the dog might get used to the sensation, and thus the handler would have to continue increasing the power of the
stimulation. Eventually, he said it would become detrimental to the dog’s welfare. Thus, Grant urged that e-collars are safe and effective tools when used by someone who understands how to use them properly, without harming the dog.

After getting a sense of Grant’s work over the initial two days, I set up a second visit in July. This time, I met three of his handlers and their canines: Nick (newly hired) and Maya (who I had already met), Mike and Rebel, and Sean and Timber. I observed some of the same training activities as the first trip, including detection, tracking, and obedience. I also observed a new activity: bite work (n=4 trials total). Bite work is an activity in which the handler commands the dog to attack a criminal (or quarry, in the case of training) by latching onto the person’s arm with their teeth. This tactic is used only in critical cases, when a dangerous criminal (e.g. someone with a weapon) is present and is not complying with the officer’s directions. Only the older dogs on the team, who were part of the team before Grant joined in 2014, are trained and recertified each year on bite work. This is because Grant’s team took a vote and overall decided to eliminate bite work training from their procedures, as the majority felt it was unnecessary for their work and in some ways reduced safety rather than improving it, which defeated its original purpose.

Because two of the dogs were trained on bite work, they need to be recertified each year to ensure they still know the proper commands and when to bite (and when not to bite), to ensure everyone’s safety. During each of these activities, I performed welfare assessments using the trial method.

My third visit was in September at a conservation area in the Cobourg area. I was invited to meet with Ontario handler Colin and his dog Gauge to observe a daily patrol. During this visit the dog was not deployed very much because the COs were monitoring the salmon run, and salmon is not a species of fish that the Ontario canines are trained to detect. Despite that, I was
still able to get a sense of what the Ontario handlers do during patrols, and I was able to witness some activities involving the canine unit, such as tracking an individual who crossed a No Trespassing Zone, and searching fishers’ equipment for the scent of fish to ensure they were not fishing over their limit. During these activities, I performed welfare assessments using the trial method. During this visit, I had the chance to witness one event in which a group of fishers were caught fishing more than their licenses allowed, plus they were using an illegal method of catching fish known as snagging (hooking a fish through a body part other than its mouth) (GO 2016). Despite that the canines on the Ontario team are not trained to detect salmon, the dog was deployed to search for fish in places the fishers might have concealed them, because the dog’s ability to detect the odour of fish in general might have been helpful. In addition, having the dog present and active in this case encouraged a deterrence effect, reminding fishers that the conservation officers and canines were present and on duty, so that they might think twice about breaking the law.

Finally, I visited Grant in Woodstock again in September, where I met Megan and her canine Colt (Nick and Maya were there as well). During this visit, I witnessed similar activities to previous visits, including detection, tracking, and obedience training; however, this time I was able to observe agility training at their agility circuit in the Kitchener area. Megan and Colt were being fully recertified for the year, so I witnessed more difficult activities, such as detection with other animals present (e.g. on a farm with chickens and cows). During each of these activities, I performed welfare assessments using the trial method.

Results – Dog Welfare

Exploring the circumstances of working dogs helps to assess their welfare status as these factors act as input-based criteria. Dogs on the Ontario team technically belong to the
government, though the handlers care for them 24 hours per day, seven days per week. The dogs live in outdoor kennels on their handlers’ property. The kennels have an insulated portion to keep them warm in the winter time, but some handlers allow their dogs inside their garage or house when temperatures are deemed excessively cold or hot, or when there are too many bugs out (determined at the handler’s discretion). Dog-handler pairs work throughout the year but their busiest season is in the fall – when the hunting season peaks – and the summertime during fishing season. Their work hours vary depending on when and where field officers require the dog-handler pair’s assistance – so for both the people and the dogs, the work schedule can vary from a few hours to 10- or 12-hour days, a large portion of which might be spent in transit. Work vehicles are fully equipped with dog kennels and constant access to water. When handlers are away from home, dogs stay inside the truck kennel, and the vehicle is left on to ensure an appropriate temperature for the dog (e.g. heat in the wintertime, air conditioning in the summer). Work vehicles also have intricate alarm systems in case of emergency. For example, if the car turns off and the dog is still inside, the car’s siren will blare, warning the handler that there is a problem and ensuring the dog’s safety. I did not witness any of the dogs’ down time, but handlers described that they generally do not spend much time with people or other dogs. They limit their interactions with people other than themselves so that the dog knows s/he must remain loyal to the handler and not listen to anyone else’s commands. Handlers limit their dogs’ interactions with other dogs (with a couple of exceptions, namely those with companion dogs at home) so that their dog is not distracted by other dogs that may be present while they are working.

Dog welfare was assessed quantitatively using an ethogram (catalogue of behaviours) (Table 2) and interviews with handlers. Welfare assessments helped to illustrate the dog’s
emotional states and thus informed welfare status. As explained in the previous section, it is
difficult to make firm statements about the welfare status of these dogs based on the behavioural
assessments alone given that controls were not feasible; however, the data demonstrates some
interesting patterns (Table 5). Dogs were praised in 100% of trials – whether via a food, toy, or
verbal/physical praise – and were punished with physical contact in 14% of trials. Dogs showed
at least one sign of stress in 95% of trials, but exhibited stress excluding panting (to account for
when panting was unassociated with stress) in only 29% of trials. Thus, if panting is excluded,
dogs showed no signs of stress in 71% of trials.

As noted in Table 5, the sign of stress most commonly expressed by the Ontario dogs
aside from panting was lip/nose-licking (22% average across the four dogs). Based on my
participant observations it seemed that dogs were most stressed out in hot temperatures and when
handlers used negative contact or aversive stimuli, which is consistent with researchers’ findings
that lip/nose-licking often occurs as a result of harsh training methods Beerda et al. 1997; Beerda
et al. 1998; Schwizgebel 1982). The welfare assessments somewhat support these observations.
Dogs showed signs of stress (excluding panting) when temperatures were 25 degrees Celsius or
higher (n=69 trials) in an average of 32% of trials; dogs showed avoidance in 20% of these trials.
Moreover, dogs showed stress (excluding panting) when handlers used negative contact (n=18
trials) in 67% of trials, and when handlers used e-collars (n=11) dogs appeared stressed in 100%
of trials. Overall, dogs seemed to enjoy the work despite the 29% of trials in which signs of
stress were apparent. This is illustrated by the fact that dogs wagged their tails in 82% of trials on
average. Moreover, of the trials in which dogs showed stress, they also wagged their tails in an
average of 64% of trials, which could imply that despite some stress dogs still enjoyed their work
(or that assessment criteria were not indicative of stress in those particular trials). In addition to
tail-wagging, dogs generally seemed to enjoy their work as they often showed high energy as soon as it was time for them to work.

**Table 5.** Welfare assessment statistics for Ontario dogs and all dogs (Alberta and Ontario dogs combined). Percentages were calculated for each dog across all trials, and then the average of those percentages was calculated and is presented for each team as well as for all dogs. The maximum and minimum percentages across dogs is also presented for each team. Each colour corresponds with a specific dog (grey indicates that two or more dogs had the same result); colours are displayed to show patterns and variability within dogs. Total number of trials for Ontario dogs n=101, four dogs; and for all dogs n=298, seven dogs.

<table>
<thead>
<tr>
<th>Welfare Indicator</th>
<th>ON Dogs</th>
<th>Min</th>
<th>Max</th>
<th>All Dogs</th>
</tr>
</thead>
<tbody>
<tr>
<td>dog showed lowered body posture</td>
<td>7.3%</td>
<td>0%</td>
<td>15.8%</td>
<td>6.2%</td>
</tr>
<tr>
<td>dog showed avoidance</td>
<td>7.1%</td>
<td>0%</td>
<td>10.5%</td>
<td>10.2%</td>
</tr>
<tr>
<td>dog lifted paw</td>
<td>0.0%</td>
<td>0%</td>
<td>0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>dog yawned</td>
<td>1.3%</td>
<td>0%</td>
<td>5.1%</td>
<td>2.2%</td>
</tr>
<tr>
<td>dog panted lightly or heavily</td>
<td>94.8%</td>
<td>89.5%</td>
<td>100%</td>
<td>76.4%</td>
</tr>
<tr>
<td>dog panted heavily</td>
<td>35.5%</td>
<td>18.0%</td>
<td>56.7%</td>
<td>25.5%</td>
</tr>
<tr>
<td>dog licked lips/nose</td>
<td>21.5%</td>
<td>7.7%</td>
<td>36.7%</td>
<td>24.0%</td>
</tr>
<tr>
<td>dog showed any signs of stress</td>
<td>94.8%</td>
<td>89.5%</td>
<td>100%</td>
<td>79.0%</td>
</tr>
<tr>
<td>dog showed signs of stress excluding panting</td>
<td>28.9%</td>
<td>7.7%</td>
<td>42.1%</td>
<td>30.7%</td>
</tr>
<tr>
<td>dog wagged tail</td>
<td>81.7%</td>
<td>71.8%</td>
<td>96.7%</td>
<td>81.1%</td>
</tr>
<tr>
<td>handler made negative contact with dog</td>
<td>13.8%</td>
<td>0%</td>
<td>26.7%</td>
<td>8.7%</td>
</tr>
<tr>
<td>handler yelled at dog</td>
<td>0.0%</td>
<td>0%</td>
<td>0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>handler praised dog</td>
<td>100.0%</td>
<td>100%</td>
<td>100%</td>
<td>96.9%</td>
</tr>
</tbody>
</table>

It is interesting to note the variation in behaviours demonstrated by each dog, as illustrated by the coloured blocks in Table 5. On the Ontario team, one dog in particular tended to show the most signs of stress (blue blocks), while a different dog typically showed the fewest signs of stress (pink blocks). Because individual dogs manifest stress in different ways (Beerda et al. 2000; Malmkvist et al. 2003; Mason & Mendl 1993; Rooney et al. 2007), this variation implies that signs of stress may or may not be related to the work – sometimes behaviour and stress can be genetic rather than a result of their environment (Horwitz & Mills 2009; Saetre et al. 2006; Storengen et al. 2014; Zapata et al. 2016).

Handler interviews also revealed important information about dog wellbeing. The major themes revealed during interviews with the Ontario team were: dogs love their work, dogs
perform innate/natural activities, dogs are better off working than not, handlers have a strong connection with their dogs, handlers show concern for their dogs’ well-being, dogs have some behavioural issues, dogs do not interact with humans/other dogs much, dogs rarely show signs of stress/fear, and handlers had mixed opinions about the idea of a union for working animals. These themes are further detailed below with handlers’ quotes.

