Animal Responders: Risks and Mitigation Strategies

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Dedication

To those who believed I could when I thought I couldn’t.

To those who put themselves at risk of harm for others without expecting a reward.

To those who strive to make this “pale blue dot” a better place for all creatures.

Abstract

Although disasters are often defined by their effect on the human populace, animals are not spared and are likewise affected. As animal and human welfare are interconnected, in disasters both will be affected and an assault on one will impact the other. Disasters are expected to become more frequent so in order to manage human safety and welfare, we must manage animal safety and welfare. The safest way to respond to animals in emergencies is to use emergency responders trained in animal behaviour and rescue techniques, however there is a lack of knowledge in this domain. This study aims to identify the factors that impact an emergency responder's health during and after an animal rescue or disaster response and to identify mitigation techniques that can be utilised to enhance their safety and resilience. An anonymous online survey was used to enquire about the responder, the impact of a recent animal-related event and the effectiveness of a selection of mitigation strategies. This study found that a significant proportion of respondents had experienced physical injuries to the arms and hands, with the animal and fatigue being common causative factors. Another finding was that there is a risk of a psychological injury and a diagnosis of post-traumatic stress disorder was likely for some respondents. Despite these risks, the majority of respondents reported that they found the animal rescue event a positive experience. Psychosocial support was found to be an effective recovery technique along with physical or recreational activity, debriefing, and mindfulness. Other mitigation options for both responders and organisations were identified from the literature such as psychological and crew resource management training and the use of the 'buddy system'. In conclusion, this study adds to the limited literature in this realm and will make a significant contribution to the safety and resilience of trained animal responders.

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Abbreviations and Glossary

Term	Definition
Animal	Refers to non-human animals.
Animal centric	A response which focusses on animals.
Animal component	Associated with the presence of animals.
Animal emergency	Refers to imminent injury or death of an animal.
Animal Rescue	Refers to removing an animal from a location of potential or actual harm to a place of safety, not a member of the public or an animal humane group which rehomes animals.
Debrief	Discussion held after a deployment.
Decontamination	The removal of potentially harmful substances.
Drugs	Pertaining to an illicit substance.
DSM-5	Diagnostic Statistical Manual 5th edition published by the American Psychiatric Association. Reference book on mental health and brain related conditions.
Emergency/professional/ official responder	Also known as a first responder, a person who is officially deployed urgently to the scene of an emergency to render assistance.
Evacuation	Movement of animals or people from an area of risk for harm to an area of safety.
Exotic Animal	Refers to an unusual or rare animal.
Freeze-phase	The animal becomes immobile, part of a stress response.
Human factors	The awareness that humans will make mistakes.
ICD-11	International Classification of Diseases and related health problems 11th edition, published by the World Health Organisation.
IES-R	Impact of Event Scale - Revised, a validated series of 22 questions designed to calculate the psychological impact of an event.
Land wildlife	Native and introduced terrestrial fauna, not domesticated.
Likert scale	Multichoice questions used in surveys to define amount of intensity.
Livestock	Animals used for protein production or the harvest of fibre.
Logistics	Obtains, provides and tracks resources to support an emergency response.
Marine wildlife	Aquatic animals.
Medications	Prescribed medications.
Mindfulness	A state of 'being in the moment', of being self-aware.
Mitigation	To reduce risk.
Pathogen	An organism that can cause a disease, a biologic hazard.
Person-mean imputation	A technique to overcome missing data by averaging across available data.
Pocket Pets	Small domesticated pets such as mice, rats, guinea pigs, rabbits, and ferrets.
PPE	Personal protective equipment such as gloves, helmets, safety glasses, overalls, and ear protectors.
Psychological injury	Mental health impact.
PTSD	Post-traumatic stress disorder.
Respondents	People who responded to this survey.
Specialist animal responder	An emergency responder who is trained in animal rescue.
Spontaneous /informal volunteer/Good Samaritan	A volunteer who is not part of an official response agency.
Victim	A person or animal who is harmed, injured or killed.
Volunteer	A person who gives their time and skill with no expectation of reward.
Zoonoses/zoonotic	A disease normally found in animals which then infects a human.

1 Literature Review

1.1 Introduction

In the field of emergency response where there is a sense of urgency for the protection and preservation of human life due to some calamitous event, there are the emergency responders. They must act quickly whilst managing risks and respond effectively. Alongside the human face of an emergency response is the often-forgotten animal component. The emergency responders who respond to animals face their own unique animal-related risks in addition to the risks faced in general by all emergency responders. This literature review will outline the similarities and differences between a general and an animal-related response, examine the importance of including animals in the disaster response and the role of trained animal responders. This narrative will also look at the hazards and risks faced by emergency responders and offer some mitigation options from the current literature.

Whilst many emergency responses will be for a single 'rescue' scenario, such as where the extraction of a trapped victim is required, in an extreme setting the response could be for a disaster with multiple victims. This literature review will focus on issues around a disaster response, though most of the stated risks will still apply to the single rescue albeit on a smaller scale. Concerningly, the frequency and magnitude of disasters are forecast to increase due to the inevitable consequence of the Anthropocene epoch and climate change (Lewis & Maslin, 2015; National Academies of Sciences & Medicine, 2016). Thus, disasters are not going away any time soon and will continue to affect the lives of humans and animals into the future and require the expertise of emergency responders.

Although disasters are often defined by their effect on the human populace, animals are not spared and are likewise affected. Human welfare is intertwined with animal welfare as described by the 'One Welfare' concept (Colonius & Earley, 2013; Pinillos et al., 2016). This concept proposes that to manage human welfare we must manage animal welfare. As animal and human welfare are interconnected, in disasters both will be affected, and an assault on one will impact the other.

This review is in seven sections. Section 1.2 discusses emergencies and the emergency response, Section 1.3 introduces the animal component and Section 1.4 discusses the types of responders involved. Following this, Section 1.5 discusses the risks and hazards that the responders face including the unique risks due to the animal component. Section 1.6 discusses some mitigation strategies to counter these risk factors and Section 1.7 summarises and concludes the review.

1.2 Emergency Response

The term 'disaster' is derived from Latin where it describes an unfavourable alignment of stars: 'dis' refers to bad, and 'aster' refers to star. An unfavourable alignment of stars was often attributed to causing an undesirable event of some magnitude (Merriam-Webster). The modern use of the word endures, however the definition has evolved. Functional definitions for disaster as used by disaster management groups are listed in Table 1-1.

Table 1-1: The Working Definition of Disaster as Defined by Disaster Management Agencies

Agency	Definition
United Nations Office for Disaster Risk Reduction (UNDRR)	"A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts. Annotations: The effect of the disaster can be immediate and localized, but is often widespread and could last for a long period of time. The effect may test or exceed the capacity of a community or society to cope using its own resources, and therefore may require assistance from external sources, which could include neighbouring jurisdictions, or those at the national or international levels." (United Nations, 2016, p. 13).
Centre for Research on the Epidemiology of Disasters (CRED)	"…a situation or event which overwhelms local capacity, necessitating a request to a national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering". Criteria: at least one of the following must be fulfilled "(1) 10 or more people reported killed (2) affect 100 or more people (3) declaration of a state of emergency (4) a request for international Assistance" (Centre for Research on the Epidemiology of Disasters, 2022, p. 13).

Organisations that might be involved in an emergency created by a disaster include the police, fire services, health and welfare agencies, and specialist technical rescue teams such as Search and Rescue. It is important that the magnitude of the event is accurately assessed for an effective response. According to Barton (1969) the main parameters to be assessed are the number of people affected, the geographic area impacted, the speed of onset of the event, the duration of the event, and the social preparedness of the community to cope. These parameters will then determine the level of response required, whether the event can be managed with a local response by a single responding agency, or whether multiple agencies or a larger area response is needed. If the requirements for a safe and effective response exceed the capability of local resources then a disaster response will be necessary.

A declaration of a state of emergency will depend on the scale of the event. In New Zealand the local government authority can declare a state of local emergency. This declaration grants legal powers to the responding agencies along with the funds required to carry out the response (Department of Internal Affairs), which can include the evacuation of a populace. If the disaster involves large or multiple areas then the central government may need to intervene and a state of national emergency would be declared (Department of Internal Affairs).

Good communication is essential for coordinating a response effectively, therefore communication and control frameworks are agreed to in advance. This framework allows for the planning, control, operations, and the required logistics to be efficiently coordinated between the different agencies. The disaster management agencies involved in a disaster response in New Zealand, Australia and the United States of America (USA) are given in Table 1-2.

Table 1-2: Disaster Management Agencies and the Framework Used to Coordinate the Response Used in Three Countries

	Agency	Control framework used in the response
New Zealand	National Emergency Management Agency (NEMA)	Coordinated Incident Management System (CIMS) (Coordinated Incident Management System, 2019)
Australia	National Emergency Management Agency (NEMA)	The Australasian Inter-service Incident Management System™ (AIIMS) (Australasian Fire Authority Council, 2017)
United States of America	Federal Emergency Management Agency (FEMA)	National Incident Management System (NIMS) (Department of Homeland Security, 2017)

When a state of emergency has been declared in New Zealand, incident coordination facilities will be set up where the various agencies involved in the response will be managed. This could be a local emergency operations centre (EOC) or scaled up to a national coordination centre (NCC). The coordination centre controls and coordinates the response using the Coordinated Incident Management System (2019). The makeup of this entity can be scaled up or down depending on the required needs and is one of the benefits of using a common communication framework. One of the decisions the controlling agency will need to decide is whether the affected populace can be managed in situ, or if an evacuation order will need to be made for the protection of human life (Civil Defence Emergency Management Act 2002). The animal component also needs to be managed and this is the responsibility of the Ministry of Primary Industries (MPI). They coordinate animal welfare utilising the services of support agencies. These support agencies assist with "animal rescue, animal evacuation, animal shelter, food, water, husbandry, veterinary care and other essential activities for all animals" (Ministry for Primary Industries, 2021, p. 1).

1.3 The Animal Component

It is estimated that half the global human population has at least one companion animal (Day, 2017) and many of them are considered family members by their owners as a consequence of the human-animal bond (Walsh, 2009). The bond is even stronger for some of society's most underprivileged and vulnerable members such as the homeless (Taylor et al., 2004) who may rely on animals for

support, safety and companionship. Human-animal interactions benefit humans both physically and psychologically (Westcott et al., 2017), and this bond can assist in the recovery from trauma (Friedmann et al., 2015; Hunt et al., 2008).

Pet ownership needs to be included in disaster planning as it affects the behaviour of the affected populace due to this bond. An evacuation may be ordered to protect humans, however these orders may be refused if animals are not included (Travers et al., 2017). Evacuation failure may also occur if animal shelter options are limited or non-existent as described by Chadwin (2017). Additionally, evacuated owners may return before it is safe to do so (Heath & Linnabary, 2015; Van Manen et al., 2021), endangering their own lives (Byard & Langlois, 2021) and further burdening the emergency response. In fact, in a poll by 60 Minutes/Vanity Fair (2013), 75% of those who were surveyed replied that they would risk their life to save their pet, this poll however will have inherent bias due to its methodology. The fact that people risk their lives for animals can also be seen in the flood-related human fatalities documented in Australia from 1788 to September 1996, where 8% were the result of the attempted rescue of pets or livestock by owners or good Samaritans (Coates, 1999). Therefore, to rescue and protect the human we must rescue and protect the animal. To better manage the welfare impact on humans during and post disaster it is essential to include animals in disaster plans (Dalla Villa et al., 2020).

The human-animal bond is not just associated with pets but can exist for farmed animals as well, where loss of stock will also have a psychological impact (Travers et al., 2017). In addition, there will be a financial cost to the farm business and the loss of genetic worth that might have been building for generations will be irreplaceable (Westcott et al., 2017). Farmers are also responsible for the welfare of their stock (Animal Welfare Act 1999), however evacuation of farmed animals is often not possible so they will need to be tended in situ. This may influence a farmer's willingness to evacuate, or they may return to care for their animals before it is deemed safe to do so.

