



Australian Government

Australian Institute for
Disaster Resilience 



Australian Journal of Emergency Management

VOLUME 36 NO. 3 JULY 2021 ISSN: 1324 1540

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SUPPORTING A DISASTER RESILIENT AUSTRALIA

About the journal

The *Australian Journal of Emergency Management* is Australia's premier journal in emergency management. Its format and content are developed with reference to peak emergency management organisations and the emergency management sectors—nationally and internationally. The journal focuses on both the academic and practitioner reader. Its aim is to strengthen capabilities in the sector by documenting, growing and disseminating an emergency management body of knowledge. The journal strongly supports the role of the Australian Institute for Disaster Resilience as a national centre of excellence for knowledge and skills development in the emergency management sector. Papers are published in all areas of emergency management. The journal encourages empirical reports but may include specialised theoretical, methodological, case study and review papers and opinion pieces. The views in the journal are not necessarily the views of the Australian Government, Australian Institute for Disaster Resilience or its partners.

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Publisher

The *Australian Journal of Emergency Management* is published by the Australian Institute for Disaster Resilience with financial assistance from the Australian Government. The journal is published online at www.knowledge.aidr.org.au.

Editorial Advisory Board

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Design, typesetting and production: Emily Fraser
Print and distribution: Valiant Press

Cover image: NSW Agriculture and Animal Services Functional Area personnel coordinated the care for animals evacuated to Berry Showground during January 2020 bushfires.

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Circulation

Approximate circulation (print and electronic): 5500.

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Contributions in the Research section of the *Australian Journal of Emergency Management* are peer reviewed to appropriate academic standards by independent, qualified reviewers.

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Foreword



Dr Melissa Parsons

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 Editor in Chief
*Australian Journal of
 Emergency Management*



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I write this foreword from the traditional lands of the Ainawan people. It is a complex region of environmental, social and cultural change that has experienced a series of recent and historical natural disasters. It is a region that inspires the multiple ways in which we can co-produce knowledge that protects, transforms, stewards and sustains.

The last few years have seen a sequence of challenging natural hazard events in Australia. Drought, bushfire, flood and pandemic. And what next? The singular and collective effects of these events in communities, institutions, economies and ecosystems will be felt for years to decades. Actions that inevitably emerge post-event to address the impact, reduce risk and build resilience can be transformative or maladaptive. Understanding the difference is sometimes difficult and often value-laden.

It is within this setting that the *Australian Journal of Emergency Management* provides a knowledge and evidence base that supports future-facing decision-making. As part of the Australian Institute for Disaster Resilience Knowledge Hub, the journal advances the practice of emergency management through the dissemination of high-quality research and practice-based articles.

The journal is unique in its positioning at the science-policy-practice interface. Complex problems such as disaster risk reduction and resilience are characterised by high stakes and high system uncertainty. Co-production of knowledge among an extended peer community is a contemporary model for understanding and managing complex problems. The journal achieves this through its mix of contributors, research and practice papers and news articles.

This themed edition exemplifies the co-production of knowledge about the management of animals in emergencies. Practitioners, academics and policy makers from animal welfare agencies, animal rescue services, federal, state and local governments, international agencies, zoos, consulting services and universities contributed to this bumper issue. The science-policy-practice knowledge embedded within the articles advances options to improve animal-inclusive emergency management and assist communities to respond and recover.

It is clear from the collection of articles in this issue that views about human-animal relationships are rapidly changing within society. These articles highlight some of the ethical, legal and operational matters that will influence the transition to animal-centric thinking in emergency management policy, programs and practice.

This issue also marks the start of my tenure as Editor in Chief. I thank the previous Editor in Chief, Dr John Bates, and more recently Emeritus Professor Frank Archer for their contributions. I also acknowledge the guest editors, editorial team and advisory board members who make the journal a success. I look forward to fostering the spirit of co-produced knowledge that characterises the *Australian Journal of Emergency Management*.

Foreword



Steve Glassey

Animal Evac New Zealand



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The emergency management profession has come a long way since Hurricane Katrina in 2005, which became the genesis for recognising the importance of creating animal-inclusive resilient communities. Over 1800 people died in that one event and 44 per cent of those who chose not to evacuate did so, at least in part, because they were not permitted to take their animals and pets.

As part of post-Katrina lessons, the *Pets Evacuation and Transportation Standards Act* (USA) was passed in 2006 to ensure emergency plans had arrangements and funding for companion animals and assistance dogs. Since that time, Australia and New Zealand have both made great contributions to practice and scholarship in the emerging discipline of animal disaster management.

Considering animals as a cross-cutting theme in emergency management can enhance public safety through improving evacuation compliance, preventing animal owners returning to evacuated areas, protecting livestock-based livelihoods, improving animal welfare, reducing organisational and legal risk, supporting psychosocial recovery, improving public confidence and trust in authorities and meeting contemporary societal expectations.

Progress was exemplified with the inaugural Global Animal Disaster Management Conference (GADMC) that was conducted online in February 2021, hosted by Animal Evac New Zealand.

The challenges of COVID-19 forced us all to make better use of technology and as a result, GADMC became the world's first animal disaster management conference. It was huge! Initial expectations of 250 attendees were soon overtaken with over 1500 registered delegates and 40 presentations from around the world over a 10-day period. The conference attracted lead researchers and Professor Leslie Irvine, one of the world's top scholars in animal disaster management, was the keynote speaker and opened the conference.

The online delivery of the conference and the generosity of sponsors allowed the conference to be free to delegates and to cover the online hosting costs and the video recordings. The conference

committee acknowledge the sponsors, in particular World Animal Protection and the Australian Institute for Disaster Resilience in the publishing of this themed edition both online and in print. The open-access nature of the *Australian Journal of Emergency Management* ensures expert opinion and peer-reviewed research remains accessible for decades to come.

Erik auf der Heide, a great emergency management scholar, once said emergency plans should be based on 'likely, not correct behaviour'. This is something that has stuck in my mind. Although we may want people to avoid harm's way, we know that people can do and will take risks, especially to safeguard animals, assets and livelihoods. From the 2019–20 summer bushfires in Australia to the Christchurch earthquake in 2011 and emergencies in between, we consistently see people putting themselves at risk for animals and wildlife. We can mitigate much of this risk if we have animal-inclusive emergency plans.

This themed edition is a companion to fantastic work in animal-inclusive planning as documented in a previous special edition of the journal in April 2015.¹ It has great advice on how to improve emergency plans; the aim is to be more effective in response and recovery. From wildlife to livestock, from Australia to Argentina, this edition brings together ideas, opinions and research to create more resilient communities.

A special thank you to my colleagues on the GADMC committee, Associate Professor Melanie Taylor, Mr Gerardo Huertas and Ms Christine Belcher.

1. Australian Journal of Emergency Management 2015, vol. 30, no. 2. At: <https://knowledge.aidr.org.au/resources/ajem-april-2015>.

The value of including animal mortality management in emergency response plans

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Disaster events, man-made or otherwise, pose significant threats to the health and safety of people and often result in the deaths of hundreds or thousands of animals. Failing to effectively manage these animal carcasses can have considerable human, animal and environmental health effects.

As emergency responders, we have a responsibility to prioritise the health and safety of individuals and the preservation of property. A comprehensive emergency response plan should address animal health and welfare in addition to managing the carcasses of animals that do not survive the event. Over the last 2 decades, we have made progress in the area of animal health and welfare. Unfortunately, we have made little progress in including animal mortality management in emergency response plans.

In the fall of 2018, Hurricane Florence struck the east coast of the USA. The hurricane drenched the region with up to 90 centimetres of rain. In North Carolina, 238 poultry houses on 62 farms were flooded, killing more than 4 million chickens and 118,000 turkeys. Also, the Australian bushfires of 2019 and 2020 burnt more than 18 million hectares. The fires killed approximately 5000 head of cattle and 3000 sheep in the state of Victoria and, on Kangaroo Island in South Australia, fires killed roughly 60,000 sheep and 1500 cattle. One estimate suggests the fires killed more than 3 billion wildlife, including mammals, birds and reptiles.

The consequences of leaving decomposing carcasses in the environment can be significant. Between 55 per cent and 80 per cent of an animal's body is water. When carcasses decompose, they release this liquid as leachate. For example, a 320kg cow can release 175 litres of leachate. Leachate is a complex mixture that, if released into surface water or groundwater, can sicken humans and animals and cause long-term environmental pollution.

The challenge with managing animal mortality is that it must begin as soon as it is safe to return to the affected area. Animal carcasses begin to decompose

and release fluids within several days. This means those responsible for animal mortality management must be separate and distinct from the emergency responders addressing human health and safety. This requires planning and training before events occur. More importantly, it requires understanding the value of animal mortality management and committing time and resources to address this need, preventing unnecessary pollution of water resources.

For governments and emergency services organisations to access this capacity, there are generally 2 options: establish and maintain internal teams with the right skill sets and training or enlist outside expertise. Today, many organisations and governments choose to bring in outside expertise and partner with specialists. Because these events occur so infrequently, it is difficult to maintain a high level of training and experience within organisations. Additionally, large events are usually all-hands-on-deck and organisations often prefer the flexibility of using their personnel in less specialised roles. Whether teams are trained, or specialists are brought in, these efforts will vastly improve the outcomes following a disaster event as well as the preparedness for the next event that kills animals and wildlife.

Gary Flory heads a global consulting firm specialising in animal disease and natural disaster response, agricultural emergency planning and emergency response training. Gary has been deployed on numerous animal disease outbreaks in the USA as well as in the Dominican Republic, Korea, Vietnam, Cambodia, Laos, Tunisia, Malaysia and Azerbaijan.

It's an assistance dog. Yeah, right!

Steve Glassey

Animal Evac New Zealand



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The prevalence of companion animals as 'assistance' animals is increasing in public places in Australia and New Zealand. How might this undermine the important role assistance animals play and how might it dilute their standing for inclusion in emergency planning and during disasters?

While wandering inside the shopping mall in Townsville, north Queensland, I noticed a small white dog on a leash. As the dog weaved a random path in front of its attached human, I wondered if, with such poor discipline, it was pet or an assistance dog. Surely, it must be a pet as it was stopped and patted by passers-by. Why is a pet being allowed inside the shopping mall? Then I saw it was wearing a vest saying it was an 'assistance dog'. This was no assistance dog. It was more likely to be a much-loved pet whose owner had purchased one of the hundreds of fake service dog vests and

identification cards available online. Who am I to question someone's medical history or impairment and demand they require an assistance animal or not! This is the dilemma not just for the public, but for those working in evacuation centres when evacuees present their companion animals falsely as legitimate assistance dogs.

Assistance dog fraud is not new, but only in the Northern Territory and the Australian Capital Territory is it illegal to pretend a dog is a bona fide assistance dog when it is not. In other states, it



Assistance dogs are trained to help people undertake daily tasks as well as provide emotional support.

Image: Assistance Dogs Australia



The New Zealand Civil Defence Disability Assistance Dog identification tag.

Image: Steve Glassey

is legal for people to purchase, without verification, a range of assistance dog identifications and paraphernalia.

Under the *Disability Discrimination Act 1992 (Cth)*, assistance dogs are specifically defined and are afforded guaranteed access to all public places in Australia. This federal law is supported by state and territory laws that provide further provisions for assistance dogs to be recognised. However, there is no national form of identification and assistance dog organisations prescribe their own identification. This makes the job of evacuation centre workers even more difficult to distinguish what dogs are bona fide assistance dogs and which are not.

The role and status of assistance dogs during disaster is not well researched. What little empirical evidence there is suggests that the challenge of validating the legitimacy of assistance animals in emergency conditions remains unresolved^{1,2} and that the needs of assistance animal users at evacuation centres are not well considered by emergency planners.^{3,4}

In response to the lessons of the 2010 and 2011 Canterbury earthquakes, I led a national project at the New Zealand Ministry for Social Development to create the world's first national-level disability assistance dog emergency management identification tag.⁵ The Honourable Nikki Kaye, the then Minister of Civil Defence, launched the tag system in December 2013. She said:

In an emergency, the tags will make it easy for certified disability assist dogs to be identified and remain with their owners or, if they become separated, to be quickly reunited.⁶

The Honourable Nikki Kaye MP (NZ)

Unlike New Zealand, Australia faces a challenge to replicate the identification tag. Australia does not have a regulatory protected civil defence (emergency management) logo that can provide the legal basis for preventing mis-use of the identification. However, an Australian assistance dog tag system that has regulatory protection could be established using the Commonwealth Coat of Arms that has legal protection. Under section 143.1 (1)(a) the *Criminal Code Act 1995*, there may be scope to classify such a tag as a Commonwealth 'document'; that being any paper or other material on which there is writing.

To ensure consistency, each state and territory could procure from a national supplier the minted discs and distribute these to recognised or accredited assistance dog training organisations (similar to certifying organisations under the New Zealand *Dog Control Act 1996*). These recognised or accredited organisations would manage the issuance of the Commonwealth-protected tags, including ensuring the animal's name and microchip were engraved on the blank reverse.

Given the legal frameworks that exist for recognising bona fide assistance animals and the protection of the Commonwealth Coat of Arms, the parts of the jigsaw required to address assistance dog fraud is an opportunity that should be explored. Until then, the challenge of distinguishing pets from legitimate service animals will remain a problem for emergency managers and the assistance dog user community.

Endnotes

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Assistance dogs new digital ID cards

Richard Lord
Assistance Dogs Australia



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An 'assistance dog' is a dog specially trained and accredited to assist a person with a disability and that has met the state standards for public access rights. How can these animals be easily identified during emergencies when speedy co-evacuation of assistance animals is required?

Assistance dog fraud is not new, but only a few jurisdictions have laws that make it illegal to purport a dog as a bona fide assistance dog when it is not. In most places it is legal for people to purchase, without verification, a range of assistance dog identifications and paraphernalia. In this digital world it is also very easy to copy organisational logos and to make fake identification documents.

To combat this growing concern, Assistance Dogs International developed a convenient and easy-to-use ID card that is stored on a mobile device and that can be used by Assistance Dogs International accredited members.

The ID card has been trialled in Australia by Assistance Dogs Australia and will be trialled by Vet

Dogs and Guide Dogs for the Blind Foundation in the USA. It has already received positive reviews from clients and from service providers like Airlines for America.

The ID card provides public access opportunities for users and, at the same time, makes it difficult to fake assistance dog accreditation. The card also allows for easy identification by people, like emergency services personnel and evacuation centre staff, to quickly identify these animals.

More information about the ID card at at: www.assistedogs.org.au/about-us/public-access-rights.



Certified assistance dogs wear a branded jacket and can now be checked using a digital ID card.

Image: Assistance Dogs Australia

AVERT: a novel approach to wildlife rescue and welfare in Australia

Dr Ian Douglas
Vets Beyond Borders



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In the immediate aftermath of the summer bushfires in Australia in 2019–20, the Australian Veterinary Emergency Response Team (AVERT) was mobilised for the first time. Based on this experience, it is evident that a well-coordinated body of volunteer veterinarians and veterinary nurses has a significant role to play following disasters.

AVERT was established by Australian-based charity, Vets Beyond Borders, in 2015 in view of the ever-increasing risk of disaster and emergency disease outbreak in Australia. The aim was to create a national pool of veterinary professionals with experience in specific animal species, including wildlife, prepared to volunteer in formal responses to such events.

Why AVERT?

Prior to the formation of AVERT, the fieldwork of Vets Beyond Borders volunteers was largely confined to parts of the world where rabies is endemic and leads to the deaths of around 60,000 humans and countless animals worldwide every year. As the organisation grew, so did the number of volunteers, however many were unable to travel overseas for extended periods of time.

Historically, Australian Government authorities and their veterinary personnel, together with private veterinary practices in affected areas, have provided an appropriate veterinary response following bushfires and floods, which are regular occurrences in Australia. However, the scale and frequency of such events has increased in recent years and this trend is predicted to continue, which places pressure on this arrangement. AVERT was formed to help address this issue, but not as a stand-alone initiative.

Irrespective of location, the work of Vets Beyond Borders is based on the development of partnerships and collaborations. In the case of AVERT, much time was, and continues to be, spent creating associations with state governments to facilitate the prompt deployment of AVERT

volunteers following requests for assistance with veterinary care of livestock, wildlife and companion animals, following natural disaster or outbreak of emergency disease.

AVERT volunteering

Veterinarians and veterinary nurses interested in donating their time during emergencies complete a comprehensive application and provide details including location, areas of expertise and relevant licences held. A confidential database of successful applicants is maintained by Vets Beyond Borders.

Australia's summer bushfires

Following the bushfires that ravaged large parts of south-eastern Australia in the summer of 2019–20, Vets Beyond Borders deployed AVERT volunteers to provide care to affected animals in New South Wales and South Australia. It also liaised with the Australian Veterinary Association Victorian division charged with responsibility for sourcing veterinarians to assist in that state.

Following the emergency response, it became evident that the demand for volunteer veterinarians and veterinary nurses would persist for many months. This was specifically with respect to wildlife species in the treatment of burns and complications arising from injuries, requiring long-term commitment. Vets Beyond Borders rostered AVERT volunteers through direct contact with wildlife rescue groups in affected areas. Over the course of the response, 52 AVERT volunteers (several deployed on more than one occasion) provided in excess of 400 days of veterinary care.



AVERT volunteers performed life-saving surgery on wildlife injured in the bushfires.

Source: Vets Beyond Borders



An injured koala is examined for injuries by Vets Beyond Borders volunteers.

Source: Adelaide Koala Rescue

Lessons learnt

Volunteers – There was a dearth of veterinary personnel with specific training and experience in wildlife medicine and surgery available to respond to disasters on the scale of the bushfires. This lack of ready expertise affected the quality and consistency of the care provided. In response, Vets Beyond Borders has prioritised training for AVERT volunteers to refine their skills in wildlife care. Thanks to Vets Beyond Borders’ sponsors, by June 2021, 24 AVERT-registered volunteers had completed comprehensive training in wildlife care, delivered by the Taronga Conservation Society.

Delivery of care – Irrespective of the experience of volunteers, the quality of care they were able to provide to affected wildlife was hampered by the availability of necessary equipment and veterinary supplies. Many wildlife rescue groups were overwhelmed by logistical demands placed on them. In addition, there was significant variation in clinical policies and protocols from location to location, especially with regard to euthanasia. In its overseas activities, Vets Beyond Borders addresses this problem through its partner organisation scheme, which focuses on providing on-the-ground assistance to animal welfare groups able to provide a satisfactory level of clinical infrastructure and resources. This arrangement is now being rolled out across Australia. With respect to wildlife, it is anticipated that collaboration between Vets Beyond Borders and large wildlife welfare organisations, such as Taronga Conservation Society, Zoos Victoria and WA Wildlife, will lead to consistency of clinical care and improved outcomes for animals.

Coordination – The response with respect to provision of care to wildlife affected by the 2019–20 bushfires in south-eastern Australia has been generally acknowledged to have been, at best, sub-optimal. It is hoped that the numerous debriefings and review processes, to which Vets Beyond Borders is contributing, will deliver clearer lines of communication and efficient collaboration between governments and non-government organisations.

The future

The AVERT database currently contains the details of 2031 veterinarians and veterinary nurses and an increasing percentage have a significant level of training and expertise in wildlife care. Given projections for future disasters, the AVERT volunteer community is well positioned to make significant contributions to animal welfare responses following such events.

Acknowledgment

Vets Beyond Borders acknowledges the support of The PetBarn Foundation, VetPartners, Royal Canin, PetSure and World Animal Protection Australia in sponsoring the training of AVERT volunteers.

Building wildlife resilience in disasters

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The emerging role of Zoos Victoria¹ and other conservation-based organisations in responding to emergencies was highlighted during the Australian summer bushfires in 2019–20. Working alongside partners in government and local communities, as well as research, wildlife, veterinary and non-government organisations, the experience and expertise of Zoos Victoria played a lead role in wildlife response, relief and recovery efforts.

Across Australia, more than 3 billion animals were killed or directly affected by the summer bushfires, including over 330 threatened species and 37 threatened ecological communities. Polluted and destroyed habitats, a lack of water, food and shelter, increased predation and stress as well as serious, long-term adverse effects on biodiversity will likely lead to more deaths.

In Victoria, 215 rare and threatened species had greater than 50 per cent of their habitat burnt, pushing some species closer to extinction. The Zoos Victoria Wildlife Conservation Master Plan 2019-2024 outlines its commitment to 35 threatened south-eastern Australian species, 15 of which had habitat significantly destroyed by the bushfires.

The 2019–20 summer bushfires

In recognition of the important role zoos can play in the care, protection and conservation of wildlife, Zoos Victoria was appointed by the Department of Environment, Land, Water and Planning (DELWP), the lead agency for responding to and managing wildlife emergencies in Victoria, to assist with the threat to wildlife and biodiversity from the escalating bushfires.

Zoos Victoria assessed and prepared resources across its 3 zoos including wildlife veterinary care, transport, equipment, dietary items, quarantine, rehabilitation and housing capacity for the variety of species that could require immediate and long-term assistance.

In the response phase, Zoos Victoria provided expertise on wildlife welfare and

threatened species conservation, including veterinary, behavioural and ecological advice. It also supported wildlife triage, rescue and transportation, provided temporary housing and rehabilitation at its properties, advised on and supported supplementary and emergency feeding programs and supported interstate wildlife response initiatives. A Zoos Victoria Director was deployed to the State Control Centre to advise on the high-level coordination of wildlife welfare response efforts.

Zoos Victoria assisted in preparing and disseminating information and advice about wildlife welfare to bushfire-affected communities and to the public. This included fundraising initiatives and advice regarding monetary, human and material donations and how members of the public could assist wildlife following fires or heatwave events.

Contributing to the development of the Victorian Bushfire Biodiversity Response and Recovery Plan², Zoos Victoria has a lead role in 3 of the recovery themes:

- wildlife health and welfare
- emergency extraction
- nature-based community recovery.

Wildlife experts are leading and contributing to wildlife welfare and environmental recovery forums, including specialist taxon group assessments. Zoos Victoria Chief Executive Officer was also selected to join the national Wildlife and Threatened Species Bushfire Recovery Expert Panel, contributing her expertise in ex situ conservation.

Threatened eastern bristlebird extraction

As fires threatened south-east Victoria, an alert from the Arthur Rylah Institute³ raised concern for a population of endangered eastern bristlebirds in the Cape Howe area in East Gippsland. DELWP requested that Zoos Victoria and other specialists retrieve a number of the bristlebirds for safekeeping and to support a new captive breeding population if their habitat was destroyed.

Fifteen birds were collected before the operation was halted and the team evacuated due to the approaching fire. The Victorian Fisheries Authority and the Royal Australian Air Force transported teams and birds to Melbourne Zoo. Zoos Victoria veterinary staff and zookeepers provided expert care to mitigate the stress of capture, transport and captivity. Crucial support for this operation was provided by DELWP, Parks Victoria, Monash University, University of Wollongong and Currumbin Wildlife Sanctuary. The eastern bristlebird habitat at Cape Howe did not burn and 8 birds were returned to their original locations in April and October 2020.



Zoos Victoria staff evacuate eastern bristlebirds from East Gippsland for safety before fires hit the area.

Image: Zoos Victoria

Wildlife field triage units

Zoos Victoria veterinary teams worked with DELWP and the Australian Veterinary Association to establish 4 emergency triage units in a local community hall, a church hall and in a purpose-built RSPCA Victoria mobile veterinary truck.

Triage units were managed by DELWP personnel and staffed by wildlife-experienced vets, veterinary nurses and zookeepers from Zoos Victoria, with support from Ballarat Wildlife Park and Taronga Conservation Society. The Australian Veterinary Association, RSPCA Victoria, University of Melbourne, Vets for Compassion and other independent veterinarians also supported the coordinated veterinary response.

Almost 3000 animals were assessed in the field, of which 259 were sent to wildlife triage units for further assessment. Most of the animals were koalas (75 per cent). Other species included feather-tail gliders, grey-headed flying foxes, eastern grey kangaroos plus a superb lyrebird, tawny frogmouth, lace monitor and a red-bellied black snake. Animals were assessed in triage and prognosis determined based on the location and severity of fire-related injuries, such as smoke inhalation, heat stress and dehydration as well as existing comorbidities, age and condition of the animal. Twenty per cent of animals were euthanased after initial veterinary examination. Nearly half were released within 24 hours back to their original or proximate location following treatment. Thirty-five per cent of animals presenting to triage required hospitalisation or ongoing care.

Koala care and rehabilitation

A koala's natural response to fire is to seek refuge in tree canopies. Unfortunately, due to the severity of these fires, this led to many koala injuries and deaths. Zoos Victoria veterinarians provided expertise in assessing injured animals. While some koalas could be released after short-term care, 6 uninjured orphaned juveniles were hand-raised by DELWP-registered wildlife carers. A further 27 severely affected koalas were evacuated with veterinary teams by the Royal Australian Air Force to wildlife hospitals at Melbourne Zoo and Healesville Sanctuary for intensive care. These koalas underwent intensive burns treatment and pain management over many weeks. Specialised nutrition and housing allowed quiet spaces for koalas to move and forage while being monitored by wildlife-experienced veterinary nurses and keepers. Once the koalas no longer needed intensive veterinary management, they were transferred to large, purpose-built, naturalistic enclosures at Healesville Sanctuary and at Phillip Island Nature Park. Regular veterinary assessments were conducted as the koalas recuperated in readiness for a release back into the wild.



Zoos Victoria staff cared for injured koalas after the bushfires in Victoria.

Image: Zoos Victoria

In late 2020, after pre-release health assessments, 14 koalas were released in East Gippsland close to their original rescue location. Each animal was fitted with a GPS collar to monitor its movement. Repeat health assessments provided a better understanding of the ongoing health and behaviour of each animal following its release. The collars were removed in early 2021 to allow for less intensive longer-term monitoring.

Lessons and continuous improvement

Strong existing and new partnerships and alliances were paramount in developing and managing the wildlife emergency response. Annual reviews of wildlife partner contacts, capacity and willingness to support wildlife disaster welfare work are now conducted. Existing stakeholder relationships within the emergency management and wildlife sectors will be strengthened to improve collaborative, best-practice responses to wildlife needs.

Zoos Victoria and its partners identified the need to build wildlife welfare capability and coordination across the wildlife and veterinary sector, including in triage and field assessments. Zoos Victoria is reviewing medical records of wildlife assessed and treated by veterinarians during the bushfires to get a better understanding and prognosis of common fire-related injuries, to improve decision-making and to update emergency medical management of fire-affected wildlife. Improved understanding of the welfare implications of veterinary care, rehabilitation and release of fire-affected koalas will inform existing protocols and improve decision-making for wildlife emergency response. Lessons from the eastern bristlebird extraction will contribute to improved species extractions in disasters and have been incorporated into Zoos Victoria's emergency response plans for rescue of threatened and other species. This includes risk mitigation, transport and housing requirements.

Building resilience for the future

The critical role of zoos and other conservation-based organisations will grow in the current climate crisis. A focus of emergency management planning for Zoos Victoria is to enhance wildlife and threatened species resilience in the face of more frequent, severe and overlapping crises predicted with climate change. The Zoos Victoria Conservation Master Plan 2019–2024⁴ and Bushfire Response and Recovery Plan⁵ support its roles in building resilience to future disasters.

The Australian Royal Commission into National Natural Disaster Arrangements calls for the establishment of best-practice arrangements and responses to wildlife emergency response and recovery and the development of national standards for rehabilitation, assessment, treatment and care for wildlife. Victoria's Bushfire Emergency: Biodiversity Response and Recovery Plan 2020⁶ outlines short- and long-term actions to support the survival of fire-affected wildlife and threatened species and ecological communities following the bushfires.

Zoos Victoria has engaged an Emergency Management Adviser and a Wildlife Welfare Coordinator to support the development of its critical roles in emergencies and build its ability to mobilise quickly, effectively and collaboratively to support wildlife as part of a state-

led response. The Zoos Victoria Emergency Management Plan expands organisational emergency management arrangements to integrate with Victoria's emergency management framework, including collaborative wildlife emergency preparedness, response and recovery operations. In addition to bushfires, the plan considers other hazards like floods, storms and heat events and supports the mental health and wellbeing of staff involved in wildlife emergencies.

As a consequence of the summer bushfires, Zoos Victoria has a significant role in wildlife emergency response training targeted at response roles in triage units and field assessment teams. This is being delivered to partners in wildlife and general practice veterinary sectors. Zoos Victoria is also improving and expanding its infrastructure and temporary housing facilities, reviewing and expanding threatened species conservation programs, developing new captive breeding programs for severely threatened species, increasing its organisational focus on wildlife welfare and leading ongoing monitoring of health and welfare of rehabilitated koalas following their release.

Zoos Victoria plays a key role in determining the status and support required for threatened species and vulnerable ecosystems, welfare of individual animals and nature-based community recovery. This work is critical to build resilience, prepare for future disasters and realise our vision for a future rich in wildlife.

This article is a summary of

Parrott ML, Wicker LV, Lamont A, Banks C, Lang M, Lynch M, McMeekin B, Miller KA, Ryan F, Selwood KE, Sherwen SL & Whiteford C 2021, *Emergency response to Australia's Black Summer 2019-2020: the role of a zoo-based conservation organisation in wildlife triage, rescue, and resilience for the future*. At: www.mdpi.com/2076-2615/11/6/1515.

More information about Zoos Victoria and its programs is at: www.zoo.org.au.

Endnotes

1. Zoos Victoria is a not-for-profit zoo-based conservation organisation in Victoria, Australia.
2. Victorian Bushfire Biodiversity Response and Recovery Plan. At: www.wildlife.vic.gov.au/home/biodiversity-bushfire-response-and-recovery.
3. The Arthur Rylah Institute for Environmental Research is a leading centre for applied ecological research.
4. Conservation Master Plan 2019–2024. At: www.zoo.org.au/media/2183/48636_zoos-vic-wcs-master-plan-128pp_-final.pdf.
5. Bushfire Response and Recovery Plan. At: www.wildlife.vic.gov.au/home/biodiversity-bushfire-response-and-recovery.
6. Information about the plan is at: www.zoo.org.au/melbourne/whats-on/news/bushfire-funds-kickstart-wildlife-recovery-and-response-plan/.

Wildlife response in bushfires: lessons from Australia's 2019–20 summer

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The bushfires in Australia over the summer of 2019–20 were unprecedented and tested systems and stretched resources like never before. The NSW Government's \$1 million bushfire relief for wildlife rehabilitators program supports wildlife rehabilitators and the veterinary sector to recover from bushfires and prepare for future extreme events.

Established in November 2019 and funded through the Environmental Trust, the wildlife rehabilitators program covers 3 streams: grants to wildlife rehabilitators, coordination and capability for wildlife response in bushfires and access to veterinary services for wildlife in emergencies.