During interviews, every Ontario handler (n=6) referred to the dogs being happy in some way, at least once. For example, the team supervisor described:

\[\text{Being a service dog – which I think these dogs are, or a police dog – you couldn’t ask for a better job for a dog or a better life for a dog. Because he gets to spend his entire life with the handler, in the vehicle, driving, searching for stuff, you know, hunting every day. It couldn’t be better.}\]

[...]

\[\text{When you open the door, the dogs cannot wait to get in the truck [to go to work]. It’s like they’re rocking towards the truck, it’s like “all right, let’s go.” The dogs live for this; it’s the best thing that’s ever happened to them. Whether they’re getting on a quad, or they’re getting on a snowmobile. They just – life is good. When they find something, they just stare at you, their tail’s going 100 miles an hour they’re so excited.}\]

Echoing this idea, when asked about their dog’s experiences at work, one handler responded:

\[\text{You think about the life of the dog, it’s a fantastic life, right? They get to go out every day, whether you’re in the truck or going on snowmobiles or getting in and out of helicopters or planes, you know, it’s awesome.}\]

Another handler agreed that the dogs love the work, explaining:

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1 Masculine pronouns are used to refer to all dogs on the Ontario team to protect handlers’ identities. Masculine pronouns were selected rather than feminine as 5/6 dogs on the Ontario team are male.
2 The pronoun “their” has been used throughout the Ontario case study to protect handlers’ identities (with the exception of the team supervisor, as permitted).
He seems to have a lot of fun when he’s out searching. He loves to be off-lead, he loves to be in the bush, he loves to run. He has a lot of fun – it seems to me like he has a lot of fun when we’re working.

And another handler summarized it like so:

We call it work but it’s really just a big game to them.

In addition to expressing how much their dogs love their jobs, handlers frequently showed concern for their dogs’ well-being, and explained that their dogs have been given a much better life than if they had lived as house pets. For example, one said:

I know if I was a dog I’d want his position. Overall like I said, 90% of the time we’re doing something involving him … If he had lived his life [as a] pet, would it have been as good as what he has now? I would say probably not. Because every day we do something for him. At the end of the day … my position revolves around him. So whether he’s in the truck all day [like] today, I made sure the truck’s on, the air conditioning’s on, he’s comfortable. You know, I go out and check on him, usually every 2-3 hours I’ll go out and make sure everything’s okay, let him out for the bathroom. So he’s constantly getting that attention.

Another expressed a similar notion:

Yeah, for sure I think he’s better [off] working than [being] a pet dog. Especially with him, his drives are very high, so as a pet he would be very tough to handle in a house, in that type of setting.

Similarly, another handler explained that their dog’s life would have been much different if he had not been given a job:

He has no clue what his future looked like for him potentially 8 years ago, being at the dog pound two or three times in his young life. Right, he has no clue that maybe you know, the next time you might get put down. However, this dog, he’s happy all the time.
Moreover, one handler described why having a job makes their dog so happy:

*One way I guess I would describe it is, [my dog] is bonded with one person so he doesn’t have a whole community or family of people that he has to learn to read and understand. He’s got really one set of expectations that he knows well, from me, because being a professional dog trainer and handler – as in I do it as a profession and hobby full-time – he gets the benefits of consistent training and reasonable expectations. So I think that’s, you know, these are all the reasons why I think his overall well-being is better than that of just about any dog, in my opinion. He gets to come to work, he gets to travel with me wherever I go. So the person that he’s bonded with, we’re rarely separated.*

And went on to explain that when they do have to be separated, the dog has the benefit of being cared for within their home, by the handler’s family members, rather than dealing with the stress of a boarding kennel. Another handler explained how they know their dog loves their job:

*I know that [he enjoys the work] because when I come out in the morning in my pajamas to let the dog out, he’s slower to get about his business, he goes and does his business, comes back to the kennel and waits for his kibble. If I go outside in my uniform, his energy is greater, he goes to the truck and I have to kind of remind him that he’s gotta go take a leak before he gets in the truck, but he’s really wound up to get in that truck and get going.*

Many handlers described how their dogs could discriminate between work time and downtime solely based on whether their handler was wearing their uniform or not – and that dogs were always more excited when the handler came outside in their work uniform. Several handlers even explained that when their dogs are not working, the dogs become depressed and want to go back to work.

In addition, handlers frequently showed a strong connection with their dog, and explained the steps they take to ensure their dog is adequately taken care of:
When he’s traveling in the truck, he has the benefits of a spot that he knows, that’s a safe place, he knows what to expect. He’s in a climate-controlled truck so he doesn’t have heat or cold stress. He has all his essentials as far as a roof over his head, he gets fed twice a day at the same times, and you know he has his water in his kennel, so all of his needs are met that way.

These dogs have the best lives in the world. We have close relationships with our vet – I can text my vet, I can call him at any time ... [My dog] gets the best medication, the best vaccines, he gets fantastic food. I basically get paid to take care of him. So even small things like brushing his teeth, keeping his nails clipped, keeping him groomed. That’s all stuff that I get paid to do. So he’s well taken care of. He gets good food, he gets water all the time. He’s consistently being kept active ... The length of how long I get to work him is [dependent upon] how good I take care of him. And the better that I take care of him, the longer we’re gonna be able to work as a team.

Another common theme was the fact that the dogs have the opportunity to use their noses and search for things, which are activities that come naturally to them. For example, the team supervisor explained:

\[ \text{It’s their nose and their hunting drive – they’re doing something they want to do. So [members of our team] all use hunting-type breeds, right, and their genetics drives them to search for stuff and hunt for stuff. So ... instead of hunting for rabbits, they’re hunting for a shotgun shell.} \]

At times, handlers spoke about situations in which their dogs become stressed, or in which they must refrain from performing actions that are natural to them. For example, one handler explained that the dogs must not chase wildlife:

\[ \text{If you don’t have control of a dog, you don’t have a dog you can use. So you have to have a dog that is obedient ... Meaning that I have to be able to let the dog in the bush, and command him back and forth through the bush ... No matter what happens, whether a} \]
rabbit takes off or a deer takes off, we have to be able to command the dogs to search an area, not chase animals, not go for a swim ... They have all these desires – they want to run, they want to play – so we have to make sure that we can focus those drives into something that’s useful for us.

Another explained that their dog cannot interact with other dogs regularly:

_I don’t socialize him with other dogs at all, and the main reason for that is because – dogs love to socialize with each other ... But, because our dogs are working dogs, say I show up to a moose camp or something, and they have their dog there, but I need to do a detection scenario. I can’t have [my dog] wanting to play with that other dog, because then he’s not going to be working for me ...

 Basically it all ties back to wanting to keep the safety of your dog ... I can’t have my dog running around and playing with another dog and then get injured. It’s not an option._

This handler further elaborated that it is the same situation with people – their dog is not allowed to socialize with other humans much because then he will not obey his handler as consistently.

Other handlers echoed this sentiment as well; however, some handlers did have dogs at home with whom their working dog was allowed to play at times. In addition, some handlers mentioned that certain activities, such as obedience training, can be stressful for their dogs. Despite these issues, handlers expressed concern for their dogs’ well-being and took steps to ensure they were not stressed in the long-run. For example:

_Stress to [my dog] is, like I said, when he’s not working, or when we’re not, he may get bored. But he shows signs of stress when he’s not working or not engaged in something he was trained to do. Now that’s all he lives and breathes is work ...

 Sometimes depending on the situation when we’re on a snowmobile or the ATV, I can see signs of stress in him ... and he will tense up a little bit. So now it’s just coaxing him a bit, like I said, slow it down and just tell him you know, “it’s gonna be all right, everything’s fine.”_
Finally, one of the handlers explained that they try to limit the amount of stress their dog experiences:

*We do our best to eliminate [stress], to keep that to a minimum. Because a dog that’s stressed isn’t, for one, going to work very well at all, and you’re just not going to get any results that way. So yeah, we try and limit it.*

Handlers were also asked whether their dogs exhibit signs of fear while working, and how they respond to such behaviours. The following are some of the responses from the Ontario handlers, in no particular order:

>If he was responding to something with fear, then I may just expose him to lesser parts of whatever he’s scared of over time until he gets over it. If it was a certain type of noise like gunfire or something like that, I might start with real soft fire, with the dog at a further distance, and then often we’ll reward calm behaviour and positive behaviour with food in that scenario.

>......................

>If he shows signs of fear or apprehension, I’ll work him to show that he can have success in a spot even where he has some fears ... So when you go [to a place the dog is afraid of], he shows some hesitation – the tail goes down, he slows his pace, and he’s looking around a little bit more. So what I do is I’ll put a shell casing out there, and I’ll continue to motivate the dog or get him to work, which he does, he doesn’t stop. And then he finds that casing and I reward the dog. So in my mind I’m teaching the dog that even though he has fear in these locations, he can still have a success, and he can still have fun ... And then we play with the ball for half an hour, you know and walk out of there, the dog’s tail is up, his head is up, he’s got the ball, he’s happy and successful. That’s how I deal with neurotic behaviour from a dog.

>......................
If he does show fear, you kind of almost ignore it, because ... if I show fear, or if I’m [comforting] him ... he doesn’t understand that. All he understands is my behaviour and how I’m acting in a situation ... Every time they’re doing something you want them to do, you give them the positive reinforcement ... He’s gonna pick up on [my emotions], and he’s gonna [be able to] tell that I’m uncomfortable and that’s gonna make him uncomfortable.

I reassure him. So when he found his first moose, there was definitely some fear, he didn’t know what he should be doing. So he kind of was hunched down very low to the ground slinking in there. And I just told him “good boy.”

I’ve never seen him show fear of anything that I can think of. But if that ever happened, in any scenario ... we would just deal with it right then and there. If he got scared of, I don’t know, a piece of metal falling down and clanging beside him, well we would go around that piece of metal and we would play and make it happen a few more times until he decided there’s nothing wrong with it.

In addition, when asked what he wants people to know about his conservation canines, the Ontario team’s supervisor, Grant, discussed the training procedures:

I think there’s value in knowing what the dogs do, what they’re trained to do. And certainly value in how they’re trained to do it. Right, because the old ways of training dogs don’t exist anymore. They used to call it the “yank and crank” method where you tell a dog to sit, if he doesn’t sit, you basically rip his head off ‘til he sits. And that stuff doesn’t exist anymore, and maybe some people still think it does. Almost all the training is through positive reinforcement. And I’m not going to say there isn’t any room for punishment, because there is. It’s not different than children, right. You can train them – raise them – using positive reinforcement and proper decision making, but every once in a while, they’re going to do something that they shouldn’t do and they know they shouldn’t do it.
Well, there are repercussions for that, and with the dog it's the same thing. And sometimes they're going to do stuff and they know they're not supposed to do it. So there is a place for punishment, but that's such a small part of dog training anymore. Like you build all this positive stuff in it so the negatives very seldom happen.

During one of my visits with Grant, he further explained that for every negative scenario, there should be a positive one. That is, if the dog must be punished for performing an undesirable behaviour, Grant ensures that the dog is rewarded for performing a desirable behaviour shortly thereafter, to encourage the concept of positive reinforcement rather than punishment as a method of learning.

Lastly, handlers were asked their opinions on the idea of creating a union for working animals (a concept discussed towards the end of Chapter 2), and how it might affect their work. These are the responses I received:

It's difficult to answer that because like what I said before, the length of how long I can work him and how long we can work as a team depends on how much I take care of him ... Every single day I do [a] ten-minute look over him ... I am so focused on his well-being that it's almost like it's, I think it's kind of unneeded, you know what I mean? I wouldn't have become a canine handler if I didn't have a passion for dogs, and I wouldn't you know, want to work with dogs if I didn’t care about them. So I don’t want to say that it would get in my way, but you know, it would get in my way because I take care of him like you wouldn’t believe. So I don’t know, it’s interesting that there would be wanting to start a union for that. And then it’s also kind of like, you know, someone else speaking for my partner, because nobody else knows my dog like I do, because I’m with him every single day. So it would be interesting having somebody – who doesn’t know [my dog] or doesn’t know my relationship – have a voice for him, I think.