There is also an ethical, moral, and in New Zealand a legal obligation on owners and society to ensure the welfare of animals. The presence of a nervous system is linked to sentience, animals therefore 'feel' (Bekoff & Pierce, 2016). This then places an ethical and moral obligation for their welfare on their owners and society. As modern society increasingly acknowledges sentience in animals, there is a growing expectation that a professional and humane approach is used to handle animals including in emergencies (Dalla Villa et al., 2020). In some countries this is enshrined in legislation, such as the New Zealand Animal Welfare Act 1999. However, legislation often considers animals as the property of their owners (White, 2012) and according to Best (2021, p. 67) this status "… allows them to be treated in ways that elevate their risk during disasters".

Not addressing the animal component of a disaster conflicts with our knowledge of the importance of the human-animal bond and the impact it has on the psychological health of evacuees and disaster recovery in general (Westcott et al., 2017). It does not address the risks pet and livestock owners will accept to save and protect their animals nor does it address the legislative and moral expectations on animal care and welfare. Additionally, the limited resources available in a disaster response are stretched even further if evacuation orders are not followed because of animals being left behind. The result is an increase in the risk of harm to all those involved.

1.4 Responders

There are several ways we can categorise responders such as being trained or not, volunteer versus professional, and unofficial versus the official responders. Each type comes with their own skill sets, advantages and risk profiles. The risk profiles can be defined by their level of training and experience they have received.

Immediate assistance is likely to come from the affected community due to their proximity to the event. They are a good source of local intelligence (Büscher et al., 2014) though their ability to help will be affected by the personal trauma they have suffered, the available resources and their personal skill set. They are unlikely to fully understand the risks they face and may unknowingly place themselves at risk of injury (Whittaker et al., 2015).

Informal or spontaneous volunteers will also arrive to offer assistance, often responding to official news reports and unofficial sources such as from social media (Whittaker et al., 2015). Informal volunteers can play an important role in a response by adding additional capability (Daddoust et al., 2021; Whittaker et al., 2015). However, they are also likely to lack the knowledge of the risks and hazards involved, and according to Drabek and McEntire (2003) they may not have the technical training, skills or equipment necessary for an effective and safe response.

The official responders in an emergency or disaster are trained members of professional and volunteer response teams including search and rescue organisations (SAR), the police, military, fire, and ambulance services. Emergency responders may be involved in administering first aid, search and rescue operations, delivering logistic supplies, and the evacuation of the populace if needed. They are a group of unique individuals responsible for protecting and preserving life, who will proceed towards potential harm and manage risk rather than distancing themselves from it (Haugen

et al., 2017). Officially deployed emergency responders understand the situation and its risks and have the knowledge and skills required to respond safely, effectively and efficiently.

A subset of the emergency responders are the trained animal responders. These responders have training to understand the disaster response to enable them to work in hazardous environments (Westcott, 2021) and have expertise in the animal component of a response. Trained animal responders are aware of the behavioural stress responses of animals, they have the technical skills for safe animal handling, humane animal extrication, animal restraint, and knowledge of animal welfare. In addition, they have animal first aid, decontamination and physiologic stabilisation skills, all of which are advantageous for an effective animal response (Squance, 2011). Some animal responders may also be able to administer animal euthanasia if required. Trained animal responders face the same general risks as the emergency responder, however they are specifically trained to be able to assess and respond appropriately to the risk the animal component brings to the risk landscape.

1.5 Hazards and Risks

The emergency responder faces many hazards and risks. The following is not an exhaustive summary, rather it serves to introduce some of the most common hazards and risks including those related to the animal component and sets up a discussion on mitigation options.

All those present during an emergency are at risk of sustaining a physical injury and/or illness due to the disruption caused by the disaster event itself. For example, there may be a lack of safe shelter, sustenance, potable water, and sanitary facilities. The collapse of infrastructure including buildings, roads, electricity, water supply and wastewater management will take time to correct and may prevent the delivery of logistic supplies (Jiang et al., 2012). The usual communication channels may be unavailable due to damage to communication and other infrastructure (Rak et al., 2016) and any working cell sites may also become quickly overloaded (Ali et al., 2015). These communication challenges can reduce the situational awareness of the disaster management organisations and responders which will reduce the timeliness of any assistance and support if required. All disruptions will impact the remaining affected populace and make the logistics of looking after the influx of emergency responders challenging.

Disasters create a dangerous environment in which the emergency responders have to operate in. Long working hours in inclement conditions such as in floodwaters, with limited access to safe water

and sustenance, will increase the risk of fatigue which can lead to injury (Patterson et al., 2012) and the likelihood of illness. There is research on the injuries reported in emergency responders such as the police or fire service, but little for disaster responders. Additionally, most of the data held on injury rates measure 'yearly injury occurrences per profession' and not 'injury rates per disaster' which makes it difficult to compare the rates.

Whittaker et al. (2015) notes that the presence of informal or spontaneous responders can be a major asset, but they can also interfere with the disaster response. Official responders operate under a set of guidelines or standard operating procedures (SOP) and have a clear line of communication for command and control. Informal volunteers are rarely constrained or even aware of these pre-established rules (Daddoust et al., 2021). In a study by Daddoust et al. (2021, p. 7) it was shown that over 60% of emergency managers agreed with the statement that spontaneous volunteers "… sometimes break the rules just trying to help". They will often arrive in large numbers, congesting and obstructing the official response. They are likely to lack appropriate shelter, food or water, PPE, and equipment, which may drain the resources of the official responders (Twigg & Mosel, 2017). Another repercussion is that they are at increased risk of injury or death (Yükseler & Yazgan, 2023).

The presence of animals can also hinder the disaster response, either from fences being destroyed, or the owners/Good Samaritans opening gates to allow animals to flee (Herthel et al., 2011). Large animals can obstruct roads and accessways (Smith et al., 2015) and abandoned dogs guarding properties can prevent entry by responders.

Emergency responders who are not trained in animal rescue are likely to lack an understanding of stressed animal behaviour, and complacency in handling distressed animals may result in injury (Smith et al., 2015). A stressed or panicked animal may not identify the arrival of the responder as a rescuer but as another threat and the sound of arriving sirens will further stimulate fear (Giminez et al., 2009). They can react aggressively, explosively and unpredictably, risking an injury to themselves, the owner or the rescuer (Holcer Janev et al., 2015).

The contamination of the environment with pathogens also poses a risk to the animals, populace, and responders. Access to safe water and sanitation may be compromised and sewerage contaminated flood waters is a health risk. A stressed animal will shed more microorganisms and the reduction in husbandry and hygiene will lead to increased contamination of the environment as indicated by Rostagno (2009). The risk of disease spread increases in disasters, including zoonoses such as leptospirosis, campylobacteriosis, and *E. coli* (Jhandai et al., 2020; Wannous, 2020).

Additionally, dead animals that are not disposed of properly will further contaminate the environment (Watson et al., 2007). Fortunately, disease outbreaks from disasters are rare (Kirkis, 2006; Watson et al., 2007).

Close contact with animals can also increase the risk of contracting zoonotic diseases such as psittacosis, zoonotic tuberculosis, leishmaniasis, brucellosis, toxoplasmosis, anthrax and echinococcosis in countries where these pathogens are found (Grace et al., 2012). However, the risk of contracting a zoonotic disease is thought to be low if the animals are evacuated with their owners and appropriate veterinary care administered (Chadwin, 2017).

Along with the injury and illness risk, there is also a psychologic risk. A psychological injury can range from mild distress such as sleep disturbances, to post-traumatic stress disorder or PTSD (Benedek et al., 2007). The magnitude of property destruction and the presence of fatalities, physical injury and a threat of risk to life are especially predictive of high rates of PTSD (Neria et al., 2008). Unlike a physical injury, psychological health injuries are often unseen, can be accumulative and have long lasting consequences (Tanielian et al., 2008). The Diagnostic and Statistical Manual of Mental Disorders–5 (2013) criteria for a diagnosis of PTSD includes experiencing or witnessing trauma which has led to intrusive thoughts or flashbacks, persistent avoidance of the stimuli associated with the event, an alteration in cognition and mood, hyperarousal and reactivity. The DSM-5 goes on to state that these symptoms need to be present for greater than one month, cause significant distress and are not attributable to a substance or other medical condition (American Psychiatric Association, 2013).

The risk of sustaining and recovery from a psychological injury can be linked to a person's resilience. According to Goldmann and Galea (2014), resilience refers to the person's ability to recover from an event, it does not suggest an absence of a psychological effect but the ability to return to 'normal'. There are several factors that can affect a responder's resilience during and post an event, including physical fitness (Deuster & Silverman, 2013), personal relationships (Williams & Drury, 2009), societal standing or reputation (Foster et al., 2021), and financial health (Wilson et al., 2020).

Despite animals also being affected by disasters, this review has noted a lack of research on responders and the risk from the animal component, and in particular there is a paucity of research on trained animal responders. We can however review the veterinary literature to note the specific risks veterinarians face and extrapolate to the trained animal responder.

A unique challenge for the animal responder is performing euthanasia. At times when rescue is not possible, or cannot be done humanely, euthanasia of the animal will then need to be considered.

Simply stated, the word 'euthanasia' is derived from the Greek term 'a good death', which implies death with freedom from suffering or pain (Broeckaert, 2015). Euthanasia plays a necessary and important part in the management of animal welfare and is a technical skill requiring knowledge and training in different species to be humane (American Veterinary Medical Association, 2020). If euthanasia is performed by untrained personnel or without the correct equipment, a rapid painless death is not always obtained. An example of this is the euthanasia of a cattle beast, uncontained in an urban setting, in which death was not achieved quickly with the minimum of distress. This was documented via a video taken by a member of the public on their mobile phone and was published on local news sites in New Zealand (Wong, 2015). To prevent this type of situation occurring, training in how to perform animal euthanasia is essential.

Performing euthanasia can result in a psychological injury (Murphy & Daly, 2020) especially when performed for reasons other than animal welfare. For instance, if the rescue of the animal is not considered financially practical, or the animal is impeding the emergency response, the euthanasia of a healthy animal may conflict with an individual's personal beliefs and this can result in a moral injury (Wasson & Wieman, 2018). As trained animal responders are more likely to be involved in performing euthanasia, this is a particular risk to them.

Another potential risk factor associated with animals is the interest of the public and media in animal stories, it is well known that animal stories get public attention (Molloy, 2011). Not every animal scenario will have an outcome that will satisfy the public's appetite for a story book ending, this may result in criticism on social media. In some cases this could result in damage to a reputation, leading to self-doubt and according to Regehr et al (2003), depression can result. Despite this, Tucker et al. (2022) did not find compelling evidence that social media such as Facebook, contributed to emergency responder stress.

1.6 Strategies to Mitigate Risk

It is essential that risk mitigation occurs during all phases of an animal response. Risk mitigation is a process of planning and preparing for a potential threat or emergency to lessen the risk and/or impact. This section will review some mitigation options for the readiness, response and recovery stages of a disaster response in reference to the animal responder.

1.6.1 Readiness

There are several measures that can be implemented in the pre-event or readiness phase that will help mitigate risk. Firstly, it is important to ensure that responders are fit and healthy to respond effectively and are not fatigued. The importance of fatigue as a risk factor affecting physical and mental health and the increased likelihood of injury, is outlined in a review paper by Marvin et al. (2023). The review states mitigation factors for fatigue which include managing work hours, good sleep hygiene, cold water immersion and exercise.

Responder preparation before engaging with biological hazards should include preventative vaccinations against pathogens that could be encountered in the country of deployment such as tetanus, influenza and rabies (Vroegindewey & Kertis, 2020). For other diseases which do not have a vaccine option, such as malaria, prophylactic options should be considered as appropriate as summarised in a paper by Migl et al. (2010).

There should be regular training sessions to prepare responders for the possible hazards that could be encountered, for instance training on the correct use of appropriate PPE and any specialised equipment. In addition, responding for animals requires knowledge on animal behaviour, animal handling, safe and humane rescue techniques, animal containment, animal welfare and physiologic needs, animal decontamination, zoonotic disease prevention, animal first-aid and euthanasia (Squance, 2011). These are skills not generally expected of the human emergency responder but are essential for the animal responder. Additionally, training in psychological first aid would be beneficial to assist the responder and human victims (National Alliance of State Animal and Agricultural Emergency Programs, 2023).

Unfortunately, skill retention declines with time, so refresher training is required for skill maintenance (Arthur 1998 as cited in Woodman et al. 2021). Paton et al (1999) discuss the concept of risk homeostasis, where training can also lead to complacency and result in an overestimation of ability, however this concept is debated by Pless (2016) who concludes there is very little evidence that this occurs. This makes the recommendations for skill training intervals guesswork at best.