The NSW Bushfire Inquiry¹ and the Royal Commission into National Natural Disaster Arrangements² gave significant consideration to wildlife response following the Australian bushfires. Key themes included incorporating wildlife response and recovery into emergency management, integrating non-government agencies into emergency response for wildlife and training for firefighters in wildlife response and for wildlife responders in bushfire awareness and incident management.

Current initiatives include preparing a wildlife response plan under NSW emergency management arrangements, establishing a technical advisor (wildlife) role in incident management teams, developing wildlife first response training for firefighters, establishing wildlife emergency response taskforces and trialling a televet service for wildlife. These projects are being delivered with consideration of feedback provided through after-action reviews, including a survey of wildlife rehabilitators and the veterinary sector and in collaboration with the wildlife rehabilitation, veterinary, firefighting and emergency management sectors.

Wildlife first response training will be available to NSW firefighters from August 2021. Taronga Conservation Society has been engaged to develop 2-hour online training to build firefighter capability to assess, report and assist wildlife encountered on firegrounds. It includes basic information on safe capture, containment and transport of wildlife without compromising the safety and effectiveness of firefighting operations. A role summary and checklist

for the Technical Advisor (wildlife) will be available from July 2021. This role has been trialled in prescribed burns across spring and autumn of 2020–21.

Wildlife-capable vets are being connected with wildlife rehabilitators, general practice vets and emergency responders via the Phone-A-Vet app as part of the televet trial for wildlife.

Standard operating procedures and role summaries for wildlife emergency response taskforces, including authorisation requirements for shooters and darters, will be available from July 2021. Bushfire awareness training has been provided for over 200 wildlife rehabilitators and veterinary practitioners who expressed interest in participating in taskforces. The Worldwide Veterinary Service platform and app is being tested for application in wildlife response.

Collaborating from the outset has provided improved animal welfare and conservation outcomes for wildlife. The funding for this work, in response to recommendation 53 of the NSW Bushfire Inquiry, will provide the refined plans, tools and resources to be shared, practised and understood, ready for the next extreme event in NSW.

Endnotes

1. New South Wales Government 2020, *Final Report of the NSW Bushfire Inquiry*, 31 July 2020, pp.322–325. At: www.dpc.nsw.gov.au/assets/dpc-nsw-gov-au/publications/NSW-Bushfire-Inquiry-1630/Final-Report-of-the-NSW-Bushfire-Inquiry.pdf [16 November 2020].
2. Commonwealth of Australia 2020, *Royal Commission into National Natural Disaster Arrangements Report*, 28 October 2020, pp.355–361. At: <https://naturaldisaster.royalcommission.gov.au/> [16 November 2020].

Preparing wildlife carers and groups for emergencies and disasters

Nicole Rojas-Marin
Jennifer Gardner

International Fund for Animal Welfare

Following the catastrophic bushfires in Australia over the summer of 2019–20, the International Fund for Animal Welfare (IFAW) recognised there was a significant gap in disaster preparedness among wildlife carers and rescue groups.



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During the bushfires, IFAW teams were hearing first-hand from wildlife carers and rescue groups about how unprepared they felt. Immediately after the bushfires, IFAW explored how it could reduce the risk to wildlife carers and learn what they needed to ensure the safety of animals and carers.

A significant problem was discovered during discussions with rescue groups. Many carers feared having to evacuate because they did not have a bushfire plan for the animals in their care. This meant that people were putting their own lives at risk as blazes came frighteningly close to their homes or places of work. It was an uncharted situation for many carers who were inundated with injured wildlife and with often limited knowledge, experience or tools to help them stay safe and evacuate if necessary.

Having recognised this gap, IFAW saw the important and potentially life-saving opportunity to create tools specifically designed for wildlife carers. Given disasters in Australia are unpredictable and increasing in intensity, these tools would be critical to help prepare wildlife carers and rescue groups for any potential extreme weather in the future.

There is also the ethical obligation for wildlife groups and carers to have an effective disaster response plan in place as they have taken on the responsibility of caring for dozens and sometimes hundreds of animals. How could they ensure continuity of care if they did not have the tools to develop emergency plans?

IFAW is undertaking a project to create a disaster toolkit including courses, guidelines and templates for wildlife carers and groups to assist them to prepare for, respond to and recover from disasters. The toolkit is designed with local stakeholders to ensure the resources are site, species and culturally specific. It includes documents that are

scalable to a group's current needs and the varying emergencies they could face. The objective is to help wildlife groups and carers prepare for events that occur outside the range of their normal operations and that may adversely affect their organisation's capacity to operate.

The first tool in the kit is the emergency evacuation workshop that teaches wildlife groups and carers how to create an evacuation plan. The workshop covers how to implement a plan, and the resources, such as emergency vehicles, skilled personnel and groups may need in an evacuation scenario. The evacuation plan features a set of procedures for moving people and animals out of dangerous and threatening zones to a safe and secure temporary facility.

An evacuation plan is essential when disasters strike as it reduces the risk to people and the animals in their care. By equipping wildlife carers with the skills to create their own evacuation plan, IFAW is giving them the tools to prepare for and respond to emergencies. This is vital to reduce panic, promote professionalism and help carers avoid becoming a victim themselves. The latter point is something IFAW identified as a significant risk among carers and wildlife groups in Australia.

IFAW has worked with wildlife carers over many years and has witnessed how selfless they can be. Many would put their own lives at risk to save the animals in their care. Thus, it was essential that evacuation plans empower carers to be proactive during emergencies. Wildlife need carers to be safe to keep them safe. Through IFAW's training, carers can continue saving wildlife and mitigate risks to their operations.

The objective of the 2-hour emergency evacuation workshop is to help wildlife groups draft an evacuation plan they can further develop with



An IFAW responder cradling a wallaby joey in rehabilitation with a wildlife carer.

Image: IFAW

their teams. Following a template, instructors guide the groups through each step, sharing experience and facilitating discussions on who would be involved, the facilities and resources needed and the plan of action for each step.

Step 1 - establish a team and support network. This requires the group to define roles and responsibilities and includes appointing an emergency response coordinator. By establishing clear lines of delegation and outlining responsibilities, panic reduces, increasing the potential to execute plans in a safe and efficient manner.

Step 2 - identify the resources needed. This includes trained and skilled personnel, such as leaf cutters and drivers, as well as the equipment required like medical supplies, transportation and carriers. This step also stresses the importance of backup resources including secondary facilities, and carers who can be called on if needed. By identifying these resources in advance, groups are equipped to respond to emergencies of varying scale and type.

Step 3 - using the number and species of animals in their care, carers and groups practice categorisations, such as critical-care or long-term patients. For example, long-term patients could be less likely to experience stress by relocation compared to critical-care animals that need extra attention; these categories may influence the evacuation procedures. Resources for preparing evacuation kits are provided to support groups in developing care instructions for the temporary carers on how to look after specific animals. The kit also includes transportation logs and identification information like tags, photographs and microchips to avoid issues of animals being lost, misplaced or mixed up during an evacuation.

Step 4 – establish site layout, evacuation routes, assembly areas and a last walk-through checklist. During emergencies and disasters, conditions may change rapidly, so the location of off-site refuges and evacuation routes is vital. By identifying what services, routes and access is available on the site and nearby

before a disaster strikes, wildlife groups and carers have a better knowledge of where they can shelter if needed and what route is most safe to use. This knowledge can be life saving during an emergency.

Step 5 – prepare clear and specific procedures outlining the actions to be taken at the various stages of an emergency. This guides the team on what triggers activate the evacuation plan and defines actions in the stages leading up to evacuation. These procedures minimise delays in putting a plan into action so that animals and people can evacuate before it becomes too dangerous.

It is essential the groups put their plan into action, which is why a ‘walk through’ is recommended as the next step, to identify any gaps, review its effectiveness and take corrective action. Then groups would be encouraged to test the plan through a disaster simulation where team members practice the evacuation plan using toy animals. This provides the groups with a lifelike scenario of how the plan will be implemented and builds confidence. After the simulation, a group debrief identifies any issues, gaps, concerns and corrective actions.

Groups are also encouraged to share their evacuation plan with local emergency services authorities. IFAW advises groups meet with authorities to discuss and review their plan, and to confirm the lines of communication during emergencies.

A lot of knowledge is shared during the workshop within a short period of time. Checklists and templates are provided in advance to maximise the workshop’s productivity. After the course, IFAW’s relationship with groups and carers continues with check-ins, in case extra assistance or resources are needed.

The 2019–20 bushfires will not be the last disaster in Australia. With climate change influencing the frequency and intensity of weather events, it is more important than ever to help carers and rescue groups prepare. Through IFAW’s disaster toolkit project, resources will build the skills of carers to safely look after their own lives as well as the lives of the animals they care for.

Improving outcomes for wildlife

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Historically, wildlife has not been a high priority in disaster management planning. With hundreds of species at risk of extinction and almost 3 billion native animals estimated to have been killed or displaced during the 2019–20 Australian summer, change is needed.

Australia has the worst mammal extinction rate in the world and was experiencing one of the most severe droughts before bushfires destroyed 18.6 million hectares over the 2019–20 summer season. Hundreds of species were pushed closer to extinction, with 119 identified by the Australian Government Bushfire Recovery Expert Panel as high priorities for urgent management intervention.

Traditionally, disaster events have been viewed from the human perspective with the aim of protecting human lives and property, including companion animals and livestock where possible. However, with climate change forecasts indicating longer summer seasons, higher temperatures and increased frequency and intensity of major events such as fires and floods, the long-term effects on wildlife and biodiversity could be catastrophic.

Globally, wildlife faces many threats, including extensive habitat loss associated with residential, industrial and agricultural development. When this is exacerbated by enormous losses of additional habitat, this may result in the deaths of high numbers of animals and potentially the extinction of local species populations. With frequent major events, there is also less time for the land to regenerate and species to recover. The accumulative effect on wildlife is likely to be exponential. If remaining critical refuge and wildlife corridors are lost, more species will become fragmented. With so few individuals left, extinction in the wild is inevitable.

There are critical actions that can and should be taken to improve outcomes for wildlife. To improve disaster risk reduction and mitigate the effects on native animals, it is imperative that emergency services organisations embrace wildlife emergency planning as part of their processes. Government agencies, wildlife and environmental

organisations can collaborate to safeguard critical areas of refuge. Endangered species populations can be identified early and proactively defended. Implementing other activities such as indigenous burning practices have also significantly improved outcomes for land and animals.

As part of improved emergency preparedness planning, WIRES is establishing robust emergency procedures and creating trained wildlife emergency response teams. WIRES also works with other agencies and organisations to clarify roles and responsibilities.

Major improvements needed for emergency response and outcomes for wildlife:

- Consistent protocols, policies, structured management systems and training related to wildlife response in the field, including search and rescue.
- Effective communication with emergency services personnel coordinating field efforts and advising on access to firegrounds.
- Effective processes to reduce risk and proactively protect wildlife, particularly threatened species and critical areas of refuge.
- Clear regulations and protocols for deploying veterinary teams and triage centres to improve outcomes for wildlife.
- Increased national wildlife rescue and rehabilitation capacity.
- Technologies that increase the efficiency and effectiveness of emergency response to permit the fastest possible rescues for animals.

WIRES is Australia's largest wildlife rescue organisation. Information about its programs is at: www.wires.org.au.

Large animal rescue and livestock emergency response training best practices

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 Rebecca Gimenez-Husted, PhD³
 Gayle Ecker¹

Livestock, including horses, are transported daily on roadways. Related transport accidents can involve loose, injured or dead livestock as well as human injury or death. Distressed animals can be unpredictable and dangerous and they can present a risk of injury to responders.

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2. Farm & Food Care Ontario
3. Technical Large Animal Emergency Rescue, Inc.



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Large numbers of livestock travel daily on Ontario roadways in Canada. For example, in 2019, Ontario Standardbred racing carried out 57,000 horse movements and Ontario cattle sales were over 400,000. To respond to any related transportation incident involves putting people and animals at risk. Responders require training in large animal response to reduce on-scene time, costs and to improve human and animal welfare outcomes.

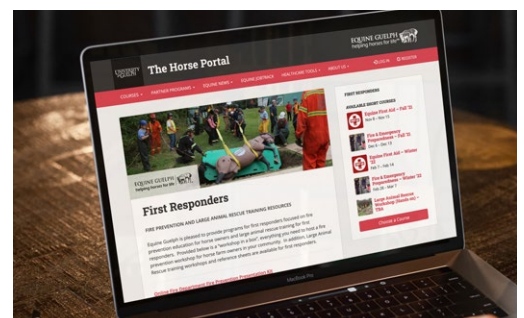
Responder training varies between emergency response departments. Large animal rescue and livestock emergency response training provided in hands-on and virtual manners is an effective forum and creates positive change. Through proper training using best practices, risks to responders and others involved in livestock transport incidents are mitigated.

Training programs are provided by Equine Guelph, University of Guelph and Farm & Food Care Ontario. Equine Guelph's online education program on TheHorsePortal.ca is a partnership with the provincial equestrian federations (Canada), Equestrian Canada, the Ontario racing industry and various local organisations. Farm & Food Care Ontario is a coalition of Ontario livestock groups (farmfoodcareon.org/livestock-emergencies).

The programs are at: www.thehorseportal.ca/partner/first-responders and www.farmfoodcareon.org/emergency-training.



Large animal rescue training for responders.
 Image: Susan Raymond



TheHorsePortal website.
 Image: Susan Raymond

Veterinary emergency management training and practice: the critical operational component

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Robust emergency management training and practice underpins all we do in emergency response, relief and recovery, including in the veterinary in-field operational context. Without knowledge, understanding and practice of emergency management systems and operating principles, a response is neither safe nor effective.

South Australian Veterinary Emergency Management (SAVEM) Inc has been a formal part of the *South Australian State Emergency Management Plan* (SEMP) since 2010. It is the national leader in all-species veterinary emergency management and is the first and, to date, the only dedicated emergency management trained volunteer veterinary agency of its kind in the country.

SAVEM is formally activated under South Australian state arrangements by the Control Agency when an emergency incident requires veterinary presence. The process is defined in law and in agency plans. The most recent of SAVEM's 17 deployments was for the bushfires over the 2019–20 summer (formal activation of 83 days) and the January and February 2021 Adelaide Hills bushfire (formal activation of 33 days). SAVEM's decade-long experience and lessons learnt enable continuous improvement and demonstrates best-practice to the emergency management community.

Most people outside the emergency services sector believe a veterinary emergency response is only about animal rescue, triage and treatment. This may be the primary mission, but is only achievable when rigorous emergency management training has been undertaken. A successful veterinary response is predicated on the understanding and application of non-negotiable principles designed and implemented to enable personnel to achieve optimal operational outcomes - and live to tell the tale.

The SAVEM model is 100 per cent volunteer with no paid staff. Volunteers undergo mandatory online and face-to-face training before having the opportunity to be selected to join a SAVEM response. Online theory modules allow face-to-face

Level 1 workshops to be interactive and practical and potential volunteers can be assessed by senior trainers. Without this training, a response will be plagued with disarray at best and, at worst, the potential for serious human injury or fatality. SAVEM's online and Level 1 training is about learning the systems, processes and protocols so volunteers understand the paramount culture of safety, to be team players and to understand chain of command. SAVEM teaches the 'Seven Cs' command, control, coordinate, collaborate, communicate and connect with coherence.

SAVEM's online training modules

- Acronyms and Terminology
- How South Australia responds to emergencies
- Principles of Operations
- Standard Operating Procedure
- PPE and PPC
- The Australasian Inter-service Incident Management System^(TM) (AIIMS)
- The Functions of Incident Management
- Communication
- Information Management
- Workplace Health and Safety

Volunteers participate in exercises after completion of Level 1 modules. Plans and sub-plans must be exercised, tested and reviewed in peacetime; it is completely inadequate to 'test' plans in operational response. Likewise, a rigorous process of debrief



The Scott Creek community notice board after the January 2021 Adelaide Hills fire.

Image: SAVEM Inc.

and after-action review at the end of the day, end of the shift or end of the response are important contributions to continuous improvement where lessons identified translate to lessons learnt and are implemented by the leadership team. Every incident is different and new lessons are identified and learnt on each occasion. The debrief process is valuable to promote mental health and provides team members opportunities to tell and share their experiences.

Attending a fireground in the immediate aftermath of a fire is physically, mentally and emotionally taxing. Veterinarians often have good counselling skills exercised in their day-to-day practice and this can be a strength, especially when assisting traumatised animal owners. But confronting scenes of hundreds of burned animal bodies, injuries and destruction of property, habitat and environment tests even the most field-hardened. To address this, SAVEM sends groups of volunteers to psychological first aid training, not only to learn how to assist people affected, but to help volunteers manage their own traumas. Support services for volunteers must be available to help address adverse effects of the things that cannot be un-seen or un-heard.

Firegrounds are very dangerous places. People can die or suffer serious injury long after the fire front has passed, and long after a fire is contained. Dynamic risk assessment is a key skill. There are several major fireground hazards that can kill – other than the fire – including falling trees, intensely hot craters beneath a surface crust of white ash and building hazards such as asbestos or stored chemicals or explosives. Even experienced, trained firefighters have died in what should have been benign circumstances but escalated unexpectedly.¹ As such, participants must understand that not every animal can be saved and not every animal refuge area is safely accessible. SAVEM has a zero tolerance for participants who disregard safety directives and put themselves or others at risk, or who self-activate. A paramount and positive culture of safety is non-negotiable. Safety on incident ground is everyone’s responsibility, not only the duty of the team leader.

First – think, act, speak and train in the context of being an emergency service with an animal welfare emergency management remit. A fireground response is nothing like

veterinary clinical practice. Typical ‘day job’ skills may not equip volunteers to be operationally adept. It is a mistake to try to replicate a veterinary clinic environment on incident grounds. It is a mistake to come to a response with only an ‘animal rescue’ mindset. There are times when best animal welfare outcomes are achieved by support and monitor-in-situ, rather than removing animals from their habitat and bringing them into care unnecessarily – just because we can. ‘Rescuing’ animals might make humans feel good, but iatrogenic² morbidities triggered by handling, transport, confinement and ongoing treatment are avoidable: *first do no harm!*

Forging strong alliances with emergency services first responders is critical. Frontline responders need to be confident veterinary teams will, without exception, operate according to established rules of engagement and respect chain of command. This is why SAVEM trains to the Australasian Inter-service Incident Management System™ (AIIMS™), enabling volunteers to understand and speak the same language as first responders, and to learn how to respond equally well to all hazards.

In South Australia, bushfire is the major hazard of concern for six months of the year, but there are nine hazard types listed in the SEMP that may be encountered. These are urban fire, rural fire, earthquake, flood, extreme weather, hazardous materials, human disease, animal and plant disease and terrorism.

Developing a veterinary emergency management capability does not happen overnight. It takes time and effort to form, maintain and grow an agency such as SAVEM. Government departments cannot do this as the volunteer sector provides operational resources and expertise that reaches far beyond the limitations of government and bureaucracy. The most important asset is having the right people. Veterinary emergency management is not easy and is not suited for everyone. SAVEM volunteers are from varied backgrounds but are like-minded individuals who mesh together and form strong teams and lasting friendships. Our people are improvisers, problem solvers and have a ‘can-do’ attitude.

To achieve best-practice animal welfare outcomes, it is critical for supporting agencies to embed with local emergency services. Volunteers must earn trust, respect and build credibility to become a formal, legislated participant in state emergency management arrangements. Going into a response with only an ‘animal rescue’ mindset is dangerous and won’t achieve access to an incident ground. Having an emergency management approach and an alignment with the emergency services requirements makes all the difference.

Information about SAVEM is at: www.savem.org.au.

Endnotes

1. Conroy B 2016, *Firefighter entrapment during routine hazard reduction burn at Mount Kuring-Gai*. In S. Ellis & K. MacCarter (Eds.), *Incident Management in Australia*, pp.99–126.
2. Iatrogenic injury is illness caused by veterinary or medical examination or treatment.

Resources for livestock during emergencies in Alberta, Canada

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Alberta Farm Animal Care



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Thousands of farm animals live in and are transported throughout Alberta, Canada every year. To help reduce risk of injury or death to these animals, a number of livestock emergency resources have been created.

Alberta has traditional emergency resources such as police and fire services and the Alberta Society for the Prevention of Cruelty to Animals (Alberta SPCA). However, additional services were needed to help livestock owners protect animals and their livelihoods, particularly during Alberta's extreme weather conditions.

ALERT Line

The ALERT Line is a 24/7 phone line where farmers help farmers. The service was created in 1995 and anyone can call anonymously to get help or report animal welfare concerns. While the ALERT Line does not have regulatory capacity, it works directly with those who do, such as the Alberta SPCA and the Royal Canadian Mounted Police.

People are encouraged to call if they:

- are concerned that livestock may be neglected or distressed
- have questions about livestock care
- see livestock in an emergency situation
- need support in caring for their livestock
- need an emergency livestock handling equipment trailer.

In Alberta, if someone suspects abuse or livestock neglect, sees severely injured livestock or if dead animals are present, the Alberta SPCA must be contacted. During the call, details are collected and forwarded to the Alberta SPCA and the caller is encouraged to contact the Alberta SPCA directly. In instances where livestock are on a highway or major road, the Royal Canadian Mounted Police is notified as this is a threat to human safety. The ALERT Line relies heavily on volunteers who are trained to assess animals and the environment. A volunteer may conduct an initial drive-by inspection of the farm to gather more information and determine if the concern is valid. This may be followed by a phone call to the farmer or a farm visit. If there is a serious issue or the farmer is uncooperative, the

Alberta SPCA is contacted. If there is a management issue, the coordinator and volunteer work can with the farmer to determine a solution. The case is monitored and if there is insufficient progress, it is forwarded to the Alberta SPCA. If there is no reason for concern, then the call is labelled as an information call. This is an opportunity to educate the caller on acceptable animal care practices.

Emergency livestock handling equipment trailers

Emergency livestock handling equipment trailers are outfitted with essential equipment needed in the event of a livestock emergency. They are usually housed at fire stations as fire services are generally dispatched to livestock emergencies. Trailers are dispatched through 911 and the ALERT Line.

The first 2 trailers were independently created by separate counties in Alberta. Alberta Farm Animal Care has since established 5 trailers through a government grant in 2012. Since then, another 12 trailers have been added. Trailer operators receive training through Lakeland College, Technical Large Animal Emergency Rescue training or other livestock emergency training courses. Alberta Farm Animal Care has an administration role and supports the creation of new trailers and ongoing training.

The ALERT Line and the emergency livestock handling equipment trailers have been successful and valuable additions to Alberta livestock farmers and animals. These or similar resources could be applied to other locations to support livestock welfare.

Alberta Farm Animal Care Association was created by Alberta livestock producers and is a collective voice of the livestock industry on matters of livestock welfare.

Access their resources for emergencies at:
www.afac.ab.ca/resources/emergency-preparedness.

Let's talk about animals

Dr Saskia van Manen¹
Associate Professor
Claudine Jaenichen²
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Pets and other animals can act as a protective factor in an emergency if we leverage design to communicate more effectively. A new prototype website does just that.

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2. Chapman University, California, USA
3. Massey University, Palmerston, New Zealand
4. National Taiwan University of Science and Technology, Taipei, Taiwan
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According to the US Federal Emergency Management Agency, 'The design of messages is critical to saving lives'.¹ In emergency management, the majority of messages and instructions rely on visual design as the main framework for communication. This includes written text, which is a visual presentation of information. However, the application of basic visual communication principles and rules of legibility are frequently omitted from the emergency planning process, skillset and training. Nevertheless, the inclusion of design principles in emergency management should extend far beyond semantics and semiotics: the design of messages should start with the principles of human-centred design.

is disaggregated by demographic data (e.g. education level, income, gender or ethnicity). In contrast, design is concerned with an audience's psychographic profile. It considers people's aspirations, motivations, barriers and accessibility requirements. Thus, at the core of human-centred design lies empathy: the knowing, or being able to imagine, what another person or other people are thinking and/or feeling. In essence, walking in their shoes. Designers come with a rich toolkit to understand the intended audience at this deeper level.

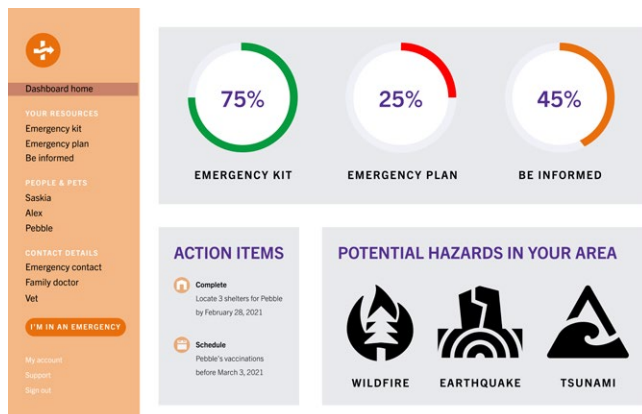
Animals are important to people. For example, consider the bond you have with your own pet or the risks people take to save an animal, even if it is not theirs. This bond has resulted in animals (particularly pets) being considered a risk factor

In emergency management, practitioners often speak to a 'general public', which only occasionally

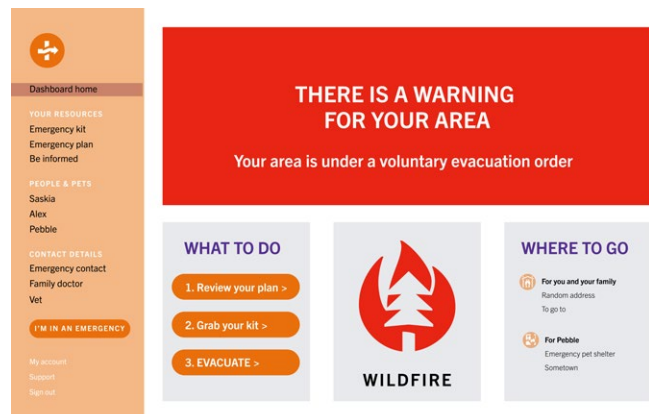


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The website prototype showing a personalised and integrated human-animal disaster preparedness kit checklist. The site relies on the evidence-based Guemil icons.⁷



The website's dashboard showing the progress a user has made with their disaster preparedness activities, an overview of potential hazards for the user's area and important action items.



The website's dashboard in emergency mode (e.g. once an alert has been issued for the user's location). It shows the action steps and refers to resources users have compiled through their previous interactions.

for effective early evacuation; if people evacuate without their pets they may subsequently return to a disaster area to care for or retrieve them or people may fail to evacuate to stay with their animals. Both activities endanger human and animal lives. However, research² indicates that the human-animal relationship can be reconfigured into a protective factor by acknowledging its importance.

Pet owners make up two-thirds of the populations of the USA³ and Australia⁴, thus the ability to reconfigure animals as a protective factor has significant importance, particularly against a backdrop of an increasing frequency of disasters. A review of Orange County's (USA) disaster preparedness information in early 2021⁵ showed that information, particularly in relation to animals, is presented in a haphazard and disconnected manner that separates anthropocentric and zoocentric viewpoints. This stands in stark contrast to the recommendations by Thompson², almost 10 years ago, who stated that reconfiguring animals as a protective factor requires 'innovative communication initiatives' that reconcile these 2 perspectives.

To address this, a prototype disaster preparedness website that integrates anthropocentric and zoocentric perspectives was presented at the Global Animals in Disaster Management Conference⁶ in 2021. While print remains very important as it allows for a more direct confrontation with emergency preparedness information, technologies to create responsive websites and apps are increasingly easy to use and online communication platforms have been adopted by large proportions of populations. These 'new' media allow for the personalisation of preparedness checklists based on a household's composition and characteristics. Thus, for example, it allows communicators to speak directly to the human-animal relationship rather than considering them individually.

The prototype website integrates elements of visual communication, user interface and user experience design. In doing so, it leverages the bond people have with their animals to open up (new) ways to motivate people to prepare for disasters. The portal also provides information during and after a disaster, which are times when information acts as a structural support.

To further develop this concept the next step is to test it with potential users. Theoretically, it offers improvements over current techniques but unless evidence on its effectiveness is gathered, its full potential to support comprehensive disaster preparedness for humans and animals cannot be realised.

More information about the prototype and the application of design in emergency management is at: www.dnem.org.

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What about Fluffy? Pet fostering in Cairns, Queensland

Sioux Campbell

Cairns Regional Council



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The perennial problem of how to effectively coordinate pets and their owners during evacuation is one that Cairns Regional Council in far north Queensland is looking to solve.

Cairns region has 20,000 registered dogs and numbers of cats are estimated in the thousands. In a location known for its significant hazard exposure of cyclones and storm surges, pet ownership means including holistic planning for pets during emergencies and disasters.

Planning can be troublesome for pet owners living in storm-surge areas when their pets cannot be brought into lock-down cyclone shelters, or for people with specific vulnerabilities who may need evacuation in a disaster. Cairns region disaster managers face the same dilemma, particularly because the RSPCA and other animal management facilities are in storm-surge or flood zones. There are multiple examples worldwide of residents refusing to evacuate without their pets or being traumatised through evacuation separation. Thus, the Cairns Regional Council disaster team worked with a new community-based animal care group to assist.

The group, Animal Care for Seniors at Home (ACSAH), was formed to support older people to keep their pets at home. Owners often find they are no longer able to walk dogs (or walk them enough), provide specific care or they need advice about medication. ACSAH assists with these services by matching volunteer carers with pet-owning clients. Pets include dogs of all breeds, ages, sizes and temperaments although cats and others have been included.

The council became involved by providing advice on different emergency scenarios and support for the group's establishment. A trust relationship has developed with regular council officer participation at meetings and activities to share information.

One aspect was what happens during evacuations. As ACSAH can offer short-term pet fostering for people who may be unwell or need to go away, its capacity to coordinate emergency fostering during times of evacuations was raised. ACSAH volunteers living outside hazard zones offer to care for pets of owners who need to be evacuated. The local disaster management team facilitates the arrangement and provides support as necessary through established response management processes.

To assist with effective planning, ACSAH provides its team with a 'client' list by hazard zone each month during the summer wet season. Volunteers work with clients to develop a personalised household emergency plan that includes the pets. The disaster management team checks the client list for any correlation with its Evacuation and Recovery ('Vulnerable Persons') Register so that priority contact is made with ACSAH clients in hazard zones at the same time as those on the register in the event of an evacuation.

ACSAH and the council's disaster resilience officer meet regularly at community activities. ACSAH members are kept informed about possible weather or other significant events through inclusion in a regional 'early advice' email group.