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Well I don’t know, how would they know how much the dog works and when he gets his breaks? I don’t know. And I’ve done this long enough, a working dog is a happy dog is a good dog. That’s all they think about, and to me personally ... not working your dog can be more of a penalty to the animal than working them too much. That’s my personal feeling ... I think it would be worse off to make a dog not work than to work ... This is what they live for, and that’s why we took these dogs in the first place – we took dogs that want to do this. So I don’t know how a union would work.

It sounds a lot like something that you would direct towards a zoo, or someone with a service dog. Because I mean no dog gets treated better ... Something like that is of no benefit in that these dogs get treated amazingly ... I wouldn’t think it would [apply to our work]. For zoo animals or something like that, because if the animal is bred for a profit, then there’s always room for people that don’t take care of the animal. But for natural resources dogs or police dogs, there’s no money in it. [We] are doing it for the love of the work. Right, so there’s no benefit, no gain, no nothing, I mean these dogs have it made.

Well I can only imagine it would potentially affect [us] in a positive way, if they worked closely with the agencies and the handlers that work directly with the dogs and understand the dogs and the work that they do, the benefits, the challenges and all those things, I can only see it being a benefit.

Yeah I don’t really have an opinion on it. I mean I’m unionized already, right. So I have guidelines around working, working conditions, and all that sort of stuff. And I think you know that kind of applies to me as well as the dog. You know, cause if something is unsafe for me, well then obviously I can’t put the dog in there, because I can’t go in there, you know whatever that might be ... You know,
a burning building, well it’s not safe for me to go in a burning building so I’m not taking my dog in a burning building, type of thing. So I don’t really have an opinion on the unionized thing.

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Yeah I think it could be a good thing. From my experience with working dogs, they’re treated very well. I don’t know what the union would address, but if it’s to benefit working animals, I’m all for it. Anything that would benefit or further educate handlers would be a good thing.

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Depending on the time of year for us it would definitely have an impact. Because there’s some days, you know during our busy times, that we work quite a bit in order to be able to respond to everything in our requirements ... It’d all depend on what they were trying to control.

With regard to the welfare assessments performed using the ethogram (Table 2), dogs on the Ontario team were praised in 100% of trials. Dogs showed at least one sign of stress (lowered posture, avoidance, paw-lifting, yawning, panting, or lip/nose-licking) in 94% of trials. Dogs showed at least one sign of stress excluding panting (to account for when panting was unassociated with stress) in 30% of trials. Handlers made negative contact with dogs in 17% of trials. A breakdown of overall statistics for each assessment criterion can be found in Table 5.

**Results – Handlers’ Experiences**

As mentioned, human handlers’ experiences are an important component of the humane jobs model. The main themes revealed during interviews with Ontario handlers were: handler loves their work, handler is proud of/confident in their work, dog is hard on handler’s personal life, and handler insists on adopting dog after retirement. These themes are detailed below.
Almost every Ontario handler interviewed mentioned or implied that they love the work they do as conservation canine handlers. In addition, every interviewee expressed pride and/or confidence in the program and the work they do. One interviewee explained:

*It’s sort of an incredibly amazing feeling of accomplishment when you take your dog out and there’s some ecologist saying they had an animal shot three days ago, and “we’ve recovered the animal but we want to find the bullet that was shot,” because if we get that we can make an arrest of the guy that poached this animal. And they’re always amazed at how well the dogs do.*

Another handler described:

*There are days where you know, you think you’re not gonna find anything and all of a sudden there he is sitting, looking at you all proud saying “give me my ball!” It makes you proud as well as a handler right, it’s just like man, this is what every day of training is about right here. Seeing that dog looking at you with pride, “give me my ball, I just found it for you.”*

Yet another handler shared their passion for the job:

*Working dogs, it’s just so interesting and every single day is different ... It’s crazy, you have to do stuff with them every single day, and it’s like climbing a mountain. It’s so challenging, and it’s so rewarding, and I love watching the dog progress, and it’s great. Sorry, I could go on and on about it forever.*

Many handlers expressed similar sentiments, in some instances explaining that having a canine as a partner makes their job unique and enjoyable.

A few handlers touched on the fact that their dog can be hard on their personal life. Some themes brought up were their dog’s energy levels (e.g. too much energy), impacts on their social life (e.g. unable to make plans due to having to look after the dog), or lack of motivation. For instance, one handler explained that the most frustrating part of their job is when the dog does not feel motivated to work; however, they always ensure the dog’s welfare is priority:
The most frustrating experiences are when you want to work and the dog doesn’t. On the canine [training] course I had a period there where it just became too much for the dog and we had to take some time off. Where you’re building and I want to keep building but the dog’s telling you, “I’ve had enough.” So you’ve gotta listen to the dog and stop, take it easy when you have to take it easy even though you want to continue to work, if your dog doesn’t you’ve got to change things up.

Another handler described that their dog’s endless energy can be exhausting:

The frustration is they are so eager, so energetic that it’s physically hard on us. This dog that I have now anyway, there is no slow button for him, there is no off button. It’s 100% all the time, or he’s sleeping – one of the two ... When I’m tired of dragging my butt through the clear-cut, he’s still dragging me: “Come on, let’s go let’s go!” And it’s hard to keep up to a dog sometimes.

Despite these issues, most handlers expressed or implied that the benefits of their jobs outweigh any consequences. This was conveyed in various ways, but one example is when asked if they would adopt their dog after they (the dog or handler) retired, one handler responded:

Oh yeah, there’s no other option, and you spend every day with these things you can’t do other than that, you know what I mean?

Another had a similar response:

Oh, definitely, yeah ... It’s very hard, you work with the dog for [several] years, and how could you not build that bond.

Most handlers on the Ontario team conveyed similar responses, implying that their dog is an important part of their lives.
Results – Environmental Impacts

The health of the environment is the third component of the One Welfare model and thus sustainable animal labour; as such, environmental impacts were assessed via interviews with conservation canine handlers. Thus, handlers were asked about the impacts of their work on the environment, whether positive or negative. The most common response regarding positive impacts for the Ontario team was the deterrence factor that the dogs offer. One handler explained:

*I believe a lot of what we contribute to natural resource law enforcement is the deterrent factor we provide. There’s the perception and knowledge from the public that dogs, they know that if they are trying to sneak stuff through by officers there’s a good chance that if there’s a dog team on site, or if the dog catches up with them, that they’ll be revealed. So I think there’s a high deterrent factor in that respect. We are highly visible in the communities. People know we have the dogs, so I think that’s the other neat thing they provide. Not only that but they’re good to gap any kind of relationships with the public, a lot of people can relate to dogs, and they’re a good educational tool that way.*

Another handler explained:

*People knowing that we have canine units, it definitely has a positive impact. They will double think or triple think their thoughts of, “I’m gonna poach today,” just knowing that we’re out there.*

In terms of the public’s perception of the program, handlers generally agreed that people perceive the program positively, unless they are interested in breaking the law. For example, one handler explained:

*I would say [laughter], are the poachers happy? No. You definitely get those snarly people that don’t like [the dogs], but it’s definitely positive when people are aware that we’re actually out there and what our dogs are capable of doing. Probably one of the biggest downfalls of our position is that we’re not well-known enough. And that’s not*
canines, it’s COs as a whole. Especially in the southern parts of the province that people don’t know who we are and what we do, let alone that we have a canine unit. We do lots of demos and public outreach, and people have no clue who we are and what we do, so as soon as they know what a CO is, “that’s pretty neat and pretty amazing what you guys do,” and then it’s like, yeah and plus I have a dog that’s trained to do this, this, and this, right. And it actually floors people like, “oh my god that’s amazing!” ... As soon as they know there’s a dog coming out and what the dog’s capable of doing, it definitely, the public interest goes straight through the roof.

Another handler also talked about the public’s positive perception of the program:

People love knowing that the dogs are doing [work with us], and especially since in the past most of our dogs were rescued dogs to start with, people were really appreciative of the fact that we would take those dogs and teach them how to do something and go and do it with them.

When asked about the negative environmental impacts, some handlers mentioned concerns over the burning of fossil fuels their work entails as a result of keeping the vehicles running all the time (to ensure the dogs’ environments are kept at appropriate temperatures), and the amount of fuel required for frequent long-distance travel to remote sites. Aside from those concerns, most handlers claimed that their work has minimal to no negative impacts on the environment. There was no documentation available for the Ontario team outlining the team’s environmental impacts or program success; rather, handlers gauged their program’s success through anecdotes and their interactions at public demonstrations.

This chapter has provided the raw results of this research with regard to the dogs’ welfare, handlers’ experiences, and environmental impacts for each case study, through interview data, welfare assessment data, participant observation, and secondary documentation. Results regarding dog welfare are mixed. Generally speaking, the dogs were not stressed and seemed to enjoy their work; however, certain activities, such as obedience training with the use
of e-collars and work performed outdoors in hot temperatures, seemed to induce stress. Handlers also implied that their dogs enjoy their work, as do the handlers themselves. Finally, environmental impacts are largely unknown, but perceived as positive – whether the dogs act as ambassadors for their program (Alberta) or as a deterrent against crime (Ontario). Some handlers mentioned concerns over the amount of fossil fuels burnt as a result of keeping work vehicles running for extended periods of time. The magnitude of these impacts requires further investigation. In the next and final chapter, I analyze these research results in light of my conceptual framework and address my broader research aim of whether conservation canine roles programs might offer humane job opportunities. I use the results of this research to help answer the question of whether or not conservation canine roles can be considered humane, addressing my research aim. Next, I provide recommendations for the future of conservation canine programs in Canada, as well as explaining the main contributions of this research to the scholarship. Finally, I discuss the limitations of this research and areas for future research.
Chapter 5: Discussion & Conclusion

In this chapter I analyze the results of this research in light of my conceptual framework, and address my broader research aim of assessing the extent to which conservation canine (CK9) programs offer humane and sustainable job opportunities. I start by providing a summary of my findings, elaborating on the selection, breeding, and training procedures for conservation canines, as well as their overall circumstances in terms of work and home environments, comparing and contrasting these components for the Alberta and Ontario case studies. Then I answer the question of whether these roles may be considered humane and sustainable by exploring this question through three different lenses. First, I discuss the types of work that conservation canines engage in and their placement on the continuum of suffering and enjoyment, as outlined in Coulter’s (2016) framework, in order to assess the humaneness of these jobs in an animal studies context. Next, I discuss the findings from my welfare assessments and participant observations as they relate to the Five Freedoms, assessing how these roles may be humane in an animal welfare science framework. Lastly, I discuss the handlers’ experiences and environmental impacts (the other two pieces of the One Welfare model) in greater depth in order to assess the humaneness of these jobs from a sustainability standpoint. Subsequently, based on my findings and conclusions, I provide some recommendations to improve the lives of conservation canines in Canada (addressing research question seven), including: the implementation of more rigid guidelines for the care of working dogs, a handler agreement to ensure dogs are protected in unexpected scenarios or upon retirement, and more consistent, unbiased welfare assessments (e.g. third-party) for working dogs and their teams. I then explain the limitations of this research, outlining areas for future research, and conclude by highlighting the significance of this research and its major contributions to the current scholarship.
Summary of Findings