Although official response teams normally have someone designated as a safety officer, this person cannot be omnipresent, so it is important that all team members are responsible for safety. One way to enable this is through Crew Resource Management (CRM) training which aims to improve team functioning and ultimately team safety (Kaps et al., 1999). CRM was developed in the aviation sector and is now used to improve safety in health care and other industries as well. CRM training covers non-technical skills such as human factors, situational awareness, decision making,

teamwork, leadership, coping with stress, and managing fatigue (Flin & Maran, 2015). Another recommendation is the use of the 'Buddy System' where two emergency responders are paired and work together as a 'single unit' to monitor and assist each other (Dass-Brailsford, 2010). It is also important that responding agencies have a 'Just Culture' which is a no-blame approach to problems where all personnel can point out issues without fear of repercussion (Pellegrino, 2019).

Many organisations believe that it may be possible to screen for the risk factors for PTSD in the responder recruitment phase. Garbern et al. (2016) claim that individuals who are prone to neuroticism and have poor coping skills such as distancing or avoidance are also more likely to develop PTSD. This finding is however refuted by Opie et al. (2020) who found no validation for the use of a pre-employment or pre-deployment screening tool for predicting the subsequent psychological health of a disaster worker. As it is possible for any emergency responder to sustain a psychological injury during deployment, this type of screening is only likely to result in discrimination.

1.6.2 Response

The response phase brings more risk and less support, longer hours and a possible reduction in situational awareness. During this stage a thorough knowledge of the risks, hazards and mitigation techniques is vital. Crew Resource Management (Paton & Flin, 1999) along with the Buddy System (Dass-Brailsford, 2010) will enhance situational awareness and help to protect the responders. It is also important for timely communication to occur, responders therefore need to have access to more than one reliable communication method (Moorthy et al., 2018) such as VHF radio and/or satellite phones.

Facilities for the decontamination of animal victims and responders is needed, this requires a source of clean water, detergents, disinfectants and the ability for the collection and disposal of contaminated items and wastewater (National Alliance of State Animal and Agricultural Emergency Programs, 2023). Cuts and abrasions should be quickly identified and treated, and if they cannot be made impervious by coverings (Migl & Powell, 2010), then the responder should be re-tasked to a lower hazard area. Ready access to trauma support should also be made available to emergency responders with rapid triage, stabilisation and egress. Treatment options including anti-venom and anti-toxins should be rapidly available when appropriate.

All responders should have up-to-date qualifications in first-aid and ready access to an appropriate first-aid kit. In a review by Umeda et al. (2020) communication should also involve the responders psychosocial support network when possible. In other words, it is important to keep the responder's family updated with reports of the deployment as staying in touch with family has been shown to be an effective way for responders to cope with stress. By organisations keeping the responder's family informed prior to and during the deployment, the family is in a better position to support the responder post-deployment.

Animals have been mentioned as a possible hazard for the responders in a disaster response. One mitigation strategy is for the disaster affected community to evacuate with their pets. In the aftermath of Hurricane Katrina the United States Congress passed the 'Pets Evacuation and Transportation Standards Act of 2006', ensuring animals are included in evacuation plans (Babcock & Smith, 2020). Unfortunately, New Zealand does not currently have such legislation. The current doctrine for an emergency response is the primacy of human interests (White, 2012) and it is important that addressing the animal component does not compromise this priority. Rather, disaster management agencies should coordinate more effectively with teams who have trained animal responders and inform owners that their animals will be included in the emergency response (Smith et al., 2015). In this way the affected populace may be more compliant with evacuation orders.

1.6.3 Recovery

In the aftermath of a response, a general debrief is important to improve the effectiveness, efficiency and safety of any future responses. A psychological debrief is used by some responding agencies to assist in the recovery of their responders, however this is a contentious issue. A review of research by Tan et al. (2022) concluded that psychological debriefing was ineffective, but they found there was evidence to support team-based skills and team cohesion training.

When a psychological injury has been sustained, emergency responders may not seek support due to stigma and other barriers to health care. This can result in a delayed presentation and therefore an increased likelihood of chronic psychological health concerns (Haugen et al., 2017). The barriers to accessing support include confidentially concerns, the concern that therapists do not understand the risk environment the responder faces and the stigma associated with mental illness (Wooller, 2022). Unfortunately, unaddressed psychological ill health has been shown to result in productivity loss, early retirement, alcohol abuse, divorce, and increased rates of suicide (Haugen et al., 2017).

Organisations need to normalise the fact that there are psychological health effects from traumatic exposure and build a workplace culture where awareness of mental health issues are part of staying healthy and resilient (Maltzman, 2011). It is important that responders have an understanding that their psychological health is important and that disregarding it is detrimental to their physical and overall health.

1.7 Conclusion and the Research Gap

Emergency responders play a crucial role in protecting and preserving human life during disasters. Despite our knowledge of the human-animal bond and its role in human lives, and the ethical and moral responsibilities we have for animal welfare, the animal component in an emergency is often overlooked. The presence of animals in an emergency adds another dimension of risk which needs to be managed, one recommended option is to enlist trained animal responders. This literature review has highlighted the need for further research on the risks faced by animal responders and the effective mitigation strategies for those risks.

To rescue the human we must rescue the animal, and to protect the human we must manage the welfare of their animal. To improve a disaster affected community's resilience we must factor animals into the disaster response.

2 Materials and Methods

An anonymous online survey was developed using Qualtrics^{XM} to collect data from the survey respondents. Prior to dissemination of the survey it was sent to two people with experience in animal rescue who were outside the research team. Their only recommendation was to provide more free text opportunities for the respondent to tell their story.

The survey was designed using the 'Code of Ethical Conduct for Research, Teaching and Evaluations Involving Human Participants revised code 2017' (Massey University, 2017). Subsequently, the study was reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 19/02. Survey respondents were provided with information on the purpose of the research, the ethical approval, their rights, and a confidentiality statement. Due to the sensitive nature of the research a link was provided on the footer of every page which listed psychological support groups. The survey could be completed in one sitting or paused and restarted at any stage. A copy of the questionnaire is provided in Appendix A.

2.1 Recruitment of Respondents

Recruitment for survey respondents was initiated by contact with rescue organisation office bearers, influencers in animal rescue in Australia, New Zealand, the United Kingdom and the United States of America (Appendix B), and via social media platforms that focused on emergency animal rescue. A 'snowball sampling' effect was encouraged for further dissemination to relevant groups. Follow-up emails, phone calls, social media texts and video posts were sent out every few months to recruit more respondents. Given the lack of data on trained animal responders, the sample size for statistical validity was difficult to determine. Instead, efforts were placed into maximising survey returns to overcome this limitation. The survey was open for responses for seven months from April 2019 and closed in October 2019 to enable collation of data.

2.2 Questionnaire Design

In total, there were fifty-nine survey questions which were grouped into seven sections including the survey disclaimer and consent (Section 1), and the concluding page (Section 2). The questions

included eleven open-ended descriptive enquiries, with 88% percent of the survey being voluntary and the remaining 12% being compulsory.

The demographics of the respondents were collected in Section 3 along with their experience in emergency responses. Initial questions captured information about the respondent's age, gender, highest level of education, country of residence, occupation, rescue experience, training, and animals the respondent cared for at home. The questions related to rescue experience covered the number of deployments within the past two years, their number of years involved in animal rescue and whether the respondent was a rescue professional or volunteer. Questions related to training determined the level of training in animal first aid, human first aid, technical large animal rescue (TLAR), small animal rescue, wildlife land and wildlife marine rescue, disaster communications, disaster management, military emergency response, and stress mitigation or support.

In Section 4 the respondent was then asked to recall an event they had responded to within the past five years. Questions focused on details from this event including whether it was the most recent or the most memorable and whether it was a positive experience. The magnitude and cause of the event was queried including the number of animal and human injuries and deaths. Further questions then enquired on the personal impact of the recalled event using the domains of physical health, psychological health, relationship health, societal standing, and financial health. Following this, recovery options were listed and the respondent was asked to indicate whether they had tried the option, and if they had, to rate its perceived effectiveness. If the respondent desired they could then describe the event in their own words.

The next part of the survey, Section 5, used the validated IES-R questionnaire to quantify the psychological impact of the recalled event (Weiss, 2007). Use of the IES-R questionnaire enabled an assessment of the respondent's response to a traumatic event in the domains of hyperarousal, intrusive thoughts and avoidance, the result of which is a useful tool for the measurement of traumatic stress (Creamer et al., 2003; Sveen et al., 2016).

In Section 6 respondents were questioned on whether they had sustained any injuries or illnesses over the previous five years in relation to an animal emergency response. The reasons for any reported injury were sought and the type and body location of the injury were identified. The respondent was then questioned about whether they had recovered and were asked to identify their recovery methods, including what they found effective or detrimental in their recovery.

The final set of questions were in Section 7 of the survey and this delved into whether the respondent had received any formal or informal psychosocial support. Enquires into the adequacy of that support were made and whether they felt it had helped in their recovery. The survey then

linked back to the concluding page, (Section 2), giving the respondent the choice to add comments if they desired.

2.3 Exclusions

Four hundred and nine surveys were returned, one survey was excluded due to duplication and further returns were excluded if the respondents had provided answers to less than 80% of the IES-R questionnaire. This left 227 surveys available for subsequent analysis, although within each section there were some omitted answers as indicated in the results chapter.

2.4 Data Analysis

The number of categories for some of the variables were collapsed if they had a low number of responses. For some questions where a free text answer was given it was possible to reattribute a category, these are detailed in the foot notes of the Results.

For each respondent an IES-R score was assigned. The Likert responses obtained from the IES-R questionnaire were assigned numeric values as follows: 'none' = 0, 'a little' = 1, 'a moderate amount' = 2, 'a lot' = 3, 'a great deal' = 4, and these were summed for the total score. For the respondents with missing entries the returns were checked to ensure that the missing entries were at random, then 'person mean imputation' was used to calculate the total score (Downey & King, 1998; Hosey et al., 2019).

Analysis of the data, tabulation and graphing were completed using Microsoft® Excel® for Microsoft 365, and the histogram graphic on the IES-R data (Figure 3-2) was generated in R for Windows (R Core Team, 2023).

3 Results

A total of 408 survey responses were returned, one survey was removed due to suspected duplication. A further 180 surveys were excluded because they completed less than 80% of the IES-R section of the survey. The final analysis was conducted on 227 respondents.

The demographic characteristics of the 227 respondents are summarised in Table 3-1. Of the 217 survey respondents indicating an occupation, 79 (36%) listed an occupation that was animal related and 35 (16%) were involved in human emergency response or care, the remaining 103 (47%) included various occupations and were collated as 'other'[1]. The four largest occupation groups from the survey respondents included 43 (20%) who listed their occupation as a veterinarian or veterinary technician, 24 (11%) who indicated that they were retired or pensioners, 21 (10%) who worked for a fire services team, and 10 (5%) who worked in the human medical field as nurses, doctors or paramedics.

A total of 134 survey respondents who answered the question on group membership reported belonging to over 80 unique response groups, of which the majority (>60%) were identified as being animal focused. Table 3-2 documents the survey respondent's experience in animal rescue or disaster responses. This varied from less than one year of experience to one respondent reporting sixty years. The number of deployments that each respondent reported within the past two years ranged from zero to 100 deployments. Out of the 227 respondents, those identifying as untrained volunteers numbered 32 (14%), whereas 144 (63%) identified as volunteers with some level of training, and 51 (22%) considered themselves professional responders[1]. The type of training that respondents had completed is described in Table 3-3. Two respondents indicated no training in any category (1%), nine (4%) were trained in at least one category and 216 (95%) had training in multiple categories, with a mean of responders indicating training in six categories.

[1] Summation of percentages ≠ 100% due to rounding errors.

The survey questioned about an experience the respondent was deployed to during the previous five years (2014 to 2019), details of which are listed in Table 3-4. For 181 respondents (80%) the overall experience was positive, 27 respondents (12%) reported neutral feelings about the deployment and 19 (8%) reported that the experience affected them negatively. Five respondents (2%) reported a single human death and 41 (19%) reported multiple human deaths from the deployment event. Twenty-four (11%) respondents reported one animal death while 102 (46%) reported multiple animal deaths (Figure 3-1)[2].