While the theory and practice are relatively simple, the relationships between the council, ACSAH and its community is one that needs nurturing to flourish. However, this is an excellent example of shared responsibility and recognises the value of the role of ACSAH in Cairns communities as well as its unique place in local disaster management.

Synergies between social work, disaster management and animal-inclusive practice

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Research into the human-animal bond in disasters can be used to inform practice and organisation planning and response. A closer alignment of social work and animal services can be addressed by conceptually framing the human-animal bond within theoretical perspectives.

Research highlights that human behaviour is often influenced by our bonds with our animals.^{1,2} However, disaster and response planning within human service and social work organisations in Australasia has rarely included non-human family members despite high levels of companion animals in households³ and the ethical imperative that recognises animal sentience.⁴

In 2020, Companion Animals in New Zealand⁵ estimated that 41 per cent of households included a cat and 34 per cent had a dog. Recent figures from Australia estimated 27 per cent of households with cats and 40 per cent with dogs.⁶

In social work, animals and humans are frequently seen as 2 distinct domains.^{7,8} The use of theoretical perspectives familiar to social workers and other human services practitioners can create a conceptual shift in thinking towards a whole-of-system orientation necessary for animal-inclusive disaster and response planning. Ecological and deep ecological theory as well as attachment theory are possible approaches.

Animal-inclusive ecological practice

Social work practice is systemic, using an ecological, 'person-in-environment' understanding. People are connected to, and potentially sustained or disadvantaged by, systems beyond themselves. These include family/whanau, community, external structures and processes and identities of gender, culture, belief, sexual orientation and disability. All of these influence our lives.

By extending an anthropocentric perspective to a recognition that human beings have mutual interdependence with the living world, theories of deep ecology can be introduced, potentially shifting

the social work gaze towards the wider ecology of 'environment-including-people' (see Figure 1).⁹ Thus, social work and human service practice can be inclusive of all beings within households and provide an imperative for including companion animals within disaster risk reduction (DRR).

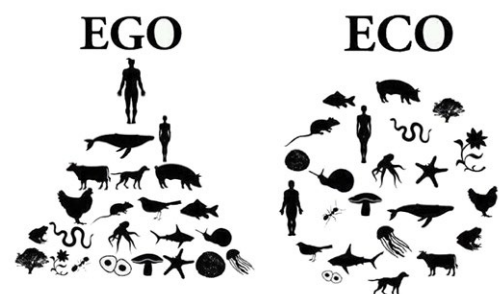


Figure 1: Shifting the ecological gaze.
Image: Reflect for Change.

Human attachment to companion animals

Even without reframing the position of humans within ecological systems, social work practice in planning and response can be informed by people's attachment to their animals. Social and human services recognise the importance of relationships and that companion animals become integral parts of family life.¹⁰ Attachment theory provides a conceptual explanation for how relationships with animals can influence human behaviour in a crisis. Use of assessment skills such as genograms and ecomaps that are standard tools of social work practice can be adapted to include relationships with companion animals within households, families and other living configurations.¹¹

Vulnerable people, vulnerable animals

Attachment theory can be used to identify the importance of animals in the lives of vulnerable and marginalised people who are often disproportionately affected by disasters. Older people and those living with disability or mental health challenges may 'live alone' but share their lives with companion animals that provide much needed caring responsibilities and mutual affection. People living without safe or permanent housing may rely on animals for support, warmth, companionship and safety. There are perils to ignoring the centrality of animals in their lives. The considerations of animals within disaster planning may encourage participation by otherwise hard-to-reach families and communities.¹²

The rationale for animal-inclusive disaster planning

There are several arguments for the inclusion of companion animals in social service planning particularly for emergencies and disasters:

- Having responsibility for animals can encourage people to prepare for disasters as well as assist in their recovery.
- Animals have been linked with peoples' failures to evacuate in accordance with warnings.
- People are exposed to greater risks if trying to rescue animals.
- People may experience added trauma if separated from their animals.
- Animals can enhance resilience by providing physiological and psychological benefits to people.
- People with poor support networks can be disproportionately affected by the loss of a companion animal in a disaster.
- Significant costs of failing to plan for the wellbeing of animals may arise during disasters.

Organisational responses for animal-inclusive social work

Social work practice can be the catalyst for a shift towards animal-inclusive DRR and this is best supported by systems-level planning for resources and processes to be in place prior to an event. Organisational-level planning can include social work practice activities of:

- instigating animal-inclusive training and education (pre- and post-qualification)
- establishing animal-inclusive assessment forms and processes
- planning or providing animal-inclusive accommodation, animal carriers, leads, etc.
- publishing registers of foster care available for animals that cannot remain with their owners
- establishing inter-agency agreements and protocols for identifying need and allocating responsibility for response animals within households
- maintaining registers of vulnerable people who may need to evacuate with their companion animals (including assistance dogs)
- identifying animals with special needs

- using microchips to identify animals separated from family
- identifying animal abuse and hoarding behaviour when animals are in shelter care.

For social work, animal-inclusive DRR has synergies with other crisis fields such as the interrelationships between family harm and animal abuse. Social work education and practice needs to be animal-inclusive to be truly human.

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Haiti earthquake animal response in 2010

Gerardo Huertas

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On an ominous afternoon on 12 January 2010, just before 5pm, dogs began barking frantically in Port-Au-Prince, the capital of Haiti. Seconds after, the ground shook as a strong earthquake unleashed chaos and destruction, killing in excess of 240,000 people and an unknown number of pets and domestic animals.

The earthquake brought catastrophic devastation to the city. In Port-Au-Prince, many roofs are made of concrete to protect from the Caribbean sun. When most of them collapsed, thousands of people were trapped, injured or were killed.

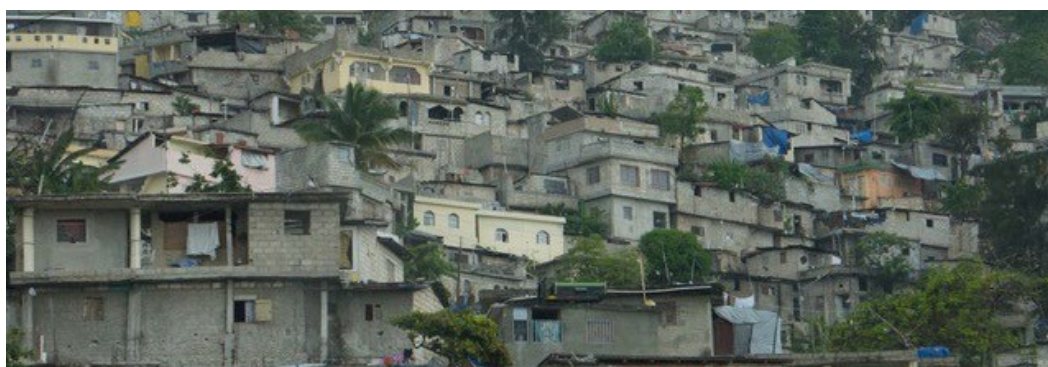
While international aid agencies prepared to assist Haiti, the poorest country on the American continent, and readied to dispatch human aid relief, World Animal Protection dispatched a response team 72 hours after the island had been violently shaken.

The cataclysmic devastation in the city was widespread and I knew the team would face challenges not seen before. Our first priority was to coordinate with local animal health authorities and with United Nations representatives to set up mobile veterinary clinics and bring relief to any surviving injured animals. The the team I led was

on-site for 15 months and over US\$1 million was contributed to the relief effort.

Coalition for coordination: To represent animals better before the Government of Haiti, 20 non-government organisations from 2 continents established the Animal Relief Coalition for Haiti Arch to pool resources and maximise the number of animals we could reach and help. Over the 15 months, approximately 70,000 animals were treated and many would certainly have died without the help they received.

Emergency relief: The mobile animal clinics moved continuously from one neighbourhood to another to reach as many communities and animals as possible. The teams helped local authorities with epidemiological surveillance rings when cases of rabies in animals were suspected and worked to prevent the widespread and



In Port-Au-Prince, many buildings collapsed during the earthquake.

Image: World Animal Protection

inhumane use of strychnine to kill dogs. The vets worked with communities to reassure them that help was available for their animals. The mobile clinics were preceded by messengers using megaphones announcing the arrival of the clinic and teams. A long line of people would form with cats, dogs, pigs, cattle, horses and goats waiting for our vets.

Animal health: Two important laboratories and all their equipment at the Department of Animal Health were destroyed during the earthquake. These were rebuilt to provide monitoring of endemic and new diseases and pathogens. We also established a network of cold stations around the capital that were powered by solar energy to allow for biological samples and vaccines to travel safely and be used to protect animal and human health.

Dog census: The first city dog census was carried out to estimate their numbers, zoonoses trends for rabies and leptospirosis and the resources needed for a future healthy dog-human relationship.

Capacity building and awareness: Together with the United Nations Office for Disaster Risk Reduction, we trained local veterinarians on how to mitigate disaster risk for animals and also developed a public awareness campaign in the local Creole

language. There were also contests at local primary schools designed to reach animal owners with the basics of disaster preparedness and promoting family emergency plans that included pets and domestic animals.

Support communities: To ‘build back better and to do no harm’, we hired all manpower locally as soon as people were properly trained and, where possible, purchased the necessary drugs and medicines from local providers.

Global policy: In an overarching effort to protect animals from disasters, 5 years after the Haiti earthquake, farm and working animals were included by the United Nations member states into the *Sendai Framework for Disaster Risk Reduction 2015–2030*.

Haiti’s development and recovery challenges, including its vulnerability to extreme hazards, will require a long-term approach from many stakeholders. Poverty levels are high while governance is still weak in the country, thus presenting mid-term challenges and opportunities for providers of disaster risk reduction and recovery management.



The World Animal Protection team assessed injuries and diseases of animals during the 15 month deployment.

Image: World Animal Protection



Mobile animal clinics were used to reach as many communities and animals as possible.

Image: World Animal Protection

Tsunami and nuclear disaster in Japan: the experiences in Fukushima

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A study was undertaken to examine how relationships between guardians (owners) and companion animals were challenged during the tsunami of March 2011 and the following nuclear disaster in Fukushima.

Japan is the only place where tsunami and nuclear disaster have occurred at the same time. Such concurrent disasters are increasing in number and present new challenges to response resources. To date, there has been little attention given to animals in disasters. This study focused on the owners of companion animals (pets) affected by the tsunami and Fukushima nuclear disaster following the Great East Japan Earthquake in 2011.¹

Ten years after a nuclear reactor meltdown, 42,000 residents are still evacuated due to the effects of radioactivity and Fukushima is an ongoing crisis area in Japan. The examination of this catastrophic disaster is crucial to understand human vulnerability. Among the survivors, pet owners faced added challenges, as they were discriminated against because of their pets.

The study commenced with 3 research questions:

1. How did guardians and their companion animals survive the large disaster?
2. Why was the relationship between guardians and their companion animals ignored during and after a disaster?
3. What structures and/or mechanisms shaped the outcomes for animals and their guardians?

Data was collected during 25 field trips to Fukushima and other areas hit by the tsunami between 2012 and 2016. Interviews were conducted with 65 individuals. The behaviour of animal guardians in Fukushima was complex relative to that of the guardians in areas hit by the tsunami. Many residents in Fukushima did not access detailed information about the nuclear meltdown and thought they could return home a few days later. As a result, an enormous number of animals was left behind.

Three major factors affected the relationship between owners and their pets. These were ‘anthropocentrism’ (the belief that human beings are the most important entity), that the government’s disaster evacuation plans were not

adequately implemented and a paradigm that prioritises the nuclear industry. In other words, that nuclear power generation is a national project promoted by the Japanese government, academics and the economics communities.

Three suggestions from this research were:

Risk – it is important to identify current and potential risks and openly discuss them. In Japan, it was considered almost taboo to examine the risk of a nuclear power plant accident prior to March 2011. If the Government of Japan had not withheld the seriousness of the situation, more companion animals would have been evacuated from the disaster areas with their guardians. Disclosure of accurate information is the responsibility of government and those who operate nuclear power plants.

Relationships – it is important to acknowledge the relationships between owners and their animals. Policy makers and the public must recognise that companion animals have been members of society from the time we have steered them into human community.

Animal value – attention could be paid to the meaning and value of the pet-owner relationship. To accomplish this, the concept of ‘bonding rights’ is put forward. That can be defined as ‘the right of the guardian and companion animal to stay together’. This concept is far from certain and requires more discussion and clarification. An example of such a right would be that owners and companion animals would receive the same level of support as non-animal owners at public shelters in a disaster.

This research contributes to understanding the outcomes for owners and their animals after the Fukushima nuclear disaster following Chernobyl. As disasters increase in frequency and severity, finding from such studies will assist to manage disaster risk and disaster response and recovery.

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Wildlife conservation: a principles-based approach to prevent biological disasters

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Biological disasters can affect living organisms in the form of epidemic or pandemic and human-induced environmental changes are driving the emergence of many infectious diseases throughout the world. In recent years, viruses from wildlife hosts have caused high-impact disease outbreaks such as SARS, Ebola and the recent COVID-19 pandemic.

The importance of viral-host switching was highlighted by the avian epizootics of high-pathogenicity strains of H5N1 Influenza A in 2003, in which ‘spillover’ to humans caused high mortality. Fortunately, there was no human-to-human transmission.¹ However, in the COVID-19 pandemic, millions of deaths have occurred right across the globe.

Contact between donor and recipient hosts is a precondition for viral-host transfer. There are many factors such as wildlife trade, bushmeat hunting, human population expansion, deforestation and changing farming practices that can potentially facilitate the entry of viruses and spread to new hosts. Increased involvement of wildlife in livestock and human diseases is likely due to several changing anthropogenic factors such as increased interaction with the wildlife for recreation purpose and increased encroachment into wildlife habitat.

Ecotone

Wildlife is usually limited to a particular habitat. When the interface between wildlife and human or livestock is disturbed it may result in disease emergence or biological disasters. This can be understood by the concept of ecotone, which is the transition zone between 2 adjacent ecological systems. Ecotone includes zones of interactions where human settlements and accompanying cropland and pasture expand into relatively intact natural ecosystems. Human-created ecotones are presenting major issues as they extend deep into intact forest areas. Biodiversity is also being lost. Between 1940 and 2004, biodiversity loss has resulted in increased pathogen transmission and

disease emergence and over 300 emerging disease events have been identified around the world.

Ebola virus disease and deforestation

Since the Ebola epidemic, investigations are ongoing to establish the network and pathways of this disaster. Most researchers have documented the significant link between forest loss and disease outbreak. Olivero and co-authors (2019)² observed positive human influence on 5 out of 20 fruit bat species that could be associated with Ebola outbreaks in deforested areas within the tropical forest biome in West and Central Africa. This biome was described as favourable for the occurrence of the Ebola virus in the wild. The human activities involving the cultivation of fruits for commercial purposes provided an ample year-round food supply for the bats and increased the human-bat interaction in this biome. This demonstrates the influence of human-created disturbances in the natural ecosystem on Ebola outbreaks.

AIDS and interaction with non-human primates

AIDS was first recognised in the early 1980s when an established SIV (Simian immunodeficiency virus) switched from non-human primates into humans. Although the exact conditions and circumstances of cross-species transmission remain unknown, human exposure to the secretions of infected primates through hunting and butchering of primate bushmeat, represents the most reasonable

source for human infection. Bushmeat hunting, as a source of animal proteins, is a longstanding practice in rural areas generally throughout sub-Saharan Africa. However, the use of firearms, commercial logging and road constructions penetrating remote forest areas resulted in human migration to previously inaccessible areas. This led to more exposure, amplification and establishment of the virus in the human population. With increased human mobility around the world, it is possible that recombinant SIV and HIV can emerge anywhere globally even farther away from the area of its first emergence.

West Nile virus infection and loss of biodiversity

West Nile virus was first observed in Africa, in the West Nile district of Uganda in 1937. When this virus reached the USA in 1999, the outbreak resulted in morbidity and mortalities. Then it spread further and within 5 years, West Nile virus was considered endemic. Ezenwa and co-authors (2006)³ reveal an association between non-passerine species richness and West Nile virus infection rates. West Nile virus activity in *Culex* mosquitoes declined with increasing non-passerine species richness suggesting that virus amplification rates were lower at sites with more non-passerine species. That study supported the hypothesis that increased biodiversity can moderate disease risk.

Biological disasters at the wildlife-domestic interface

Lions in the Serengeti were severely affected by the outbreak of canine distemper in 1994 and the event led to the loss of one-third of the lion population. Similarly, canine distemper resulted in tiger deaths in Amur in Russia and also in big cats in India. In most of the cases, evidence and studies suggested domestic dogs, especially feral dogs living in the ecotones and peripheral villages, as the potential reservoir of canine distemper. These cases indicate that ecological disturbances at ecotones may lead to biological disasters in any species.

Human-made biological disasters

Increased human interventions in protected areas have created a reservoir that can lead to biological disasters and epidemics at any time. Nipah virus epidemic, which led to human deaths in South East Asia, was the result of integrated farming system. Fruit bats are usually sub-clinically infected but they do not infect other species until their natural habitat is disturbed. However, deforestation and intensive fruit cultivation in ecotone areas and rearing pigs on the same land led to the transmission of the Nipah virus to pigs. Rapid amplification of the virus occurred in the pig population and then to humans who came into direct contact with infected pigs.

Negative implications for the removal of wildlife reservoirs

In countries where the economy is largely based on livestock products, questions regarding the removal of reservoir species

are common. It has negative implications that can be understood by the example of the culling of the European badger to control tuberculosis in farm animals. Culling was initiated because several studies on bovine tuberculosis indicated the disease was consistently higher in badgers than in other British wild mammals around the cattle farms. Badgers are social animals and culling depleted their social structure. The remaining animals started to wander and move to other burrows resulting in greater exposure of cattle to the pathogen and increased incidences of tuberculosis in the cattle population. Thus, removing a wildlife reservoir may instigate or exacerbate virus transmission.

Is wildlife in every biological disaster?

The answer is 'yes' because, in many epidemics, wildlife has been the potential source. However, wildlife is an integral part of ecosystems and is very sensitive to biological changes. Hence, wildlife can be considered as 'the canary in the coal mine'. Wildlife safeguards mankind and will be quickly affected in any disaster. Various wild species harbour pathogens and act as reservoirs but do not transmit the same to other species. Half of the disease emergence in the world is associated with biodiversity loss and biodiversity moderates disease risk via the 'dilution effect'. That is, infection rates among hosts will be very low in highly diverse communities. This is because there are 'incompetent' hosts in communities and there are reservoir hosts and dead-end hosts that will interfere with the active transmission of pathogens to a new species.

Conclusion

Biological disasters might be prevented by limiting the contact between the hosts and potential new communities. The concept of ecotone is important because the more that humans exploit their natural resources, the more they will be giving space for pathogens to thrive, as shown in the cases of Ebola and Nipah virus infections. Wildlife biological disasters could be averted by the cessation of culling reservoir species such as bats. In addition, awareness should be raised about hunting and selling wild species. Every species has a definite role in the ecosystem and their alteration or extinction will make the whole ecosystem vulnerable to biological disasters.

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Animals matter: global conference and awards

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The Global Animal Disaster Management Conference (GADMC) was held online from 14 to 24 February 2021. Professor Leslie Irvine, the author of *Filling the Ark: Animal Welfare in Disasters* was the keynote speaker and she set the scene with her presentation, ‘Why animals matter in emergencies’.

Dr Melanie Taylor described the conference concept¹ but GADMC participation exceeded expectations with over 1500 delegates registering for the free online conference, hosted by Animal Evac New Zealand. The online and free nature of the conference made the content accessible to a global and diverse audience. All presentations were video recorded and are available to view on the GADMC website, free of charge. The spirit of this not-for-profit conference helped secure some of the most influential leaders in animal disaster management, with over 40 experts covering topics from law, case studies, large animal rescue, carcass disposal, wildlife response, disaster risk reduction, emergency planning and more.

The conference format allowed delegates to virtually mingle and the trivia session saw several multi-national teams competing for prizes. Anabela Santos Moreira won the spot prize, a copy of *Animal*

Management and Welfare in Natural Disasters by James Sawyer and Gerardo Huertas.

The success of GADMC showed there is significant demand for connecting and sharing information to create animal-inclusive resilient communities. The awards for 2021 were given based on delegate feedback and voting and the conference committee is contemplating the theme for GADMC 2022.

Sponsors were World Animal Protection, American Veterinary Medical Foundation, Australian Institute for Disaster Resilience, Bushfire and Natural Hazards Cooperative Research Centre, C4 Group New Zealand, Central Queensland University, and International Fund for Animal Welfare and Reach & Rescue.

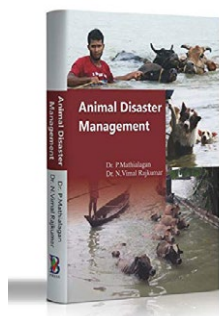
Sign up for updates and to view the video presentations at: www.gadmc.org.

Awards

<p>Best Overall</p> <p>Wildlife response in bushfires: lessons from the Black Summer of 2019–20</p> <p>Peta Norris and Tim Johnson (Australia)</p>	<p>Most Engaging</p> <p>Treatment of livestock affected by fire: successes and failures</p> <p>Dr Jeremy Rogers (Australia)</p>	<p>Most Popular</p> <p>Large animal rescue: technical review of case studies</p> <p>Dr Rebecca Husted (USA)</p>
<p>Most Thought-Provoking</p> <p>Creation of VERU in Argentina</p> <p>Dr Jennifer Ibarra (Argentina)</p>	<p>Best New Emerging Researcher</p> <p>Animals’ legal status as a source of their disaster vulnerability</p> <p>Ashleigh Best (Australia)</p>	<p>Special Merit</p> <p>All hazards preparedness for the exotic animal industry</p> <p>Dr Yvonne Nadler (USA)</p>

1. World-first conference on animal disaster management. At: <https://knowledge.aidr.org.au/resources/ajem-april-2021-world-first-conference-on-animal-disaster-management/>.

Animal Disaster Management



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P. Mathialagan and N. Vimal Rajkumar

Reviewed by Steve Glassey

Animal Evac New Zealand

PUBLISHED BY

Agri-biovet Press

ISBN: 978-93-84502-84-3



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In the past couple of decades, the emerging field of animal disaster management has seen a greater number of journal articles and books on the subject. Initially, the bulk of the publications came out of the United States, often building on the experiences from Hurricane Harvey, which was the catalyst for reform and research. Now, we are seeing a more globalised range of publications and this is welcome progress. When I saw the new book, *Animal Disaster Management* by P. Mathialagan and N. Vimal Rajkumar, I was quick to order it online to see what new gems of knowledge could be gleaned.

What intrigued me most about the book was that I had never heard of the authors nor their works relating to animal disaster management and so I was looking forward to fresh perspectives and ideas to challenge my own thinking. A further cursory search found negligible research in the animal disaster management context, however the authors had solid research experience in veterinary sciences, particularly with livestock. The book starts by referring to ‘natural disasters’, which is a misnomer in contemporary emergency management. The book’s format and approach appeared to be an adaptation of a thesis than a book, but it is well organised and has a good flow from introducing basic terms through to more complex considerations.

The book title is not an accurate reflection of its content. A more suitable title to align reader expectations could be ‘Livestock

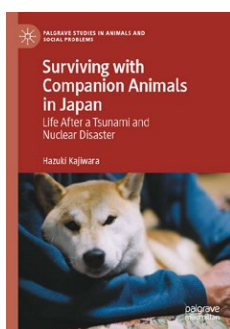
disaster management in India’, which is a major contribution to the body of knowledge. The range of references is light in regard to animal disaster management, with the exception of Sebastian Heath’s works. It was surprising the works of Leslie Irvine, James Sawyer, Gerardo Huertas and Dick Green were not featured especially given the book’s focus on livestock disaster management in developing nations.

Despite these reflections, the book deserves to be read, especially by those within the veterinary and primary industries. What is well covered in this book that is not commonly published, is research on the indigenous disaster risk reduction practices for livestock around floods and earthquakes, many of which have relevance in developed countries too. The authors offer 3 animal disaster management models specific to drought, earthquakes and hydrological hazards (floods, cyclones, etc) that provide a simple visual aid for farmers and policy makers.

I feel unqualified to comment on the sections on veterinary care and restraint but suggest they would be of benefit to veterinary practitioners and emergency responders.

For those seeking to diversity their knowledge in practical ways to implement livestock-focused disaster risk reduction in developing countries that are similar to India, this book provides a depth of information that helps build livestock-inclusive community resilience.

Surviving with Companion Animals in Japan: Life after a Tsunami and Nuclear Disaster



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Animal Evac New Zealand

PUBLISHED BY

Palgrave Macmillan

ISBN: 978-3-030-49327-1



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It is rare to find literature outside of the western world that provides an insight into how companion animals and their guardians are affected by tsunami as well as a radioactive emergency. The author has purposely crafted a mixture of anecdotes and references to highlight that the human-animal bond is just as strong in Japan as other commonly studied countries such as the United States, Australia and New Zealand and that such bonds can heavily influence citizen behaviour during and following a disaster.

The book is aimed at those who have an interest in disasters and animal welfare and will be of use to policy makers, emergency managers, veterinarians, animal welfare workers and community leaders.

The author has been guided by recognised scholars such as Professor Leslie Irvine and Professor Annie Potts and the content of the book is largely drawn from Kajiwara's doctoral dissertation that she completed through Rikkyo University. Having a PhD specifically researching the 2011 Japan tsunami and nuclear disaster makes her a world authority on the matter and her novel concept of 'bonding rights' builds on existing literature around the intrinsic link humans share with companion animals.

Beside the book *Animals in Emergencies: Learning from the Christchurch Earthquakes*, by Potts and Gadenne in 2014, there are few other animal disaster management books written by scholars that are event specific. This makes this book an important and accurate academic contribution to the body of knowledge in this emerging discipline. The book also makes extensive use of peer-reviewed literature and direct interviews to justify the positions made.

The book raises numerous issues and many of these are lessons that have been identified in previous disasters. These include the use of 'guidelines' that are too weak to be effective and specific laws may be more appropriate, and that where evacuation centres fail to accommodate companion animals with their guardians, both human and animal welfare will be compromised. This creates unnecessary loss of confidence in, and dissent against, authorities.

Issues around lessons management are highlighted that are not unique to Japan nor the emergency management sector.

As companion animals are treated as part of the family, our emergency planning should reflect an 'all of family' approach. In some cases, families had to drive 150 kilometres from their temporary accommodation to see their pets that were left to stay in the radioactive zones as instructed by authorities.

Former US FEMA Administrator Craig Fugate said when talking about Hurricane Katrina in 2006, "Our messaging at the time was 'if you evacuate, leave your pets behind with plenty of food and water'. But I am like, isn't that a mixed message? Because I am either saying it's your pets last meal, or it's not really that bad and you don't need to go"¹. This analogy is resounded in Kajiwara's book, with authorities giving conflicting safety advice about the levels of radiation that lead to people illegally staying in radiation exclusion zones to be with their animals.

Any good book will have limits imposed on its scope to ensure it is manageable to write as well as read, so it is unrealistic to expect every potential issue to be explored. I would suggest it adds to views by Heath and Linnabary (2015)² that the root cause of animal welfare in disaster is due to a weak animal management system and overpopulation. The other two issues that appear omitted were the impacts on disability assistance (service) dogs and whether any human fatalities or radiation sickness were due to people taking measures to protect animals.

This book highlights that emergency managers can do better. Animal disaster management policies and guidelines need to be strengthened with laws and resourced to give effect. There needs to be greater collaboration at the international level to share lessons identified and in a more sustainable fashion.

1. Fugate C 2019, *Animal Evac NZ at Parliament presenting animal disaster law report*. At: www.animalevac.nz/lawreport/ [2 June 2019].
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Conference preview: research, insights and case studies to feature at AFAC21

Molly Price

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After being postponed in 2020, the AFAC21 conference returns to Sydney with an exciting program, running in partnership with the Australian Disaster Resilience Conference and the Institution of Fire Engineers Australia National Conference.

The AFAC21 program will respond to the theme ‘Balancing impact and expectations’, focusing on managing the consequences of major events, while meeting the expectations of the community and government. A range of expert presenters will explore how the emergency management sector can continue to learn and find opportunities to deliver with new and innovative approaches.

Commencing with the AFAC Research Day, the program will include presentations about the value of research, based on a study from RMIT University and Strahan Research, and insights into the new Australian Climate Service presented by Bronwyn Ray.

The concurrent stream program will cover a range of topics including cultural partnerships, workforce and capability, risk, prediction and modelling, recovery and wellbeing, evacuation and communications.

Delegates will participate in combined plenary sessions with keynote speakers including: Australian of the Year, Grace Tame; ABC’s International Affairs Analyst, Stan Grant; Senior Counsel Assisting the Royal Commission into National Natural Disaster Arrangements, Dominique Hogan-Doran SC; and Commissioner of Resilience NSW, Shane Fitzsimmons AFSM.

Following their presentations, speakers are invited to the AIDR Knowledge Centre in the exhibition for the Meet the Speaker program. The program offers an opportunity for attendees to learn more from presenters and expand their networks. The Centre also houses the extensive collection of conference posters. The exhibition will feature the latest in equipment and technology to support the work of fire and emergency services and will host an exciting live demonstration and Expo Stage program.

The Australian Disaster Resilience Conference will bring together delegates from a range of sectors to share knowledge and build connections for a disaster resilient Australia. Centred on the theme ‘Meeting in the middle: community voices and complex choices’, the program will generate national conversation about local impact, community engagement in disaster resilience and decision making to reduce risk.

For the first time, the Australian Disaster Resilience Conference will expand to 2 concurrent streams. Presentations will cover issues of resilience policy and strategy, children and youth, the business of resilience, place-based resilience, disaster risk reduction, disability inclusion, recovery, resilience through collaboration, community leadership and engagement in action. Running as a concurrent stream, the Institution of Fire Engineers conference will focus on ‘Shifting the culture: enhancing safety, sustainability and resilience’. The program is approved as a continuing professional development event for members of the Institution of Fire Engineers.

The final day of the conference is dedicated to professional development, including workshops, field trips and the National Recovery Forum, hosted by the Australian Institute for Disaster Resilience.

AFAC21 powered by INTERSCHUTZ will take place at the International Convention Centre in Sydney on 5–8 October. Explore the full conference program and register at www.afaconference.com.au

The 2021 Australian Disaster Resilience Conference will be held on 6–7 October. View the program and register at www.aidr.org.au/adrc.