CK9 Selection & Breeding

I explored the selection and breeding processes for conservation canines because these factors can potentially affect dog welfare. For example, choosing dogs from shelters is an excellent way to give an “unwanted” dog a chance at a better life – adopted by a team who will care for them to the best of their ability, rather than sitting in a shelter for the rest of their days before ultimately being euthanized (Beebe et al. 2016; Miller et al. 1996; Shubert 2012; WD4C 2015a). Despite these advantages, it should be noted that shelter dogs have their own unique concerns. Spending part of their lifetime in a shelter – and prior to that, unknown circumstances – these dogs tend to develop certain behavioural traits that can make them difficult to work with (Voith & Borchelt 1996). I witnessed this problem throughout my research, particularly on the Alberta team since their dogs generally come from shelters (however, it is not possible to determine whether dogs acquired these issues because they came from shelters, or if they were surrendered to the shelter because of these issues). For example, one dog had issues with separation anxiety; another with sociability. Separation anxiety and aggressive or fear-related behaviour are caused by both genetic (nature) and environmental (nurture) factors (Horwitz & Mills 2009; Saetre et al. 2006; Storengen et al. 2014; Zapata et al. 2016). But because breeders of working dogs, a growing industry (Benoit 2008), are so meticulous about selecting for certain traits and avoiding others (Jeppsson 2014), there is lower risk of inheriting these traits genetically for working dogs that come from breeders. Therefore, while the behavioural issues seen in this case study may or may not have been a direct result of the fact that these dogs were adopted from shelters rather than bred to work, it is an appropriate assumption that dogs from shelters are more likely to possess such traits. Handlers agreed with this notion, explaining that
their dogs’ issues could have arisen as a result of the fact that they were rescued and their circumstances prior to these roles is largely unknown. That being said, separation anxiety is a common condition amongst companion dogs (Bamberger & Houpt 2006; Herron et al. 2014) regardless of whether the dog is working, and having a job could arguably be better for the dog’s welfare as it might mean they spend less time alone and have more activities to distract them. In addition, shelter dogs with behavioural problems are unlikely to be adopted as pets – and if they are, they are likely to be surrendered again (Beebe et al. 2016; Miller et al. 1996; Shubert 2012). Thus, roles in conservation (and other industries) truly do give these dogs a second chance, since they often exhibit desirable traits for work such as a high ball drive, and trainers and handlers are willing to put in the work to resolve their behavioural issues. It should be noted, however, that while some research demonstrates that dogs with behavioural issues are likely to be re-abandoned if they are adopted at all (Beebe et al. 2016; Miller et al. 1996; Shubert 2012), I was unable to obtain information about the shelters from which these dogs were adopted. Thus, the conditions within these shelters is unknown, and it is uncertain whether the dogs were adopted from a pool of individuals who were deemed unlikely to be adopted.

On the other hand, choosing dogs from a breeder or broker perpetuates a potentially unethical industry in terms of breeding practices. Irresponsible and inappropriate breeding practices, such as inbreeding (mating of close relatives), can lead to decreased welfare (Crispin 2011; McGreevy 2007). These practices can increase the occurrence of genetic disorders (Leroy 2011) such as breathing issues, heart disease, and hip dysplasia (Bovenkerk & Nijland 2017). Hip dysplasia is of particular concern as it tends to affect German Shepherds (Ibid.), a breed that is commonly bred for work in law enforcement (Benoit 2008; Tenner 2017). Despite these issues, major concerns regarding dog breeding practices tend to apply more so to pedigree and
show dogs than working dogs (Crispin 2011; Jeppsson 2016). The breeding industry for working
dogs has a greater focus on function than aesthetics, generally resulting in healthier dogs and
thus fewer welfare concerns than pedigree dogs (Crispin 2011). In addition, concerns over loss of
 genetic diversity due to breeding practices have historically been inflated, with some researchers
finding that breeds have retained 87% of their original diversity level – which is much higher
than commonly believed (Wade 2011). Nevertheless, breeders are still urged to consider their
choices carefully as to not threaten existing diversity (Crispin 2011; Leroy 2011). Moreover, the
Ontario team supervisor explained that he prefers to purchase dogs from brokers than adopting
them from shelters because these dogs are more likely to possess the necessary traits for the
work, and less likely to acquire health issues that prevent them from working, thereby saving
money, time, and other resources required for training and housing the dogs (Rieder, personal
communication, 03 March 2017). Finally, it can be argued that dogs who are bred to work should
be given jobs that keep them busy, doing what they were bred to do. Many handlers throughout
this research, particularly on the Ontario team, discussed that their dogs have high ball drive and
endless energy. Some handlers stated that their dog’s high energy is the reason they are not
allowed inside their home – as to prevent damage to their furniture. Some handlers even stated
that their dog becomes depressed when they are not working. Thus, if a dog who is bred for
work, or who possesses the high drive required for these roles, is given the languid life of a
house pet, they will likely become anxious and stressed, creating trouble for the family as a result
(e.g. destroying household items due to boredom/anxiety), and potentially being abandoned or
euthanized in the end. Therefore, as many handlers asserted, a working dog might, in fact, be a
happy dog in this regard. For these reasons it is difficult to determine whether adopting dogs for
work is a more suitable option than breeding dogs for work, with regard to animal welfare.
CK9 Training Procedures

Training procedures were explored as part of this research because different training methods can affect dog welfare. Traditional dog training methods involve the application of an aversive stimulus in order to decrease undesirable behaviours. Some researchers have found evidence that reward-based training methods, such as the use of a treat or toy to encourage desirable behaviour, are more efficient than aversive training (Adams & Johnson 1994; Haverbeke et al. 2008; Hoby et al. 2004; Salgirli et al. 2012; Schilder & van der Borg 2004). Throughout this research, handlers consistently described how they use positive reinforcement as a means of obtaining a desired action or behaviour. My observations were consistent with these statements, as handlers used positive reinforcement (through a reward or praise) in nearly 100% of trials; however, during trials I also observed that negative reinforcement was sometimes used (e.g. leash pops) when the dog performed an undesired behaviour. This was done either through making physical contact with the dog (Ontario team), leash pops, or through the use of an e-collar (both teams) as a form of punishment or correction. Aversive training methods and the use of e-collars are largely agreed to be detrimental to dog welfare (BSAVA 2003; Beerda et al. 1998; Hoby et al. 2004; Overall 2007; Schilder & van der Borg 2004) and positive training methods are thought to be more efficient (Adams & Johnson 1994; Haverbeke et al. 2008; Hoby et al. 2004; Salgirli et al. 2012; Schilder & van der Borg 2004). In addition, some research has shown that when e-collars are used, dogs begin to associate the presence of their handler with being shocked, resulting in long-term welfare concerns (Schilder & van der Borg 2004). In contrast, some researchers have found that e-collars may not have negative effects on dog welfare (Christiansen et al. 2001; Klein 2000). Throughout this research, handlers expressed the importance of using e-collars for obedience training and explained that if used by a professional
who is thoroughly trained to use e-collars safely, then they would not be detrimental to the dog’s welfare. This echoes the findings of Salgirli et al. (2012), who concluded that e-collars are effective learning tools and induced less stress than pinch collars, but should only be used if trainers and handlers are sufficiently qualified. Several handlers explained that the use of e-collars is a safe technique if they are used on a low enough setting to avoid causing harm to the dog, but sufficiently high that it bothers the dog enough to comply. In addition, the e-collar offers convenience such that handlers can employ them from a distance; whereas alternatives like choke chains require the dog to be on a leash (Schalke et al. 2007). This is an interesting consideration because working dog welfare has been found to improve when dogs are not on a leash (Glenk et al. 2013). And since much of the work done on both teams, but particularly the Ontario team, takes place while the dogs are off leash (so that the dogs can cover more ground in a shorter amount of time), training aids that require a leash are not always an option. As well, handlers on both teams explained that e-collars are necessary for the training such that if a dog does not listen to its handler, it threatens their safety. An example I was given is if the dog decides to chase wildlife, it may risk injuring the wildlife, or getting injured itself. Or, if the dog runs after a child and ends up hurting them, the dog’s job – and life – may be threatened. Thus, handlers argued that e-collars are a necessary component of training and that dogs’ welfare is not at risk if these devices are used properly. The main concern, according to handlers, is that if an e-collar is used by someone who is not sufficiently trained to use one, and for example uses it on a setting that injures the dog or causes long-term stress, then the dog’s welfare would be at risk. Given that the use of e-collars can pose a threat to welfare since their safety is largely dependent on the user’s training, and that dogs may begin to associate their handler (with whom they spend the majority of their time) with stress as a result of e-collar use, I conclude that all possible
alternatives should first be considered, and if used as a last resort, there should be strict guidelines and training procedures in place for the proper usage of this tool.

**CK9 Circumstances**

Input-based criteria are important considerations when assessing dog welfare; therefore, dogs’ circumstances, such as their work and home environments, were explored as part of my observations. As discussed in Chapter 2, working dogs are often homed in a kennel environment, which can sometimes induce stress depending on if dogs are secluded from other dogs or prevented from expressing natural behaviours (Hiby et al. 2006; Rooney et al. 2007; Rooney et al. 2009). For the Alberta team’s dogs this was not as much of an issue because they live primarily inside their handlers’ homes. The only time this varies is when the dogs are working or travelling for work. I was unable to perform welfare assessments on dogs while in transit, but this would potentially be the most stress-inducing environment since the dogs are secluded in kennels in the vehicle, for several hours in some cases. Then, during trips away from home, dogs are housed in an unfamiliar environment – usually hotel rooms – which may or may not be stressful for dogs. In contrast, the Ontario team’s dogs live outdoors in an insulated kennel. Being separate from the family and other dogs limits their social interactions, and living outdoors could arguably have welfare implications in extreme temperatures. Despite these concerns, the team supervisor expressed confidence that keeping dogs outdoors encourages them to grow a thicker fur coat which enables them to withstand the colder temperatures while working. Other handlers also mentioned that they bring their dogs inside their garage or house when temperatures are extreme or when too many bugs are present. Moreover, dogs are kept in kennels inside the work vehicle during transit to various work sites, as well as during trips away from home. The dogs stay in the vehicle overnight during these trips, with the air conditioning or
heating on to ensure a comfortable environment. The seclusion of the dogs and lack of social interactions in these environments could have implications for their welfare. Again, dogs were not assessed while in transit, so the welfare implications of the input-based criteria for these dogs is largely unknown.

Other important input-based criteria to consider are the work schedules (e.g. shift length, breaks, days off) and their feeding, grooming, and veterinary care. The fact that dogs on the Alberta team have designated shift lengths of 7.25 hours per day, with breaks as needed and two days off per week, seems to support dog welfare. I observed handlers take their dogs for walks or give them breaks from work as soon as they noticed the dogs were feeling unmotivated or disengaged (namely through behavioural observations such as looking or turning away). The variable shift length of the Ontario team’s dogs might induce stress for dogs if they are unable to take a break for extended periods of time; however, many handlers expressed that their dogs are much happier working than when they are at home in their kennels. This is certainly something to explore further with regard to welfare. Both teams’ handlers ensured that dogs receive the utmost veterinary care and grooming. The dogs’ feeding schedules are generally consistent, but on the Ontario team meals are sometimes skipped in order to motivate the dog to work for a food reward. This may have welfare implications if dogs are not adequately fed and should be further assessed.