The *IES-R* questionnaire (Weiss, 2007) data is graphed in Figure 3-2. Out of the 227 respondents, 13 (6%) returned a score of 24 to 33 in which partial PTSD is a clinical concern and seven (3%) scored 33 or above meeting the criteria for a probable PTSD diagnosis (Creamer et al., 2003). Concerningly, of the seven respondents who scored above 33, four (1.8% of the 227 respondents) scored above 37 indicating an extreme effect with possible long term health consequences (Kawamura et al., 2001).

Enquiry into injuries and illnesses sustained in a deployment which involved an animal over the previous five years (2014-2019) are detailed in Table 3-5, 216 respondents completed this section. Thirty-eight (18%) of survey respondents reported an injury, whilst 10 (5%) reported symptoms of an illness. The respondent reported if they had routine health check-ups and 178 (82%) indicated 'No'. The survey enquired about the recovery of the respondent from the injury or illness encountered, 31 (82%) indicated that they had recovered, whilst seven (18%) indicated they had not at the time of answering this survey. Those who reported they had not recovered then indicated the duration of time since the event and this is shown in the survival curve Figure 3-3.

The adequacy of psychosocial recovery support is reported in Table 3-6 from the 205 survey respondents who answered this question. Sixty-six (32%) indicated a single source of support for this question, whereas 139 (68%) indicated they received support from multiple sources. Talking to a support person was reported to be beneficial by 133 (65%) survey respondents, 70 (34%) felt neutral about talking and two (1%) considered they felt worse.

[2] Differing numbers of respondents answered the injury and death section: there were missing responses for human death(s) (n=10), animal death(s) (n=6).

Survey respondents reported the perceived effect on their mental health, physical health, relationship health, financial health, and the effect on societal standing from the recalled event in Figure 3-4. The survey respondents were then given a choice of nine recovery techniques and asked whether they had used the technique, and if so to rate its effectiveness (Figure 3-5). Of those who tried each technique, talking with friends, family or teammates was ranked the most effective by 187 (95% of 197) respondents, followed by debriefing with the team or mentor by 163 (95% of 172). Exercise or recreational activities were considered effective by 122 (92% of 133) respondents and mindfulness was reported to be effective by 91 (87% of 105). Of the few respondents who tried counselling (n=34), 17 or 50% found it to be effective.

Table 3-1: Demographic Characteristics of Survey Respondents [a]

Variable	n (%)
Gender	
Female	152 (67%)
Male	75 (33%)
Age	
16-30	22 (10%)
31-40	41 (18%)
41-50	59 (26%)
51-60	67 (30%)
>61	38 (17%)
Highest Level of Education	
College degree	64 (28%)
Professional degree or post graduate qualification	62 (28%)
Certificate or Diploma	44 (20%)
High school or below	34 (15%)
Apprenticeship, technical or trade certificates	21 (9%)
Country of Residence	
United States of America	92 (41%)
New Zealand	53 (23%)
Australia	45 (20%)
Other	37 (16%)
Animal Types Owned	
Dogs	174 (77%)
Cats	113 (50%)
Horses	104 (46%)
Livestock	70 (31%)
Wildlife/exotic	31 (14%)
Birds	37 (16%)
Pocket pets	23 (10%)
None	21 (9%)

Note. Responses were missing for 'Highest Level of Education' (n=2) and 'Animal Types Owned' (n=1). Summation of percentages in 'Age' section ≠ 100 due to rounding errors.

[a] Data from 227 emergency responders engaged in animal response.

Table 3-2: Experience in Animal Rescue or Disaster Support as Reported by Survey Respondents [a]

Variable	n (%)
Experience in Animal Rescue or Disaster Response (years)	
< 2	25 (11%)
2 to 5	51 (23%)
6 to 10	45 (20%)
11 to 15	33 (15%)
16 to 20	27 (12%)
21 to 30	26 (12%)
≥31	18 (8%)
Recent Experience (number of rescues over past two years)	
< 5	111 (54%)
5 to 10	58 (28%)
11 to 20	20 (10%)
21 to 30	7 (3%)
≥31	11 (5%)

Note. Responses were missing for 'Experience in Animal Rescue or Disaster Response' (n=2) and 'Recent Experience' (n=20). Summation of percentages in the 'Experience in Animal Rescue or Disaster Response' section ≠ 100 due to rounding errors.

[a] Data from 227 emergency responders engaged in animal response.

Table 3-3: The Training Received in the Fields of First Aid, Animal Rescue and Disaster Response Reported by Survey Respondents [a]

Type of Training	n (%) No Training	n (%) Training
Animal first aid	35 (17%)	177 (83%)
Human first aid	13 (6%)	195 (94%)
Technical large animal rescue	42 (20%)	170 (80%)
Small animal technical rescue	52 (26%)	148 (74%)
Wildlife land rescue	91 (47%)	104 (53%)
Wildlife marine rescue	134 (69%)	59 (31%)
Other animal rescue	17 (46%)	20 (54%)
Communication	50 (23%)	167 (77%)
Disaster management	45 (21%)	167 (79%)
Military emergency response	156 (80%)	40 (20%)
Stress mitigation or support	72 (36%)	130 (64%)
Other disaster response	16 (42%)	22 (58%)

Note. There were missing responses for 'Animal first aid' (n=15), 'Human first aid' (n=19), 'Technical large animal rescue' (n=15), 'Small animal technical rescue' (n=27), 'Wildlife land rescue' (n=32), 'Wildlife marine rescue' (n=34), 'Other animal rescue' (n=190), 'Communication' (n=10), 'Disaster management' (n=15), 'Military emergency response' (n=31), 'Stress mitigation or support' (n=25), and 'Other disaster response' (n=189). The categories of training are not mutually exclusive.

[a] Data from 227 emergency responders engaged in animal response.

Table 3-4: Description of the Event Recalled by Survey Respondents [a]

Variable	n (%)
Event Recounted	
The most recent experience	123 (55%)
The most memorable positive experience	65 (29%)
The most memorable negative experience	20 (9%)
Some other experience	15 (7%)
Years Before the Survey	
< One	32 (14%)
One	75 (34%)
Two	60 (27%)
Three	34 (15%)
Four	12 (5%)
Five	9 (4%)
Event Type [b]	
Animal entrapment	80 (35%)
Fire	54 (24%)
Flood/hurricane	41 (18%)
Other	25 (11%)
Motor vehicle	15 (7%)
Human related (welfare, hoarding etc)	11 (5%)
Scale of Event	
Local	107 (48%)
Regional or county	74 (33%)
Multiple regions or counties	22 (10%)
State or provincial	14 (6%)
National	8 (4%)

*Note. T*here were missing responses for 'Event Recounted' (n=4), 'Years Before the Survey' (n=5), 'Event Type' (n=1), and 'Scale of Event' (n=2). Summation of percentages in the 'Years Before the Survey' and 'Scale of Event' sections ≠ 100 due to rounding errors.

[a] Data from 227 emergency responders engaged in animal response.

[b] The 'Event Type' 'Other' category was reattributed as appropriate into a new 'human related' category for grouping of welfare or hoarding issues (n=11). An additional five entries in the 'Other' category were reattributed as follows: 'stuck in mud' – moved to 'Animal entrapment' (n=1), references to a fire event moved to 'Fire' (n=3), and 'vehicle' – moved to 'Motor vehicle' (n=1). The following returns remained in the 'Other' category (n=12): 'marine injury' (n= 1), 'training' or 'teaching' (n=2), 'lockdown in Christchurch (mass shooting)' (n= 1), 'Illness' (n=2), 'oil spill' (n=1), 'heatwave' (n=1), 'cold/ice' (n=1), and entries with no text (n=3). The responses in the categories of 'stranding' (n=8), 'earthquake' (n=2), 'structural collapse' (n=2), 'volcanic' (n=1) were added to 'Other' as these had single-digit responses (n=13).

Table 3-5: Illness and Injury Details Associated with an Animal Rescue or Disaster Response Involving Animals from 2014 to 2019 Reported by Survey Respondents [a]

Variable	n (%)
Cause of Injury [b]	
Animal inflicted	19 (48%)
Fatigue-related	11 (28%)
Action or inaction of other people	9 (23%)
Equipment failure	8 (20%)
Existing illness or health concern	6 (15%)
Failure to wear personal protective equipment	5 (13%)
Stress-related	5 (13%)
Inadequate training or lack of currency	5 (13%)
Miscommunication	3 (8%)
Inexperience	1 (3%)
Location of Injury [c]	
Arm	12 (32%)
Hand	8 (21%)
Back	8 (21%)
Leg	8 (21%)
Foot	5 (13%)
Head or face	3 (8%)
Neck	3 (8%)
Pelvis	3 (8%)
Groin	1 (3%)
Chest	1 (3%)
Nature of Injury [d]	
Laceration, cut or wound	18 (30%)
Bruising or general soft tissue injury	16 (27%)
Dislocation or sprain or strain	10 (17%)
Muscle or tendon injury	10 (17%)
Concussion or brain injury	2 (3%)
Facial trauma	2 (3%)
Fracture or broken bone	2 (3%)
Illness Symptoms [e]	
Fatigue or lethargy	6 (20%)
Cough or cold	4 (13%)
Difficulty breathing	4 (13%)
Infection of a specific body part	3 (10%)
Fever	2 (7%)
Headache	2 (7%)
Infection of your whole body	2 (7%)
Psychological illness or distress	2 (7%)
Rash or skin reaction	2 (7%)
Other	2 (7%)
Chest pain	1 (3%)

Note. Thirty-eight respondents out of the 216 who answered this section reported 52 unique injuries and 10 respondents reported illness symptoms, the categories were not mutually exclusive. Summation of percentages in the 'Cause of Injury' and 'Location of Injury' added to over 100% due to respondents reporting multiple injuries or illness symptoms.

[a] Data from a survey of emergency responders engaged in animal response. One hundred and seventy-six (81%) survey respondents answered this section, 216 indicated 'No' injury or illness. The remaining 40 survey respondents who indicated an injury or illness provided the data for this table.

[b] For the 'Cause of Injury' question, the 'Other' free text answers (n=8) were reattributed as described as follows: 'Physicality of the work' moved to 'Fatigue' category (n=1); 'Lack of proper hazard marking', 'Traveling and staying with others in close quarters, passing cold & flu germs' moved to the 'Actions or inactions of others' category (n=2); 'Manual handling issue', 'Back injury due to the weight of the animal involved', 'Slipped and fell, face submerged in water that was contaminated with chemicals in flood water' were moved to 'Inadequate training or lack of maintenance training' category (n=3). Fifteen (38%) of respondents reported multiple causes.

[c] For the 'Location of Injury' question 'Other' free text replies (n=4) were reattributed: 'knee' and 'left knee' to 'Leg' (n=2); 'shoulder' to 'Arm' (n=1); 'knee/chest/elbows' to 'Leg' (n=1), 'Arm' (n=1) and Chest (n=1). For the 'Nature of Injury' question 'Other' free text replies (n=8) were reattributed to: 'Chemical burns to both eyes from contaminated flood water' moved to 'Facial trauma' (n=1); 'Traumatic amputation of part of left index finger', 'Bite to dominate hand which gave me cellulitis' moved to 'Laceration, cut or wound' (n=2); 'Torn meniscus cartilage' moved to 'Soft tissue injury' (n=1); 'Acerbated [sic] early osteoarthritis from being non-limiting to being unable to function without anti-inflammatory/pain relief medication, culminating in surgical intervention 1 year later' moved to 'Dislocation or sprain or strain' (n=1). For the 'Location of Injury' questions, 15 (39%) of respondents reported multiple injury locations.

[d] For the 'Nature of Injury' questions, 16 (42%) of respondents reported multiple traumas.

[e] For the 'Illness Symptoms' questions, 6 (60%) of respondents answering this question reported multiple symptoms.