Promoting owner responsibility for pets in disasters

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Abstract

The issue of managing animals in the disaster context is well recognised in both research and practice. Complex human-animal relationships affect decision-making and behaviour, which can delay or prohibit effective emergency response and evacuations and motivate premature returns to unsafe conditions. The desire to safeguard animals in an emergency situation can ultimately result in human fatalities. There is extensive literature regarding the management of vulnerable wildlife or agricultural stock during hazardous events, yet the care and protection of companion animals and pets, particularly in higher-density urban environments, continues to represent a significant challenge. Emergency management arrangements in Australia identify formal roles and strategies for response organisations and agencies, however, in a legal and policy perspective, individual pet owners ultimately retain responsibility for the care and welfare of their animals. Consistent with a 'shared-responsibility' approach, individuals and households should be proactive in planning and making arrangements for their pets in an emergency. An online survey of Townsville residents was conducted to investigate pet ownership patterns, the extent of pet-inclusive disaster management planning and any identified issues in preparing and planning for companion animals in an emergency. Survey results showed that the majority of pet owner respondents were uncertain or underprepared. This paper considers existing literature and presents the survey findings to

provide recommendations for greater community awareness and self-sufficiency. The aim is to encourage pet-inclusive disaster management planning - particularly evacuations of pets.

Introduction

Disaster events continue to demonstrate that a failure to adequately account for animals can endanger human life. The desire to protect animals in a disaster, whether for intrinsic value, economic value or attachment, can affect decision-making, behaviour and psychological responses that present risks to human safety, health and, ultimately, recovery efforts (Australian Animal Welfare Strategy 2014, Day 2017, Taylor 2019). To reduce the potential adversity associated with protecting or saving animals many governments and emergency response agencies actively incorporate animal management within disaster management planning.

The context, variability and type of human-animal relationships compounds the difficulties in implementing consistent and effective animal-inclusive disaster management strategies. Specific policies, frameworks and resources can also vary between government jurisdictions and stakeholders. Urban built environments with varying hazard risks, heterogeneous communities and diverse pet ownership present practical and logistical challenges for emergency management authorities. Consistent with the concept of 'shared responsibility' promoted in Australia's *National Strategy for Disaster Resilience* (COAG 2011), there is capacity for pet owners to be proactive and engaged in understanding the risks and making appropriate arrangements for their animals during emergencies and disasters.

Animal in disasters

In developed, industrialised, high-income countries such as the USA, Canada, New Zealand and Australia, the literature on animal management

in disasters broadly reflects 3 complex and dynamic contexts (although these are not mutually exclusive):

- Wildlife and animals in natural habitats (terrestrial, aquatic, marine) comprise issues of animal safety, protection, exposure, vulnerability, sentiment, rescue, rehabilitation and the intrinsic value of sentient beings.
- Livestock, commercial, agricultural, farm and production animals primarily have an economic, functional or livelihood value.¹
- Companion animals, pets, domesticated animals (with service/assistance animals a subset within this) encompass animal guardianship, ownership, emotional connection, attachment bonds, care and responsibility.

Each of these contexts has implications on the way people react during a high-risk hazard event. However, for emergency services organisations, the protection of human life is the highest priority over potential environmental, economic or animal losses. People who risk their safety for the welfare of animals remains a significant emergency management issue.

There has been extensive research conducted to understand the diverse and complex human-animal relationships and associated psychological and behavioural responses to hazards. However, in Australia, there remains a limited appreciation of the capacity of individuals or households to proactively reduce the risks. Effective disaster management and resilience relies on understanding the issues to develop an effective approach.

Animal disaster management in Australia

Following devastating losses associated with the Victorian bushfires in 2009, Australian states and territories resolved to integrate animal management within government and organisational disaster planning arrangements (Australian Animal Welfare Strategy 2014; Taylor, Eustace & McCarthy 2015). Although the National Planning Principles for Animals in Disasters (Australian Animal Welfare Strategy 2014) advocated for a 'collaborative and proactive approach to the integration of animals into disaster management planning across all jurisdictions and communities' (p.2), there is still no consistent, national policy or formal procedures for managing animals during emergency events.

A review of relevant state and territory legislation reveals a number of issues and inconsistent guidelines, particularly in the case of human evacuations with companion animals (White 2012; Taylor, Eustace & McCarthy 2015; Best 2019). In some states, pets are accommodated with their guardians under formal human relief and evacuation shelter arrangements (although this may be limited to small animals). Other authorities and agencies may designate pet-specific evacuation sites, provide appropriate pet-friendly trailers in close proximity to human shelters or give recommendations for animal-suitable housing. In contrast, in some locations, the evacuation, safety and sheltering of pets

1. Animals in zoos, sanctuaries and laboratories are variably considered within wildlife, commercial and/or educational contexts.

during emergencies is considered the responsibility of the owner. Given the varied contexts and capacities, people who own animals are encouraged to seek advice from local authorities for up-to-date information specific to local circumstances (RSPCA 2020). The Australian Animal Welfare Strategy (2014) acknowledges that the majority of people in Australia believe that formal emergency management arrangements include the welfare and care of pets and other animals.

In spite of such community expectations, from a legal and policy perspective, pet owners retain a duty of care and responsibility for their animals as they are considered 'personal property' (Best 2019, White 2012). Consistently, most formal disaster management arrangements are premised on the idea that people (whether owners, guardians or carers) will cater for their animals in an emergency event, including evacuation (White 2012; Australian Animal Welfare Strategy 2014; Taylor, Eustace & McCarthy 2015). While government agencies, emergency services organisations and non-government organisations maintain a protective and supportive role, pet owners and carers should plan to be self-sufficient where possible. Research by Day (2017) and O'Dwyer and Thompson (2018) found that the desire to save companion animals from disasters can positively influence preparedness, response and evacuation behaviours. Proactively engaging pet owners in planning for emergencies has the potential to reduce risk and make communities safer, adaptive and resilient.

Challenges to planning

The Bushfire and Natural Hazards Cooperative Research Centre 'Managing Animals in Natural Disasters' project (Taylor 2019) has made significant progress. However, companion animal disaster management is still an emerging area of investigation and research (White 2012; Taylor, Lynch, Burns & Eustace 2015). Related literature (in English language) identifies some recurrent issues and challenges:

- Ambiguity in formal definitions of what constitutes (or is accepted) as a pet or companion animal.
- A high pet ownership/human-to-pet ratio, particularly in developed/industrialised countries and urban environments.
- The complexity of pet ownership in reference to quantity, types and composition.
- The emotional strength of the human-animal relationships and attachment bonds.
- Ad hoc community hazard awareness of planning, preparedness and evacuation behaviour.
- Individual/household logistics such as the capacity to transport and evacuate all pets.

Although the terms 'companion animals', 'pets' and 'domesticated animals' are often used interchangeably in the literature, the parameters or distinctions used to define a pet for legislative and policy purposes can have implications for formal shelter and evacuation arrangements. Standard definitions include a level of animal domestication, close proximity to households and a degree of companionship. The policy position

of the American Society for the Prevention of Cruelty to Animals (ASPCA) is that companion animals 'should be domesticated or domestic-bred animals whose physical, emotional, behavioural and social needs can be readily met as companions in the home, or in close daily relationship with humans' (ASPCA 2021). In contrast, the Victorian Emergency Animal Welfare Plan (DJPR 2019) defines a companion animal as 'any non-human vertebrate animal kept for the purpose of companionship, recreation, protection or work' (p.4). These definitions are primarily intended to differentiate companion animals from wildlife or livestock. However, inconsistency can create public uncertainty over which animals will be accommodated under evacuation arrangements and this may adversely affect an individual's planning and actions. Service and assistance animals have a separate legal provision with special dispensation.

More than half the world's households are thought to contain at least one pet or companion animal (Thompson 2018). Effective planning and protection for both guardians and their animals in a disaster event represents a significant challenge for authorities. In addition to human needs, pets also require sufficient food, water, bedding, medication and first aid (where necessary), toileting and cleaning supplies, equipment (e.g. bowls, leads, harness, toys and carriers), identification, adequate transport and shelter arrangements (RSPCA 2020). In evacuation or relief shelters where animals may be kept in close proximity to other animals and/or humans, there are further concerns about safety, public health, the provision of care, appropriate vaccinations and the potential for transmittable diseases (between animals and zoonosis).

Taylor (2019) found that pet ownership levels in Australia are among the highest in the world. Hannink (2020) estimates almost two-thirds (62 per cent) of people in Australia own at least one pet including dogs, cats, fish, birds, horses and other animals. As over 40 per cent of people surveyed (Hannink 2020) indicated they had more than one type of pet, effective disaster planning and logistical arrangements become increasingly complicated. Greater quantities and diversity of companion animals increases the magnitude of hazard risk (Taylor, Eustace & McCarthy 2015). While the onus of responsibility is with pet owners and carers, a high pet-human ratio can create issues for evacuations and the physical management of official shelters in a disaster event.

A significant amount of the available research and literature about pets in disasters is dedicated to the attachment bond or emotional strength of the human-companion animal relationship (White 2012, Day 2017, Taylor 2019, Thompson 2018, Trigg *et al.* 2015). Pets have been described by their owners as valued family members, companions, partners, friends and a source of happiness, comfort and wellbeing. As many people consider themselves inseparable from their companion animals, this relationship can have a direct influence on their actions during an emergency, particularly decisions to stay or go (Taylor 2019, Trigg *et al.* 2016). Day (2017) found that pet ownership can influence risk behaviour and decision-making and may cause adverse psychological symptoms due to the event (the stress of caring for or keeping pets captive, losing or abandoning pets,

leaving animals behind, setting animals free or just general worry). In cases where owners have evacuated without their pets, many take unnecessary risks to return to hazardous areas to rescue or recover animals. Travers, Degeling and Rock (2017) found that injury or loss of companion animals during a disaster can result in high levels of acute stress, depression, posttraumatic stress disorder and dissociative experiences that impede response and recovery efforts. Detailed, proactive pet-inclusive disaster management planning and early enactment could mitigate such adversity (Taylor, Eustace & McCarthy 2015; Taylor 2019).

To reduce ad hoc responses and unnecessary risk exposure during a hazard, the Australian Government (2014) advocates for communities to 'be prepared, act early, be considerate and act safe'. Disaster and hazard preparedness information with supplementary ways to plan for pets is publicly available from veterinary clinics, government agencies, local councils and emergency services organisations. While online website access and the availability of advice on social media platforms is increasing, traditional methods such as brochures, pamphlets, television and radio are still used to communicate and disseminate advice. Initiatives such as the Blue Mountains Animal Ready Community has developed extensive resources, guides and networks that support pet owners in communities to be prepared and empowered (Patch 2021). Despite the availability of such resources and guidance, the majority of households still lack adequate pet-inclusive disaster planning (Thompson 2018; O'Dwyer & Thompson 2018; Taylor, McCarthy & Brigelow 2018).

Taylor and co-authors (2015) investigated pet owner behaviour in hazard events in Australia and found over 35 per cent of respondents self-reported limited or no emergency planning and a further 48 per cent indicated they were 'somewhat' prepared. In respect to evacuation behaviour, only 70 per cent of respondents who were advised to leave complied with the direction and many were unwilling to leave pets behind. Approximately 15 per cent of those who evacuated did leave animals at home (either deliberately left, set free, escaped or were unable to catch in time to evacuate). In some cases, family members or carers stayed to protect their animals while the remainder of their household evacuated. Similar results were found in a community in the Blue Mountains, NSW, which had previously experienced severe bushfire disaster (Taylor, McCarthy & Brigelow 2018). Although not all hazards, events or animals require the same type of planning, a failure to prepare can create unnecessary risks and adversity before, during and after an event.

It is recognised that the type of pet, hazard and accessibility can influence decisions to evacuate (Travers, Degeling & Rock 2017). The RSCPA (2020) recommends owners consider different pet-friendly destinations and evacuation locations prior to an event happening. These options include the homes of friends and family outside the risk area, identifying boarding facilities and animal care centres, pet-friendly accommodation or official evacuation centres and facilities where pets are permitted. Taylor, Eustace and McCarthy (2015) note that effective

pet evacuation planning should consider both the time and capacity to evacuate animals in high-stress situations including appropriate transport, sufficient provisions, accessibility and contingency plans. Day (2017) and Thompson, Trigg and Smith (2017) indicate that the capacity to evacuate with pets may be a greater issue for vulnerable and low socio-economic sectors of the community. Taylor, Eustace and McCarthy (2015) indicate that less than 20 per cent of respondents were 'very prepared' for a disaster with a written plan that included pet arrangements. If not addressed, the complex issues of pet diversity, quantities, composition, owner attachment and insufficient disaster planning can create unnecessary risks in the advent of a disaster.

Case study: Townsville

With limited empirical data regarding pet-inclusive disaster management in the Australian urban, multi-hazard context, an exploratory study was undertaken in consultation with the local Townsville City Council to investigate pet ownership patterns, levels of community emergency preparedness for animals and any identified issues in preparing and planning to self-manage pets during a disaster event. Townsville has experienced cyclones, flooding and bushfires over the past decade and emergency planners recognise that evacuation shelters do not have the mandate to accommodate pets and many residents have been unwilling to leave pets behind (Gurtner & Vachette 2017).

Townsville is a city on the north-east coast of Queensland with a population of approximately 180,000 at the time of the survey (TLDMG 2018). It is the largest urban centre north of the Sunshine Coast and is considered a regional location with a mix of urban and peri-urban residential development. While

only dogs and cats are required to be registered with council (TCC 2018), pet variety and ownership rates within the city are reported to be relatively high by both the RSCPA and the local council animal management. High-risk hazards such as cyclones, storm surges and flooding are common and many residents only live in Townsville for a few years depending on education, military or work commitments. More transient populations such as tourists and visitors also frequent the local region with their pets. With such a heterogeneous population, local hazard awareness, planning and hazard experience can be highly variable. In addition to a desire to have all residents 'Plan. Prepare. Survive' (TLDMG 2018) the council recognised a specific need to promote better pet-inclusive planning at the individual and household levels. A survey was designed to assess existing community capacity and to inform the development of public communication and engagement activities.

The online survey comprised 15 questions covering suitability criteria, geographic location, dichotomous yes/no queries and open-ended responses to assess pet profiles, levels of disaster preparedness, evacuation arrangements and general pet-inclusive disaster planning and awareness. To meet study inclusion criteria, respondents had to be local residents (verified by postcode), pet owners and over the age of 18 at the time of completing the survey. The survey was administered using SurveyMonkey™. A link to the survey with an invitation to participate was distributed using a combination of social media (predominantly Facebook), other online platforms, posters and flyers at local pet stores and vets as well as local newspaper feature article. The link on social media was reposted by a number of animal interest groups and similar special interest pages. Data were collected over a 3-week period (8 August to 1



Families and loved pets share a makeshift evacuation space during wild weather and floods in Townsville in 2019.

Image: Allison Thomson

September 2018) with an average reported completion time of 5 minutes.

This research and the survey received prior approval from the James Cook University Human Research Ethics Committee (Approval Number: H7447).

A total of 242 local pet owners responded to the survey. Consistent with most online surveys, respondents self-assessed and reported their circumstances. As an anonymous survey there was limited capacity to verify or cross check responses. In terms of pet ownership complexity, this sample of Townsville residents recognised issues regarding species variety, quantity and mixed household pet composition. Figure 1 illustrates the diversity of companion animal types including dogs, cats, birds, fish, horses (deer and goats) and reptiles. However, a number of respondents also collected and bred invertebrates as pets. Over 80 per cent owned dogs, 39 per cent had cats and a further 15 per cent had fish and/or birds (9 respondents did not specify the types of animals owned). In respect to issues of quantity and composition, numbers of personal pets varied from a single animal to hundreds of fish as well as birds and rodents. Almost 60 per cent of respondents reported having only one type of pet, 25 per cent had two types and 18 per cent had 3 or more (up to 8) pet varieties.

A number of questions related to household disaster kits (with minimum provisions for 3 days) and an appropriate evacuation plan. Nearly half (42 per cent) of respondents indicated that they did not have a household disaster kit and/or evacuation plan. Of those respondents who reported having disaster plans, only 39 per cent included contingencies for the evacuation of all their pets. If there was limited warning time to evacuate, respondents would not have adequate personal supplies nor transport for all their pets. This was evident in one survey participant’s extended comment:

I have a disaster kit with food for me and my pets (my dogs, the hand raised birds, mouse) and some of their accessories, I have a tent that I can pack into the car quickly and I plan to go to my sister’s house in Oak Valley if I had to be able to evacuate. I’d try to take as many of them with me if I could. I wouldn’t be able to evacuate all of them though if there was little warning time to evacuate, I think I may end up leaving some behind like the fish and birds which would be hard to catch and put in a travel cage :(

(Survey response)

In contrast to these low levels of household disaster preparation and pet planning, approximately 95 per cent of respondents

Reported animal and pet ownership (n-242).

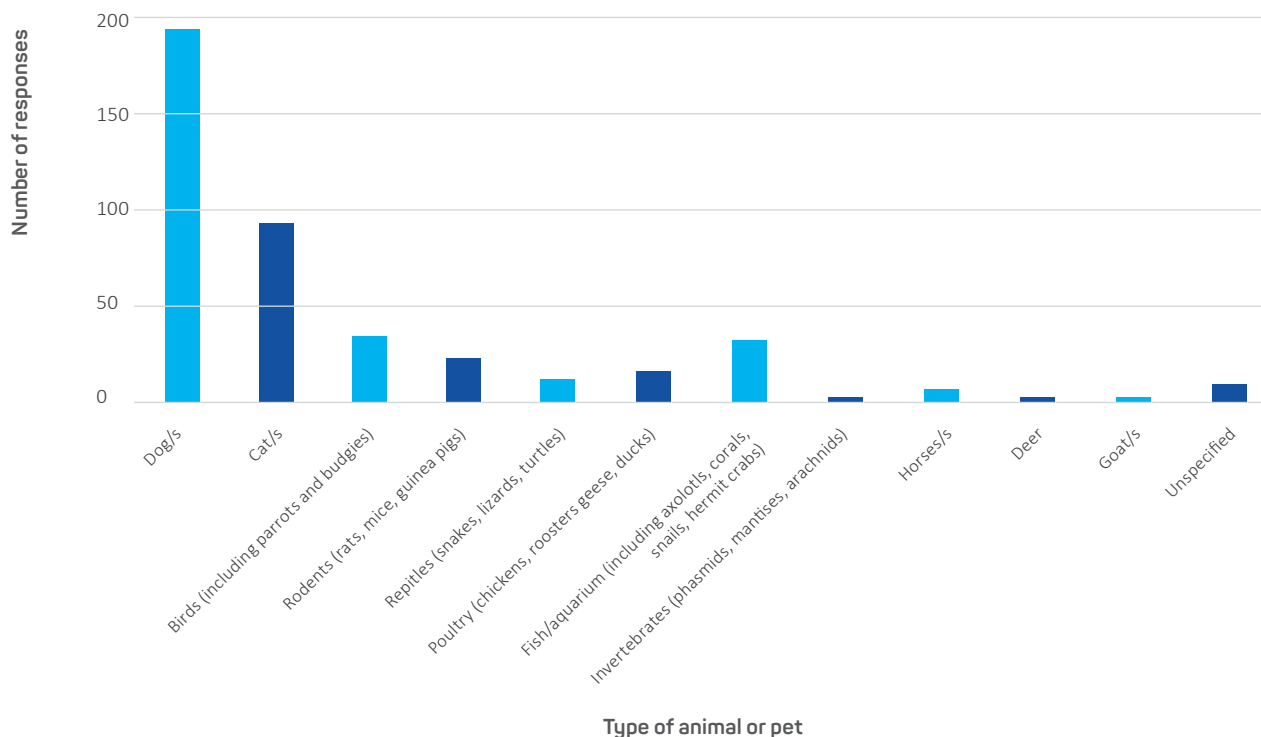


Figure 1: Self-reported pet ownership in Townsville, Queensland.

still believed they had the capacity to evacuate all their pets in a disaster event. Only 12 people said ‘no’ or they were ‘uncertain’ to this question. While 91 per cent indicated they would not be willing to leave pets behind, 5 per cent indicated they did not have their own mode of transport and/or required regular external mobility support, thus limiting their capacity to self-evacuate. Additional social and economic constraints or vulnerabilities were not considered in this research.

For pet-inclusive evacuations, there was significant variability regarding planned locations, awareness of local options and where to source relevant information or advice. In the advent of a directed evacuation, 17 per cent of respondents planned to stay and ‘shelter in place’, with a further 24 per cent uncertain or contingent on the hazard situation. For those more predisposed to evacuate, intended destinations included friends and family, hotel accommodation, inland or distant locations away from the hazard risk and official evacuation centres or specified locations. Of those surveyed, 71 per cent indicated they were uncertain whether local government shelters allowed for pets and almost 4 per cent erroneously believed that companion animals were allowed. Consistent with this confusion and uncertainty, 61 per cent claimed they did not know where to source credible information about planning for pets in disasters.

The survey sample size was small, but despite limitations regarding the scope and narrowness of the survey, the results highlight recognised issues regarding the diversity of Townsville pets and pet ownership, the limited extent of household hazard preparedness and an apparent overestimation of self-reported capacity to evacuate with all companion animals. This sample of pet owners suggests that residents are underprepared to independently ensure the safety of their companion animals in an emergency situation. The case study of Townsville confirms many of the established challenges in pet disaster management planning, indicating further collaborative effort is required by authorities to help owners share responsibility and be self-sufficient.

Recommendations

Research by Day (2017), Thompson (2018), O’Dwyer and Thompson (2018) and Taylor (2019) posit the ‘pets as a protective factor’ principle in which companion animal guardianship can actually motivate owners to connect and be proactive in disaster risk management planning, through education, behaviour change and improved marketing and communication strategies. While friends, family and supportive networks remain an important resource, it is suggested that focusing on individual disaster preparedness ‘for the sake of your pet’ will deliver better engagement for planning for pet evacuation and self-reliance that will, in turn, yield higher human survival rates (Thompson 2018). This has been the central premise for the Animal Ready Communities project (Patch 2021).

The efficacy of any related strategy is premised in consistency, unilateral commitment, increased collaborative partnerships among all relevant stakeholders, and the strengthening of communication and messaging approaches (Trigg *et al.* 2015, Taylor 2019). At the local level, a practical approach to promote

and increase individual guardian awareness, knowledge and responsibility for pet-inclusive disaster management would be the distribution of relevant information among a targeted ‘community of interest’. Possible avenues to proactively provide information and education include:

- council pet registration and renewal notices
- registration for licensed pet breeders and animal handlers
- pet microchipping
- pet insurance
- registered pet-related businesses and organisations (e.g. pet stores, veterinary clinics, animal welfare organisations and shelters, animal boarding facilities, groomers, pet sitters and walkers)
- local community events and schools
- targeted media campaigns (both online and traditional media) to leverage existing groups and campaigns.

While a targeted communication approach remains relatively feasible and resource and cost efficient for relevant authorities, further research would determine the extent that the provision of such information translates into increased household pet-inclusive hazard planning and changed behaviours. Informed communities is only the first step to increasing disaster resilience.

Conclusion

Although the challenges of pet-inclusive disaster management are well established, there is still limited literature, research and empirical evidence available in the Australian context. With high levels of local pet ownership and the influence of complex, human-animal attachment bonds, there are significant concerns about responsibility and household capacity to respond safely and appropriately in an emergency. A case study of Townsville pet owners found that few residents included pets in household disaster management planning, with limited knowledge of recommended strategies. While all levels of government, emergency services organisations and stakeholders have a role in emergency management, it is considered a shared responsibility. As animal guardians have the legal responsibility and ‘duty of care’ for their companion animals, there is an expectation that individuals and households must become more aware, proactive and self-sufficient.

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Do no harm: a challenging conversation about how we prepare and respond to animal disasters

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Abstract

What if people responded to disasters to help animals, but their responses created unintended negative animal welfare outcomes or unnecessary barriers for future responses? The axiom of ‘do no harm’ is well established within the humanitarian aid community, however, it is an approach that is not well articulated in the emerging discipline of animal disaster response. This paper discusses the challenges for responding to animals affected by disaster events, the delegitimisation of animal rescue and how some response actions can have long-term negative effects on animal welfare. Recommendations are provided to create credible and sustainable responses into the future.

Introduction

The emerging field of animal disaster science continues to expand in both interest and research. Societal attitudes have changed in recent times with animals afforded more consideration given the human-animal bond that has been well established (Heath 1999, Irvine 2009, Sawyer & Huertas 2018). However, this growth has also given rise to the number of individuals and organisations wanting to help animals affected by disasters, which, though morally applaudable, may have unintended negative consequences for animal welfare (Green 2019). The aim of this paper is to highlight current practices that may contribute to undermining the role that animal disaster response organisations play. As such, corrective actions can be taken to improve coordination and emergency management organisations can maintain operational confidence that should lead to better human and animal welfare outcomes.

Do no harm

The paradigm of responding to emergencies and disasters to help but actually causing harm is well understood in the humanitarian sector. In 1999, Mary Anderson, a globally respected expert in humanitarian interventions, published *Do No Harm: How aid can support peace or war*, which has become the founding text for this approach (Anderson 1999). This followed the 1999 United Nation’s General Assembly Resolution 46/182 that created the first 3 core humanitarian principles, being humanity, impartiality and neutrality. In 1992, the *Code of Conduct for the International Red Cross and Red Crescent Movement and NGOs in Disaster Relief* was drafted and in 1994 it was adopted. In 2004, the fourth core principle of independence was added by the United Nations General Assembly. The 4 core humanitarian principles were solidified as humanity, impartiality, neutrality and independence. Since it was launched, more than 600 organisations have signed the code, including a few animal disaster response organisations such as World Animal Protection, the Society for the Protection of Animals Abroad and Animal Evac New Zealand (International Federation of Red Cross and Red Crescent Societies 2020). The code provides globally accepted ground rules for humanitarian responses, both in disasters and complex emergencies. The voluntary code enshrines the 4 core humanitarian principles as well as providing further expectations of:

- building disaster response on local capacities
- involving program beneficiaries in the management of aid
- reducing vulnerabilities to future disasters as well as meeting basic needs
- accepting accountability
- recognising disaster ‘victims’ as dignified human beings and not hopeless objects.

The humanitarian system is largely guided by the standards established by Sphere (formerly the Sphere Project). The Sphere handbook includes universally accepted minimum standards for humanitarian response, a Humanitarian Charter that is based on the Code of Conduct, protection principles and 4 technical chapters (Sphere Association 2018). Through the recognition that livestock play an important role in livelihoods of communities, a companion document to the Sphere handbook—the Livestock Emergency Guidelines & Standards (LEGS)—provides international guidelines and standards for the design, implementation and assessment of livestock interventions to assist people affected by humanitarian crises (Sphere Association 2018). However, LEGS focuses on livestock protection in less-developed countries and is not generally suitable for other disaster situations involving commercial farms, wildlife or companion animals.

The humanitarian imperative to ‘do no harm’ in an emergency context is often defined as ‘to avoid exposing people to additional risks through our actions’ (Charancle & Lucchi 2018, p.16). This definition is anthropomorphic and fails to consider the needs and sentience of animals. Bekoff and Pierce (2016) link the axiom of ‘do no harm’ to animal sentience and argued the ‘need to shift from welfarism to a more compassionate moral framework’ (p.3). However, no literature could be found that applied the ‘do no harm’ axiom to the context of animal disaster management. In contrast to the lessons learnt in the humanitarian space, the animal disaster management space lacks any equivalent code of conduct nor similar principles at a global level. To provide some context, the do-no-harm approach includes 4 categories namely: negative effects on the rights of beneficiaries, negative effects on the function of communities and relationships between local and national actors, negative effects on the local economy and livelihoods and the negative effects on the environment.

Examples of negative affects covered by the do-no-harm approach in the context of animal disaster response include:

- oversupply of imported milk powder as part of foreign aid decimating against the local dairy providers (J Thomas, personal communication, 2021)
- restocking of buffalo in Myanmar following Cyclone Nargis without adequate health checks leading to animal disease outbreaks and stock losses (Sawyer & Huertas 2018, p.7)
- providing temporary animal-only shelters using volunteers rather than animal owners taking responsibility that lead to animal stress, reduced enrichment and reinforced unscalable or sustainable approaches (Glasse & Anderson 2019) as well as taking away economic recovery opportunities from affected local businesses
- absolving responsibility from mandated organisations by undertaking their functions and leaving them less accountable (Glasse & Anderson 2019)
- creating dependency and expectation of future response that reduces community-led resilience
- providing response interventions that are not scalable and sustainable causing future vulnerabilities

- failing to document and share lessons from responses so that future responses can improve animal welfare outcomes (Glasse, King & Rodriguez Ferrer 2020)
- failing to reduce vulnerabilities to future disasters such as providing interventions that address a ‘weak animal health infrastructure’ as referred to by Heath and Linnabary (2015) as the root cause to animal disasters
- displacing local capacity with external resources leading to resentment and disempowerment
- delegitimising animal disaster response.

Delegitimisation of animal rescue

The delegitimisation of animal rescue can be defined as the:

Sub-optimal response by animal interest groups who respond to assist animals in emergencies or disasters in an unsafe or illegal manner, which consequently makes it more difficult for bona-fide emergency animal rescue groups to be accepted and used by authorities and the community in future interventions.

Aside from potentially putting human lives at risk, delegitimisation has negative effects for animal welfare through eroding trust between the animal response community and emergency services organisations. Ultimately, this loss of trust and confidence may lead to animal protection in disasters being considered a hinderance rather than an opportunity to improve human and animal safety. Studies have shown that humans do place themselves at risk for the needs of animals, such as breaching cordons to attend to their animals or failing to evacuate if they are unable to take their animals (Heath 1999; Heath *et al.* 2001; Irvine 2009; Glasse 2010, 2019; Glasse & Wilson 2011; Potts & Gadenne 2014; Taylor *et al.* 2015; Travers, Degeling & Rock 2017; Sawyer & Huertas 2018; Green 2019).

During the bushfires in Australia in the summer of 2019–20, the loss of 3 billion animals (World Wildlife Fund 2020) gained global attention, as well as responses from domestic and international animal interest groups. Such groups, formally or informally, identify as ‘animal rescue’, however, in the disaster response context, this is confusing and misleading to emergency service organisations. These groups use the term ‘animal rescue’ whereas it might be more appropriate if ‘animal care’, ‘welfare’ or ‘rehoming’ were used. The use of ‘animal rescue’ undermines the credibility of emergency services organisations that rescue animals and may regard the term ‘rescue’ as an embellishment of capability.

Although community resilience includes building community capacity and self-reliance, there needs to be a setting of standards for training and equipment to safeguard those working in and around disasters. Craig Fugate, former Administrator of the Federal Emergency Management Agency (FEMA), acknowledges the need for the emergency management sector to see and to value the public as being part of the solution and not the problem (Fugate 2019). Communities can and should be encouraged to create formal and semi-formal networks or response capability as part of developing disaster-resilient communities.