**Are Conservation Canine Roles Humane Jobs?**

The central aim of this research was to determine the extent to which conservation canine roles are an example of a humane and sustainable job. To address this aim, I discuss my findings below as they relate to each major framework that informed this research: animal studies, animal welfare science, and sustainability.
Animal Studies Framework

The types of work involved, as well as the context in which the work is performed, are important factors in assessing the humaneness of work roles from an animal studies perspective. Within conservation roles, dogs perform many different forms of work, as outlined by Coulter (2016), including dirty work, body work, communication work, and sometimes emotional work. I elaborate on these concepts below and how they can help us determine the placement of conservation canines’ work on the continuum of suffering and enjoyment (Figure 1).

Dogs must perform some dirty work in conservation roles – for example, when searching for a dead animal’s remains. This is a common activity on the Ontario team, when the conservation officers are searching for evidence of a poaching event. Not only is the dog looking for dead animal remains, but I was told by handlers that sometimes they have to search through the gruesome remains to find a shell casing or other evidence for the case. This can be considered a form of dirty work based on human standards; however, it might be something that dogs actually enjoy. I did not have the opportunity to perform any assessments or observations of this particular activity so there is no data to determine whether dogs enjoy this type of work.

Dogs in conservation roles must perform many activities that require body work. For example, on the Alberta team, dogs must manoeuvre their bodies to be able to sniff the different parts of the boats during watercraft inspections, such as getting up on their hind legs to reach higher places, and crouching down to sniff underneath the boat. On both the Alberta and Ontario teams, dogs must exert energy – especially in harsh weather conditions – as they run around searching for targets, being meticulous and ensuring they breathe through their noses rather than their mouths (if they are panting, and thus breathing through their mouths, scent detection rates and efficiency decrease; Gazit & Terkel 2003). Another example of body work on the Ontario
team is the agility training I witnessed. During these obstacle courses, dogs were required to manipulate their bodies in various ways to get through the obstacles. This was, of course, training them for their regular work in which they are required to manipulate their bodies to search throughout forests and various terrain. Another example of body work on the Ontario team is the bite work that some of their dogs must perform, in which the dog must latch onto a criminal (or decoy, during training) and not let go until commanded to do so. Bite work is especially difficult in terms of body work, as it requires the dog to bite hard enough to ensure the person cannot get away, but not so hard that they injure the person (especially during training).

These forms of work may be physically taxing for dogs, and can influence their placement on the continuum of suffering and enjoyment (Figure 1).

Communication work is one of the most important forms of work that dogs working for conservation must do. Dogs must learn to communicate with their handlers in a variety of ways. For example, they must be able to listen to the commands that their handler gives them and react appropriately. They are also required to communicate information to their handler; for example, if they find a target odour, they usually alert their handler by sitting or lying down (or sometimes by barking) – and in some cases, they even have to pinpoint the odour by touching it with their paws or snout. Moreover, Burrows et al. (2008a) discussed that when a working dog receives mixed signals from different people – in the case of their study, a dog assisting an autistic child had to respond to the parents’ commands as well as the child’s emotional needs – it can be very stressful for the dog. Some handlers in my research explained that their dog benefits from the fact that they have only one person to whom they must respond and with whom they must bond. Therefore, while preventing dogs from communicating closely with other people might go against dogs’ natural instincts, it also has potential to make the dog’s job easier and less stressful.
in the long-run, in terms of the communication work involved. Given the obvious communication barriers between humans and animals, these challenges must not go unacknowledged.

Finally, conservation canines also perform emotional work. Dogs must frequently resist their natural instincts in many cases, which can be considered emotionally difficult. For example, as discovered through interviews with handlers, working dogs must not chase wildlife, and often times they must avoid interacting with other dogs and people. These commands can be difficult for dogs since they are counter-instinctual. Another example of the emotional work that dogs working for conservation must perform is when they must react to their handlers’ commands even when their handler is not adequately or clearly communicating with them. For example, according to one of the handlers I interviewed, if a handler is stressed or feeling other strong emotions, it is often said that those emotions “travel down the leash,” ultimately impacting how the dog acts and reacts. If dogs can sense humans’ emotions but they are supposed to be working, they must ignore any frustration on the line and simply do what is being asked. I witnessed this during one of my site visits with the Alberta team. There was a handler present who was not part of the Alberta team, but was a partner. The handler was clearly frustrated because their dogs were not alerting in the places the handler suspected there was a target. The handler’s frustration led the dogs to appear visibly stressed (based on their behaviours), and they wound up communicating false alerts to their handler due to the anxiety and anticipation of being successful. Therefore, working dogs perform emotional labour in many different capacities, and the handler’s ability to deal with their own emotions also comes into play.

Exploring the types of work conservation canines perform can help determine their placement on the continuum of suffering and enjoyment (Figure 1). Overall, I believe that the
work of conservation canines in Alberta and Ontario can be placed on the enjoyment end of the continuum. While some work may be considered “dirty” for humans, it might actually be stimulating and enjoyable for dogs – so work that involves searching through dead animals’ remains might still be placed on the enjoyment end of the continuum. Some of the body work involved can be taxing, but if handlers provide their dogs with adequate breaks and ensure they are working in appropriate temperatures, then the work is likely to be on the enjoyment end. Because dogs must sometimes work in extreme temperatures – particularly the Ontario team, whose dogs must work and live outdoors through the winter – they may be further from the enjoyment end of the spectrum on these days. In addition, bite work has the potential to cause damage to dogs’ jaws given the precision with which they must perform this work (e.g. grip firmly but not too firmly, and resist letting go). Since the team has eliminated this practice from their certification process, it may not be a concern going forward. Next, if handlers are communicating clearly and ensuring their emotions do not “travel down the leash”, then the communication and emotional work involved may still be enjoyable for dogs. On days where handlers’ moods affect the dogs’ success, the work may be further from the enjoyment end because dogs may become frustrated (at times in response to their handler’s frustration). In general, since conservation canines often perform innate activities like searching, their work seems to be more so on the enjoyment end of the continuum. I do not believe there is any time at which the dogs would be closer to the suffering end of the continuum, unless they were being chronically mistreated – of which there is no evidence to support in these case studies. Overall, noting the context of the work and how different variables affect a working dog’s behaviour are a good reminder that the continuum is fluid, and that placement can change depending on the day,
the activity being performed, the weather conditions, and the dog’s or handler’s mood that day (Coulter 2016).

While much of the work conservation canines perform seems innate and enjoyable, one may still wonder whether having the relaxed life of a family dog would be more desirable and better for the dog’s welfare. The discrepancy between a family dog’s life and a conservation canine’s life is apparent in many ways. While a family pet typically receives endless attention and affection – noted by one of the handlers as something that dogs naturally desire – most of the dogs I observed did not receive the same amount of affection from their handlers. The Ontario team, being an enforcement branch, seemed to be stricter about this than the Alberta team. While Ontario dogs received praise in 100% of trials, I rarely witnessed these dogs receive praise unless they had just performed a desired action. Moreover, the Ontario dogs are almost never allowed into the handler’s home and live a life separate from the family (with a couple of exceptions). In contrast, the Alberta team’s dogs live in the handlers’ homes and seem to live lives more similar to pets, aside from their work hours. The Alberta handlers also showed affection towards the dogs when they were off duty, and were noticeably softer with them even while on duty. This discrepancy is likely a result of the fact that the Ontario dogs’ findings have the potential to be used as evidence in court, whereas the Alberta dogs do not play a role in the legal process. Several Ontario handlers explained to me that being part of court procedures requires a dog to be much more rigid so that their actions can serve as accurate and legitimate evidence. One of the main questions that arises is whether or not some of the factors that cause stress in the short-term are worthwhile in the long-run. For example, while obedience work may be stressful for dogs and communication work may be taxing on some days, in the long-run these dogs must obey their handlers in order to work in these positions. Thus, perhaps being able to work in these roles...
is worth some acute or short-term discomfort. If dogs are able to have a better life as conservation canines than at a shelter or as unsatisfied and anxious house pets, then the short-term discomfort might be worthwhile.

Animal Welfare Science Framework

Another way of assessing whether or not conservation canine programs offer humane jobs is considering the extent to which the Five Freedoms (Table 1) are met. As discussed in Chapter 2, many animal welfare scientists use the Five Freedoms as a guideline for assessing animal welfare (Harrington et al. 2013; Houpt et al. 2007; Molomo & Mumba 2014; Rahman & Reed 2014; Rooney et al. 2009; Rushen et al. 2008; Shubert 2012; Sonntag & Overall 2014). While the Five Freedoms do not focus on positive states, but rather are concerned with alleviating suffering, they act as a baseline for the minimum protections working animals should receive. The first Freedom is the freedom from hunger and thirst, by providing ready access to water and a diet to maintain health and vigour. All handlers expressed that they have the utmost concern for their dogs’ well-being, ensuring they receive the best food and fresh water. During my observations I noted that dogs always had access to water during travel, and handlers offered dogs water in between trials throughout the day. On the other hand, as mentioned, I witnessed on the Ontario team that at times a dog’s meal might be skipped in order to motivate them to comply during obedience sessions. Therefore, while long-term hunger and thirst are certainly not a concern, there are some acute welfare concerns in this regard.

The next Freedom is the freedom from discomfort, by providing access to an appropriate environment. Again, all handlers expressed their concerns for their dogs’ well-being, ensuring their kennels are properly equipped, spacious enough, and are an adequate temperature – whether it is their kennel at home or in the work vehicle. On the Alberta team, dogs live inside their
handlers’ homes, so living conditions are favourable in that they are not confined to one small area, and they are free to move about as they please. This is important because, as mentioned in Chapter 1, previous research on working dogs has found that dogs who lived at home with their handlers demonstrated fewer signs of reduced welfare (Lefebvre et al. 2007). On the Ontario team, I witnessed first-hand that their work vehicles have systems in place to protect the dog in case the car’s battery dies (such as a loud siren and emergency backup air conditioning), so that the dog is not too hot or cold. In terms of their home environment, some Ontario handlers allowed their dogs inside their homes during extremely cold temperatures or during bug season (if they usually weren’t allowed, which was the case for most handlers), and one handler allowed their dog in their home for relaxation time. Despite these exceptions, the Ontario team’s general standard is to keep their dogs outdoors (in an insulated kennel) in order to encourage the growth of their fur coats, so that they can work outdoors regularly without becoming too cold. This may give rise to some acute welfare concerns; however, if kennels are sufficiently insulated, acute welfare may not be a concern. I was unable to thoroughly assess dogs’ kennels so no concrete conclusions can be drawn in this regard.

The third Freedom is the freedom from pain, injury, and disease by prevention or rapid diagnosis and treatment. Conservation canine work may involve certain risks to injury and disease – for example, a dog may injure their paw while working outside, or attract pests such as ticks. Despite these concerns, all handlers expressed how much effort they put into ensuring their dogs are in good health – particularly by consistently examining them for signs of injuries. In addition, both teams’ handlers stressed that they have strong relationships with their vets, ensuring they always get checkups when needed. Despite these good practices, one of the main concerns here is the fact that e-collars and other negative punishment techniques are sometimes
used. If these techniques are painful to dogs, then this freedom is not adequately met. Therefore, there are some welfare concerns with regard to the freedom from pain and injury, and alternatives should be considered.