Table 3-6: Recovery Options Reported by Survey Respondents

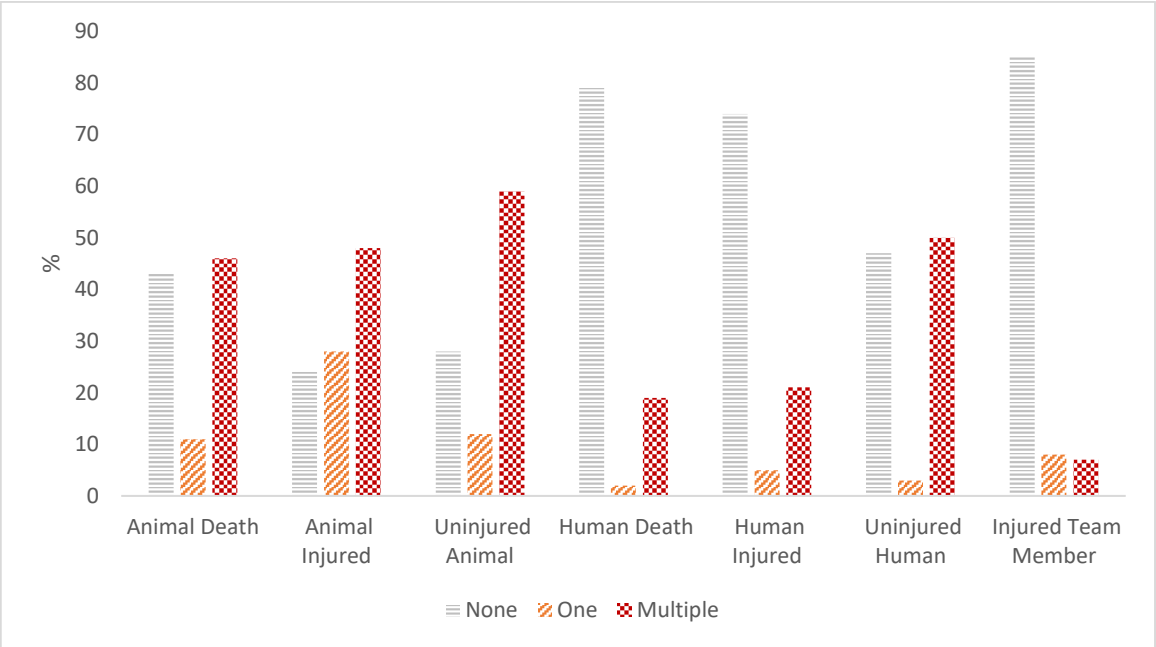
Variable	n (%)
Adequacy of Psychologic Support [a]	
Partner	98 (48%)
Team	97 (47%)
Friend	79 (39%)
Organisation	79 (39%)
Work	66 (32%)
Other family member	38 (19%)
Counsellor or similar professional	9 (4%)
No one	8 (4%)
Other	9 (4%)
Likelihood of Talking to a Support Person [b]	
Always	62 (30%)
Most of the time	52 (25%)
About half the time	12 (6%)
Sometimes	75 (36%)
Never	5 (2%)

Note. Summation of percentages in the 'Adequacy of Psychologic Support' is over 100% due to respondents reporting multiple support options. Summation of percentages in the 'Likelihood of Talking to a Support Person' ≠ 100 due to rounding errors.

[a] Data from 205 emergency responders engaged in animal response.

[b] Data from 206 emergency responders engaged in animal response.

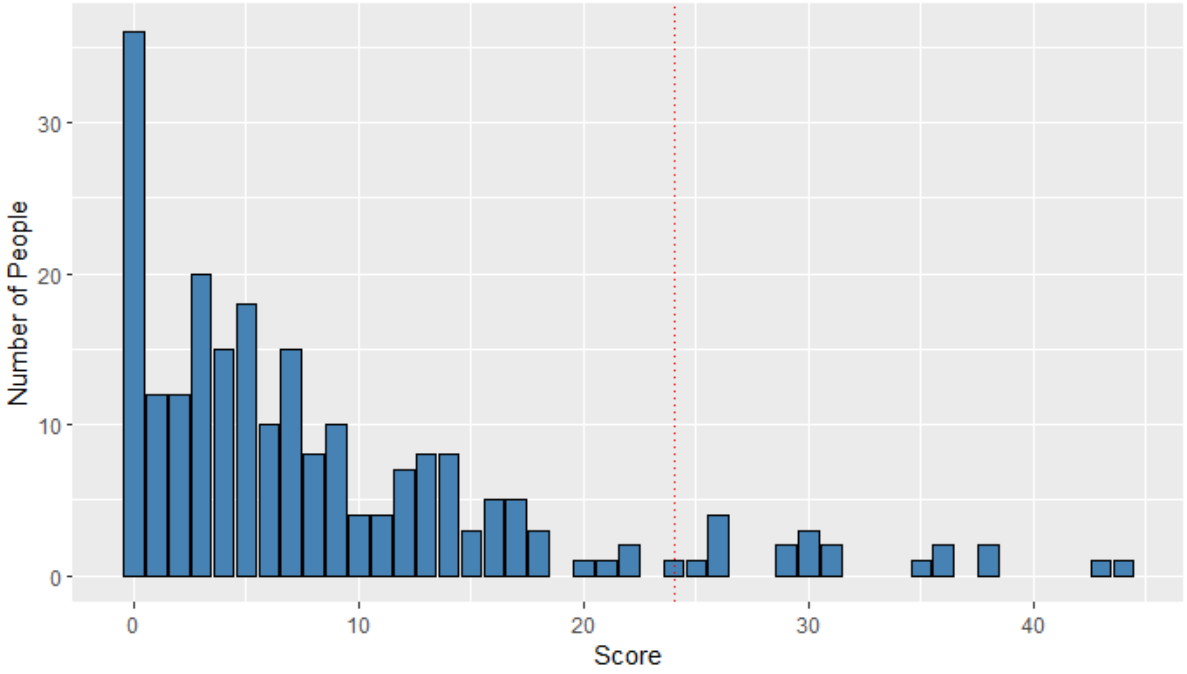
Figure 3-1: Percentage of Respondents Reporting Incidents of Injury and Death in Animals and Humans in the Survey Event Recalled [a]



*Note. R*esponses were missing from 'Animal Death' (n=6), 'Animal Injured' (n=6), 'Uninjured Animal' (n=10), 'Human Death' (n=10), 'Human Injured' (n=14), 'Uninjured Human' (n=14), and 'Injured Team Member' (n=11).

[a] Data from 227 emergency responders engaged in animal response.

Figure 3-2: Histogram of the Impact of Event Score - Revised Questionnaire Data [a] [b]

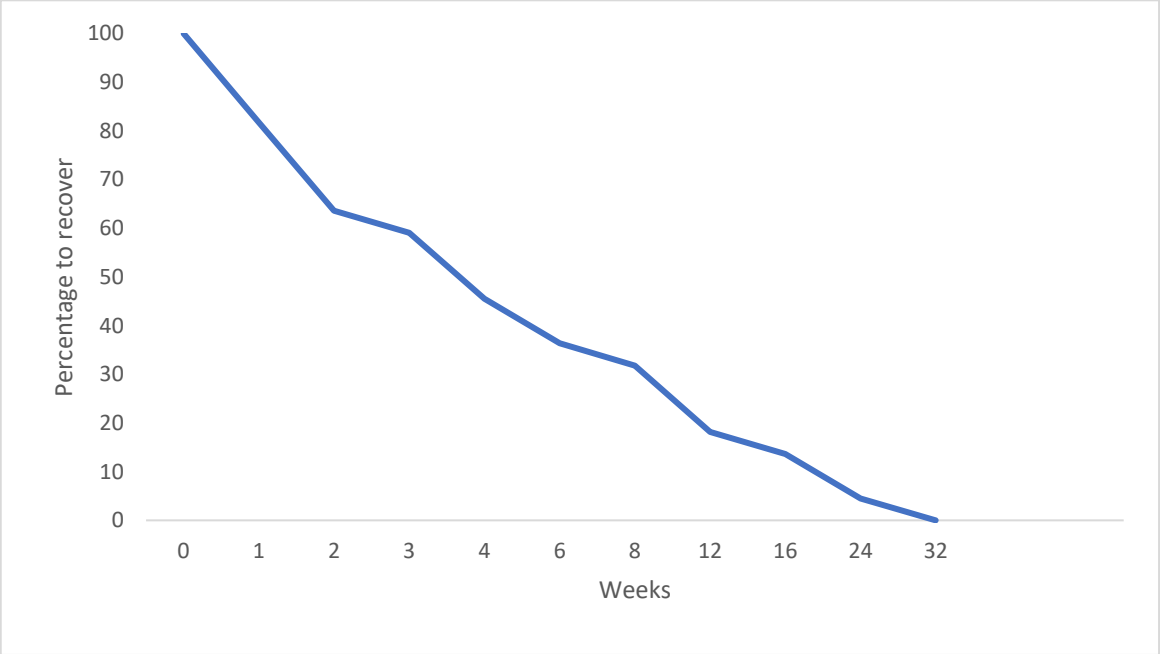


Note. A score of 33 or above supports a probable diagnosis of PTSD and 37 or above is likely to be accompanied by long-term health issues.

[a] Data from emergency responders engaged in animal response.

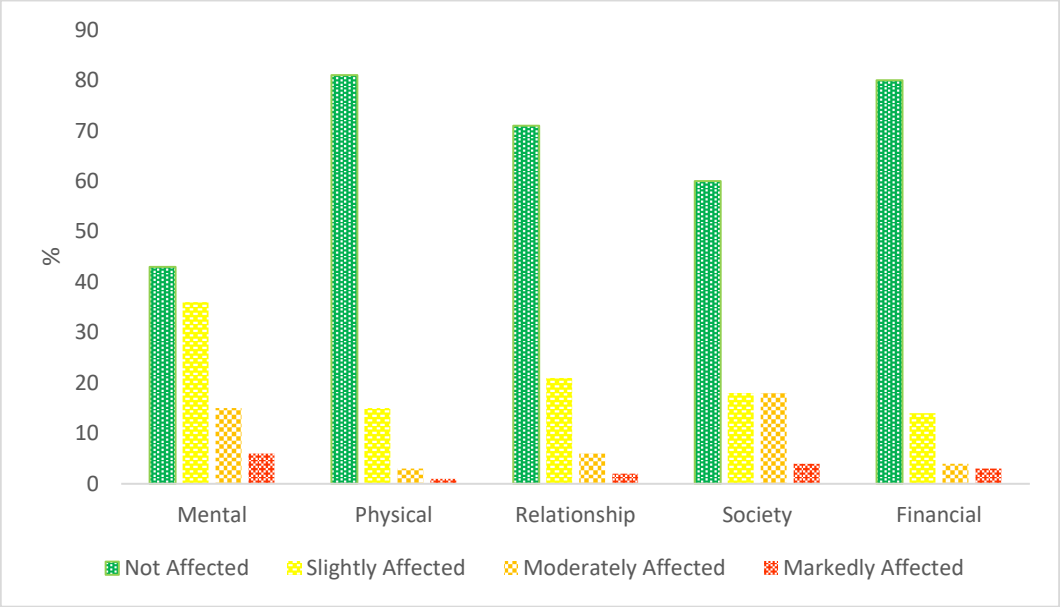
[b] Reference line indicates a score of 24. Responses greater than or equal to 24 indicate a clinical concern for partial PTSD.

Figure 3-3: Recovery Duration Reported by Survey Respondents who Sustained an Illness or Injury During Animal Rescue or Disaster Support Involving Animals Over Five Years Preceding the Survey (2014 to 2019) [a]



[a] Data provided by 24 survey respondents out of 31 who reported to have recovered, from a survey of emergency responders engaged in animal response.