Unfortunately, the lack of animal-inclusive emergency management planning results in animal interest groups responding to disasters without appropriate authority, training or equipment as observed by Glassey and Anderson (2019) in the Nelson fires. Even animal interest groups that have a focus on animal disaster response have been found wanting, such as during the summer bushfires where promotional videos showed personnel working with flames and smoke around them (Humane Society of the United States 2020a) and also without basic protective equipment (Humane Society of the United States 2020b, 2020c). The wearing of flame-retardant apparel, safety boots, helmets, goggles and gloves is a rudimentary requirement for working on firegrounds as, even days and weeks after the fire has gone through, vegetation and underground fires are common and create a risk for personnel to step or fall into (KPTV Fox 12 Oregon 2020). The risk of branches and trees falling during and after fires remains a risk and requires helmets to be worn. The use of videos or pictures showing people from animal interest groups not adhering to basic safety requirements delegitimises animal rescue and reduces the level of confidence and trust in emergency services organisations.

Another aspect of delegitimation of animal rescue occurs where animal interest groups respond to an emergency and purport pre-existing animal-welfare issues as being caused by or related to the event. This could include taking footage of stray animals in a damaged city and suggesting the animal was in need of rescue when it was, at that time and prior to the disaster, a stray animal, or showing dogs without kennels or being chained up following floods when the dogs were in these conditions prior to the flood. The flooding exposed these vulnerabilities but was not the cause of animal welfare issues. It is argued that prevention is better than post-event response and animal interest groups wanting to reduce animal vulnerability to disasters could focus efforts on mitigation and strengthening weak animal health infrastructure to make a sustainable impact on improving animal welfare.

Legitimising animal rescue

Despite the many observations of delegitimation, there are also examples of activities that have legitimised animal disaster management activities including rescue. It is reasonable to assume that these activities strengthen public confidence and build trust and credibility with emergency services organisations. This enables animal disaster response organisations to be deployed and undertake safe and competent animal rescue, which results in improved animal welfare outcomes and community safety. Before a response phase, a number of legitimising actions can be taken, for example:

- working with emergency services managers to be listed as a formal partner in emergency management plans (McCarthy & Taylor 2018) as done by South Australian Veterinary Emergency Management
- improving rescue standards such as seen in the USA with the addition of NFPA 1670 Standard on Operations and Training for Technical Search and Rescue Incidents (National Fire Protection Association 2014)

- developing and appointing incident management tactical (United Kingdom) and technical advisers (New South Wales) for animal and wildlife rescue
- classification of response assets (teams, equipment and training) also known as resource typing for animal rescue as developed by FEMA (Green 2019, p.171)
- ensuring all animal disaster responders are trained in and apply the locally prescribed incident command system (Sawyer & Huertas 2018, p.44; Green 2019, p.13).

In effect, legitimisation of animal rescue includes adopting and using the same terminology, training and systems as the human rescue framework where possible. This builds recognition and confidence in emergency services organisations, which gives authority to effect animal rescue and delivers associated improved animal welfare outcomes.

The actions of emergency services personnel helping animals during disasters are often met with overwhelming public interest and support. There is increased acceptance that where there is no direct risk to human life rescue efforts should include animals. In the USA, it is common for FEMA urban search and rescue task forces to bring out companion animals from disaster-struck areas, and they are funded for such tasks (Fugate 2019). While the USA has learnt through catastrophic events such as Hurricane Harvey and has put in place federal law (*Pet Emergency Transportation and Standards Act*) to allow companion and service animals to be rescued during disaster, the same cannot be said for other countries. In Australia and New Zealand, emergency services organisations often use images of their personnel saving animals in their publicity that appears to legitimise animal rescue. However, such commendable actions do not reflect that the organisation has little to no responsibility for animal rescue. Often, other government entities are responsible but are under resourced and not integrated sufficiently to provide timely responses (M Taylor, personal communication, 2021).

Good practice emergency management extends to the post-incident actions of response agencies including debriefing, after-action reporting and corrective action planning, which form part of a lessons management process. However, there is little obligation to debrief nor to produce after-action reports. Where reports are written, they are usually not shared or are centrally located, which means those lessons are lost (Glassey 2011). The lack of after-action reporting means the lessons from one event may not prevent future negative consequences. In a comparative analysis of the 2017 Edgumbe flood and 2018 Nelson fires by Glassey, King and Rodriguez Ferrer (2020), only 7 per cent of lessons identified were indeed learnt from one event to the next. As a result, the Global Animal Disaster Management Conference plans to establish the Global Lessons from Animals in Disasters Information System (GLADIS) to allow after-action reports to be shared online and internationally.

Recommendations

This paper explored the concept of ‘do no harm’ in the animal disaster management context. This highlights the potential

divide between this evolving discipline and the humanitarian and disaster management frameworks. To improve integration and acceptability, it is recommended the legitimisation of animal rescue be reinforced. More work is needed to mainstream animal disaster management within existing arrangements where possible, rather than create new or duplicate systems:

1. Traditionally human-centric emergency management entities such as fire and rescue services be encouraged to lead and coordinate animal rescue as a core function, with the support of agricultural, wildlife, veterinary and animal interest groups. This could lead to entities such as the Australasian Fire and Emergency Service Authorities Council creating an Animal Disaster Management Working Group to build interoperable response capacities, and having the United Nations International Search and Rescue Advisory Group consider technical animal rescue within the team typing and search marking systems (Glasse & Thompson 2020). The function of animal disaster rescue is an operational role and should be coordinated by those managing the operations of the event to permit coordination, improve response efficiency, reduce duplication of effort and use credentialled animal disaster responders as a force multiplier to human-centric rescue capacities (Glasse & Thompson 2020).
2. The Code of Conduct (IFRC 2020) should be revised to be inclusive of animal disaster response organisations and recognise the importance of animals to communities. This would be consistent to their progressive efforts in pushing animal welfare as a core component of humanitarian and development actions (Sawyer & Huertas 2018, p.29). Animal interest groups should be signatories to a revised animal-inclusive code of conduct.
3. Creating a global framework for accountability across animal disaster response including animal interest groups and government. A global index could be developed with animal disaster management metrics to allow for useful comparison of country performance in this area. This comparative tool could be similar to that of the World Animal Protection Animal Protection Index and state-level assessments carried out by the American Society for the Prevention of Cruelty to Animals 'National Capabilities for Animal Response in Emergencies' program (Spain *et al.* 2017).
4. Animal interest groups working in disaster response should actively pursue mainstream emergency management training and qualifications such as incident management, bushfire safety, flood safety, urban search and rescue awareness and first aid. Additionally, legitimacy could be evident with professional qualifications such as the Certified Emergency Manager (CEM®) and graduate qualifications in emergency management rather than relying on animal or veterinary qualifications that seldom have disaster management syllabus or recognition.
5. Awareness within the animal disaster response sector needs to be raised of the concept of 'do no harm' and how actions may unintentionally lead to negative animal welfare outcomes and that actions need to be evidence-based.

Limitations and further research

The challenge of managing international and self-deploying animal response organisations has been highlighted from recent events such as bushfires in Australia and the massive explosion in Beirut. Although studies have shown that international disaster rescue deployments are characterised by limited outcomes in terms of (human) lives saved (Bartolucci, Walter & Redmond 2019; Rom & Kelman 2020) the effectiveness of international animal disaster response is less known and warrants research.

Conclusion

To date, the literature has positioned 'do no harm' as a principle of humanitarian action, however, that should be widened to include the emerging discipline of animal disaster management. There is an increasing body of research that shows that well-intended responses by animal interest groups may create unintended negative outcomes for animal welfare in the long-term through the delegitimisation of animal rescue. Where such groups lose legitimacy is through a lack of competency, equipment and authority and they also lose access to assist affected animals. If animal disaster management was recognised within the public safety sector, significant work is required to integrate this within traditional human-centric response systems. The success of this collaboration to create animal-inclusive resilient communities requires the public safety sector to encourage genuine engagement and collaboration with animal interest groups.

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Examining national planning principles for animals in Australian disaster response

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SUBMITTED
 8 May 2020

ACCEPTED
 24 June 2020

DOI
www.doi.org/10.47389/36.3.49



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Introduction

The summer bushfires in Australia in 2019–20 (Davey & Sarre 2020) and unprecedented loss of animal life reiterated the need for disaster planning, preparation and response that effectively includes animals. This is reflected in recommendations from Australia’s Royal Commission into National Natural Disaster Arrangements (Commonwealth of Australia 2020), where animal management and evacuation planning needs were highlighted and animals were indirectly implicated across various other recommendations (e.g. jurisdictional cooperation). In this particular natural disaster example, there was significant loss of animal life, with an estimated 3 billion animals killed or displaced (van Eeden *et al.* 2020), 1.8 million hectares across southeast Australia affected by bushfires (Bradstock *et al.* 2021) and 33 human lives lost.

In 2014, the National Planning Principles for Animals in Disasters (NPPAD) was released by the National Advisory Committee for Animals in Emergencies (2014) and endorsed by the Australia-New Zealand Emergency Management Committee (World Animal Protection 2015). The principles were designed as a non-prescriptive tool and aimed to promote best practice for integrating animals into disaster planning. The NPPAD comprises 24 principles; 8 relate to the planning process (Table 1) and 16 to disaster plans (Table 2). The principles are referred to in this text by number, for example (P2), (P18). Following its endorsement, the principles were, to varying extents, incorporated into policies and plans at state and territory governments as well as at the local government level. However, since the Australian Government disbanded the National Australian Animal Welfare Advisory Committee in 2013, there has been no published information tracking the adoption of the principles nor assessing the utility of this guidance across disaster arrangements.

As Australia’s *Disaster Risk Reduction Framework* (Commonwealth of Australia 2019a) is largely silent on animals, further research and policy action is needed to promote effective integration of animals into Australia’s disaster response arrangements. Animal welfare in disasters

Abstract

Australia’s summer bushfires of 2019–20 were a reminder that animals are increasingly exposed to risks from changing climate conditions. In Australia, differing organisational approaches to managing owned animals in disasters can lead to different welfare and safety outcomes for animals and the people responsible for them. The need for consistency was reinforced by recent Australian royal commission findings. In 2014, the Australia-New Zealand Emergency Management Committee endorsed the National Planning Principles for Animals in Disasters, a tool supporting best practice in emergency planning and policy for animal welfare. This study examines current planning for animals in disasters in relation to the principles and describes their implementation in the Australian context. A national survey of organisation representatives with a stake in animal management in disasters (n=137) and addressing the national principles implementation was conducted from July to October 2020. Findings show moderate awareness of the principles by respondents and low to moderate implementation of these in planning processes and arrangements for animal welfare. Implementation of specific principles is described from the perspectives of stakeholders. Greater awareness of the national principles and attention to specific principles promotes consistency in animal welfare planning arrangements.



Sheep penned within a burnt area after bushfire require water and food.

Image: NSW Department of Primary Industries, Local Land Services

has been framed as a risk issue for human safety (Trigg *et al.* 2017, Squance *et al.* 2018), a social value concern for animal displacement, injury or death (Rogers *et al.* 2019) and an economic consideration for industry (Campbell & Knowles 2011). As these issues span national research priorities for emergency management (Commonwealth of Australia 2019b), examining how the NPPAD is implemented in Australia will inform the policy agenda to benefit people and animals. Ideally, this can leverage the growing attention this receives in public discourse (Reed, DeYoung & Farmer 2020) and emergency response development (McKenna 2020).

This study examined awareness and implementation of the NPPAD in disaster planning arrangements in Australia to describe how these had been applied and to discuss future needs. This study is part of a larger project examining animal planning and policy principles in Australia.

Method

Design

A national survey was developed to examine awareness and implementation of the NPPAD by organisations with a stake in animal emergency management or welfare in natural disaster contexts. This study focused on owned animals (e.g. farmed animals, companion animals) although did not exclude

stakeholders with responsibility for non-owned animals (e.g. wildlife). The 48 survey items took approximately 40 minutes to complete via a combination of multiple choice, rating scale and open-ended items. The questions addressed organisational perspectives on planning, policy and response for animal management in emergency and disaster events. These included organisation characteristics, awareness of jurisdictional emergency arrangements for animals, awareness of the NPPAD and how these were implemented to support animal welfare. Implementation questions focused on how the principles were applied in the process of creating and maintaining plans for animals (i.e. planning process) and how the principles were represented in the final emergency planning arrangements (i.e. disaster plan). Scoping conversations with stakeholder representatives and a literature review informed the survey design. Questions relating to specific principles also required open comments about implementation.

Procedure

The confidential survey was administered using Qualtrics (Provo, UT) via a shareable link emailed to stakeholder groups and identified organisation representatives. The email included a study description and a participation and consent summary. Contacts were identified from hearings of the 2020 Royal Commission into Natural Disaster Arrangements, state emergency response organisations and government departments, as well as social media and email networks of professional associations. Participants were aged over 18 years and were currently or formerly employed in a role involved in planning, policy development and response for animals in emergencies and disasters. This included government agencies (e.g. agricultural departments, emergency services organisations), local government, animal organisations and not-for-profit organisations. Data were collected between July and October 2020 and a reminder email was sent prior to the survey's close. Statistical analyses are largely descriptive and tested categorical differences where appropriate (e.g. Fisher's test).

The study was approved by the Macquarie University Human Research Ethics Committee (Reference number: 6757).

Participants

Of the 215 eligible organisations and individuals consenting to the survey, 137 provided responses. As the survey was directed to animal management stakeholders, this represents a high degree of engagement with the target audience. Participant organisations were primarily from New South Wales (26 per cent), South Australia (15 per cent), Western Australia (15 per cent), Queensland (11 per cent) and Victoria (11 per cent), with 10 per cent reporting national jurisdiction, 'Other' (6 per cent), Tasmania (4 per cent) and Northern Territory (0.7 per cent). 'Other' included those who had held roles in Australia and New Zealand. Participants worked in state and territory government bodies (26 per cent), local government (21 per cent), emergency services organisations (13 per cent), not-for-profit organisations (26 per cent), professional associations (3 per cent), private companies (3 per cent) and other organisations (8 per cent).

Participant roles at their organisations were primarily described as emergency management (35 per cent), animal welfare management (27 per cent), veterinary response (13 per cent) and industry representation (7 per cent). Figure 1 shows participant areas of oversight for disasters and emergencies were largely in operational response, animal management and welfare, emergency management and planning, and community engagement and preparedness. Participants could select multiple oversight areas.

Most participants described their current role (89 per cent) and had direct contact with animal owners in this role (75 per cent). Across organisation types, direct contact with animal owners was most often reported by respondents from state and territory governments (69 per cent), local government (97 per cent), emergency services organisations (83 per cent) and not-for-profit organisations (85 per cent), compared to those

from professional associations (67 per cent), private companies (67 per cent) or other organisations (56 per cent). Figure 2 shows that respondents from stakeholder organisations most often held responsibilities for farmed animals and agricultural livestock, domestic pets, wildlife and all animal types. In this context, ‘all animals’ refers to the ‘all species’ perspective taken by some organisations in disaster response and management.

Most respondents felt that their organisation should have responsibility for animals in emergency or disaster situations (55 per cent). While 25 per cent of respondents felt they should have more responsibility, 17 per cent desired no responsibility for animals.

Results from the survey sample are presented as a whole. Given the sample profile, these data should be viewed as broadly representative of Australian organisations with a stake in animal emergency management.

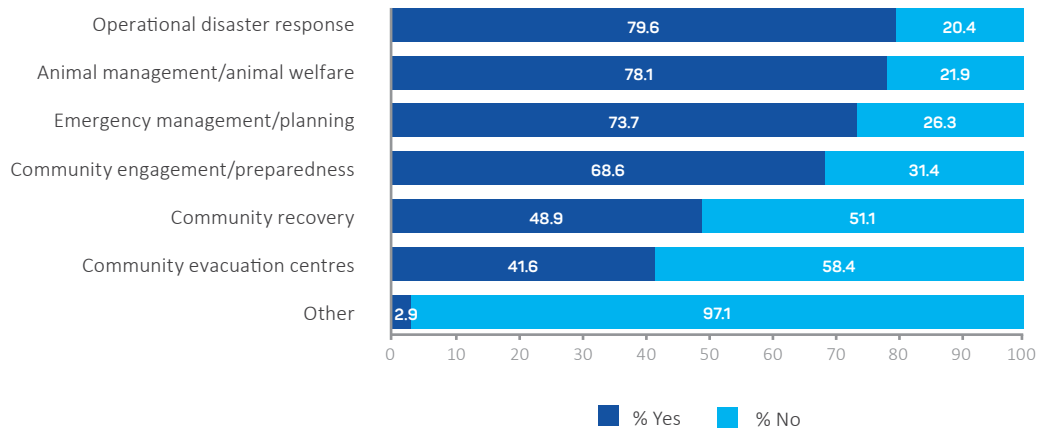


Figure 1: Stakeholder role areas of oversight for disasters and emergencies (n=137).

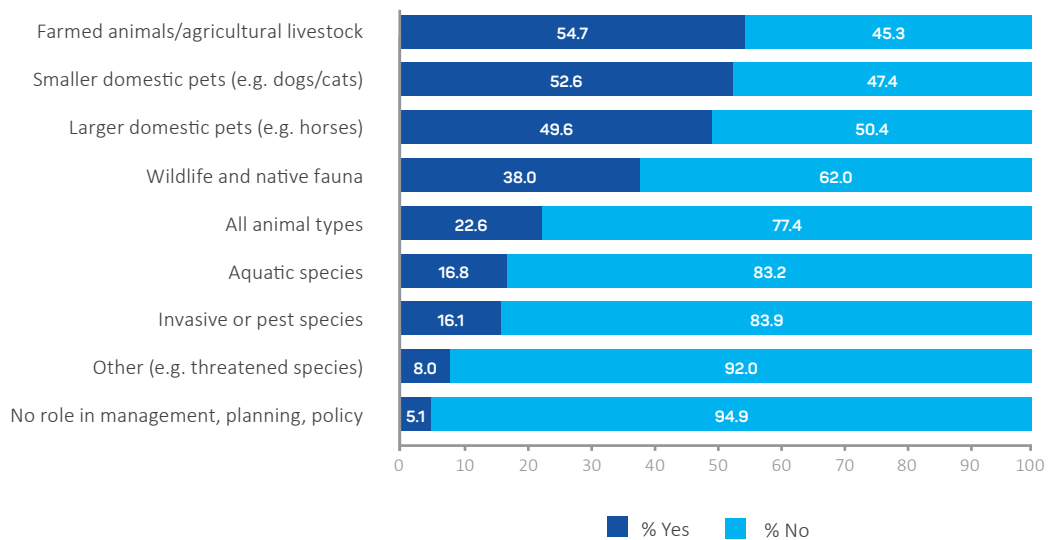


Figure 2: Stakeholder organisation responsibility for animal types in disasters and emergencies (n=137).

Results

Awareness of the NPPAD

Comments were provided describing levels of awareness and implementation of the principles (n=105). More than half of the respondents were aware of the NPPAD (58 per cent) with approximately a third (31 per cent) unaware of them and some were unsure whether they had encountered them (11 per cent). This suggests increased active promotion of the principles to organisations with a stake in animal welfare and management (e.g. through targeted information campaigns) is required.

Open responses for describing understanding of how the NPPAD is used in Australia suggest that respondents regarded the principles as a useful guide for planning rather than providing operational information. Example responses include:

The safety and welfare of people remains the overarching priority at all times—this is the key principle reflected in our planning. We are currently using [the] principles in our review of our local emergency animal welfare plan.

(local government)

They are a set of guidelines organisations can use and base their policy, practices, and procedures on.

(state/territory government)

The principles were used as a framework, and [were] considered in the development of the City's Animal Welfare Plan.

(local government)

They are directly applied in this state as a result of our lead animal agency.

(state/territory government)

The principles inform our policy development work, although they are due for an update to bring them into line with contemporary emergency management practice and language.

(private company)

We are mindful of the principles, but the document has no operational information.

(state/territory government)

I know they exist, and have looked at them, but operationally, we remain focused on what our organisation requires and what works on the ground.

(state/territory government)

Descriptive analysis also suggests that, for respondents who were 'unaware' of or 'unsure' if they had encountered the principles (n=44):

- Over half felt that the official responses for animals could be improved (59 per cent).

- Over half held responsibilities for community engagement on disaster preparedness (57 per cent).
- Many held responsibilities for operational disaster response (73 per cent).
- Many held responsibilities for animal management or animal welfare (71 per cent).
- A third held responsibilities for community evacuation centres (30 per cent).
- Over half held responsibilities for emergency management planning (59 per cent).
- A third held responsibilities for community recovery (34 per cent).

These figures and comments indicate there is some level of awareness of the intended use of the NPPAD in informing animal emergency planning, however, an increased awareness of the principles is needed given respondent role responsibilities.

Implementation of the NPPAD

In general, of the respondents who were aware of the NPPAD (58 per cent), just over half (54 per cent) had implemented them to some degree in animal emergency planning and policy arrangements of their organisation. Respondents were asked for each NPPAD principle individually, whether they had fully, partially or had not implemented the principle or if it was not applicable to them. To provide a simple overview of implementation of the NPPAD, 'overall' data are the focus in this study (i.e. the sum of respondents who had either 'fully' or 'partially' implemented the areas covered in each principle), but all response categories are provided. The results are presented in Table 1 relating to the 'planning process' and Table 2 relating to the principles and 'disaster plan' arrangements.

Implementation in the planning process

Almost three-quarters of respondents (73–74 per cent) reported integrating needs of animals into their disaster planning to improve human and animal welfare outcomes (P1, P2) and that their planning processes clearly identified roles with animal welfare responsibilities (P3). However, just under two-thirds of stakeholders (62–63 per cent) reported that they recognised and consulted with a wide range of parties when writing and reviewing plans (P4) or included effective communication about plan implementation with those likely to be involved or affected (P7).

Fewer again (58 per cent) reported that their planning process respected the role of local government or local government expertise in understanding local needs (P5) or considered effective integration of animal welfare in planning processes and training (P6). This suggests that despite acknowledgment of the importance of integrating animals into disaster planning processes, there is still a need to be better involved with relevant audiences. In particular, the accessibility of language used in the planning process for stakeholders including the general public (P8) was the area least likely to have been fully implemented. This suggests that the planning process was more likely to include technical or expert audiences or would be less understandable by general audiences.

Table 1: Stakeholder organisation endorsement of the National Planning Principles for Animals in Disasters in Planning Processes (n=90).

	Implementation				
	Fully	Partially	Overall	Not	N/A
The planning process should:					
P1. Explicitly recognise that integrating animals into emergency management plans will improve animal welfare outcomes.	47 (52%)	19 (21%)	66 (73%)	6 (7%)	18 (20%)
P2. Explicitly recognise that integration of animals into emergency management plans will help secure improved human welfare and safety during disasters.	46 (51%)	21 (23%)	67 (74%)	6 (7%)	17 (19%)
P3. Aim, for the benefit of emergency managers and animal welfare managers, to clearly identify roles and responsibilities within command-and-control structures in sufficient detail to allow for effective implementation of animal welfare measures.	41 (46%)	23 (26%)	64 (71%)	6 (7%)	20 (22%)
P4. Recognise the wide range of parties involved in animal welfare at each stage of the disaster cycle and ensure these organisations are consulted during writing or reviewing disaster plans.	32 (36%)	24 (27%)	56 (62%)	14 (16%)	20 (22%)
P5. Respect the role of local government, especially with reference to animal welfare and animal management arrangements within the local area, as ‘first responders’ in disasters and acknowledge local government expertise in understanding local needs and resource availability.	31 (34%)	21 (23%)	52 (58%)	17 (19%)	21 (23%)
P6. Consider how best to ensure effective integration and implementation of the plan by, for example, extensive consultation during the planning process or inclusion of an animal welfare element in requirements for disaster training exercises.	28 (31%)	24 (27%)	49 (58%)	13 (14%)	25 (28%)
P7. Include effective communication about plan implementation with those parties who may be involved as well as those who may be impacted by disasters.	28 (31%)	29 (32%)	57 (63%)	10 (11%)	23 (26%)
P8. Be communicated in language that is accessible to all stakeholders including the general public.	23 (26%)	29 (32%)	52 (58%)	13 (14%)	25 (28%)

Note: Frequencies and valid percentages reported. N/A responses were self-selected. Percentages have been rounded.

Implementation in disaster plans

Reviewing the implementation of the NPPAD in emergency and disaster plans, a greater proportion of respondents (71 per cent) indicated that their plans specified that the person in charge of an animal held ultimate responsibility for the animal’s welfare (P9) and the same proportion included an outline of processes for inter-agency cooperation disaster stages (P21). There were also relatively higher levels (62 per cent) of consideration for scaling up response and resources to match the effects of disasters on human and animal welfare (P17) and in using accessible language to describe command-and-control structures (P20). Respondents indicated greater inclusion of systems for formalising animal welfare support arrangements (P22), consideration of logistical challenges (P23) and having situated their plans within jurisdictional regulatory and legal frameworks (P10). All these requirements are fundamental for effectively executing plans and suggest that practical and operational issues were relatively well considered in disaster planning. Additionally, a similar proportion of respondents had adopted an all-hazards and all-species approach to animal welfare (P11), although it should be noted that some organisations have a specific disaster or species focus.

Around half of the respondents indicated their organisation’s plan focused on disaster types most likely to affect animals in their jurisdiction (P13) and just under half of respondents indicated their planning arrangements considered animals at all stages of the cycle (i.e. preparedness, response, recovery and mitigation) (P14). For those not developing plans across all stages, a greater focus was placed on animal welfare in the preparation (71 per cent) and response (87 per cent) stages, relative to recovery (63 per cent) and prevention (46 per cent), suggesting that further emphasis on animal welfare planning in risk reduction and in post-disaster stages would be beneficial. Around this mid-level of implementation was the inclusion of requirements and arrangements for regular testing and review of plans (P24). Although periodic review and testing forms part of planning processes, it is evident that these aspects are not always undertaken where animal welfare is a focus.

Four principles with relatively lower levels of implementation (36–42 per cent) were noted. Relatively few respondents reported the inclusion of vision statements in plans that outlined the value of securing animal welfare (P18) or included rationale statements describing the broad benefits to animal welfare, human wellbeing and the economy of integrating animals into

Table 2: Stakeholder organisation endorsement of the National Planning Principles for Animals in Disasters in Disaster Plans (n=83).

	Implementation				
	Fully	Partially	Overall	Not	N/A
The disaster plan that incorporates animals should:					
P9. Specify that the individual in charge of an animal is ultimately responsible for its welfare in disasters.	35 (46%)	19 (25%)	54 (71%)	4 (5%)	18 (24%)
P10. Make reference to, and situate the plan within, the local area and/or jurisdictional regulatory and legal frameworks.	29 (35%)	18 (22%)	47 (57%)	14 (17%)	22 (27%)
P11. Take an ‘all hazards’ humane approach to all species and encompass a wide range of possible disaster-type situations that may impact upon the welfare of livestock, companion animals, wildlife and other categories of animals such as laboratory animals.	18 (22%)	29 (35%)	47 (57%)	18 (22%)	18 (22%)
P12. Use a definition of disaster that aligns with the National Strategy for Disaster Resilience	-	-	-	-	-
P13. Appropriately plan for animals taking into consideration the types of disasters most likely to be experienced in the particular jurisdiction.	25 (32%)	15 (19%)	40 (51%)	16 (21%)	22 (28%)
P14. Include consideration of animals at all stages of the disaster cycle including preparedness, response, recovery and mitigation.	27 (47%)	-	27 (47%)	30 (53%)	-
P15. Include a statement of scope that excludes animal disease and biosecurity emergencies from the plan.	18 (23%)	10 (13%)	28 (36%)	28 (36%)	22 (28%)
P16. Emphasise that biosecurity requirements are of utmost importance in disasters and that quarantine and biosecurity protocols must be followed wherever practicable.	18 (23%)	15 (19%)	33 (42%)	19 (24%)	26 (33%)
P17. Provide for a staggered scaling up of response and resources in line with the scale and severity of disasters and their impact on animal and human welfare.	24 (31%)	24 (31%)	48 (62%)	13 (17%)	17 (22%)
P18. Include a vision statement that makes reference to the importance of securing animal welfare outcomes in disasters.	17 (21%)	16 (19%)	33 (40%)	31 (37%)	19 (23%)
P19. Include a brief rationale statement that includes reference to the benefits of the plan for animal welfare, human safety and wellbeing and for the economy.	9 (11%)	25 (30%)	34 (41%)	26 (31%)	23 (28%)
P20. Outline command-and-control structures in language that is accessible to the general public.	23 (30%)	25 (32%)	48 (62%)	10 (13%)	20 (26%)
P21. Outline the processes for interagency cooperation at all stages of the disaster cycle.	35 (46%)	19 (25%)	54 (71%)	4 (5%)	18 (24%)
P22. Include a system for formalising arrangements with animal welfare support organisations.	22 (29%)	22 (29%)	44 (58%)	12 (16%)	20 (26%)
P23. Take into consideration logistical challenges that may impact upon implementation of the plan during disasters, for example, in the event that key infrastructure or personnel are not able to be deployed, communication is affected or shelters are destroyed or otherwise unavailable.	23 (30%)	20 (26%)	43 (57%)	13 (17%)	20 (26%)
P24. Include requirements and arrangements for regular testing and review of animal welfare in disasters plan.	14 (18%)	23 (30%)	37 (49%)	16 (21%)	23 (30%)

Note: Frequencies and valid percentages reported. N/A responses were self-selected. Principle numbering continues from Table 1 and disaster definition (P12), though not discussed here, is included for completeness. Percentages have been rounded.

disaster planning (P19). This is interesting, given the greater recognition of the importance of animal integration to human and animal safety in planning processes. The principles least likely to be implemented were including an emphasis that biosecurity is important and biosecurity protocols must be followed as far as possible (P16) and explicit mention that animal disease and biosecurity emergencies are out of scope in the disaster plan (P15). An initial explanation for this overall lower level of implementation is that around a third of stakeholders reported that P16 was 'not applicable'. This finding may reflect the organisational profile of the sample in the study.

Discussion

This study examined awareness and implementation of the NPPAD from the perspective of organisations in Australia with a stake in managing animals in emergencies and disasters. Most respondents were from government, emergency services organisations and not-for-profit organisations, they held roles with responsibilities related to animal management and were in direct contact with animal owners. One-quarter of respondents desired more responsibility for animals, and primarily held responsibilities for farmed animals and smaller domestic species (e.g. pets).

Respondent awareness of the principles as a resource for animal welfare planning and policy was moderate, as just over half the sample was aware of them but only slightly more than half had implemented them to some degree. This low level of overall implementation, and the variable level of applying specific principles covered in the NPPAD, demonstrates a clear need to increase awareness and uptake of the principles in many organisations.