The next Freedom is the freedom to express normal behaviour, by providing sufficient space, proper facilities, and appropriate company in terms of humans and of the animal’s own kind. On both teams, the provisioning of this freedom is quite variable. For example, some handlers have other dogs at home, so their canine is able to interact with other individuals of its own kind in that regard. For those handlers who do not have other dogs at home, their working dogs rarely get to interact with other dogs. As explained earlier, handlers do not allow their dogs to interact with other dogs very much because they want their working dog to obey commands and not become distracted by other dogs that might be present at an inspection station (Alberta team) or a crime scene (Ontario team). The same goes for interaction with other humans; most handlers do not allow it because they want the dog to remain loyal to the handler and only obey the handler’s commands. In addition, dogs on both teams are required to ignore certain natural instincts, such as chasing wildlife. This goes against their natural behaviours, but is required so that the dogs do not become distracted from their job duties. In addition, since working dogs are required to ‘work’, they may not be able to express normal behaviours if they are being commanded to act in a certain way or perform a task that they otherwise might not do. For example, if a dog is tired and wants to relax, this is something the dog may not be allowed to do during work hours; however, according to handlers and as witnessed through my observations, these dogs tend to have a high drive and are not interested in lying around. In addition, much of the work conservation canines perform is quite instinctual, as explained previously – for
example, searching and detection work. Thus, this freedom may be met in some ways but unachieved in others; there is room for improvement.

The final freedom is the freedom from fear and distress, by providing conditions and treatment that avoid mental suffering. To assess the extent to which this provision was met, I asked handlers how they respond if their dog exhibits signs of fear while working. Most times, handlers explained that they ignore the behaviour, so that they do not indirectly reinforce it. These handlers explained that if they try to comfort their dogs, the dog will take their reaction as affirmation that they should feel scared, as a form of inadvertent positive reinforcement. Thus, handlers generally avoid showing concern and instead act confident so that the dog does not continue to exhibit these undesirable behaviours. Another tactic some handlers described is exposing the dog to the object or situation that they are afraid of, demonstrating that it is harmless, and then positively reinforcing them when they are near that object or in that situation (either with praise, toys, or treats). Handlers also stressed that they would not force the dog into a situation in which they felt scared if the fear did not dispel upon exposure and reinforcement. In cases where dogs were truly distressed, handlers explained that they would take smaller steps to alleviate these fears. During my observations, I did not witness dogs expressing fear; however, it can be difficult to determine whether some behaviours were driven by fear. I did witness distress during some trials. The fact that dogs showed signs of stress during welfare assessments implies that this freedom is not completely fulfilled and handlers should strive to limit the fear and distress their dogs experience.

Taking into consideration the Five Freedoms as a method of assessing whether these roles are humane, I conclude that generally speaking the freedoms are met but there is room for improvement. There are some acute welfare concerns that should be addressed in order to avoid
chronic stress. Regarding the first freedom, handlers should ensure dogs are fed at appropriate times and perhaps use toy rewards rather than treats, so that there is no need to skip meals to motivate the dog, since skipping meals raises concerns for dog welfare, and can even impair dogs’ search accuracy depending on how food-deprived they are (Miller & Bender 2012). If dogs are not motivated enough to work for a toy reward, this behaviour should be encouraged through training, or handlers should select other dogs who would be more appropriate for the work. With regard to the second freedom, handlers should ensure dogs are kept in environments in which they are not too cold or too hot, and only work in appropriate temperatures for their wellbeing. Whether dogs should be kept outside through the winters is something that should be further investigated by welfare experts and veterinarians. Next, handlers should strive to minimize any pain inflicted on their canines during work, such as the use of e-collars, by considering nonaversive alternatives. Handlers should encourage their dogs to engage with other dogs and people at times so that they have the freedom to express these natural behaviours. If handlers are concerned with the dogs becoming distracted during work, there are other tactics to reduce this than eliminating interaction all together – for example, handlers can put particular vests or collars (e.g. with a bell) on their canines while working so they know to associate those ‘uniforms’ with work and learn what behaviours are (un)acceptable during these times. Finally, handlers should ensure freedom from fear and distress by using reward-based training and continuing to react to dogs’ behaviours by allowing them to take breaks and days off when dogs seem disengaged with their work.

Sustainability Framework

By exploring whether or not conservation canine roles are humane jobs, I am simultaneously exploring the extent to which they might be sustainable. To qualify as a humane
job, the animals and humans involved must have good welfare (Coulter 2016), and I argue that their work must also be good for the environment, encompassing a One Welfare model (Figure 2) (Fraser 2016). Similarly, sustainability requires the health and well-being of animals and humans, as well as the environments in which they live (Forget & Lebel 2001; Lebel 2002; Rapport et al. 1999). Therefore, in addition to assessing dogs’ welfare within conservation roles, I explored the handlers’ perceptions of their work and the impacts of their work on the environment to determine the extent to which these jobs are sustainable in terms of the human and environmental perspectives, comprising a One Welfare model.

In order to assess handlers’ experiences, during interviews handlers were asked about the most enjoyable and most frustrating aspects of their job. Most handlers were enthusiastic about their roles. Being a relatively exclusive position (only three positions in the province of Alberta and six in Ontario), handlers frequently expressed pride and confidence in their work. Handlers on the Alberta team discussed how they love having the opportunity to work with a dog, and that they appreciate the extent to which their dogs improve public education regarding the Aquatic Invasive Species program. Handlers on the Ontario team discussed how they admire seeing their dogs work and efficiently recover evidence for other conservation officers in the field. Some Ontario handlers expressed their frustration in situations where field-level conservation officers do not take advantage of the canine teams’ assistance with various cases. Others explained that having the dog has an impact on their personal life, whether as a result of the amount of energy the dog has, which can be exhausting; or the fact that they have to look after the dog, preventing them from engaging in social functions. Because I was embedded in the context of each case study, I was able to form my own insights as a data source for handlers’ experiences as well. Through my visits I learned that handlers generally seemed content with and proud of the work
they do, through the way they acted with their dogs and coworkers, and the enthusiasm and passion they conveyed when talking about their work or during work activities.

Considering the experiences of canine handlers in conservation work, it is interesting to note that both the Alberta and Ontario teams work within unionized roles. Unions are “the primary vehicles human workers can use to advocate for themselves and other workers … Workers use unions to defend gains and promote progressive change, individually, collectively, and socially” (Coulter p. 124-125). Some researchers argue that unionization is associated with improved life satisfaction and worker happiness (Charman & Owen 2014; Flavin et al. 2010; Keane 2012). While it cannot be assumed that handlers’ apparent happiness is a result of the unionization of their roles, historically there have been interesting outcomes when people who work with animals are unionized. For example, in the past, some unionized workers have used their collective authority to advocate the conditions of the animals with whom they worked (Coulter 2016). In some cases, caring for animals becomes politicized in the sense that if workers feel respected and their workloads are manageable, they may be able to provide higher quality care to the animals with whom they work (Briskin 2013; Coulter 2016).

While animals have historically benefitted from humans’ labour unions indirectly, researchers in Canada and Sweden have recently demonstrated interest in creating a labour union specifically for animals – particularly those who work in health care and welfare industries – to ensure their rights to breaks and days off (CBC 2016). Due to the perceived links between unionization and worker happiness, handlers were asked about their thoughts on this novel idea and how it might affect their work as canine handlers. The overwhelming response by handlers was that the union would be unnecessary. Most were either skeptical or unsupportive of the idea because they felt that they already do enough to ensure their dogs’ needs are met. Some handlers
expressed that their sheer passion for dogs is enough to ensure their dog is well cared for – particularly stressing the idea that their dog is their partner and that no one cares more about her/his well-being. In addition, some handlers expressed concern with who would be advocating for the animals and setting the standards, since animals are obviously unable to do so for themselves. Others explained that the union might be unnecessary because the success of their work depends on their dog’s well-being, providing further incentive to ensure their dog’s welfare (a concept echoed by Rooney et al. 2009, that welfare and working ability are linked). One Ontario handler indicated that in some cases, having restrictions on work hours would have an impact on their work. They explained that the number of hours their dog works is determined on a case-by-case basis, and that at times, the dog might have to spend several hours working, or travelling in order to get to a field site. In contrast, the Alberta team has designated shift lengths for canine-handler teams (7.25 hours per day maximum, with breaks as needed – compared to regular inspectors’ 10-hour shifts); however, there are certainly times when the dogs must ride in a vehicle for several hours in order to get to a field site – for example, during training and certification in other locations. Moreover, some handlers explained that because their positions are unionized, their canine is essentially unionized too, and are protected in similar ways. Finally, a couple of handlers were supportive of the union idea, stating that so long as the organizers worked directly with the handlers to set standards, it would be beneficial to handlers through further education, and to the dogs by promoting their welfare. The variety in responses to the proposal of a union for working animals is not unlike the historical controversy over unions proposed for people.

Finally, in order to fulfill the One Welfare model of sustainability, the environment must be considered. I assessed environmental impacts in two ways: first, by asking handlers about the
positive and negative impacts of their work; and second, by researching program success data and documentation. For the Alberta team, the most frequently mentioned positive impact was the idea of the dogs as ambassadors, encouraging public outreach and education. Handlers frequently expressed how much the dogs have improved the public’s perception of their program.

Watercraft inspections can take time, especially during busy season when there are lineups, but all handlers noted that the public seems much happier to go through the process if the dogs are around. In my experience observing the inspections and other activities, I witnessed numerous people express interest in the dogs (30% of trials), whether by asking questions about them, watching them work, or taking photos. The dogs were especially intriguing to families with young children – it gave them a chance to get out of their car and stretch (many families had been travelling for a few hours before arriving at the stations), while having the opportunity to witness something novel that kids generally enjoyed. The Alberta team encourages people to watch the dogs and ask questions – they even have business/identification cards for the dogs that mimic collectibles. Moreover, the dogs have appeared in several media reports, and the Alberta government has even created several videos (see Appendix F) to showcase what the dogs do. In addition, there are signs at each inspection station where there is a working dog present, indicating that the dogs are not looking for drugs, alcohol, or firearms, but that they are looking for mussels. This further demonstrates the fact that the Alberta team is concerned with the public’s perception of their program, and does not want the public to feel threatened or intimidated by these procedures. This sentiment was echoed by one handler who discussed her concerns that the public might be intimidated by her dog due to his appearance.

In addition to the environmental impacts revealed via interviews with handlers and participant observations, some secondary documentation helped to measure environmental
impacts on the Alberta team. The team’s success figures (Table 4) are available to the public in their annual reports, which further demonstrates the positive environmental impacts of their work. Numbers of mussels detected are generally low, and thus numbers of dog-assisted mussel interceptions are low, too; but this can certainly be seen as a positive environmental impact. The annual reports also emphasize the impacts their dogs have had as ambassadors for their program, stating that the team was covered in 23 media events in 2016 (AEP 2016a) and that in 2015 their campaigns reached an estimated audience of over 2 million people (AEP 2015). The Alberta team did not express concerns over negative impacts of their work on the environment, explaining that they take care not to allow their dogs or themselves act as vectors for the invasive species that they are working to prevent.