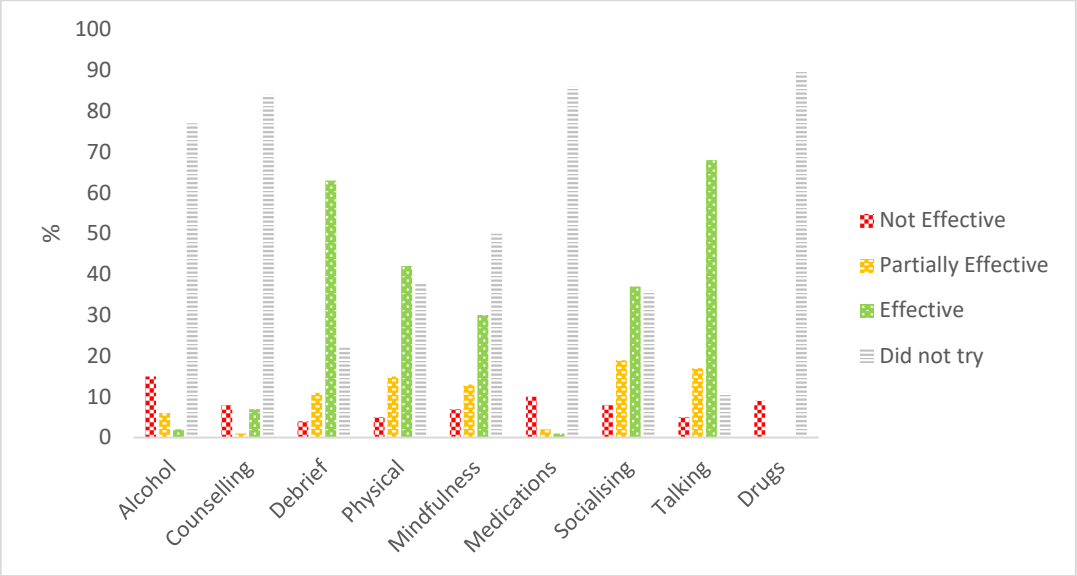
Figure 3-4: The Impact of the Events Detailed in the Survey Reported by Survey Respondents on Mental Health, Physical Health, Relationship Health, Societal Standing and Financial Standing [a]



Note. There were missing responses for 'Societal Standing' (n=1).

[a] Data from 227 emergency responders engaged in animal response.

Figure 3-5: For the Event Described by Survey Respondents, the Percentage that Tried Different Recovery Techniques Stratified by Effectiveness [a]



Note. There were missing answers for 'Alcohol' (n=17), 'Counselling' (n=17), 'Debrief' (n=7), 'Physical' (n=14), 'Mindfulness' (n=15), 'Medications' (n=20), 'Socialising' (n=15), 'Talking' (n=5), 'Drugs' (n=22), and 'Other' (n=196). The category 'Debrief' refers to debriefing with team or mentor, 'Physical' refers to physical or recreational activities, 'Medications' refers to prescribed medications, 'Talking' refers to talking with friends, family or teammates and the category 'Drugs' refers to self-administered drugs.

[a] Data from 227 survey respondents engaged in animal response.

4 Discussion

4.1 Key Findings

This study found that over a five-year period, in emergencies with an animal component, nearly one in five responders sustained a physical injury. Unfortunately, other studies give an injury per year rate and as our questionnaire only sought whether an injury had occurred in the last five years, and it did not assess the frequency of injury, we cannot directly compare the rates. A study by Reichard and Jackson (2009) estimated an overall injury rate for emergency medical service personnel from 8.9 to 14.5 per 100 workers, police were around 25 and firefighters around 21.8, which demonstrates the risk emergency responders face. We can conclude that injuries do also occur in an animal response and recommend further research.

Of those reporting an injury, nearly half listed animals as a contributing factor. Overall, most of the injuries reported were soft-tissue damage with over 50% involved injury to the arms and hands. As a comparison, in a study of Australian first responders by Gray and Collie (2017), musculoskeletal injuries were identified as the most common. Ambulance officers were more likely to sustain an upper body injury, fire and emergency workers injured the lower body, whereas police officers were more likely to sustain a psychological injury.

Fatigue was identified by three in ten respondents as a contributing factor for injury, and this has been identified as a risk in other studies in emergency responders as well (Patterson et al., 2012). Other contributing factors included the actions or inactions of other people and equipment failure. Additionally, this study found that the recovery time for all illnesses and injuries exceeded a month for almost half of the respondents.

This study also found that individuals working as emergency responders in situations involving animals are at risk of sustaining a psychological injury. Approximately one in 10 respondents scored above 24 on the IES-R scale indicating a marked psychological impact from the event (Creamer et al., 2003; Weiss, 2007). Within this group two thirds had a score consistent with partial PTSD and a third met the criteria for probable PTSD. This study had a similar rate of PTSD as found in a 2012 analysis of a worldwide pooled study of emergency workers (Berger et al., 2012). The lifetime prevalence of PTSD in the general population worldwide is 4%, with high income countries having twice this rate (Koenen et al., 2017). This shows that emergency responders are at greater risk of a psychological injury than the general public. Additionally, over half of the respondents indicated that their mental

health was the most affected of the five domains investigated in this study. However, a limitation of comparing this study with other studies on emergency responders and PTSD is that many studies use the DSM or ICD criteria for a PTSD diagnosis, whereas this study used the IES-R questionnaire so the results may not be directly comparable.

Another finding from this study was that over 80% of respondents did not access counselling services for their recovery despite indicating a psychological health impact. Information was not gathered about the reasons the respondents did not seek counselling services, but possible reasons could include the respondents not believing that they required help. Other studies have identified the cost of counselling services, the time availability for counselling and the stigma associated with psychological support as barriers to seeking out counselling (Andrade et al., 2014; Haugen et al., 2017; Jones et al., 2020; Sareen et al., 2007; Stanley et al., 2017). As other studies on seeking treatment for a psychological injury are based on a mental health diagnosis, the results from this study are difficult to compare (Kessler et al., 2005).

For those who did receive counselling, half reported it to be partially or fully effective. The reasons why counselling was not considered effective for some were not investigated in this study. Possible reasons for the lack of efficacy are discussed in a meta-analysis by Vybiral et al (2023) and can include the perception that the therapist was not listening or not understanding , that there was no improvement felt, feeling emotional discomfort, or the therapy was not being tailored to what would be effective for the individual. Over 90% of respondents who favoured a less formal 'talking' pathway found that it helped. This could involve talking with friends, family or teammates and this is acknowledged in the literature as being one of the better coping strategies (Tran, 2018). Additionally, over 90% reported that a debrief with team members or a mentor was helpful. Around 9 out of 10 respondents found that physical or recreational activities were helpful, likewise for socialising, and for mindfulness.

4.2 Limitations and Future Research

This study contributes to the knowledge that emergency responders are at risk of sustaining a physical injury during an emergency response and that the responder-animal interaction is a common causative factor. Additionally, responders are at risk of sustaining a psychological injury. However, there are limitations in this study which need to be considered. The first consideration is that anonymous voluntary online surveys have limitations inherent to their design, for example requiring access to the Internet thereby possibly limiting potential respondents. A second

consideration is that this survey was voluntary and was partially distributed through social media so the target population size was not known, this reduces the generalisability of the returns (Andrade, 2020). A further consideration is that despite this survey limiting the number of questions to reduce the time required to complete the survey, the ideal time of ten to 15 minutes was exceeded which may have further limited the number of completed returns (Revilla & Höhne, 2020). Also, as the survey relied on the recollection of an event, recall bias may come into play which could affect the validity of the data received (Colombo et al., 2020). Despite these limitations online surveys are a cost-efficient way to reach many potential respondents (Andrade, 2020). Additionally, the finding from this study regarding the psychological risk is of a similar magnitude to other studies involving emergency responders, adding to the confidence of the results. As the objective of this study was descriptive, multivariate analysis was not required.

Future research into other unique risks faced by trained animal responders is recommended, such as the psychological impact of performing animal euthanasia, particularly en masse. Other studies have indicated a psychological risk associated with performing euthanasia (Murphy & Daly, 2020; Wasson & Wieman, 2018), but there are few studies on the risk to the trained animal responder. Further research into why so few animal responders sought out counselling services is also important to ensure the recovery options for these workers are fit for purpose.

4.3 Implications

To help mitigate the physical and psychological risks to the responder, it is imperative that both individuals and organisations take responsibility for safety. Responders can achieve this by attending training sessions to maintain currency and ensuring that PPE and equipment is used correctly. Additionally, responders need to be proactive in utilising psychosocial support opportunities such as talking with team-mates, friends and family, partaking in physical and recreational activities, socialising and mindfulness. Free online training courses such as those provided by the Disaster Technical Assistance Center (Substance Abuse and Mental Health Services Administration) are available for responders to access independently and should be encouraged.

Organisations that deploy emergency responders have a responsibility for the health and safety of their workers, this can be addressed by providing training on the physical and psychological risks of an emergency response and the effective mitigation strategies for managing the risk. Response team organisations should also ensure that appropriate PPE and equipment is available and provide training in their correct use. The organisation should also promote a safety culture where everyone

is responsible for safety, one way to enable this would be through crew resource management (CRM) training as developed by the aviation industry. CRM addresses the human factors contributing to the risk and relies on effective communication, situational awareness, decision making, leadership and team work (Mearns et al., 2001). Another way to increase safety would be through peer support (Donovan, 2022) such as the 'buddy system'. In this model, buddies assess each other for signs of stress, fatigue or injury and can intervene when concerns arise during training, deployment and post-deployment (Dass-Brailsford, 2010). Organisations should also ensure that there is support in the field for their workers to minimise fatigue, this would include ensuring safe and adequate access to water and sustenance as well as suitable rest and sleeping arrangements. There should also be provision for responders to have access to appropriate and confidential psychological support services should they choose to utilise this option.

Emergency responders who happen upon animals when deployed need to know how to keep themselves safe around stressed animals. They need training on how to assess the situation and decide whether trained animal responders should be called in to mitigate the risk of harm from the animal, and to ensure the safe and humane handling of the animals.

5 Conclusion

Animals are an important part of society and are an essential part of our lives. Despite this they can be overlooked in a disaster response. Animal owners will place their own lives at risk to care for their pets and livestock if emergency plans do not address the welfare of their animals. Therefore, to protect and rescue the human we must rescue the animal.

The safest way to respond to animals in emergencies is to use emergency responders trained in animal behaviour and rescue techniques, however there is a lack of knowledge in this domain. This study has helped to address this research gap. This study found that animal responders are at risk of a physical injury particularly to the arms and hands, with the frequent cause of injury being due to the animal being rescued and fatigue. It has also found that the responder can suffer a psychological insult from the rescue event, which in extreme cases can cause prolonged psychological health issues. This study also found that psychosocial support was an effective recovery technique along with physical or recreational activity, debriefing, and mindfulness. Other mitigation options for both responders and organisations were identified from the literature, such as psychological and crew resource management training and the use of the 'buddy system'.

Trained animal responders are an important asset for the resilience of society, its human members and the welfare of animals. These trained teams will improve the safety of all emergency responders and the priority of human interests upheld.

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7 Appendices

Appendix A: Survey

International Survey of Emergency Animal & Disaster Response Volunteers & Workers

Standard: Study Introduction & Consent (1 Question)

Branch: New Branch
If
If International Survey of Emergency Animal and Disaster Response Volunteers and Workers We are inte... No, I will leave the survey Is Selected

Block: End of Survey (1 Question)

EndSurvey:

Block: Help us to understand a little about you & your experience (14 Questions)
Standard: Please share one of your most recent animal rescue or disaster experiences (10 Questions)

Branch: New Branch
If
If You have completed the second part of this survey - thanks! You are about halfway through, but we... No, I would like to leave the survey Is Selected

Block: End of Survey (1 Question)

EndSurvey:

Block: Mental wellbeing (24 Questions)

Branch: New Branch
If
If You have now completed most of the survey - great work! There will be an opportunity at the end o... No, I wish to leave the survey Is Selected

Block: End of Survey (1 Question)

EndSurvey:

Block: Physical wellbeing (11 Questions)
Block: Relationships (4 Questions)

Branch: New Branch
If
If Please remember, there will be an opportunity at the end of the survey for you to tell us more ab... No, I would like to leave the survey Is Selected

Block: End of Survey (1 Question)

EndSurvey:

Standard: End of Survey (1 Question)

EndSurvey:

Page Break

Section 1: Disclaimer and Consent

Start of Block: Study Introduction & Consent

Q1.1 **International Survey of Emergency Animal and Disaster Response Volunteers and Workers**
We are interested in evaluating some of the factors affecting the well being and the recovery of animal rescue personnel and disaster support teams. Your experiences in these fields are vital to helping shape our understanding as a community and will contribute to recommendations for further improvement of the safety, well being and recovery potential of personnel.

Thank you for your interest in contributing to this anonymous survey. Although the survey has been developed to be used on a portable device, we recommend completing it on a larger screen for ease of use.

Information related to this study, contact details, ethics statement and helplines are outlined in the following document, for a printable copy please click on the highlighted link to download and open the file: Emergency animal and disaster response volunteers and workers

Dear Participant,
There is an increasing societal importance for individual animal emergency rescue and animal welfare in more extensive disasters and incidents. The rescue and evacuation of animals is important not only for their welfare, but also for preventing human injury and loss of life during the emergency event, and aiding the emotional, mental and economical recovery of affected people.