At the state level, sound examples of implementation were found in state government planning and processes in Victoria (Victoria State Government 2019), South Australia (Primary Industries and Regions South Australia 2018) and Western Australia (State Emergency Management Committee 2019). These serve as models for other organisations to consult when adopting the principles into their own arrangements. Importantly, although animal management planning in disasters primarily occurs at state and territory levels, the principles should be widely adopted as a common language by other non-government and private organisations to establish a consistency in Australia's disaster response planning.

Reported implementation of the NPPAD suggests that despite acknowledging the importance of integrating animal considerations into planning processes and arrangements, there is still a need for animal interest groups and organisations to translate this to practice. An excellent example of this is the Committee for Animal Welfare in Emergencies, a Western Australian operational and policy initiative connecting government (e.g. local) and industry (e.g. agriculture) expertise in coordinating animal support during emergencies (Department of Primary Industries and Regional Development 2019). This also extends to providing local government support for animal emergency welfare planning and response capacity. As survey

respondents indicated low recognition of local expertise and resources in this area, actions to improve this are needed.

In both disaster planning processes and plan arrangements, levels of implementation of best-practice communication recommended in the NPPAD varied such as consultation, engagement and accessibility of language. Improved strategic communication about how animal emergency plans are implemented is needed with affected and involved parties and this needs to be provided in easily accessible language (i.e. high readability, minimal jargon). Many animal owners may not understand emergency management and disaster planning and that they hold primary responsibility for their animal's welfare—an animal emergency management tenet. However, as shared responsibility is also a goal in emergency management, it is essential that planning processes are inclusive and that plans are written and communicated in accessible language. Although preparedness resources for the public are available and written in accessible language (e.g. the NSW State Emergency Service 'Get Ready Animals' resources website (NSW State Emergency Service 2021)), it would be beneficial to test the readability and ease of comprehension of disaster plans and descriptions of planning processes with target audiences (e.g. smallholders, horse owners, companion animal owners).

Principles relating to final plan arrangements indicated a need to increase emergency animal planning considerations for the prevention and recovery stages. Respondents indicated a need for increasing formal arrangements for animal support and, although this is seen in animal management functional support structures (e.g. New South Wales Government 2017), non-government organisations can draw on these approaches in disaster planning. Given that this survey captured a convenience sample of Australian stakeholders, findings should be interpreted as a snapshot that is broadly representative of animal management planning and policy stakeholders. However, as stakeholders considered the position of their organisation, findings show specific principles that could be a focus for future research and action.

The NPPAD is an essential tool for the current and future improvement of Australia's animal arrangements in disasters. This overview of how Australian organisations have adopted them highlights areas for those creating and managing animal welfare plans to implement, adapt and discuss the principles to protect animals from increasing risk.

Acknowledgments

This research was independently conducted via Macquarie University and was funded by World Animal Protection. Views expressed in this article are those of the authors and may not be regarded as stating an official position of organisations involved.

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Categorising animals and habitats in disaster-related activities

Peer Reviewed

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SUBMITTED
24 January 2021

ACCEPTED
5 May 2021

DOI
www.doi.org/10.47389/36.3.57



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Introduction

Among the many variations of defining ‘disaster’, a common baseline is typically a situation requiring external assistance (Perry & Quarantelli 2005, Quarantelli 1998, UNDRR 2020). An assumption in this definition is that people, society or human activities must be affected for a disaster to result. Animals and their habitats are part of society and it is important to consider animals and habitats as part of disaster-related activities. These activities cover pre-disaster actions such as mitigation, risk reduction, planning and preparation along with activities during and after disasters such as response, recovery and reconstruction.

Initiatives to incorporate animals and habitats within disaster-related activities are scattered at times, often focusing on one particular typology or classification defined by the discipline or purpose of the people involved. For instance, Darroch and Adamson’s (2016) ‘animal-inclusive disaster risk reduction’ focuses on companion animals. Furthermore, animals can be labelled as problematic in disasters or as inhibitors for disaster-related activities, rather than being regarded as advantageous or supportive factors (Thompson 2013). Ideas of naming, categorising and creating hierarchies for animals and habitats from human perspectives have also been critiqued (Borkfelt 2011, DeMello 2012, Irvine 2008).

These debates might or might not assist people and animals during a hazard when people are making life-and-death decisions, especially when disagreements across disciplines preclude clear-cut philosophical and conceptual pathways. Many viewpoints fustigate theories of categories or express disappointment at humans attempting hegemony over animals and habitats (Franklin 1999, Irvine 2008). A gap still exists in bringing together the multiple modes of animals and habitats within all disaster-related activities (cf. Arluke & Sanders 1996, DeMello 2012, Kumaravel *et al.* 2020). Operational decisions have differed for the presumed purposes of animals (e.g. Glassey, Rodriguez Ferrere & King 2020), even if accepting that the human-animal binary divide ought to be challenged (DeMello 2012, Irvine 2008).

Collecting the many practitioner aspects regarding animals and habitats in disaster-related activities assists in understanding and training for situations before, during and after disasters. Five non-exclusive categories of animals and habitats are used to allow for critical reflections on operational aspects of disasters.

Abstract

A disaster is typically defined as a situation requiring external assistance, under the (contestable) assumption that the situation must affect people and society to be a disaster. Animals and their habitats are part of society and humans connect with them, so animals and their habitats are part of all disaster-related activities. This straightforward statement has produced divergent theories, policies and practices including challenges to categories, labels and divisions for humans and non-humans. This paper collates many practitioner aspects regarding animals and habitats in disaster-related activities. It assists in understanding and training for situations involving non-humans before, during and after a disaster. Five categories, sometimes overlapping, are provided of (non-human) animals and their habitats affected by disaster-related activities: companion animals, service animals, livelihood animals, captive animals and wildlife and wildland animals. Other aspects emerge about animals and habitats contributing to disasters and to disaster-related activities. Some ethical and practical issues are discussed regarding rights for, responsibilities of and disaster definitions relevant to dealing with animals during disasters.

Categories of non-humans

1. Companion animals

Many people have animals for companionship, as in pets, which can be seen as being an integral part of the family and household (Irvine & Cilia 2017). Leaving these animals behind during evacuation might be construed as being animal abuse, yet many evacuation shelters are not equipped to deal with companion animals. People with animals can be turned away or feel forced to manage on their own because their companion animals cannot be let in or taken care of (Farmer, DeYoung & Wachtendorf 2017; Farmer & DeYoung 2019; Glassey 2020). Pets left behind in a disaster suffer, such as through increased stress (Nagasawa, Mogi & Kikusui 2012), and people whose companion animals are killed can experience impeded recovery (Travers, Degeling & Rock 2017). People evacuating without their pets might put themselves and others in danger by trying to return to recover their pet (Heath, Voeks & Glickman 2001).

Philosophical discussions exist related to owning animals for companionship and raise issues of speciesism and animal oppression (Irvine 2008). Irrespective, research on companion animals in disasters provides direct advice that can be enacted long before a disaster to address practicalities of evacuation and sheltering (Anderson & Anderson 2010, Glassey 2010, Onukem 2016, Taylor *et al.* 2015).

Some people have allergies to or phobias of some animals. Evacuation shelters should cater for these needs while recognising the needs of companion animals and their owners. For example, how might pest control in a shelter, such as insecticide or rat poison, affect pets? This question imposes a human-centric value judgement through the label ‘pest’ (Arluke & Sanders 1996) although laws in many jurisdictions protect people in public places from animals such as rats, fleas and cockroaches. Irrespective of human-centric labels such as ‘pests’ and ‘vermin’, it is neither straightforward nor consistent to judge whether or not a companion animal is likely to pose a danger to other people or animals. Where an animal has potential to harm or kill, such as pythons, poorly trained dogs and cats, and poisonous spiders, a balance is needed between serving pets and achieving safety for everyone. Animal handlers who are trained in emergency planning and preparedness could be deployed to disaster sites with manuals that assist their operations (Kumaravel *et al.* 2020).

Cleanliness and hygiene are important and include activities like keeping fish tanks and bird cages clean and providing appropriate space and sufficient cleaning for animal areas. There must be certainty that pets are clean and vaccinated and not bringing fleas, ticks or diseases into the shelter. Many dogs require regular exercise and some birds need to be kept in confined spaces. Owners must bring everything they need for their animal, such as leashes, muzzles, cages, food and water bowls and bedding. If animals are injured or become unwell, it would be ideal to have an on-site veterinarian with adequate facilities and equipment.

Many of these requirements such as hygiene, health care and potential for harm apply to all categories of animals.

2. Service animals

Novak and Day (2018) emphasise the importance of preparing specific information related to service animals and people, to be ready for when a disaster occurs. Many people with disability rely on animals and need to have the animals with them. For example, a guide dog supports its owner during a disaster (Anonymous 2015) as do hearing-ear dogs and seizure-alert dogs. Thus, disaster-related activities must account for this human-animal relationship. Service animals can also provide confidence and emotional support to people without disability, expanding the types and roles of animals involved. Legal (Bourland 2009) and moral (Irvine 2008, Irvine & Cilia 2017) discussions result. Emotional support animals can also help people to deal with disasters (Fine 2019).

Service animals offer more than providing functional needs to people with disability or emotional support. Parenti and co-authors (2015) provide a taxonomy of service animals that demonstrates the variety of tasks these animals undertake. Examples are search and rescue, apprehending suspected criminals, security and guarding, hunting, sports such as racing and showing, herding as well as the detection of explosives, drugs and food. Some of these roles overlap with companion animals. Some roles overlap with livelihood animals, such as when used for sports, hunting or herding.

3. Livelihood animals

Livelihood animals encompass livestock such as cattle, pigs, sheep and chickens as well as other animals used for working and jobs such as horses, mules, llamas and alpacas. Extensive overlap occurs with livestock and service animals and many of the categories used by Parenti and co-authors (2015) cover both service and livelihood animals. For example, guard dogs, herders, ploughing animals and detection animals provide services to their owners while also creating the owners’ livelihoods.

Improvements to evacuating and caring for large livelihood animals have occurred in response to fires (Squance *et al.* 2018; Thompson, Haigh & Smith 2018). Rescues of these animals from water and soft ground feature prominently in manuals and textbooks (Gimenez, Gimenez & May 2009; Heath 1999; Ray 2006). Drought is also a major concern in terms of providing water and food for livestock. Nomadism and pastoralism used to be common and provided a form of disaster risk reduction by moving herds large distances to find healthier pastures and water sources (e.g. Fleuret 1986, Rubert & Beetlestone 2014). These previously successful approaches of dealing with disasters have been undermined by imposed changes including:

- forced sedenterisation
- increased marketisation of herds
- fragmentation of habitats and partitioning of management regimes by international borders, roads, railways and settlements
- shifting infrastructure and land management
- counterproductive aid systems.

Such aspects have been shown for Mongolia (Sternberg & Batbuyan 2013) and Kenya (Bersaglio, Devlin & Yap 2020).

Key challenges with livelihood animals, especially livestock, are providing adequate food and water if the owners cannot reach the animals to provide care. This is exacerbated by the loss of livelihoods if animals die (Deen 2015 for the 2010 Pakistan floods, Glassey & Wilson 2011 for the 2010 New Zealand earthquake). Insurance is touted as one approach (Ye *et al.* 2017 for winter weather in China) but this means that the animals have already suffered and died. Successes have been achieved through short-term evacuation (Paul *et al.* 2010 for cyclones in Bangladesh) and long-term evacuation (Wilson *et al.* 2012 for a volcanic eruption in Chile). Setting livestock free in advance of an impending disaster is sometimes applied (Paul 2012 for a cyclone in Bangladesh). Re-entering a danger zone to care for animals, even while people live outside the zone, has been used as a way to maintain livestock-related livelihoods (Akabayashi & Yoshinori 2012 for a nuclear power plant disaster in Japan).

4. Captive animals

Animals are kept captive in many locations such as zoos, enclosed safaris (e.g. the African Lion Safari in Ontario, although these 'open zoos' overlap with the 'wildlife and wildland animals' category since safaris are undertaken in wildlands), aquaria, marine parks, pet stores and research facilities. Many site-specific operational procedures exist. Sawyer and Huertas (2018) provide general lessons for zoos dealing with disasters and Singh, Kaur and Gupta (2020) detail disaster-related issues for New Delhi's National Zoological Park.

Miller and Fowler (2012) provide disaster-related advice for what they term 'captive wildlife facility' workers and Irvine (2009) provides recommendations for 'animals in research facilities'. Most research facilities and shops typically adhere to building and jurisdiction disaster-related rules and regulations. This situation does not mean that the needs of animals have been fully considered especially in terms of disaster-related safety or welfare. For example, lockdown measures during the COVID-19 pandemic led to many research animals being killed because they could not be cared for and few contingency measures existed (Nowogrodzki 2020).

5. Wildlife and wildland animals

The delineation between 'wildlife' or 'wild animals' and animals in the other 4 categories cannot be strictly determined because animals retain instincts and behaviours irrespective of how 'domesticated' they appear. Not all 'wild animals' are necessarily wildlife and Garde, Acosta-Jamett and Bronsvort (2013) refer to 'free-roaming' dogs. Similarly, dogs and cats in cities such as Istanbul are unowned yet are part of the local neighbourhoods with varying levels of friendliness towards people. Human-wildlife interactions show many constructive examples rather than always being in conflict and 'conflict' is often a misnomer in this context (Peterson *et al.* 2010).

Could wildlife or nature be damaged by an environmental process or phenomenon? Extinctions, including mass extinctions, are part of nature and human beings would not exist without previous mass extinctions. However, extinctions depend on the environment. Could mass extinctions be labelled as disasters? Today, if an environmental process or phenomenon might make a species

extinct or destroy a unique habitat (e.g. fires started by lightning (Pickrell & Pennisi 2020)), would that be a 'disaster'?

Another facet is legal rights for non-human entities, such as primates (Wise 2014) and for rivers (Pecharrroman 2018). These rights include the right to protection. Thus, would primates, rivers and other non-human entities have a right to protection from disaster? Moral questions arise. An earthquake can lead to a landslide damming a river. Have the river's rights been infringed? Is this a disaster afflicting the river, entailing human action to breach the dam? Does it matter whether or not this situation occurs in locations where beavers build dams? If a river already has a natural dam and an earthquake breaches this dam, have the river's rights been infringed? Is the natural dam breaking a disaster and should human action be required to rebuild the dam?

The idea of nature as static is nonsense and environmental processes and phenomena should be accepted as typical, even if they are sometimes hazardous to human society. Who judges whether environmental changes are positive and could reduce disaster risk for the environment or if they are detrimental and could be a disaster for the environment?

If non-human entities have disaster-related rights, then do they have disaster-related responsibilities, duties and obligations, as humans do? How would entities with legal rights, such as primates and rivers, be forced to fulfil responsibilities, duties or obligations? What would be the punishment for failing to fulfil these duties? Disasters with respect to wildlife and wildland animals raise challenging ethical, legal and operational questions.

Critiquing reflections

Many other aspects of animals and habitats in disaster-related activities exist and have received attention, even if not being fully integrated into operational work. Animals and habitats are not only affected by disasters but can be a fundamental input into a disaster. Disaster risk, by definition, combines hazard and vulnerability with the hazard component sometimes coming from the environment. Wind, volcanic eruptions, floods, landslides and other environmental processes and phenomena are part of habitats. These physical, or non-living, processes are often labelled as 'natural hazards' or 'environmental hazards', even when people influence them substantially such as engineering rivers to alter or create floods (Criss & Shock 2001, Etkin 1999).

Part of the environment is also the biological, or living, components. Microorganisms represent the hazards for some of the deadliest disasters, such as epidemics and pandemics (Garrett 1994) and plants can be problematic, for example, casualties from falling coconuts (Barss 1984). Plants including crops must be considered within contexts of habitats and human-environment connections and interactions for disaster-related activities. For example, living entities can adversely affect crops and lead to famines (Devereux 1993). Large animals, as with microorganisms, can be hazardous and might be classified as 'natural hazards'. Kelman, Raut and Drake (2019) compiled material on animals attacking people, terming them 'macrobiological hazards' and Gaillard and colleagues (2019) placed human-animal interactions into a disaster risk reduction framing.

With the definition of ‘disasters’ frequently being situations requiring external assistance, animals and their habitats might be able to render external assistance. An example is search-and-rescue dogs (Jones, Downend & Otto 2004) within the service animals category. Macpherson and Roberts (2006) speculate that dogs might seek help in an emergency, blurring the line that a disaster must necessarily involve people or human society. Animals also realise loss (e.g. Bradshaw 2004 for elephants) meaning that wide-scale impacts on an animal group or their habitats could be a disaster for the animals.

Habitats can contribute to stopping disasters as in ‘ecosystem-based disaster risk reduction’ (which encompasses ecosystem-based climate change adaptation) and ‘nature-based solutions’ (Renaud, Sudmeier-Rieux & Estrella 2013). Using nature and the environment to avert disaster has been a mainstay of human activities for millennia (e.g. Bardsley, Prowse & Siegfriedt 2019 for bushfires in Australia). Thus, it is unclear why recent work emphasises human-nature connections through what is termed ‘ecosystem-based approaches’ and ‘nature-based approaches’, as if humanity and the environment are not connected. Much scholarship expresses concerns at assuming human hegemony over the environment and taking for granted human abilities to tailor nature for society’s purposes (Irvine 2008, Irvine & Cilia 2017). Separating out ‘ecosystem-based’ and ‘nature-based’ may be counterproductive to the long-term, baseline processes of disaster-related activities that integrate human and non-human elements.

To overcome the artificial separation of human and non-human elements in contemporary approaches also means querying why definitions of ‘disaster’ tend to focus on humans and human society (Perry & Quarantelli 2005, Quarantelli 1998, UNDRR 2020). Biodiversity, geodiversity and ecodiversity are prominent traits of the environment (Barthlott *et al.* 1999). Bringing these 3 traits into disaster-related activities examines whether or not they should be considered as non-human entities or characteristics of nature. To overcome the criticisms of the human/non-human dichotomies, such as through challenging the nature/culture divide (Descola 2013), instead, human beings and society should be enfolded within them. That is, biodiversity includes human beings, ecodiversity includes human-created habitats such as cities and geodiversity includes infrastructure. Consequently, the fields of ‘ecosystem-based disaster risk reduction’ and ‘nature-based solutions’ are obviated since, by definition, they incorporate human beings and societal constructions.

Descola (2013) suggests animism, totemism, naturalism and analogism as ontological categories appearing in different forms based in different belief systems. This provides further labels for exploring animals and habitats in disaster-related activities alongside the definition of ‘culture’ within the context of the definition of ‘disaster’ (e.g. Donovan 2010, Krüger *et al.* 2015). These belief systems and the authors challenging culture/nature, human/animal and other dichotomies can themselves be challenged. Belief systems exist that separate humans from (other) animals and which, for disaster-related activities, suggest that humans are more important than (other)

animals. These belief systems have dominated many operational recommendations for animals and habitats in disaster-related activities while indicating a preference for categorising. Examples are Descola’s (2013) ontologies and Arluke and Sanders’s (1996) ‘Sociozoologic Scale’. Continuing discussion about these belief systems and balanced critique of them and their implications for animals and habitats would help entities affected by disasters benefit from human decisions. In addition, exploration into the operational consequences of accepting or rejecting specific belief systems (especially human centrism and speciesism (e.g. Hovorka 2019)) could improve implementation of disaster-related activities.

Conclusion

This paper considered 5 non-exclusive categories and some diverse theories, policies and practices regarding animals and habitats affected by and affecting disaster-related activities. This contributes to the connections of topics and improves understanding in this field. These considerations challenge the notion that for a disaster to occur, it must affect people or society.

Many aspects of animals and habitats described in the categories are valued based on human interest. Whether or not nature and the environment have intrinsic value irrespective of human acknowledgment, judgement or interest is an ongoing discussion. These issues deserve continued philosophical and practical exploration and discussion so that they are appropriately incorporated into disaster-related activities, especially for pre-disaster actions.

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The legal status of animals: a source of their disaster vulnerability

Peer Reviewed

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SUBMITTED
10 February 2021

ACCEPTED
16 May 2021

DOI
www.doi.org/10.47389/36.3.63



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Introduction

Disasters in recent decades, such as the 2019–20 Australian bushfire season, have made animals’ vulnerability to hazards sharply apparent. In so doing, they have prompted governments across the world to improve emergency management measures for animals. Hurricane Katrina, which devastated the Gulf States of the USA in 2005, was a watershed event in this regard (see Travers, Degeling & Rock 2017). The storm caused the deaths of almost 2000 people (Rhodes *et al.* 2010) along with hundreds of thousands of companion animals (Baum 2011) and revealed how ill-equipped emergency response systems were to meet the needs of residents living with animals. In response, the US Congress passed the *Pets Evacuation and Transport Standards Act 2006* Pub. L. No. 109–308, 120 Stat 1725 (2006) (PETS Act). This compelled emergency management authorities to consider the needs of individuals evacuating with companion and assistance animals in order to receive certain federal funding. Similarly, following the 2009 Black Saturday Bushfires, the Australian State of Victoria introduced the *Victorian Emergency Animal Welfare Plan* (Agriculture Victoria 2019). New Zealand also substantially improved provision for animal welfare in its emergency planning framework in the wake of the 2010 and 2011 earthquakes in Canterbury.

Although some scholarly attention has been paid to these developments, and particularly to the PETS Act, there is a dearth of literature examining how the underlying legal status of animals aggravates their vulnerability to disasters. ‘Vulnerability’ is conceptualised in line with the widely accepted definition posited by Wisner and co-authors (2003, p.11):

...the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard (an extreme natural event or process).

On this view, disasters occur when hazards affect vulnerable communities. Rather than focusing on the content and effectiveness of disaster planning instruments for animals, this study uses the vulnerability paradigm to interrogate how the law itself increases animals’ susceptibility to hazards. To this end, this paper draws on 4 case studies: Hurricane Katrina, the Canterbury earthquakes, the Black Saturday

Abstract

The 2019–20 Australian bushfire season had a devastating impact on animals. A report sponsored by the World Wide Fund for Nature (2020) estimates that 3 billion native wild animals were affected by the bushfires, with several species now closer to extinction. Thousands of domesticated farm animals also perished, either as an immediate result of the bushfires or as a consequence of being euthanised with fire-related injuries. In addition, there was concern about the adequacy of arrangements for the evacuation and care of companion animals during the emergency. In these diverse ways, the bushfires brought the profound and multidimensional vulnerability of animals to disaster events into stark focus. Using case studies, this paper examines the role the law plays in contributing to this vulnerability. It investigates how the status of animals as ‘property’ under law increases their exposure to hazards and affects their priority in disaster planning and response. This paper also scrutinises the extent to which statutory welfare and environmental protections are capable of optimising wellbeing and survival outcomes for animals in disasters.

bushfires and the 2019–20 Australian bushfire season. This paper begins with a brief survey of the rationales for considering animals in disasters. It then scrutinises how 2 dimensions of animals' legal status amplify or fail to address their disaster risk. The first dimension is their status as property under law. The second is comprised of the provisions that apply to them under animal welfare and environment protection statutes (together, 'statutory protections'). The purpose of this study is to critique animals' existing legal status by interrogating its role in rendering them vulnerable during disasters. Future research might consider the modifications that could be made to this status to improve outcomes for animals in emergencies.

Considering animals in disasters

Over the past 2 decades, and particularly since Hurricane Katrina, the emergency management literature has reinforced the importance of accounting for the interests of animals during emergencies. In their review of scholarly sources on the management of companion animals in disasters, Travers, Degeling and Rock (2017) observe that research identifies 2 reasons for incorporating companion animals within emergency management plans. First, the bond many share with their companion animals represents a 'risk factor' to human safety and resilience. During a disaster, owners may be reluctant to leave their properties if they cannot take their companion animals with them or might return to check on their animals before it is safe to do so (Heath & Linnabary 2015). Studies have also confirmed that the loss of companion animals can have adverse psychological consequences and hamper community resilience and recovery in the aftermath of a disaster (Hunt, Al-Awadi & Johnson 2008). Similarly, concern for the welfare of farm animals can influence human evacuation behaviour (e.g. Glassey & Wilson 2011), and livestock losses can inflict 'enormous emotional distress' on farming families and communities (Travers, Degeling & Rock 2017).

Animals are also said to be 'at risk' during disasters (Travers, Degeling & Rock 2017). This rationale for including animals in disaster planning generally emphasises their sentience and innate (as opposed to only instrumental) value (Travers, Degeling & Rock 2017). Irvine examines how distinct categories of animals experience varying levels of exposure to hazards and 'are differentially provided opportunities for rescue or escape' (p.6). On this logic, Irvine (2009) contends that emergency planning frameworks are remiss to exclude animals densely confined and reliant on automated food systems in factory farms (p.6). Similarly, White (2012) argues the omission of companion animals from official disaster management frameworks in many jurisdictions overlooks their 'intrinsic value' and entitlement to 'care and respect in their own right' (p.381). Analogous arguments have been made in relation to wildlife, particularly given this group's sensitivity to shifting environmental conditions. For example, Lovvorn (2016) explains that climate change is disrupting weather patterns and terrestrial and marine habitats, and is therefore exterminating species that are unable to adapt. These processes impair ecosystem functions and services (Lovvorn 2016) and jeopardise biodiversity (Clark *et al.* 2014). Lovvorn (2016) also emphasises the extraordinary suffering they

inflict on sentient animals, who have 'no ability to plan, mitigate, or (in many cases) migrate away from the impacts of climate change' (p.40). Rather than characterising measures for animals as merely ancillary to those that safeguard humans, proponents of this rationale argue that animals should be protected from the adverse effects of hazards for their own sakes.

Animals as property: legally exploitable and inferior

Whereas Western legal systems categorise humans as persons, animals bear the legal status of property (Wise 1996). At common law (the tradition prevailing in Australia) domestic animals are at all times the property of their owners, whereas wild animals only become property when killed or brought under the control of a person (*Yanner v Eaton* (1999) 201 CLR 351, pp.386–387; note, a similar doctrine exists in the European civil law tradition: see, e.g. Polojac 2014). Some Australian jurisdictions have modified the common law position by passing legislation that vests ownership of all wild animals in the Crown. Regardless of the precise rule in operation, animals in Australia, including wild animals, are either property or capable of becoming property. Consequently, they are not persons.

Categorising animals as property has extensive ramifications for their wellbeing and survival, particularly during disasters. It is this status that allows animals to be used and kept in ways that maximise their value and economic efficiency (Kelch 1998), regardless of whether such practices exacerbate their vulnerability to disasters. The implications of this are particularly significant for agricultural animals. The fact that these animals are property justifies contemporary husbandry practices that increase their exposure to hazards, while failing to make provision for emergency events. According to Crawford (2020), tens of thousands of agricultural animals perished in the 2019–20 Australian bushfire season. In early 2020, harrowing images emerged of scorched carcasses in paddocks and along roadsides in NSW and Victoria. These animals had unsuccessfully attempted to flee (Bell 2020). On Kangaroo Island in South Australia, an astounding 60,000 head of livestock (mostly sheep) died (Government of South Australia 2020). It was precisely the property status of these animals that enabled them to be enclosed in paddocks exposed to the flames.

The effects of confinement are even worse for animals housed in intensive agricultural facilities (Irvine 2009): a practice similarly sanctioned by their property status. As in Australia, animals in New Zealand and the USA are categorised as property under law (*Putt v Roster* (1682) 2 Mod Rep 318; *State v Chambers*, 194 La. 1042, 1045 (1940)). The first of the Canterbury earthquakes in 2010 resulted in the deaths of 3000 chickens at one layer-hen facility where 2 of the site's 3 stands collapsed (Glassey & Wilson 2011). While this was a direct consequence of the earthquake, Potts and Gadenne (2014) nonetheless describe the casualties as 'victims of inhumane structural design' (p.224). Hundreds of millions of broiler chickens were estimated to have met a similar fate during Hurricane Katrina. Irvine (2009) argues that, in cases such as this, 'the factory farming system, not the weather alone,

created disastrous consequences' (p.8). That these birds could be housed in such densely stocked and poorly constructed facilities is attributable to their status as property.

Since animals' property status makes them legally inferior to people, they are usually afforded a low priority in emergency response initiatives. This was evident during Hurricane Katrina where emergency transport and accommodation services widely refused to accept evacuees who were accompanied by their companion animals. One poignant case was that of Snowball: a small white dog forcibly removed from a young boy before he could board an evacuation bus (Zotarelli 2010). This kind of hostility towards animals in emergency policy is symptomatic of animals' subordinate status as property. Baum (2011) argues that this status creates a 'value disparity' between humans and animals, whereby animals have 'less value than humans'; as a consequence, their interests are relegated during emergency rescue and relief operations (p.108). Potts & Gadenne (2014) similarly observe that, since animals are legally mere 'possessions', they 'are at risk of being treated as "things" or "objects"' under emergency management law (p.7).

Although jurisdictions – including in Australia – have started to integrate animals in disaster planning, their interests remain secondary to those of humans. In response to the recommendations of the 2009 Victorian Bushfires Royal Commission, the *Victorian Emergency Animal Welfare Plan* (Agriculture Victoria 2019) was introduced. Despite being the first substantial attempt in Australia to safeguard animals in disasters (White 2012), the instrument is highly anthropocentric. Its first guiding principle is that the '[p]rotection and preservation of human life is paramount' (State of Victoria 2019, para. 3.0). South Australia's animal emergency management framework describes the protection of humans in disasters as 'the overarching priority' (Government of South Australia 2018, p.10) and the Western Australian equivalent states that protecting the safety of people is the 'primary aim of emergency response' (Government of Western Australia 2019, p.1). There may be justifications for prioritising humans in disasters. Nonetheless, the subjugation of animal interests, enabled by their status as property and therefore as non-persons, can have profound implications for their survival and wellbeing (Heath & Linnabary 2015).

Due to their proximity to humans, companion animals derive some benefit from even anthropocentric disaster plans. In contrast, production animals have been largely overlooked by these instruments. Glassey (2020) attributes this to the absence of a 'human-animal bond' in respect of such animals. Irvine (2009) observes that, unlike companion animals, animals on farms firmly 'occupy the "animal" side' of the human-animal divide (p.40). This is evident in New Zealand's National Civil Defence Emergency Management Plan Order 2015 (NZ). Although the plan contemplates the mass evacuation of production animals in writing (cl 140(d)(iii)), this measure is elsewhere described as merely 'aspirational' and not a 'current requirement' (Ministry of Civil Defence and Emergency Management 2015). In Australia, the substantial farm animal casualties during the 2019–20 bushfire season attest to a similar

approach. Given the obstacles facing the large-scale transport of animals at short notice (The Senate Finance and Public Administration References Committee 2020), these outcomes are hardly a result of individual negligence or callousness. They are, however, related to these animals' property status, which enables them to be characterised as insurable and replaceable economic goods (see, e.g. Stoddard & Hovorka 2019).