For the Ontario team, the most frequently mentioned positive impact on the environment was their dogs’ role as deterrents for poaching and other crimes related to natural resources. Handlers explained that the public is much more careful about their actions when they see the dogs patrolling because they know the dogs have greater detection capabilities than humans. I was also told that some people even post on online forums when the dogs are present, to warn other hunters and fishers to be cautious. While Ontario handlers generally felt that the public’s perception of their team was positive because they are helping protect Ontario’s natural resources, some handlers expressed that individuals who want to break the rules evidently do not perceive the dogs positively. I witnessed an example of this during my visit to the Cobourg area when some fishers had their fish confiscated because they were fishing over their allowable limits, and using the illegal fishing method known as snagging. The fishers were visibly unhappy with the outcome, unsurprisingly – and the dog’s presence seemed to instill anxiety as well. It is interesting to note the discrepancy between the Alberta and Ontario teams in this regard. On one
hand, the Alberta team emphasizes that the dogs are not looking for illegal substances (with a
sign at the inspection stations, as described in Chapter 4), and they want the public to perceive
their program positively. In contrast, while the Ontario team also wants to be perceived
positively, they sometimes use the dogs as a method of intimidation, in the sense that they act as
a deterrent against crime.

Aside from helping to protect natural resources directly, Ontario handlers discussed how
the dogs act as ambassadors during educational demonstrations, such as at schools, helping to
promote natural resources protection awareness. The only negative impact on the environment
that the Ontario team described was the amount of fossil fuels burned as a result of keeping their
vehicles running frequently and for extended periods of time, such that the dogs have the comfort
of a temperature-controlled environment, and because of the long-distance travel that is often
required. While this is an important environmental consideration, it is necessary for the dogs’
well-being, and it remains uncertain whether these impacts are outweighed by the positive
impacts of the Ontario team’s work.

**Recommendations**

The following are some potential considerations to help improve the lives of conservation
canines in Canada going forward, based on the information I have gathered through this research
whether through interviews with conservation canine program supervisors and handlers, welfare
assessments, participant observation, or secondary documentation. First, there seems to be a
variety of opinions among handlers regarding the best training and care-taking methodologies to
ensure working dog welfare. In addition, handlers had varying levels of interest in and
knowledge of dog training and care-taking procedures and dog welfare indicators. For those
reasons, and because some acute welfare concerns were apparent throughout this research, I
believe these programs could benefit from having stronger guidelines for the care of working dogs, including a section on key welfare indicators and concerns, basic requirements such as feeding schedules, and some background information on animal welfare science and tools – for example, an outline of the Five Freedoms. It would be good to familiarize handlers with welfare concerns specific to working dogs as well, such as those outlined in Rooney et al. (2009). Perhaps some best practices regarding how to respond to various scenarios, such as when dogs exhibit fear or perform an unwanted behaviour, should also be outlined, given the variety of responses received during interviews in this respect. In addition, as discussed under the CK9 Training Procedures section of this chapter, there should be an explicit section on the use of e-collars – the history and controversial nature of their use, their effects on welfare, and how they are to be implemented in order to minimize risks and concerns for dog welfare. Finally, in this regard, teams should look for alternatives to punishment and aversive stimuli, and move towards training methods based purely on rewards, since these approaches have been proven more effective and much safer than alternatives, as well as good (rather than simply ‘not bad’) for dog welfare.

Further, I believe a handler agreement should be required for all conservation canine handlers, outlining their duties and responsibilities with respect to caring for their dogs, and requiring a signature to ensure they will care for the dog to the best of their abilities. It should also include a section explaining the handler’s options in various scenarios. For example, if the dog comes to retirement, there should be a plan in place (e.g. will the handler adopt the dog, or will the dog be put up for adoption, etc.). While every handler stated that they would be adopting their dog come retirement, and most were insistent about this, there is still a risk that the dog may end up homeless upon retirement – thus this section would help avoid a situation in which dogs
must be put down. Other situations in which the dog’s future might be uncertain is if a handler takes on a new job, or a handler becomes pregnant. In these cases, it would be helpful to have plans set out such that the dog does not necessarily lose her/his job (considering that welfare can be diminished when dogs with high drive are not able to engage in work activities as an outlet to release their energy). It should be noted that a handler agreement is already being written up for the Alberta team; however, I would urge future handler contracts to be signed at the start of the position to avoid any issues should these scenarios occur.

Finally, more consistent assessments of welfare would be a better determinant of dog’s chronic welfare status compared to the snapshot this research provides. While this research has demonstrated that acute stress is uncommon, it is uncertain whether the isolated incidents in which dogs did appear to be stressed would be apparent in the long-run. Stress cannot be considered chronic unless the dog is observed over a longer period of time (Rushen et al. 2008). In addition, a large portion of this research used information provided by handlers to assess dogs’ welfare, which is inherently biased. At the same time, as many handlers conveyed, handlers generally care about their dogs more than anyone else, and thus handlers should be trusted to care for their dogs to the best of their abilities. Regardless, I believe there should be some means of ensuring and regulating that these working dogs are healthy and have good welfare. A third-party inspection for welfare might not be the most appropriate option as they would also be collecting mere snapshots of the dogs’ lives since they would not see them every day (and the individual inspector might change). Moreover, hiring a third-party has potential to produce negative consequences for handlers, who may feel as though they are not trusted to care for their dogs. Therefore, considering these issues but acknowledging that the concern for a longer-term regulation of dog welfare is crucial, I suggest that handlers should be required to complete
welfare assessment check-up forms every few months, assessing their dog’s behaviours, body condition, living conditions, working schedule, and other details about their daily life and welfare. These can then be reviewed by the team manager or supervisor, or perhaps a dog welfare consultant, making note of any issues and taking action when necessary. In this way, some of the key concerns of those interested in having a union for working animals might be addressed, which may be a preferable alternative to handlers who feel that a union would be detrimental to their work. At the same time, handlers who feel impeded by such regulations might be the ones who need them the most. As Coulter (2016) states:

_The promise of interspecies solidarity means that animals cannot be seen as subordinates or as tools, and their needs and desires must be taken seriously through changes in perceptions and practices, and through regulation and enforcement._ (p. 156)

Thus, stricter regulations with regard to breaks and days off might be a means of ensuring these dogs are not exploited, and their welfare is ensured in the long-run.

**Limitations, Significance & Conclusion**

Throughout this research I have made every effort to accurately illustrate the experiences of dogs working for conservation in Alberta and Ontario, as well as their handlers’ experiences and the environmental impacts of their work, but there are always areas for further research. First, this research provides a snapshot of the lives of conservation canines within each case study and locale; thus, these findings do not depict a fully accurate and comprehensive illustration. There are other dog-handler teams that could be considered “conservation canines” in these provinces, such as Alberta’s Karelian bear dog who works with the Fish & Wildlife department as mentioned in Chapter 1, that were not selected and may offer additional insights to the in-depth findings of conservation canine teams presented here. Secondly, because the
presence of a researcher can influence the reactions and behaviours of dogs (Stellato et al. 2017), there is some concern as to whether my presence at site visits had an impact on the dogs’ behaviour. Previous research has also demonstrated concerns that the presence of a researcher might affect handlers’ actions, such that they attempt to convey themselves in a more positive light (Haverbeke et al. 2008). While this assumption should not be made without reason, it is an important consideration due to the fact that dogs were not observed for extended periods of time in this research, but rather, only on a few planned occasions. In addition, the sample size for welfare assessments was quite small, and there were not enough opportunities to assess welfare while the dogs were at rest, to act as a control group. Overall, this research represents only two conservation canine teams in Canada; thus, claims cannot necessarily be made about the larger picture of conservation canines in Canada.

Furthermore, the assessment of handlers’ experiences in these roles and gauging the environmental impacts of these programs are both areas for improvement and further research. While the dogs’ experiences were the dominant focus of this research, mainly because previous literature on working dogs has tended to focus on the ways in which humans benefit from working dogs, I would urge future research assessing humane jobs to incorporate additional strategies to understand the handlers’ experiences in these roles. Handlers’ insights are not only important in their own right, but people’s perceptions of their work can also affect the way they treat the animals with whom they work (Coulter 2016). Moreover, it should be noted that when asked about their dogs’ success (thus attempting to gauge the success of these programs with regard to their positive environmental impacts), handlers might demonstrate lenience when asked to rate their own dog’s performance (Rooney et al. 2015). As well, the implications of some of the environmental concerns, and their magnitude of impact compared to the positive effects,
require further investigation in order to make concrete conclusions. Thus, longer-term studies may be required to assess accurate handlers’ experiences and environmental impacts of these programs.

Finally, the most important limitation of this research is the fact that animals manifest stress in different ways, and thus may express various different behaviours as a result of stress, making behaviour difficult to interpret (Beerda et al. 2000; Malmkvist et al. 2003; Mason & Mendl 1993; Rooney et al. 2007). For example, previous research has indicated that detection dogs can exhibit highly variable panting rates in response to the same environmental conditions (Smith et al. 2003) – thus, behaviours that might indicate stress for one dog may not be indicative of stress for another. In addition, some researchers argue that physiological measures of welfare are more reliable than behavioural measures (Beerda et al. 2000; Dawkins et al. 2004; Rooney et al. 2007; Rushen 1991) – although some disagree, and have found that behavioural measures are more reliable (Salgirli et al. 2012; Schilder & van der Borg 2004). Given these disagreements, future research should combine behavioural observations with physiological indicators – in particular, non-invasive methods such as measuring fecal cortisol – in order to obtain a more complete picture of dog welfare through various methods of assessment.

Despite these shortcomings, this research has provided an in-depth description of the dogs working for conservation in Alberta and Ontario, and explained the ways in which these roles may provide humane and sustainable job opportunities as well as areas for improvement. It is not possible to determine with certainty whether these jobs are exemplary of a humane and sustainable job through this snapshot alone. Rather, this research has explored conservation canines as a case study to help move towards the idea of interspecies solidarity by “thinking through ways to eliminate problematic practices, improve human-animal relationships, and
envision new ways of building solidaristic multispecies communities” (Coulter 2016, p. 156). I hope that other researchers and professionals might be able to use the findings and recommendations of this research to conduct further research and make informed changes in animal labour industries that will benefit all living beings and entities, striving to achieve sustainable welfare for animals, humans, and our shared environment.
References


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Appendix A: General Research Ethics Board Approval

May 18, 2017

Ms. Renee D'Souza Master’s Student
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GREB Ref #: GENSC-084-17; TRAQ # 6020721
Title: "GENSC-084-17 Conservation Canines: Roles, Welfare, and Environmental Impacts"

Dear Ms. D’Souza:

The General Research Ethics Board (GREB), by means of a delegated board review, has cleared your proposal entitled "GENSC-084-17 Conservation Canines: Roles, Welfare, and Environmental Impacts" for ethical compliance with the Tri-Council Guidelines (TCPS 2 (2014)) and Queen’s ethics policies. In accordance with the Tri-Council Guidelines (Article 6.14) and Standard Operating Procedures (405.001), your project has been cleared for one year. You are reminded of your obligation to submit an annual renewal form prior to the annual renewal due date (access this form at http://www.queensu.ca/traq/signon.html; click on "Events"; under "Create New Event" click on "General Research Ethics Board Annual Renewal/Closure Form for Cleared Studies"). Please note that when your research project is completed, you need to submit an Annual Renewal/Closure Form in Romeo/traq indicating that the project is 'completed' so that the file can be closed. This should be submitted at the time of completion; there is no need to wait until the annual renewal due date.