Who are we? We are a small group of researchers, some of whom also volunteer in emergency response teams and support organizations. The research team includes Dr Steve De Grey, a veterinarian and the graduate student working on this project, Professor/Dr Chris Riley, a large animal veterinary surgeon and Hayley Squance from Massey University, New Zealand who volunteer with emergency animal rescue. Our other team members are Dr Michelle McArthur, a researcher into human-animal relationships at the University of Adelaide in Australia, and Dr Kirrilly Thompson a researcher into human risk at the University of South Australia. This project will also contribute to the requirements of an MVSc qualification for Dr Steve De Grey.

Why this survey? Depending upon the organisation or the role of the persons involved, there are varying levels of understanding of the impact of being involved in work of this type upon owners, volunteers and professional rescue workers involved in animal emergency rescue and disaster response. This international study aims to understand the ways in which those involved in animal emergency work are affected, and how people manage and recover from any consequences that may arise. We seek to understand and investigate different factors that may influence the effects that involvement of these rescue events and disasters have on volunteers and workers. To do this we need your help. In this study you are invited to complete a de-identified (anonymous) online survey about your experiences, if and how they may have affected you, and your recovery after being involved with an emergency animal rescue or disaster response incident. It will take approximately 20 minutes or less of your time. Any information provided to us through this survey

is anonymous and is not linked back to you. Electronic information from the survey will be stored on Professor Chris Riley's password-protected computer and backed up on Massey University servers. Governance, custodianship and disposal of data will comply with the Code of Responsible Research Conduct at Massey University and will be held confidentially.

Data submitted in this project may contribute to future studies of resilience in animal rescuers. At the end of the study, only the overall results will be analysed and published for the benefit of the community and those involved in emergency animal response and disaster response. Results may be published in journal articles, presented at conferences and meetings, and other means of dissemination. Copies of the final published reports will be freely available on request. No financial or other compensation is provided for participants.

By completing this survey, you are indicating that you are aged 16 years or older, and consent to participate in the study. Completion of as much of the survey as possible will provide better information, but you may exit the survey at any time. If you would like more information about this study, please contact Professor Chris Riley at Massey University (c.b.riley@massey.ac.nz).

Feeling troubled?

Sometimes the recollection of your emergency animal response or disaster management experience may lead to distress or anxiety. If you experience these effects we suggest that you contact your support professional or organisation. Some additional helpline contacts are below. If a help line number is not listed for your country or region, please contact your local emergency response organization.

Australia

Lifeline: 13 11 14

Beyond Blue: 1 300 22 4636

AUS National emergency number: 000

New Zealand

Lifeline: 0800 543 354 (0800 LIFELINE) or text 4357 (HELP)

Depression Helpline: 0800 111 757 or text 4202

NZ National emergency number: 111

Canada

Canada Suicide Prevention and Support Service (CSPS) 1-833-456-4566

CSPS Quebec 1-866-APPELLE [277-3553]

Provincial crises numbers found at https://thelifelinecanada.ca/help/call/

CAN National emergency number: 911

United Kingdom

National Health Services First Response Service for mental health: 111, Option 2

Samaritans Helpline: 116 123

UK National emergency number: 999 and 112

United States

National Suicide Prevention Lifeline: 1-800-273-TALK [8255]

Crisis Text Outline: text HOME to 741741

US National emergency number: 911

Massey University Human Ethics Committee contact statement:

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 19/02. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz

Consent: To participate, please read the statements below and indicate whether you give your consent.

1. I have been informed of, and understand, the proposed research.
2. I have been informed that the information provided will be kept confidential, stored securely and then destroyed securely seven years after the completion of the study.
3. I can cease the completion of the survey or interview at any time.
4. I confirm that I'm sixteen years of age or older If you have read and understood the information above, and give your consent to be included in this research, please click 'Yes, I will contribute to this survey' to begin

- ○ Yes, I will contribute to this survey (4)
- ○ No, I will leave the survey (5)

End of Block: Study Introduction & Consent

Section 2: Concluding Page

Start of Block: End of Survey

Q2.1 Thank you for your contribution. If there are any further comments or questions you would like to add, please enter them below

_____

_____

_____

_____

_____

End of Block: End of Survey

Section 3: Demographics

Start of Block: Help us to understand a little about you & your experience

Q3.1 What is your usual occupation or job?

_____

Q3.2 In which country do you currently live or reside? (Click on the box below to select your country)

▼ Afghanistan (1) ... Zimbabwe (193)

Q3.3 What is the zip or postal code where you usually live?

_____

Q3.4 Please indicate your age?

- ○ 15 or younger (38)
- ○ 16 - 20 (39)
- ○ 21-25 (40)
- ○ 26-30 (41)
- ○ 31 - 35 (42)
- ○ 36 - 40 (43)
- ○ 41 - 45 (44)
- ○ 46 - 50 (45)
- ○ 51 - 55 (46)
- ○ 56 - 60 (47)
- ○ 61 - 65 (48)
- ○ 66 or older (49)

Display This Question:

If Q3.4 = 15 or younger

Q3.5 Thank you for considering participating in this survey. Unfortunately, you are not eligible for this survey at this stage. Please click through to the End of Survey page.

Skip To: End of Survey If Q3.5 Is Displayed

Q3.6 What is your gender (sex):

- ○ Male (1)
- ○ Female (2)
- ○ Other (3)

Q3.7 What is the **highest** level of education that you have attained?

- ○ Elementary or primary school (1)
- ○ High school graduation (2)
- ○ Certificate or Diploma (4)
- ○ Apprenticeship, technical or trade (3)
- ○ College or Bachelors degree (9)
- ○ Professional degree or Masters degree or Doctorate (PhD) (10)
- ○ Other (11) _____

Q3.8 Approximately how many years have you been involved in animal rescue or disaster response? (click on the slider and drag to your number)

0 6 12 18 24 30 36 42 48 54 60

YEARS ()

Q3.9 Approximately how many emergency animal rescues or disaster responses involving animals have you attended during the last two (2) years? (click on the slider and drag to your number)

0 10 20 30 40 50 60 70 80 90 100

NUMBER ()	

Q3.10 What is the nature of your involvement or role with animal emergency rescue and/or disaster response support?

- ☐ Untrained volunteer (1)
- ☐ Trained Volunteer (2)
- ☐ Professional or paid responder (3)
- ☐ Other (4) _____

Q3.11 Which animal rescue or disaster relief organizations are you currently a member of? (optional)

_____

Q3.12 What level of **animal rescue** training have you had? (tick the box with the highest training level that you have in each row at the time of the survey)

	None (1)	Introduction or Awareness (2)	Responder or Technician (3)	Expert or Instructor (4)
Animal first aid/veterinary (9)	☐	☐	☐	☐
Human first aid/rescue (3)	☐	☐	☐	☐
Technical large animal rescue (7)	☐	☐	☐	☐
Small animal (pet) rescue (8)	☐	☐	☐	☐
Wildlife -land rescue (10)	☐	☐	☐	☐
Wildlife -marine rescue (12)	☐	☐	☐	☐
Other (16)	☐	☐	☐	☐

Q3.13 What level of **disaster response** training have you had? (tick the box with the highest training level that you have in each row at the time of the survey)

	None (1)	Introduction or Awareness (2)	Responder or Technician (3)	Expert or Instructor (4)
Disaster communications (14)	☐	☐	☐	☐
Disaster management (15)	☐	☐	☐	☐
Military emergency response (22)	☐	☐	☐	☐
Stress mitigation or support (19)	☐	☐	☐	☐
Other (16)	☐	☐	☐	☐
Other (20)	☐	☐	☐	☐

Q3.14 Which of the following animals or pets do you keep at home or provide care for normally? (check all that apply)

- [ ] None at this time (10)
- [ ] Bird(s) (18)
- [ ] Cat(s) (19)
- [ ] Dog(s) (20)
- [ ] Horse(s) (21)
- [ ] Rabbits, hamsters or other small (pocket) pets (22)
- [ ] Livestock or farm animals (25)
- [ ] Wildlife or exotic pets (26)
- [ ] Other (specify) (8) _____

End of Block: Help us to understand a little about you & your experience

Section 4: Recall of Event

Start of Block: Please share one of your most recent animal rescue or disaster experiences

Q4.1 Please think about the most recent or most memorable experience that you have had with an emergency animal rescue or disaster response within the past five(5) years. Please indicate if this is:

- ○ Your most recent experience (1)
- ○ Your most memorable positive experience (2)
- ○ Your most memorable negative experience (4)
- ○ Some other experience (5)

Q4.2 Approximately when did this experience occur?
Year (1)
Month (2)

▼ 2014 (1) ... 2020 ~ December (91)

Q4.3 Thinking about this experience, which of the following terms best describes the animal rescue or disaster response involving animals incident that you recall:

- ○ Animal entrapment or misadventure (14)
- ○ Bush or Wild Fire (2)
- ○ Earthquake or landslide (7)
- ○ Flood (1)
- ○ Hurricane or typhoon (12)
- ○ Motor vehicle accident (13)
- ○ Structural collapse (e.g. building) (3)
- ○ Stranding (e.g. whales) (5)
- ○ Tsunami (11)
- ○ Volcanic eruption (8)
- ○ War or conflict (4)
- ○ Other (9) _____

Q4.4 In terms of geographic area, this event is best described as being at a level that was:

- ○ Local (1)
- ○ Regional or county (2)
- ○ Multiple regions or counties (3)
- ○ State or provincial (4)
- ○ National (5)

Q4.5 Thinking about this experience, please indicate the nature of injuries and loss of life associated with this incident: (tick all that apply)

	none (4)	one (1)	multiple (28)
Animal loss of life (4)	☐	☐	☐
Injured animals (8)	☐	☐	☐
Uninjured animals (3)	☐	☐	☐
Human loss of life (2)	☐	☐	☐
Injured people (public) (1)	☐	☐	☐
Uninjured people (public) (10)	☐	☐	☐
Injured team members (6)	☐	☐	☐

*

Q4.6 Please indicate in which ways you think that this experience has affected you? Please respond even if you think that you have not been affected.

	not affected (1)	slightly (2)	moderately (3)	markedly (4)
Mental or emotional wellbeing (1)	☐	☐	☐	☐
Physical health or ability (2)	☐	☐	☐	☐
Personal relationships (3)	☐	☐	☐	☐
Societal standing or reputation (4)	☐	☐	☐	☐
Financial wellbeing (5)	☐	☐	☐	☐
Other (6)	☐	☐	☐	☐

Q4.7 Which of the following helped you recover or maintain your wellbeing following this animal rescue or disaster response experience?

	Not effective or worse (18)	Partly effective (19)	Effective (20)	Did not try this (24)
Alcohol (10)	☐	☐	☐	☐
Counseling (3)	☐	☐	☐	☐
Debriefing with your team or mentor (5)	☐	☐	☐	☐
Exercise or recreational activities (2)	☐	☐	☐	☐
Mindfulness or meditation (1)	☐	☐	☐	☐
Prescribed medications (8)	☐	☐	☐	☐
Socialising (4)	☐	☐	☐	☐
Talking with friends, family or team mates (6)	☐	☐	☐	☐
Self administered drugs (9)	☐	☐	☐	☐
Other (7)	☐	☐	☐	☐
Other (11)	☐	☐	☐	☐

Q4.8 This question is optional. If you feel comfortable to do so, in your own words briefly describe this experience. You may include the name of the incident or disaster if you wish.

_____

_____

_____

_____

_____

Q4.9 Overall, what best describes how you feel about your involvement in this experience?

- ○ Highly positive (11)
- ○ Somewhat positive (12)
- ○ Neither positive nor negative (14)
- ○ Somewhat negative (15)
- ○ Highly negative (18)

Q4.10 You have completed the second part of this survey - thanks! You are about halfway through, but we would like to better understand your experience so that we can improve the information available to support people like you in this field. Are you willing to participate further in the survey?

- ○ Yes, I would like to continue with the survey (23)
- ○ No, I would like to leave the survey (25)

End of Block: Please share one of your most recent animal rescue or disaster experiences

Section 5: IES-R Questionnaire

Start of Block: Mental wellbeing

Q5.1 The next few questions are to understand how it may **or** may not have affected your mental wellbeing. Please indicate your level of agreement with the following questions:

Q5.2 Any reminder brought back feelings about it.