The legal status of wild animals also has implications for their management in disasters. Concern for the ecological consequences of mass wildlife mortality has bolstered support for wild animal relief efforts. However, as the 2019–20 Australian bushfire season made plain, the status of wild animals as non-persons operates to diminish their interests in emergencies. The exclusion of wildlife from mainstream statutory rescue frameworks (see, e.g. *State Emergency and Rescue Management Act 1989* (NSW) s 3(1)) has the potential to create discord between first responders and wildlife rescuers during emergencies. The Final Report of the Royal Commission into National Natural Disaster Arrangements observed that, in jurisdictions where wildlife organisations were integrated in formal emergency management frameworks, wildlife rescue teams received prompt access to fire grounds (Commonwealth of Australia 2020). However, in other states, a lack of coordination between first responders and wildlife rescuers delayed the treatment of injured animals (Commonwealth of Australia 2020).

These structural challenges affecting the management of wildlife were compounded during 2019–20 Australian bushfire season by resource shortages. Referring to public submissions, the Interim Report of the Senate Inquiry into the 2019–20 bushfires noted concern over the 'limited' capability to retrieve and care for affected wildlife in the wake of the disaster (Senate Finance and Public Administration References Committee 2020). Non-government organisations also stressed the crucial work wildlife rescuers and carers perform, usually on a voluntary basis (see e.g. Gecko Environment Council (2020)). The incapacitation of wildlife rescuers and under-resourcing of the sector are an expression of the perceived worth of wildlife; as non-persons, wild animals can make very little claim on an emergency management framework designed principally to serve the interests of persons.

Statutory protections for animals: moderate and uncertain

The treatment of animals is also subject to anti-cruelty and environment protection statutes. These were originally introduced to rectify perceived deficiencies in animals' underlying property status. As the 19th Century Supreme Court of Mississippi observed, the common law 'punished no cruelty' towards animals, 'except insofar as it affected the right of individuals to such property'. It explained that animal welfare statutes operated to 'remedy this defect' (*Stephens v. State*, 65 Miss. 329, 331 (1888)). Modern wildlife protection and biodiversity conservation laws were likewise first introduced to slow the depletion of wild animal populations due to unrestricted hunting and trapping practices (Bowman, Davies & Redgwell

2010). Both anti-cruelty and wildlife conservation laws were motivated by anthropocentric concerns: namely, preserving society's moral fibre by denouncing acts of gratuitous cruelty against live creatures (Ibrahim 2006) and ensuring a sustainable game harvest. Nonetheless, these bodies of legislation represent some of animals' most substantial sources of legal protection (Frasch *et al.* 1999, White 2013).

While welfare legislation provides animals with some material benefit, it is only moderately effective in protecting them from the adverse effects of natural hazards. Its provisions generally impose unexact and meagre obligations in order to reduce disruption to an individual's enjoyment of their proprietary rights. Welfare laws often demand only the minimum standards necessary to keep animals alive and in an adequate state of health. Consequently, they fail to address the vulnerability to which animals are exposed as a result of their property status.

As possessions, animals – including dogs – are often lawfully permitted to be tethered, at least in certain circumstances. This practice can detrimentally prevent animals from escaping hazards, such as floodwaters (Glassey 2019). In Louisiana, legislation now prohibits the tethering of cats and dogs in 'extreme weather conditions' in designated emergency areas (LA Rev Stat § 3:2362 (2018)). However, no such law was in place at the time of Hurricane Katrina. As the storm approached, the Society for the Prevention of Cruelty to Animals called for residents in threatened regions not to confine animals left behind on properties (McNabb 2007). Contrary to this advice, owners tied their animals to fence posts outside their homes before evacuating; some eventually drowned in floodwaters (Glassey 2019).

Other jurisdictions are yet to follow Louisiana in prohibiting the tethering of animals during disasters. Legislation in Victoria provides that animals may only be tethered where certain criteria are met, including that they have access to water and sufficient shade (Prevention of Cruelty to Animals Regulations 2019 (Vic) reg 7(1)). The Regulations are silent about the need for favourable weather conditions. The Victorian Code of Practice for the Tethering of Animals (Revision 2) provides that '[a]nimals should never be tethered in conditions where they are vulnerable to heatwaves, severe cold or driving rain'. As the code is advisory, its legal relevance is limited (see *Prevention of Cruelty to Animals Act 1986* (Vic) s 6(1)(b)). At least one local council in New Zealand prohibits the confinement of dogs in extreme weather conditions (*Kapiti Coast District Council Dog Control Bylaw 2019* cl 7.1(e)). However, the New Zealand Government has not introduced legislation to this effect (Glassey 2019; cf *Animal Welfare (Care and Procedures) Regulations 2018* (NZ) regs 16 and 18). Nevertheless, New Zealand prohibits the confinement of animals in a manner that causes them unreasonable or unnecessary pain or distress under the *Animal Welfare Act 1999* (NZ) (s 23(1)).

Statutory welfare protections likewise only marginally mitigate the vulnerability of agricultural animals to natural hazards. In Australia, the welfare of farm animals is usually governed by regulatory schemes (Bruce 2012). These instruments make only rudimentary provision for the protection of animals in hazardous

conditions. They leave more systemic drivers of their vulnerability, such as confinement, poor infrastructure design or the holding of animals in disaster-prone areas, largely unaddressed. For example, during the Black Saturday bushfires, the Code of Accepted Farming Practice for the Welfare of Cattle (Vic) required herds to be protected from climatic extremes and heat stress 'as far as practical', be provided with sufficient feed and water and be kept behind 'adequate fire breaks' (cll 5.1, 3.1, 2.1, 5.3). The scale and ferocity of the bushfires made these requirements largely redundant, as more than 8000 agricultural animals were killed during the bushfires (Victorian Parliament 2010). The number of farm animal casualties during the 2019–20 summer bushfires was tenfold; these animals enjoyed similar protections to those affected by the Black Saturday bushfires (e.g. *Animal Welfare Regulations 2012* (SA) regs 63(1), 74(1)).

Similarly, during the Canterbury earthquakes, minimum housing requirements for poultry birds (*Animal Welfare (Layer Hens) Code of Welfare 2005* (NZ) Minimum Standard 3(b)) proved futile as the September 2010 earthquake devastated layer-hen facilities. Rules requiring dairy cows to be protected from adverse weather conditions (*Animal Welfare (Dairy Cattle) Code of Welfare 2010* (NZ) Minimum Standard 6(a)) also became ineffective as animals held on properties near the fault line suffered fractured bones and were humanely destroyed. In these ways, the modest nature of statutory welfare protections left agricultural animals with limited tangible support during the relevant disasters.

The inadequacy of statutory environmental protections came into sharp focus during the 2019–20 Australian bushfire season. The ecological catastrophe revealed that the federal *Environment Protection and Biodiversity Conservation Act* (Cth) (EPBC Act) and state and territory analogues insufficiently protect crucial features of wildlife habitat. In 2020, a review of the EPBC Act found that it has produced a patchwork of management interventions which 'fail to deliver at a system scale' (Samuel 2020, p.128). A recent issues paper concerning the *Wildlife Act 1975* (Vic) similarly observed that it does not 'account for indirect threats such as the destruction of wildlife habitat' (Peterson *et al.* 2021). These shortcomings were particularly consequential for wildlife during the 2019–20 Australian bushfire season: the availability of unburnt habitat and wildlife corridors were identified as factors *directly* affecting wild animal mortality during the fires (van Eeden *et al.* 2020). Land clearing activities conducted in accordance with previously approved development applications were also nominated as an 'anthropogenic factor at play in the immediate post-fire environment' that influenced the survival of wildlife (van Eeden *et al.* 2020).

The operation of statutory protections for animals can also become uncertain in disasters. During the Black Saturday bushfires and the Canterbury earthquakes, owners of companion animals were obliged to provide ill and injured animals with appropriate treatment (*Animal Welfare Act 1999* (NZ) s 11; *Prevention of Cruelty to Animals Act 1986* (Vic) s 9(1)(i)). However, during both disasters, road blocks and limited resources made it difficult for owners to secure effective and timely veterinary assistance (Potts & Gadenne 2014, Animal Aid 2009). Similarly,

welfare legislation in these jurisdictions and in Louisiana at the time of Hurricane Katrina prohibited the abandonment of animals (La Rev Stat Ann § 14:102 (2005); City of the New Orleans Code of Ordinances Sec. 18–2; see *Animal Welfare Act 1999* (NZ) s 10; *Prevention of Cruelty to Animals Act 1986* (Vic) s 9(h)). Desperate circumstances left many owners with no choice but to part with them though.

While failure to procure veterinary treatment for animals and instances of animal abandonment might ordinarily constitute breaches of welfare legislation, the circumstances in which this conduct took place complicates the law’s application. White (2012) argues that, in Australia, statutory welfare protections are likely displaced or tempered in the disaster context. The concept of ‘cruelty’ is usually associated with behaviour that qualifies as ‘unjustifiable, unnecessary or unreasonable’ (White 2012, p.387). For White, ‘coping with the demands of a disaster will be relevant to the scope of a reasonable excuse’ (White 2012, p.387). The statutory protections that applied to companion animals during Hurricane Katrina, the Canterbury earthquakes and the Black Saturday bushfires did not use explicit words of qualification when describing the offences of abandonment or failure to provide for an animal’s needs. However, it is unlikely that these provisions continued to bind animal owners with full force during the disasters. The final report of the 2009 Victorian Bushfires Royal Commission affirmed that it was for individuals to ‘decid[e] what to do with pets and other animals during an evacuation or when defending a property’ (2010, p.353). Irvine (2009) also expresses the view that prosecutions for animal abandonment would have been unlikely in the difficult circumstances of Hurricane Katrina. As this demonstrates, disasters can obscure the application of, and culpability for, contraventions of statutory welfare protections.

Conclusions

Law is increasingly used to improve disaster preparedness and response, including for animals. A series of disaster planning instruments has been introduced across jurisdictions to optimise welfare outcomes in disasters. While these plans are a welcome development, this study contends that attention must also be paid to the various ways in which animals’ underlying legal status contributes to their vulnerability. As the paper examines, 2 key components of this status amplify or fail to rectify animals’ susceptibility to the adverse effects of hazards. Animals’ property status allows them to be treated in ways that elevate their risk during disasters. It also relegates them to a state of legal inferiority. At the same time, the modest and fluid nature of statutory protections for animals hinder their effectiveness in the extreme context of a disaster. Since its objective was to describe the myriad ways in which the existing status of animals under law makes them vulnerable during disasters, the paper does not consider alternative forms this status might take.

Future research might recommend the abolition of animals’ status as property and the institution of a new status such as personhood. Alternatively, it might propose the introduction of robust statutory frameworks for animal welfare and the preservation of habitat, both in ordinary conditions and during

emergencies, which comprehensively address the adverse effects of their property status. Whatever solution may be explored, this paper provides one point of departure for future inquiry by diagnosing certain features of animals’ existing legal status that constitute them vulnerable to disasters.

Acknowledgment

This research was supported by a Commonwealth Government scholarship. The author is grateful to the 2 anonymous peer reviewers for their incisive feedback, and to Professor Christine Parker and Professor Lee Godden for their instruction and encouragement.

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Cultural factors in livestock emergency management

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SUBMITTED

8 February 2021

ACCEPTED

2 June 2021

DOI

www.doi.org/10.47389/36.3.69



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Introduction

Disaster mitigation and emergency response are contextual and complex. This is especially the case with disasters where there are high levels of uncertainty, for example, volcanic eruptions. Despite advanced monitoring and early warning systems, communication networks and measures, such as implementation of evacuations, casualties occur among people living in high-risk hazard zones of volcanoes who are often dependant on small-scale or subsistence farming.

Attending to animals and crops as long as possible is often given as a reason to delay evacuation (Mei *et al.* 2013) and residents are reluctant to leave and keen to return. Furthermore, in 2010 the spiritual gatekeeper of Mount Merapi in Indonesia and the people who took guidance from him did not evacuate in time and many died. Reports and case studies on evacuation reluctance or refusal concern many places in the world. Residents may consider risk rationales that differ from scientific risk calculation and modelling.

An understanding of why people are reluctant to evacuate or choose not to evacuate requires insights into the context of communities and their risk rationales. To explore this the following questions are considered:

- How do cultural (incl. psychological) factors play a role in evacuation reluctance prior to and during volcanic eruptions and what do they mean in terms of risk perceptions and assessments, and people and animal evacuation?
- How can livestock emergency preparedness (and reconstruction) programs be designed and implemented in a culturally sensitive manner?

Methodology

Complex societal issues, such as culture and how it influences emergency management, are difficult to scientifically capture. They encompass broad topics that are too many for a single discipline and can become fragmented in a multi-disciplinary endeavour. Thus, an inter-disciplinary and phenomenological approach was adopted for this study. Contrary to a neo-positivist approach (common in the life and natural sciences), phenomenological approaches take context into consideration. Observations and reflections of patterns and how knowledge, including science, is socially constructed are part of this approach (Latour & Woolgar 1986).

Abstract

Despite the institutionalisation of volcanic eruption early warning and response systems, casualties are still seen among local farmers who are reluctant to evacuate. Farmers may also prematurely return to their farms to save livelihoods and take care of animals. Case studies and media reports show the importance of understanding the cultural beliefs of residents when developing emergency plans. By reviewing literature from different scientific disciplines in relation to volcanic eruptions and livestock emergency preparedness, differences can be identified in the underlying risk and control paradigms, including the meaning given to volcanoes and livestock. Concurrently, livestock emergency preparedness approaches fall short of people-orientation. Using selected studies that consider these aspects, a people-centred and culture-sensitive framework to improve local learning and participation in emergency preparedness is offered. With disaster events becoming more frequent, participatory learning is useful to strengthen emergency management and preparedness programs.

A literature review was conducted from different scientific disciplines related to culture, livelihood and risk that correlated to the research questions. This was linked to studies concerning response to disasters, particularly to volcanic eruptions and people and livestock evacuations. This showed a pattern of evacuation reluctance reasons regarding the first research question and an observation for the second research question. A pattern of recurring psychological-cultural reasons for not evacuating as shown in the literature included:

- religious beliefs
- relying on traditional coping mechanisms
- mistrust of outsiders
- compromised resilience
- false sense of safety or perceived immunity.

Most commonly mentioned evacuation reluctance reasons in media articles were animals and religious beliefs. Analysis showed that livestock emergency programs and frameworks were focused on livestock rather than the people who owned livestock. Searches for example studies that confirmed or denied the pattern and observation were undertaken to select for ways to address culture in livestock emergency management and to develop a framework for a people-centred approach in emergency preparedness and response.

Applications of MEDLINE/PubMed, Web of Science, Google Scholar and internet search engines were used to search scientific literature, case studies and media records.

Background

Volcanic eruptions have direct impacts on communities at the time of the event and in the aftermath as well as at the eruption site and beyond the danger zone (Williamsen & Courtney 2018). With regard to livestock emergency management, it is useful to distinguish between fast- and slow-onset disaster events with long or short durations that are large or small-scale in combination with the chance and effects of the event. For example, droughts are usually a slow-onset event and can be manageable, but when they become wide-spread and long-lasting they have the potential to cause significant human and animal casualties. Alternatively, cyclones and volcanic eruptions can be drastic events with high uncertainty and possibly high levels of localised fatalities and destruction of infrastructure and disruption to delivery of services.

Brown and co-authors (2018) updated and expanded a global volcano fatality database to include human fatalities from 1500 to 2017 involving 194 volcanoes in 38 countries, with most recorded in southeast and east Asia (approximately 50 per cent). Besides fatalities, there are more people whose lives and livelihoods are affected, including people living beyond designated high-risk hazard zones. Communities can also experience an influx of displaced people and animals and the disruption of local economies (Woo 2008). Statistics on the numbers of people affected by the world's major volcanic eruptions from 1900 to 2016 show that 8 of the top 10 most disruptive eruptions

have taken place since 1990. The growth in population and in tourism has led to greater numbers of people being affected and Indonesia, the Philippines and Japan have the largest populations living within 100km of an active volcano (Cotrell 2015).

Animal losses due to volcanic eruptions have been recorded from archaeological findings and historic diaries but are only recently being addressed in terms of mitigation and evacuation (FAO Regional Office for Asia and the Pacific 2021). Although the value of animals, particularly livestock for livelihood recovery, is increasingly acknowledged in disaster mitigation, animal evacuation is not yet common practice in the context of smallholder farms in developing countries. The focus remains on reducing human fatalities by evacuation, thus abandonment of animals is common. The rescue of animals is often left to non-government organisations. These rescue attempts can be frustrating and stressful for both farmers and rescuers. Coordinated collective efforts can improve emergency response and livestock emergency preparedness. However, collective effort coordination entails people as well as managing people and when 'people manage people', culture inherently plays a role. Fundamental to disaster mitigation and preparedness is the desire to control for more positive and/or less negative outcomes. Therefore, 'unhelpful' culture may be acknowledged, analysed, understood and managed. This notion overlooks culture as context.

Cultural contexts

Culture as a phenomenon is difficult to define but can be generally understood as socially shared belief and meaning systems that influence values, perceptions, social norms and behavioural practices of individuals and groups of people. People are born into a culture as they are born into a language. Cultures, like languages, have evolved with humans and their environments. Members of communities must make a livelihood and protect themselves from hazardous environments. They develop ways to reduce vulnerabilities and improve knowledge and give meaning to their lives and circumstances. These survival strategies, beliefs and social norms are passed on and shape the cultures. Communities near active volcanoes experience eruption threats and have developed coping strategies. Volcanic eruptions can cause unusual and traumatic experiences that can result in psychological trauma and have lasting consequences for communities. Cashman and Cronin (2008) examined how communities process events by developing volcano mythologies. Eyewitness reports from 2 eruptions (Mt. St. Helens, USA in 1980 and Monserrat in 1997) were compared with a myth from the Mt. Tarawera eruption in New Zealand in 1886 to uncover a structure for narratives leading to myths (shown in Table 1).

This myth ontology explains other documented myths, for example, Mt. Merapi (Donovan 2010), Mt. Kelud and Sinabung (Adreastuti *et al.* 2019), Mt. Arenal (Van Manen 2014) and Montserrat (Haynes, Barclay & Pidgeon 2008). Myth structure narration varies by region and even between villages as they experienced different eruption histories (Donovan 2010). Chester and Ducan (2007) found that 35 of 51 records had religious

Table 1: Narrative structure from eyewitness accounts to shaping a myth.

Post-eruption eye witness reports characteristics	Story elements or stages in shaping a myth
<p>Immediate records:</p> <ul style="list-style-type: none"> · inconsistency (due to extreme stress) · struggle to put the event into context (being beyond experience and comprehension) · descriptions as if an (animated) hidden power was behind the event. <p>Reflections:</p> <ul style="list-style-type: none"> · psychological unbelief processed first by rumour and media and later by folk songs (US) and poetry (Montserrat), using metaphorical language to express the ‘unnatural’ of the hazard · Harry Truman, who had refused to evacuate and got killed, became a mythological hero in songs (first in the USA, later adopted in Monserrat). 	<ul style="list-style-type: none"> · Effects and impacts on the lives and land (e.g. ruined, burned, ugly, hunger, dead animals). · Supernatural/other world metaphors (e.g. blast stood up by something or someone). · Analogies for unfamiliar phenomena (e.g. black snowflakes, inky waterfall, fire snakes, avalanche of black chalk, waves lapping up on a beach). · Responsibility of a higher power (e.g. gods, spirits, authorities who should have warned). <p>When a story gets older and is repeatedly told, the supernatural and higher power elements in the tale structure gradually overtake the effects and analogy elements in the story, thus shaping a myth.</p>

Source: Cashman and Cronin (2008).

responses to eruptions. Monotheism, polytheistic, animism and humanism are associated with different narrative characteristics. For example, a pantheon of deities or legendary royal courts versus animals, plants, landscape features and ancestors figure in the story. Complex interactions between people’s faiths and rituals from older faiths are common. According to Cashman and Cronin (2008), narratives, such as myths, are an integral part of community resilience in that, ‘The oral traditions how communities attempt to cope;provide a cultural safety net of context within which to place and comprehend future catastrophic events’ (p.417).

Myths can be understood as psychological phenomena in cultural contexts. Livelihood and livestock keeping also have a cultural context. Generally, people understand other people’s culture through their own cultural perspective. This necessitates comparing the cultural contexts of both local farming communities in volcanic areas and external emergency preparedness approaches to understand how to address psychological and cultural factors affecting livestock emergency management.

Farmer versus expert perceptions of livelihood and risk

Risk and livelihood shape cultures. For example, preagricultural communities and agricultural societies have different social structures and belief systems. Due to prevailing culturally established values and attitudes, risk and uncertainty are dealt with disparately in various cultures and influence people’s risk perceptions. Additionally, farmers, volcanologists, emergency managers and politicians belonging to a same national culture, have different livelihoods and social circles that shape their cultural values. For example, local villagers live with, monitor and live through a hazardous event, which is different from people outside the village and their understanding of the event

(Haynes, Barclay & Pidgeon 2008; Armijos *et al.* 2017). Volcanoes, livelihoods and risks are viewed differently by ‘insiders’ and ‘outsiders’, further referred to as farmers and experts. Experts focus on preventing loss of life, whereas farmers can lose their life and livelihood. Generally, experts are scientifically trained and modern science (and policy-making) deals with risk and uncertainties by studying the ‘unknown’, using the information to calculate or model risk to be pre-empted, reduced or mitigated (Woo 2008). Instead, people in traditional settings may have learnt to be familiar with and have a sense of safety through repetition of stories and rituals. They focus on what is uneventful or protective to reduce uncertainty and develop trust (Schechner 1994).

A decision on whether to evacuate due to volcanic eruption is a risk and uncertainty decision. Various scientific disciplines define and study risk decision-making, whereby the level, kind and accuracy of information is an important factor. The human brain deals with informed risk and uninformed uncertainty in a different way. Known risk from past information can be assessed or calculated, but the brain cannot handle a ‘no information’ situation. It will reconstruct earlier information and come up with best guesses, analogies, stereotypic patterns and historic information (Kahneman, Slovic & Tversky 1982). Communities near volcanoes rely on re-constructions of earlier information, such as plant and animal behaviour patterns, mythological explanations and oral history in association with previous eruptions (Torrence 2019, Donovan 2010). If earlier experiences of evacuations, including false alarms or encounters with authorities were not good, people associate evacuations with bad outcomes and may take a chance that an eruption may not take place or have limited effects. Another reason for not evacuating is due to a psychological phenomenon of ‘unjustified sense of subjective immunity’, causing a false sense of safety (Douglas 1985). If previous eruptions were long ago or mild and life continued as usual, people may feel safe even if the actual event poses danger. Schelle (1996) notes:

... the volcano is not just a threat. It makes the land enormously fertile. The residents have their own perception about the dangers of Mount Merapl. Their belief in the spirits and the rituals related to these spirits provide them with a subjective sense of security and strengthen their resistance to the government's resettlement policy. (p.104)

Table 2 summarises the different and at times opposing values and outlooks of local communities versus external experts and official emergency approaches.

Table 2: Comparison of values and outlooks in emergency approaches.

Local farming communities	External experts and official emergency approach
Safeguarding livelihoods, including livestock.	Save as many lives as possible.
Religious, spiritual beliefs and history and experiences of previous eruptions as approach to dealing with uncertainty.	Scientific, quantified risk assessment: rational and logical approach to dealing with uncertainty.
Relying on combination of official communication, media and 'shadow' networks.	Reliance on official (top-down) communication.
Safeguarding social capital and livelihood resilience in reconstruction.	Reconstruction – build back better.

Source: Based on case studies by Haynes, Barclay and Pidgeon (2008); Donovan (2010); Schechner (1994); Schlele (1996); Van Manen (2014); Armijos and co-authors (2017).

Table 3: Livestock roles and replaceability.

Livestock role	Main production system	Livestock replaceability
Food item	Subsistence livestock systems	Replaceable, if replaced by food (aid).
Economic – financial product, production mean, reproduction mean, asset	All livestock systems (except purely subsistence)	Replaceable by food aid and insurance (sale and slaughtering), compensate for loss of income, livestock replacement takes time. Not replaceable, animals with unique genetic traits and other unique animals with a specific economic function.
Social – status and (re)establish relations	Community livestock systems	Not replaceable, if qualities or uniqueness of animals matters. Replaceable short-term, if animals matter only in numbers (swift replacement).
Abstracted – for social, cultural or religious functions	Traditional livestock systems	Irreplaceable, if animal is given symbolic identity. Loss can involve traumatic experience.
Affectionate – animal, herd / flock, or species	Almost all livestock systems, individually based	Irreplaceable, can involve traumatic experience.

Source: Based on inter alia Herrero and co-authors (2013), Waiblinger and co-authors (2006)

Meaning of livestock

People go to great lengths to safeguard animals (Mei 2013). Animals play an important role in livelihoods, both economically and socio-culturally, which can be associated with replaceability (see Table 3). This relates to the level of trauma inflicted when animals are lost. Livestock can be centrally placed in cultures. For example, in Melanesian islands of the Pacific region, pigs represent stored wealth interwoven with social structures and beliefs and treating pigs poorly will be punished in the afterlife (Rappaport 1984).

Similarly, emergency planners, policy makers, government authorities, animal welfare agencies and people in general, place value on animals. Legally, animals are regarded as ‘private goods’, but the meaning of animals can surpass property value. Animals are sentient beings and can be viewed in their abstracted value (Villanueva 2018), motivating animal rescuers and farmers to put their lives, health and wellbeing at risk. Scientists increasingly study animal welfare and advocate for contingency plans that include animals (Glassey & Wilson 2011, Waiblinger *et al.* 2006). Animal welfare is becoming part of humanitarian and political agendas and an integral part of disaster mitigation and emergency preparedness (LEGS 2014).

Emergency response

Analysis of case studies indicated entry points and opportunities to plan and implement emergency responses in a people-oriented, culturally sensitive manner.

Connections and communications

Van Manen (2014) and Haynes, Barclay and Pidgeon (2008) illustrate that cultural and socio-economic factors affect hazard knowledge and risk perceptions of local communities. Miscommunication and distrust are common and varying levels of distrust, local knowledge and rumours may compete with official information. Haynes, Barclay and Pidgeon (2008) indicate that scientists are a more trusted source of official information than government but scientists seldom play a role in emergency response communication. Such disconnects combined with a lack of feedback mechanisms and local consultation can lead to distrust and un- or under-preparedness of local communities. Typical emergency participants and information flows are presented

in Figure 1, with official communication indicated by the broad arrows and the informal communication by the narrow arrows.

Building trust and agency

Armijos and co-authors (2017) describe a ‘shadow’ network alongside and interacting with formal disaster response institutions. This network evolved after the eruption of the Tungurahua Volcano in Ecuador in 1999. Official emergency response had been chaotic and there was a forced evacuation. Distrust in authorities and scientists became widespread. Afterwards, scientists reached out to villagers to develop a common vocabulary and establish shared knowledge that linked the informal community networks with formal government networks. The government decentralised risk management, conducted response trainings and improved shelter and infrastructure. During subsequent eruptions (2006 and 2014) villagers self-evacuated with their animals after direct communication from scientists and as assisted by authorities. Each village decided its risk tolerance and hour of evacuation and evacuated collectively. In addition, partial evacuations were facilitated for farmers with day jobs near their shelter home. The government took care of transport and assisted in a local ‘feed for animals’ distribution program. This approach of people-centred early warning and evacuation saved lives, including animals. Self-evacuation, however, would not have worked if there was no appropriate shelter for people and animals and if people’s livelihoods were drastically affected.

Village level emergency planning

Donovan (2010) describes the influence of traditional cultural values during the 2006 volcanic crisis at Mt. Merapi in Indonesia

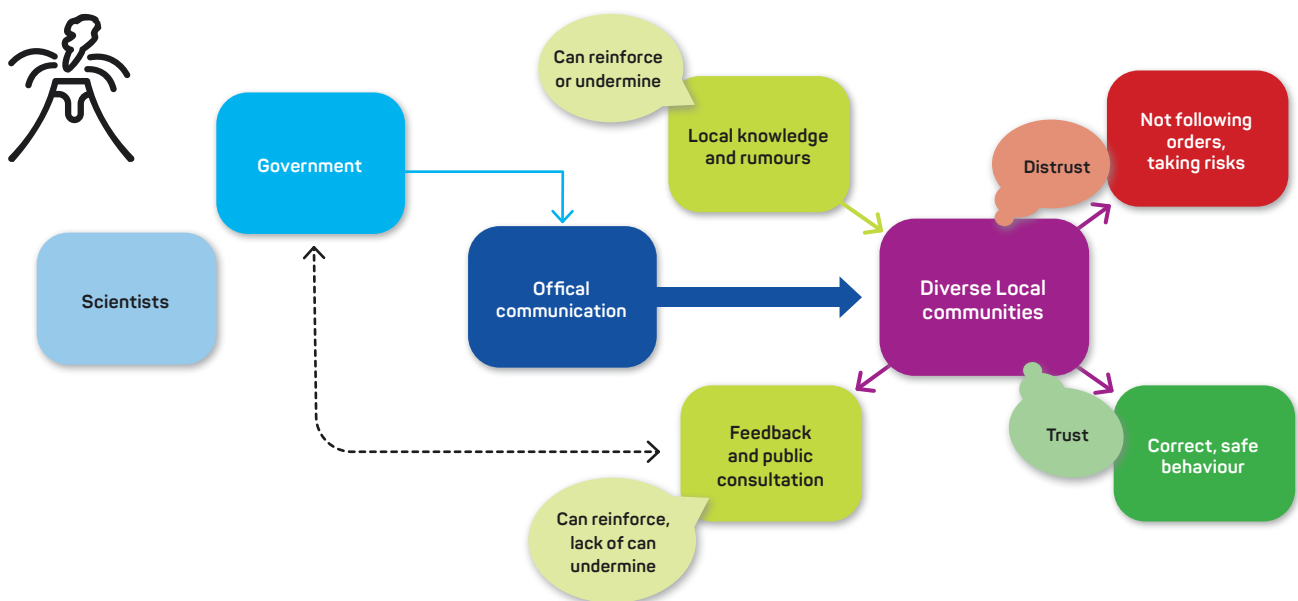


Figure 1: Typical participants and information flows in emergency communications.