You are reminded of your obligation to advise the GREB of any adverse event(s) that occur during this one year period (access this form at http://www.queensu.ca/traq/signon.html; click on "Events"; under "Create New Event" click on "General Research Ethics Board Adverse Event Form"). An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours.

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example, you must report changes to the level of risk, applicant characteristics, and implementation of new procedures. To submit an amendment form, access the application by at http://www.queensu.ca/traq/signon.html; click on "Events"; under "Create New Event" click on "General Research Ethics Board Request for the Amendment of Approved Studies"). Once submitted, these changes will automatically be sent to the Ethics Coordinator, Ms. Gail Irving, at the Office of Research Services for further review and clearance by the GREB or GREB Chair.

On behalf of the General Research Ethics Board, I wish you continued success in your research.

Sincerely,

John Freeman, Ph.D.
Chair
General Research Ethics Board

cc: Dr. Alice Hovorka, Supervisor
Appendix B: University Animal Care Committee Approval

Memo

Dr. A. Hovorka, Department of Geography & Planning

Dr. C. Nicol, Chair, University Animal Care Committee

April 10, 2018.

Subject: Animal Use Protocol Approval

Dear Dr. Hovorka,

This memo is to confirm that the following animal use protocol had University Animal Care Committee approval.

<table>
<thead>
<tr>
<th>Reference Number</th>
<th>Title</th>
<th>Approval Date</th>
<th>Closure Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1740</td>
<td>Conservation Canines: Roles, Welfare, and Impacts on the Environment</td>
<td>04/19/2017</td>
<td>03/02/2018</td>
</tr>
</tbody>
</table>

If you have any questions, please contact the UACC Coordinator at uacc@queensu.ca or at extension 78805.

Sincerely,

Christopher Nicol, PhD
Associate Professor,
Department of Pathology & Molecular Medicine
Queen's Cancer Research Institute, Cancer Biology & Genetics
Chair, University Animal Care Committee

/nkd
Appendix C: Key Informant Interview Questions

Questions regarding humans’ roles in conservation canine work:

1. What is your title, and what does this position entail?
2. How did you become interested and involved in this career path?
3. What educational/employment background do you have?
4. What educational/employment background is required to obtain your position now?
5. How are humans trained for their work with the dogs on your team?

Questions regarding dogs’ roles in conservation:

6. What type of work do dogs do for conservation on your team?
   a. In [province], on other teams (that you know of)?
   b. In other provinces in Canada, that you know of?
7. Why does your team employ dogs for these purposes? PROMPT: more successful than humans or other equipment at performing certain tasks?
8. How many dog-handler pairs are on your team?
   a. Are they paired for life (until the handler or canine retires)?
9. Where do your dog-handler teams conduct their work? PROMPT: based on calls/problem areas, or specific boundaries?
10. How are your dogs selected for this work? PROMPT: bred and purchased, or adopted from shelters; based on what traits?
11. How are your dogs trained for this work?
12. How would you describe your dogs’ success at performing assigned duties?
13. What are major impacts your dogs have on the environment? PROMPT: positive, e.g. improved efficiency and accuracy; negative, e.g. prey drive (chasing squirrels), pest transfer (ticks).

Questions about your dogs’ welfare:

14. How would you characterize your dogs’ welfare, and based on what measures?
15. In what ways does your team support dog welfare? PROMPT: government requirements, e.g. Animal Welfare Act; individual interest.
16. Where are your dogs housed when they are not working, and who cares for them?
17. What happens to the dogs when their work term ends (retirement)? PROMPT: keep him/her as a pet? Other options?
18. Recently, some researchers and practitioners have demonstrated interest in creating a union for working animals. Do you have any comments about this?
   a. How might this impact the work of your conservation canine team?

Questions about research on conservation canines:

19. What kind of research do you think might be valuable with regard to conservation canines? (Describe my research and existing literature). Is there anything that stands out to you as an understudied topic in this realm?
20. Are there any opportunities for me to visit your canine team this summer and shadow their work to learn more about what dogs are doing for the environment and conservation?

21. Are there any other canine teams you can refer me to for interviews and/or shadowing as part of my master’s research?
Appendix D: In-depth Handler Interview Questions

Questions about the handler’s role and career path in conservation canine work:

1. What is your title, and what does this position entail?
2. How did you become interested and involved in this career path?
3. What educational/employment background do you have?
4. How long have you been a dog handler?
5. What type of training procedures must you undergo as a conservation canine handler?
6. Describe your experience working with your dog.
   a. What is the best part of your job?
   b. What types of frustrations do you encounter on the job, if any?

Questions about the dog’s role as a conservation canine:

7. What is your dog’s name?
8. How long have you been working with [dog’s name]?
   a. Are you paired for life (until one of you retires)?
9. Tell me about how [dog’s name] came to work with you in conservation. PROMPT: selection criteria, origin, breed, life history.
10. Why does your team employ dogs for these purposes? PROMPT: more successful than humans or other equipment at performing certain tasks?
11. Where do you and [dog’s name] conduct your work? PROMPT: based on calls/problem areas, or specific boundaries?
12. How are dogs generally selected for this work on your team? PROMPT: bred and purchased, or adopted from shelters; based on what traits?
13. How is [dog’s name] trained for this work?
14. What does a typical day in the life of you and [dog’s name] look like? PROMPT: schedule, tasks, types of interactions, etc.
15. How would you describe [dog’s name]’s personality?
16. How would you describe [dog’s name]’s success at performing assigned duties?
17. How would you describe [dog’s name]’s experiences at work? PROMPT: does he/she seem to enjoy this work? Based on what measures?

Questions about the dog’s welfare and living environment:

18. First I would like to know what the word “stress” means to you, when it comes to dogs. PROMPT: physical, emotional, or both? Indicators?
19. How would you characterize [dog’s name]’s welfare, and based on what measures?
   a. What situations tend to make [dog’s name] happy? Stressed?
20. In what ways do you and your team support dog welfare? PROMPT: government requirements, e.g. Animal Welfare Act; individual interest.
21. Where is [dog’s name] housed when he/she is not working, and who cares for him/her?
22. What types of behaviours do you notice while [dog’s name] is in his/her kennel? PROMPT: pacing, howling, excessive barking/whining, destroying material e.g. bedding, over-grooming certain body parts, etc.
23. Do you have any other dogs at home?
24. How much time does [dog’s name] spend interacting with other dogs on a daily basis?
25. How much time does [dog’s name] spend interacting with people (other than you) on a daily basis?
26. How much time does [dog’s name] spend exercising on an average day?
27. What will happen to [dog’s name] come retirement? PROMPT: keep him/her as a pet? Other options?
28. Recently some researchers and practitioners have demonstrated interest in creating a union for working animals. Do you have any comments about this?
   a. How might this affect your work and [dog’s name]?

Questions about environmental impacts of conservation canine work:

29. Can you describe some of the impacts, both positive and negative if applicable, that yours and [dog’s name]’s work has had on the environment?
   a. Can you quantify his/her success?
30. How has the program been perceived by the public, and by other officers without canine units?
Appendix E: Welfare Assessment Checklist

Date: Activity: Location:
Session Start Time: Session End Time: Weather conditions:

<table>
<thead>
<tr>
<th>Dog/Handler:</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
<th>Trial 4</th>
<th>Trial 5</th>
<th>Trial 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial start time:</td>
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<tr>
<td>Trial end time:</td>
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**Dog Behavioural Indicators**
- Back position (0-2)
- Ear position (0-2)
- Tail position (0-2)
- Avoidance (look/turn away)
- Paw-lift
- Yawn
- Panting (y/n, light or heavy)
- Lip/nose lick
- Tail wag (y/n)

**Handler Behavioural Indicators**
- Physical contact (negative)
- Raise voice (negative)
- Praise (pet/treat/toy/verbal; y/n)

**Notes**
### Appendix F: List of Media Reports & Videos

<table>
<thead>
<tr>
<th>Title</th>
<th>Published By</th>
<th>Date Published</th>
<th>Source</th>
<th>Media Type</th>
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</thead>
<tbody>
<tr>
<td>Alberta’s mussel-sniffing dogs</td>
<td>Alberta Environment</td>
<td>April 13, 2018</td>
<td><a href="https://www.youtube.com/watch?v=CAHagBroBQY">Link</a></td>
<td>Promotional video</td>
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<tr>
<td>Alberta’s top dogs are on the trail of an invasive weed</td>
<td>Government of Alberta</td>
<td>September 22, 2016</td>
<td><a href="https://www.alberta.ca/release.cfm?xID=434643C47CCE7-DADE-D5BF-3C0442AC742C40F1">Link</a></td>
<td>News release</td>
</tr>
<tr>
<td>Sniffer dogs used to search for destructive weed in Calgary’s Fish Creek park</td>
<td>Global News</td>
<td>September 22, 2016</td>
<td><a href="https://globalnews.ca/news/2957961/sniffer-dogs-used-to-search-for-destructive-weed-in-calgarys-fish-creek-park/">Link</a></td>
<td>News article</td>
</tr>
<tr>
<td>Alberta Environment &amp; Parks Conservation K 9 Unit</td>
<td>Alberta Environment</td>
<td>September 16, 2016</td>
<td><a href="https://www.youtube.com/watch?v=ok5PBe1OLfY">Link</a></td>
<td>Promotional video</td>
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<td>Boat inspection stations at Alberta lakes</td>
<td>Let’s Go Outdoors</td>
<td>August 23, 2015</td>
<td><a href="https://www.youtube.com/watch?v=pZqUfhB7N4">Link</a></td>
<td>Promotional video</td>
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<tr>
<td>Man’s best friend is a mussel’s worst enemy</td>
<td>Government of Alberta</td>
<td>August 7, 2015</td>
<td><a href="https://www.alberta.ca/release.cfm?xID=383895AE5CD9E-E0C7-D1BD-AA3F0750F9F2B01C">Link</a></td>
<td>News release</td>
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<td>We let the dogs out!</td>
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<td>September 25, 2014</td>
<td>Alberta Environment</td>
<td><a href="https://www.youtube.com/watch?v=EmmzE1wwBcM">https://www.youtube.com/watch?v=EmmzE1wwBcM</a></td>
</tr>
<tr>
<td><strong>Ontario Team</strong></td>
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<tr>
<td>Meet Colt, Megan and Cedar</td>
<td></td>
<td>September 6, 2016</td>
<td>Ontario MNRF</td>
<td><a href="https://www.facebook.com/ONresources/photos/a.735069293206957.1073741833.649350345112186/1046235102090373/?type=3&amp;theater">https://www.facebook.com/ONresources/photos/a.735069293206957.1073741833.649350345112186/1046235102090373/?type=3&amp;theater</a></td>
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<tr>
<td>Service dogs retire from Ministry of Natural Resources and Forestry</td>
<td></td>
<td>July 1, 2016</td>
<td>CBC News</td>
<td><a href="http://www.cbc.ca/news/canada/sudbury/service-dogs-retire-1.3660824">http://www.cbc.ca/news/canada/sudbury/service-dogs-retire-1.3660824</a></td>
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