- ○ None at all (18)
- ○ A little (19)
- ○ A moderate amount (20)
- ○ A lot (21)
- ○ A great deal (22)

Q5.3 I had trouble staying asleep.

- ○ None at all (18)
- ○ A little (19)
- ○ A moderate amount (20)
- ○ A lot (21)
- ○ A great deal (22)

Q5.4 Other things kept making me think about it.

- ○ None at all (18)
- ○ A little (19)
- ○ A moderate amount (20)
- ○ A lot (21)
- ○ A great deal (22)

Q5.5 I felt irritable and angry.

- ○ None at all (18)
- ○ A little (19)
- ○ A moderate amount (20)
- ○ A lot (21)
- ○ A great deal (22)

Q5.6 I avoided letting myself get upset when I thought about it or was reminded of it.

- ○ None at all (18)
- ○ A little (19)
- ○ A moderate amount (20)
- ○ A lot (21)
- ○ A great deal (22)

Q5.7 I thought about it when I didn't mean to.

- ○ None at all (18)
- ○ A little (19)
- ○ A moderate amount (20)
- ○ A lot (21)
- ○ A great deal (22)

Q5.8 I felt as if it hadn't happened or wasn't real.

- ○ None at all (18)
- ○ A little (19)
- ○ A moderate amount (20)
- ○ A lot (21)
- ○ A great deal (22)

Q5.9 I stayed away from reminders of it.

- ○ None at all (18)
- ○ A little (19)
- ○ A moderate amount (20)
- ○ A lot (21)
- ○ A great deal (22)

Q5.10 Pictures about it popped into my mind.

- None at all (18)
- A little (19)
- A moderate amount (20)
- A lot (21)
- A great deal (22)

Q5.11 I was jumpy and easily startled.

- None at all (18)
- A little (19)
- A moderate amount (20)
- A lot (21)
- A great deal (22)

Q5.12 I tried not to think about it.

- None at all (18)
- A little (19)
- A moderate amount (20)
- A lot (21)
- A great deal (22)

Q5.13 I was aware that I still had a lot of feelings about it, but I didn't deal with them.

- ○ None at all (18)
- ○ A little (19)
- ○ A moderate amount (20)
- ○ A lot (21)
- ○ A great deal (22)

Q5.14 My feelings about it were kind of numb.

- ○ None at all (18)
- ○ A little (19)
- ○ A moderate amount (20)
- ○ A lot (21)
- ○ A great deal (22)

Q5.15 I found myself acting or feeling like I was back at that time.

- ○ None at all (18)
- ○ A little (19)
- ○ A moderate amount (20)
- ○ A lot (21)
- ○ A great deal (22)

Q5.16 I had trouble falling asleep.

- None at all (18)
- A little (19)
- A moderate amount (20)
- A lot (21)
- A great deal (22)

Q5.17 I had waves of strong feelings about it.

- None at all (18)
- A little (19)
- A moderate amount (20)
- A lot (21)
- A great deal (22)

Q5.18 I tried to remove it from my memory.

- None at all (18)
- A little (19)
- A moderate amount (20)
- A lot (21)
- A great deal (22)

Q5.19 I had trouble concentrating.

- None at all (18)
- A little (19)
- A moderate amount (20)
- A lot (21)
- A great deal (22)

Q5.20 Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.

- None at all (18)
- A little (19)
- A moderate amount (20)
- A lot (21)
- A great deal (22)

Q5.21 I had dreams about it.

- None at all (18)
- A little (19)
- A moderate amount (20)
- A lot (21)
- A great deal (22)

Q5.22 I felt watchful and on-guard.

- ○ None at all (18)
- ○ A little (19)
- ○ A moderate amount (20)
- ○ A lot (21)
- ○ A great deal (22)

Q5.23 I tried not to talk about it.

- ○ None at all (18)
- ○ A little (19)
- ○ A moderate amount (20)
- ○ A lot (21)
- ○ A great deal (22)

Q5.24 You have now completed most of the survey - great work! There will be an opportunity at the end of the survey for you to tell us more about your experience if you wish.

Now, thinking about the animal rescue or disaster relief situation that you have described, would you like to contribute further by answering questions on your physical wellbeing (injuries or health), and factors that may impact the recovery of people involved with emergency animal rescue or disaster response?

- ○ Yes, I would like to continue with the survey (5)
- ○ No, I wish to leave the survey (6)

End of Block: Mental wellbeing

Section 6: Injury and Illness

Start of Block: Physical wellbeing

Q6.1 Did you have regular medical checkups with a health professional after the animal rescue or disaster incident that you described earlier?

- ○ Yes, (approximately how many months ago) (1) _____
- ○ I only go when I have an issue or health problem (3)
- ○ No, I do not have medical check ups (11)

Q6.2 Thinking about the last five (5) years, have you sustained an injury or illness associated with an emergency animal rescue or disaster response?

- ☐ Yes, a physical injury (4)
- ☐ Yes, a physical illness (5)
- ☐ No (6)

Skip To: End of Block If Q6.2 = No

Q6.3 What are the factors that contributed to your illness or injury? (tick all relevant options)

- [ ] Actions or inactions of others (5)
- [ ] Existing illness or health concern (4)
- [ ] Equipment failure (8)
- [ ] Failure to wear personal protective equipment (PPE) (10)
- [ ] Fatigue or tiredness (6)
- [ ] Stress (1)
- [ ] Inadequate training or lack of maintenance of training (13)
- [ ] Injury by animal(s) being rescued (14)
- [ ] Inexperience (3)
- [ ] Miscommunication (9)
- [ ] Other (please specify) (12)

_____

Q6.4

If you sustained an **injury** which body region(s) were affected? (tick all relevant options)

- ☐ Not applicable (23)
- ☐ (1) - head or face (11)
- ☐ (2) - neck (12)
- ☐ (3) - arm (upper or lower) (13)
- ☐ (4) - hand (14)
- ☐ (5) - chest (15)
- ☐ (6) - stomach (16)
- ☐ (7) -groin (17)
- ☐ (8) - leg (upper or lower) (18)
- ☐ (9) - foot or ankle (19)
- ☐ (10) - back (20)
- ☐ (11) - pelvis or buttocks (21)
- ☐ (12) - other (describe) (22)

_____

Q6.5 If you sustained an **injury**, what was the nature of the injury? (tick all relevant options)

- ☐ Not applicable (15)
- ☐ Concussion or brain injury (1)
- ☐ Facial trauma (2)
- ☐ Dental injury (3)
- ☐ Fracture or broken bone (4)
- ☐ Crush injury (5)
- ☐ Internal injury (6)
- ☐ Laceration, cut or wound (7)
- ☐ Bruising or general soft tissue injury (8)
- ☐ Dislocation or sprain or strain (9)
- ☐ Muscle or tendon injury (10)
- ☐ Burn (11)
- ☐ Other (please specify) (12)

_____

Q6.6 If you sustained an **illness**, what symptoms were associated with your illness?

- [ ] Not applicable (1)
- [ ] Abdominal pain (7)
- [ ] Chest pain (8)
- [ ] Cough or cold symptom (10)
- [ ] Diarrhoea (6)
- [ ] Difficulty breathing (9)
- [ ] Fatigue, lethargy or weakness (15)
- [ ] Fever (11)
- [ ] Headache (2)
- [ ] Infection of a specific body part or region (12)
- [ ] Infection of your whole body (e.g. bacteria or virus) (13)
- [ ] Nausea (4)
- [ ] Psychological illness or distress (3)
- [ ] Rash or skin reaction (16)
- [ ] Vomiting (5)
- [ ] Other (please describe) (14)

_____

Q6.7 Have you recovered from the illness or injury?

- ○ Not applicable (3)
- ○ No (indicate how long ago this occurred) (1)
  _____
- ○ Yes (how long did it take to recover?) (2)
  _____

Q6.8 If you have described an **injury,** did you have any treatment to assist with your recovery?

- ○ Not applicable (2)
- ○ No (1)
- ○ Yes (please briefly describe the rehabilitation program) (3)
  _____

Q6.9 If you have described an **illness**, did you receive medical treatment to assist with your recovery ?

- ○ Not applicable (1)
- ○ No (2)
- ○ Yes (please briefly describe) (3)
  _____

Q6.10 What had the **most positive effect** on your recovery?

_____

Q6.11 What had the **most negative effect** on your recovery?

_____

End of Block: Physical wellbeing

Section 7: Psychosocial Support

Start of Block: Relationships

Q7.1 Please remember, there will be an opportunity at the end of the survey for you to tell us more about your experience if you wish. The final three (3) questions look at relationships in a general way and their effect on recovery from events encountered in animal rescue or disaster response.

- ○ Yes, I would like to continue with the survey (4)
- ○ No, I would like to leave the survey (5)

Display This Question:

If Q7.1 = Yes, I would like to continue with the survey

Q7.2 Thinking about the animal rescue or disaster response incident that you described earlier, which of the following people do you feel provided you with enough emotional support after the incident.

- [ ] Counsellor or similar paid professional (7)
- [ ] Friend (2)
- [ ] My rescue or disaster organisation (5)
- [ ] Other family member (6)
- [ ] Partner or spouse (1)
- [ ] Team mate (3)
- [ ] Work colleague (4)
- [ ] No one (8)
- [ ] Other (9) _____

Display This Question:

If Q7.1 = Yes, I would like to continue with the survey

Q7.3 After the incident, how likely were you to talk to the people identified above about the incident?

- ○ Always (16)
- ○ Most of the time (17)
- ○ About half the time (18)
- ○ Sometimes (19)
- ○ Never (20)

Display This Question:

If Q7.1 = Yes, I would like to continue with the survey

Q7.4 After the incident, how did you usually feel after talking about the incident with the people identified above?

- ☐ Much better (16)
- ☐ Moderately better (17)
- ☐ Slightly better (18)
- ☐ About the same (19)
- ☐ Slightly worse (20)
- ☐ Moderately worse (21)
- ☐ Much worse (22)

End of Block: Relationships

-

Appendix B: Organisations Contacted for Survey Dissemination

Australia

Animal Welfare League of South Australia Inc. (AWL)
Australian Veterinary Emergency Response Team (AVERT)
Department of Biodiversity, Conservation and Attractions
Equine Emergency Rescue
Fauna Rehabilitation Foundation (NAR)
Government of South Australia Department of Primary Industries and Regions
Native Animal Rescue
Royal Society for the Prevention of Cruelty to Animals Australia (RSPCA)
South Australian Veterinary Emergency Management Inc. (SAVEM)
Vets Beyond Borders (VBB)

New Zealand

Bay Veterinary Group LTD / VETS 4 PETZ
Civil Defence and Emergency Management (CDEM)
Department of Conservation (DOC)
Federated Farmers of New Zealand
Fire and Emergency New Zealand (FENZ)
Fonterra Co-operative Group Ltd
Helping You Help Animals Trust (HUHA)
Massey University Veterinary Emergency Response Team (MUVERT)
Ministry of Primary Industries (MPI)
New Zealand Institute of Animal Management (NZIAM)
New Zealand Police
New Zealand Red Cross
New Zealand Veterinary Association (NZVA)
NZ Emergency Managers Facebook group
Oiled Wildlife Response
Palmerston North Search and Rescue (LSAR)
Project Jonah
Rescue Emergency Response Team, NZRT4 (REST)
Rural Support Trust NZ
School of Veterinary Science (SoVS), Massey University
Society for Prevention of Cruelty to Animals (SPCA)
SPCA National Response Unit (NRU)
Whakatane Emergency Response Team NZRT 17 (WERT)
Workspace SPCA groups (Civil Defence and Inspectorate)

United Kingdom

British Animal Rescue & Trauma Care Association (BARTA)
Hampshire & Isle of Wight Fire and Rescue Service
Royal Society for Prevention of Cruelty to Animals (RSPCA)

United States of America

California Veterinary Emergency Team (CVET)
Code 3 Associates Inc.
North Carolina State Animal & Agriculture Response Teams (NCSART)
Oklahoma Large Animal First Responders Inc
PennVet Working Dog Center (PVWDC)
Piedmont Emergency Animal Response Team (PEART)
University of California, Davis, Veterinary Emergency Response Team (VERT)
Washington State Animal Response Team (WASART)

Other

Technical Large Animal Emergency Rescue Inc. (TLAER)
Twitter
World Animal Protection