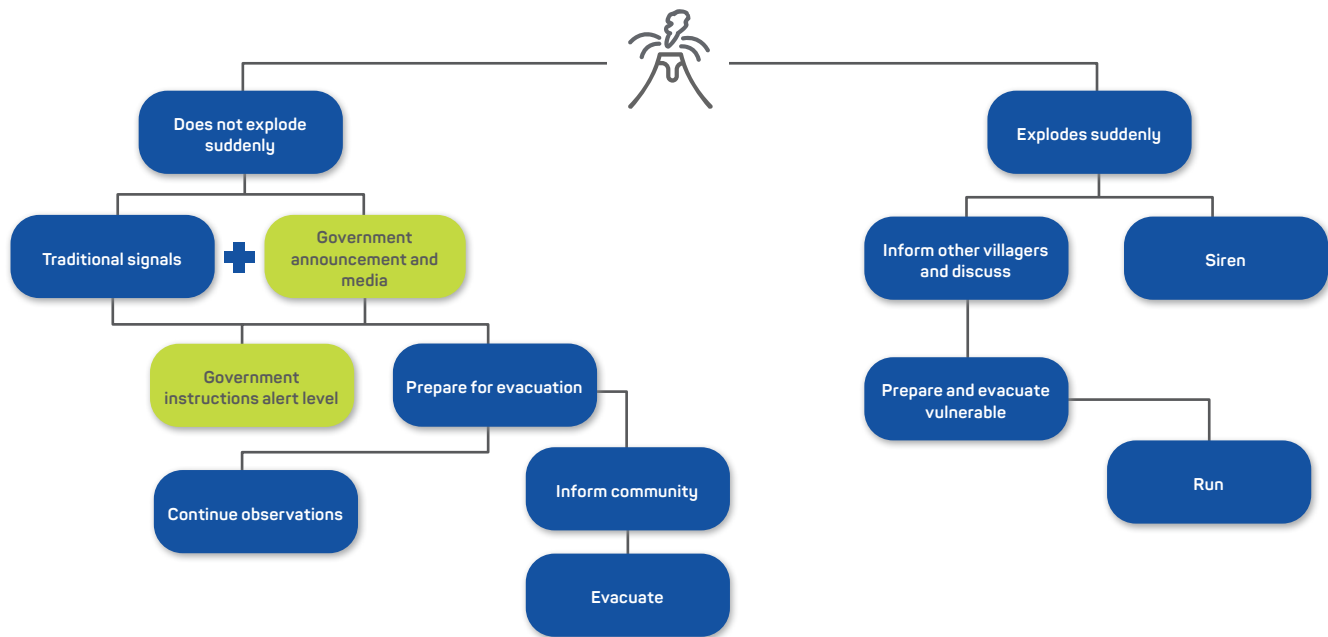


Figure 2: A summary of the Pelem Sari village emergency plan.

in 2 villages where people had refused to evacuate. Participatory-based village workshops included hazard mapping and village emergency plans. Figure 2 is a summarised version of the Pelem Sari village emergency plan, adapted from Donovan (2010, p.123). The decision tree shows an emergency plan in which traditional signals are important next to government warnings. It also shows the importance of informing others, community decision-making and planning, even during the emergency. In the group discussion, Donovan (2010) noted that, ‘villagers would not take action unless they had received both a traditional and an official warning’ (p.122). Figure 2 shows instances where outside ‘government’ information was received or considered by the Pelem Sari villagers (marked in yellow). Andrestuti and co-authors (2019) indicate that the most common problem arising during volcanic eruptions is a breakdown in communication between scientists, decision-makers and threatened communities. Mapping out the emergency planning processes in a participatory manner at the village level and mapping the connections to outside information sources improves both cultural insights and communication flows and supports emergency planning. It also offers opportunity to discuss the best approach for including livestock in emergency plans.

Social capital and livelihood resilience (pre- and post-eruption)

Social capital, the potential to benefit from social relations, is especially important during crises. When a community falls apart, for example when community members evacuate to different locations or die, there is a loss of supportive livelihood arrangements (Cox & Perry 2011). Social relations can be comforting, inspiring and a collective narrative can help individuals adopt recovery strategies (Cashman & Cronin 2008, Chamlee-Wright & Storr 2011).

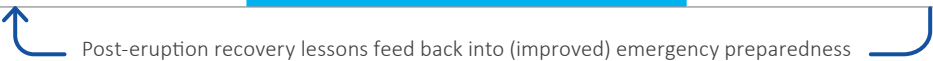
After the 2004 Indian Ocean tsunami, James and Paton (2016) found that women under 15 or over 60 years of age, female-headed households and people with disability were easily overlooked in aid and recovery programs. Moreover, they had difficulties accessing help, resources, financial credit and influencing policy. Gender, age, ability and social privilege become denominators for wealth distribution, dependency, ownership, resource access and political power (Speranza, Wiesmann & Rist 2014). These ‘denominators’ mirror the capacity to (re)build livelihoods, unless counteracted upon. During recovery and reconstruction, social capital is critical for mobilising collective action to rebuild community property as well as reshape livelihood resilience and community strength. Nakagawa & Shaw (2004) compared community recoveries after earthquakes in India and Japan and showed that high social capital in combination with community leadership provides a speedy and satisfying recovery.

Strong livelihoods can better withstand and recover from disaster. Haynes, Barclay and Pidgeon (2008) advocate to shift priority in emergency management strategies from hazard exposure reduction to tackling the root causes of livelihood vulnerability and boosting livelihood resilience.

Livestock emergency preparedness

Pre-eruption preparation should focus on people more than animals. This can take the form of knowledge exchange (from an intercultural perspective) on volcanic eruption risk assessment and (livestock) emergency management, building trust and intercultural communication plans. Turning to the integration of livestock concerns in emergency response, more governments start to get involved in animal emergency preparedness. The Philippine Daily Inquirer of 17 January 2020 included passages by Matthew Reysio-Cruz that illustrate how non-government

Table 4: People-oriented, culture-sensitive emergency preparedness for people and animals.

Pre-eruption emergency preparedness	During eruption	Post-eruption recovery
← Participation and communication → between government, non-government organisations, scientists and communities		
Acknowledge culture and experience, develop common vocabulary and dialogue	Respect	Evaluation and feedback
Village Emergency planning, connect to these.	Implement plans	Evaluation and feedback
Building trust	Maintain trust	Build further trust
← Focus on livelihoods and social capital →		
Increase livelihood resilience, agency, leadership	Trade-off risks vs livelihood	Restore or improve livelihood resilience, attention for socio-psychological aspects.
Setting priorities, including livestock. Assist with shelter, feed, transport, communication preparations	Implement accordingly	Evaluation and feedback
Acknowledge diversity in community (gender, age, social class)	Ensure all groups included in emergency support	Focus recovery on all groups, especially most vulnerable
 Post-eruption recovery lessons feed back into (improved) emergency preparedness		

organisations and government joined forces in the rescue of horses during the 2020 Taal eruption:

Animal rights organizations had complained that the military initially prohibited residents from taking animals with them....officials called an emergency meeting that day with animal welfare organizations ..[and others] to coordinate their efforts, putting an end to chaos that marked rescue efforts on previous days when the groups struck anywhere they were needed.... There's now a plan for the animals to also be part of the evacuation.

Volcanic eruption responses are complex and require leadership and clear communication at every level. Combined with livestock evacuations, complexity increases. In densely populated volcanic areas with small-scale farming, the logistics and shelter provision can be challenging. However, the people-oriented emergency preparedness approach that Ecuador took, suggests that animal evacuation is feasible; demographics and politics allowing. Evacuations or de-and-restocking of animals in great numbers and on short notice needs good preparation and coordination involving farmers. Participatory tools (e.g. Participatory Response Identification Matrix) for scoring livelihood objectives, emergency phases and technical interventions, such as destocking and

restocking and veterinary support (LEGS 2014), can be suitable for slow disaster management. Pre-eruption uncertainties hamper trade-off decision-making between risk and livelihood. However, a post-eruption situation involving livestock can develop into a slow disaster crisis.

Ensuring livelihood continuity is essential. Therefore, facilitating evacuation, insurance options, innovative adaptations to protect and care for livestock and improve livelihood resilience and animal health are priorities. Experts should be cautious to 'do the thinking' for farmers and come up with ill-adapted solutions, for example, cyclone shelter homes not catering for livestock. (Miyaji *et al.* 2020). Exchanges between communities of experiences and local adaptations are deemed more appropriate and thus more successful.

Framework for addressing cultural factors

These case studies on emergency preparedness in volcanic areas uncovered a number of commonalities, even though cases are located in communities across several continents. The patterns identified allow a comparison of emergency preparedness by local farming communities versus externally

imposed emergency preparedness approaches. They point to connecting and communicating in a participatory manner as well as acknowledging that livelihood continuity and social capital play important roles for people-oriented, culture-sensitive (livestock) emergency preparedness. Table 4 summarises the framework.

Lessons learnt during post-eruption evaluation generate new knowledge for preparing for a next eruption threat. The psychological-cultural factors that influence communities' evacuation willingness and preparedness cannot be 'solved' but they can change with new experience and knowledge. A people-oriented approach that seeks to understand the underlying values and outlooks, combined with feedback and interaction processes would be constructive for bridging differences and building trust. Developing a common vocabulary to avoid misinterpretations is part of this process (Armijos *et al.* 2017).

Since livestock evacuation decisions are a trade-off between risk and livelihood, farmers assess a tolerable or acceptable risk. Safeguarding livestock during an emergency situation and increasing livelihood resilience may be prioritised (Haynes, Barclay & Pidgeon 2008). Albeit, a people-oriented culture-sensitive approach with consultation needs to come first. Then, if it transpires that people's priorities concern their livestock; this should be incorporated in the emergency preparedness approach.

Culture and livelihood embedded risk perceptions and attitudes of scientists and policy makers versus those of residents also needs to be understood and taken into consideration to identify effective communication strategies (Doyle *et al.* 2014). Local leaders and cultural interpreters play a pivotal role in understanding risk interpretation and messaging and should be consulted (Mangundjaya 2013).

Conclusions and recommendations

Taking an interdisciplinary phenomenological approach, this study shows that cultural factors, including the meaning of livestock and livelihood, play a role in evacuation reluctance. Example studies tested the pattern and observations from the literature reflection to develop a framework for culturally sensitive livestock emergency preparedness (and reconstruction) programs. The framework can clarify trade-off decisions between livelihood and risk (small-chance vs high-impact risk). How this translates to other types of disasters could be studied. It may be expected that different types of livestock contingency plans are needed, but that all disaster management could benefit from a people-oriented and culture-sensitive approach. Additionally, the contexts of countries differ in various ways and distances in cultural difference between residents, emergency managers and authorities can be significant.

In a people-oriented and culture-sensitive approach, one should be aware that emergency planners view situations as problems and they have been trained to analyse and solve them. By working in multidisciplinary teams, the scope broadens. However, looking through a culturally sensitive lens allows seeing the context. Culture sets the context of communities and also of emergency planners, government bodies and non-government organisations. In addition, women and men have

different viewpoints. In a people-oriented approach this should be considered as women, men, young, old, disabled and poor are not equally vulnerable in crises situations. Therefore, it is vital to have female and male scientists, policy makers, communication experts, authorities and activists working together and with communities to better manage disaster events.

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Abstract

Emergencies and disasters create stressful situations that can exacerbate ongoing behavioural health issues. Veterinarians have been identified as a professional group at elevated risk for behavioural health issues when they are involved with an emergency response. Prior studies looking at transboundary animal disease disaster management demonstrate the significant and long-lasting mental health effects experienced by veterinary responders. To examine the scale and scope of behavioural health issues exhibited by veterinary responders, an online and anonymous survey was conducted with veterinarians who had participated in events in the Asia-Pacific, Africa, Europe, Latin America and North America regions. The results of the survey showed that behavioural health issues were reported by 51 per cent of respondents during and up to 6 months after the disaster. Behavioural health issues reported included loss of sleep, anxiety, difficulty with personal and professional relationships, mood swings, depression, nightmares and flashbacks and suicidal thoughts. The scope and magnitude of veterinarians with behavioural health issues associated with disasters underscores the need for guidelines, standards, education, training and further research in this area.

Veterinary behavioural health issues associated with disaster response

Peer Reviewed

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SUBMITTED
6 February 2021

ACCEPTED
26 May 2021

DOI
www.doi.org/10.47389/36.3.78



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Introduction

Emergencies and disasters can have impacts on human, animal and environmental health. The psychological or behavioural health effects on veterinary responders across disaster types has not been widely studied. The aim of this research is to examine the scale and scope of behavioural health issues exhibited by veterinary responders.

A 'disaster' is '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' (UNDRR n.d.). Mental health, psychological health and behavioural health are terms that have been used interchangeably. For this study, the concept of behavioural health is used as described in *Behavioral Health vs Mental Health* Alvernia University 2021: 'Behavioral health describes the connection between behaviours and the health and wellbeing of the body, mind and spirit'. This concept includes how behaviours effect physical and mental health.

Because disasters have significant impacts on human and animal health, economies, trade and societies, animals and animal-related issues are increasingly becoming part of disaster management and risk reduction planning due to economic, health, welfare and social aspects. *The United Nations Office for Disaster Risk Reduction Annual Report 2019* (UNDRR 2020, p.12) estimated the global economic losses from natural hazards at USD\$232 billion, highlighting the animal component of disasters by citing Australia's October 2019 to March 2020 bushfires that killed an estimated 1.25 billion animals

The World Organisation for Animal Health (OIE) disaster preparedness and response guidelines (OIE 2016) as well as the United Nations Food and Agriculture handbook, *Good Emergency Management Practice: The Essentials* (GEMP) (Honhold *et al.* 2011), have identified critical roles for veterinarians in emergency management including the protection of animals, people and economies. For example, veterinarians are critical during a transboundary disease

outbreak, which is a specific animal-disaster category that can cause significant economic, trade and food security risks at national and international scales (Otte, Nugent & McLeod 2004). Transboundary animal disease control is a process that mitigates these negative effects. Examples include the 2001 foot-and-mouth disease outbreak in the United Kingdom (Davies 2002) and the 2017 avian influenza outbreak in the USA (Lee *et al.* 2017). In both cases, part of the control measures included depopulation or killing of diseased and healthy animals within a geographic area to prevent the spread of the disease and to protect the remaining livestock. Veterinarians participate in depopulation at all levels including the decision process, supervision of depopulation and killing of designated animals. The psychological effects of killing diseased and healthy animals has been described as 'perpetration-induced traumatic stress' (Whiting & Marion 2011). Depopulation has behavioural health effects on the communities, producers and those undertaking depopulation.

Veterinarians have been identified as having a potentially high rate of suicide as well as other behavioural health issues. Studies in the USA show that veterinarians may have a proportionate mortality rate from suicide of 1.7 to 2.6, being 3 times that of the general population (Tomasi *et al.* 2019). Nett and co-authors (2015) indicated 9 per cent of veterinarian respondents to their survey reported current serious psychological distress. These studies highlight the background behavioural status of veterinarians. Khatri, Fitzgerald and Meen (2019) provided a systematic review of published articles on health risks for disaster responders that showing mental health as a key issue. Forty-five of the 71 identified articles cited in the review included veterinarians as responders, however, there is a general lack of detailed information on veterinary responder behavioural health. The combination of underlying veterinary behavioural health issues and the added stresses of a disaster response creates an environment for elevated behavioural health risks.

Veterinary psychological or behavioural health stress in emergency response has been associated with specific transboundary disease disasters. Despite the reports on this issue there are very few references to behavioural health in international animal health standards and guidelines. *The Terrestrial Animal Code* (OIE 2019) has numerous references to animal welfare, but it does not address human welfare to a significant extent. The UNFAO GEMP identifies psychological distress support needs by producers and communities, but it gives limited attention to responders (Honhold *et al.* 2011). These high-level references provide guidelines for the technical aspects of veterinary emergency response and do not address the safety, health and wellbeing of veterinary responders.

Nusbaum, Wenzel and Everly (2007) identified the need for psychological first aid for both veterinary responders and the animal-owning population. A study of the behavioural health effects for veterinarians participating in the foot-and-mouth disease response in the Netherlands in 2001 showed the potential long-lasting consequences with 40 per cent of veterinarians showing signs of traumatic stress after 6 years (Noordman & Endenburg 2008). Similarly, posttraumatic stress disorder (PTSD) was identified by Hibi and co-authors (2015)

in veterinary personnel 2 years after the foot-and-mouth disease control program in Japan in 2010. However, there is a lack of programs available or in use to address behavioural health of veterinarians (Wasson & Wieman 2018). The United States Department of Agriculture (USDA) National Animal Health Emergency Management Systems (NAHEMS) along with the Center for Food Security and Public Health has published guidelines for addressing responder behavioural health in animal disease events as one model (CFSPH 2018). But the training, exercising, execution and evaluation of these guidelines during actual events has not been examined. Documentation of veterinary behavioural health issues associated with disasters has primarily focused on the responses to transboundary disease in specific countries. The broader range of behavioural health issues in a variety of disasters and locations is worthy of study. Therefore, a study of behavioural health of veterinarian responders to qualify and quantify the scale and scope of behavioural health issues should be across identified disasters events including conflict, technological disasters, natural hazards including the subcategory of disease events as well as geographic locations.

Method

A cross-sectional study was conducted via an online anonymous survey consisting of 24 questions. The survey was developed, tested for functionality and reviewed by veterinarians, disaster responders and behavioural health practitioners for validity before data collection on the Qualtrics® platform. Questions were in pick-list and free-text formats. The purpose of the survey was to identify the scope and scale of behavioural health issues of veterinarians responding to disasters. In addition to informed consent language, the survey included stress warnings for participants to stop the survey and seek support if feeling distressed. A link to the survey was sent to individuals identified as veterinarians from contact lists of the OIE headquarters and attendees from conferences with a focus on disaster and emergency management. Supporting this snowball sampling approach, the survey link was coded for reuse so it could be forwarded to others. Two seeding emails announcing the survey were sent; the first with 1113 email addresses and the second, one month later, with 968 email addresses that were determined to be active. The survey was open for one month following the second notice. The results were tabulated and analysed by the authors.

The research received ethical review and approval before the survey was fielded and was conducted under Institutional Review Board #875 V.0, Lincoln Memorial University.

Survey results

There were 255 responses to the survey. Of these, 15 responses were discarded as they did not meet the criteria for inclusion, resulting in 240 useful responses. Criteria for inclusion were agreement to participate, responding to the 4 independent variable questions (number of disasters participated, number of years practicing as veterinarian, birth year and gender) and agreement that the respondent participated in at least one disaster and identification of the region where the disaster

event occurred. Not every respondent answered each question resulting in an 89 per cent (227/255) full completion rate. The organisational affiliation of the respondent was not identified in the survey therefore government, private and non-government roles of responding veterinarians were not determined. The non-probabilistic data collection technique limits the results to descriptive statistics. These results reflect responses to individual questions and are rounded to nearest whole numbers.

Most respondents (73%, 174/240) had participated in 2 or more disaster events with over a third (35%, 85/240) participating in 4 or more events. Respondents were equally distributed by gender (male 53%, 126/240 and female 48%, 114/240) and the majority (85%, 205/240) had worked for more than 10 years as a veterinarian. The responses covered disasters that occurred in Canada and the USA (40%, 96/240), Europe (31%, 75/240), Asia-Pacific (12%, 28/240), Africa (11%, 26/240) and Latin America (6%, 15/240). More than half of the respondents had participated in an animal disease outbreak (52%, 124/240) with natural hazards the second highest reported (36%, 87/240) followed by military or civil conflict (6%, 14/240), human disease (4%, 9/240) and technological disasters (3%, 6/240). More than half the respondents (54%, 129/239) reported participating for 5 or more weeks during the disaster.

Veterinarians described multiple response roles with the majority in fieldwork (45%, 108/239) and emergency operations centres (29%, 69/239) and the remaining equally divided between categories of epidemiology, laboratory and other. Those working in fieldwork served in a variety of roles with most (88%, 95/108) tasked with depopulation, carcass management and quarantine tasks.

Many respondents (60%, 142/237) were unaware of current standards, guidelines or standard operating procedures for their behavioural health. Few respondents reported receiving training before deployment (24%, 56/238) or during deployment (26%, 61/238), much less behavioural health support during (16%, 38/234) or after (13%, 31/234) the event. However, 51 per cent (120/235) reported experiencing at least one behavioural health symptom during the disaster response and 34 per cent (77/227) of respondents reported at least one behavioural health symptom after the disaster.

Survey analysis

Several veterinary behavioural health issues were identified during and after responding to an emergency with half of respondents reporting behavioural health symptoms (see Figure 1). These responses included a variety of behavioural health symptoms ranging from sleeplessness and anxiety to depression and thoughts of suicide. In addition, these symptoms often persisted 6 months after a deployment with several of the most significant symptoms (mood swings, depression, nightmares and suicide thoughts) showing little change from numbers reported during the disaster.

Figure 2 illustrates the behavioural health issues reported across the spectrum of disasters including transboundary disease disasters, human disease, conflict, natural and technological disasters. Figure 3 shows that males and females equally reported experiencing behavioural health symptoms. Figure 4 shows that behavioural health issues were reported in every geographic area surveyed.

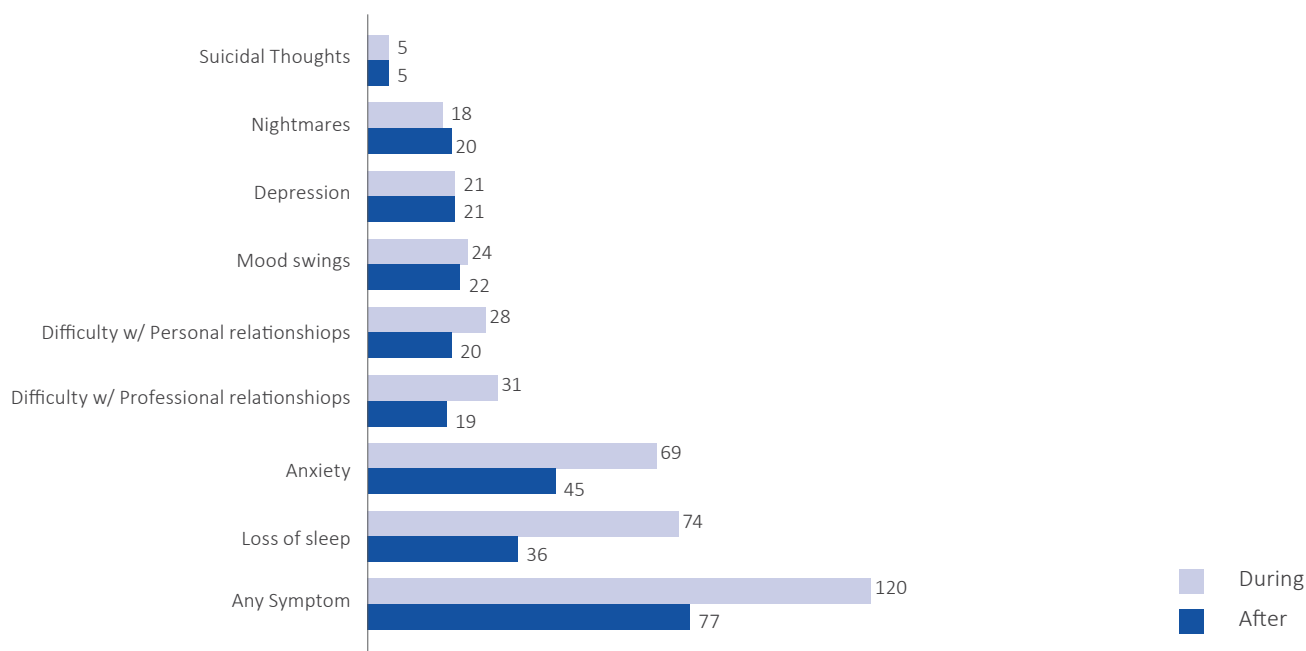


Figure 1: The numbers of reported behavioural health issues experienced during the disaster response and 6 months after the disaster response by symptom type (n=240).

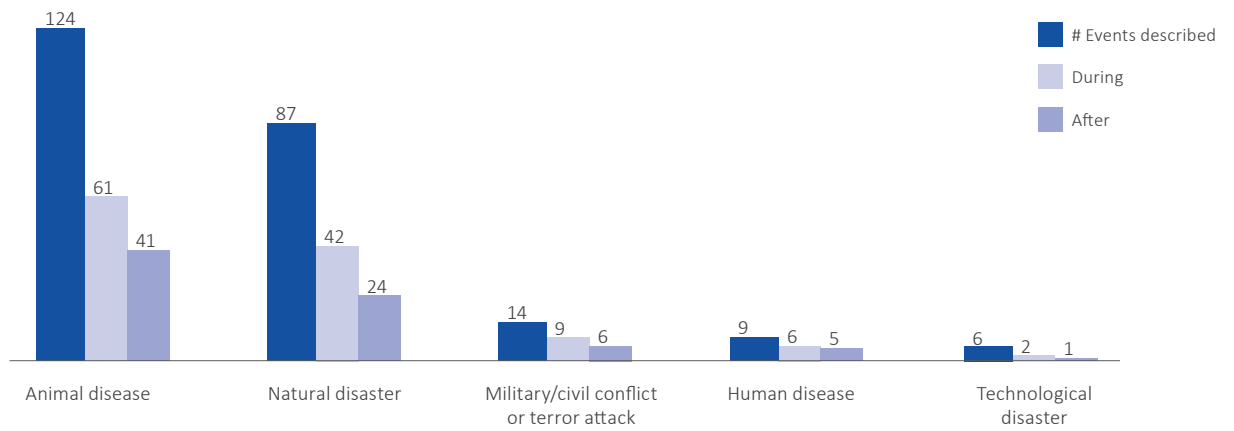


Figure 2: The numbers of reported behavioural health issues experienced during the disaster response and 6 months after the disaster response by disaster type (n=240).

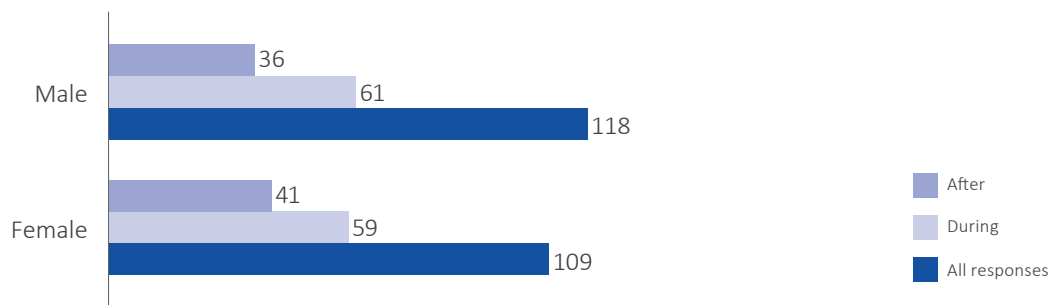


Figure 3: The numbers of reported behavioural health issues experienced during the disaster response and 6 months after the disaster response by male and female respondents (n=227).

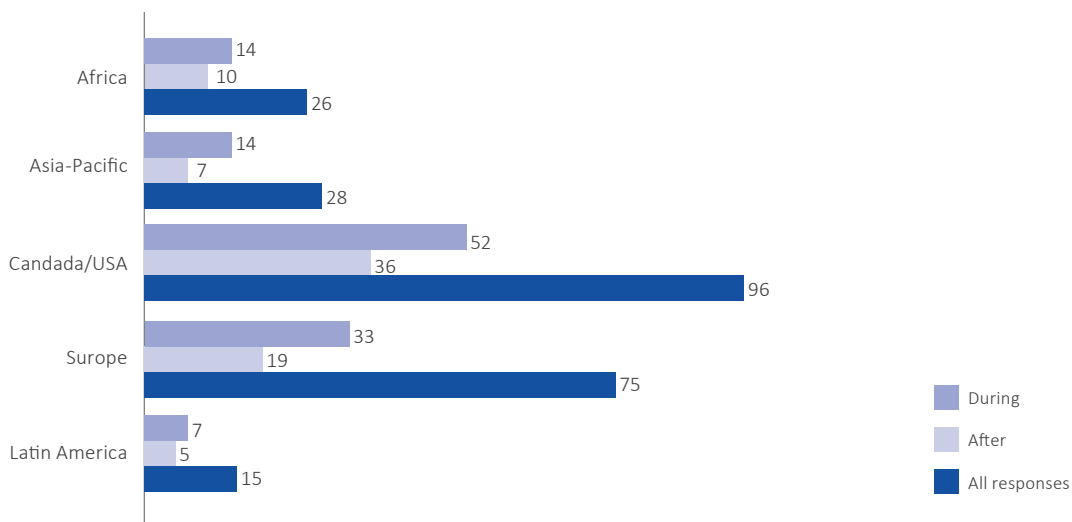


Figure 4: The numbers of reported behavioural health issues experienced during the disaster response and 6 months after the disaster response by region (n=240).

Behavioural health training and education for responders before a disaster event was generally reported as lacking or insufficient. Similarly, behavioural health support during and after the response was reported as ‘highly variable’. Few guidelines, standards and operating procedures for behavioural health are available and are not consistently published. When examples of mitigation techniques such as time off and swapping of duties were reported, their execution was highly variable.

The survey asked an open-ended question: ‘What behavioural health support do you believe veterinarians need BEFORE, DURING and/or AFTER participating in a disaster event? A total of 195 respondents made 186 suggestions and 3 languages were used. The suggestions were separated, coded and sorted. Changes in behavioural health training and processes before, during and after deployment were highlighted. For example, there was a recommendation for briefings that prepare veterinarians for:

A clear, even if hard to see/hear, picture of what they will see and experience during deployment. That can include scenes of depop [animal depopulation]; interviews and retrospectives of other DVMs [doctors of veterinary medicine] and producers. The sights (and smells) of carcasses.

The need to communicate situational awareness, provide time off to rest during the event and personal time off after the event to recover before returning to regular duties was reported:

Broad resilience training before, time off during and after-event assessment to determine needs.

Respondents wrote about the need for guidance:

We need a standardised course before we deploy.

Leadership was cited as a need in the response to the question: ‘Awareness briefing, good leadership to mitigate risks, availability of counselling’. The need for counselling during the event was frequently mentioned:

Counselling is the most needed.

Fifteen respondents indicated behavioural health support was not required:

We in [named country] don’t need behavioural health support.

Several free-text comments were extensive and recounted health issues related to the veterinary role and profession experienced before, during and after participating in a response. An example:

Eventually I had a major depressive episode hospitalised 30 days back to work 6 months. May have had nothing to do with the event.

This comment highlights the severity of the effects as well as the complexity of specifically attributing participation in a disaster as a single triggering event for behavioural health effects.

Discussion

Biases in sampling is acknowledged and may have occurred through the selection of initial recipient emails, through providing the survey in English and through self-selection. Self-selection could have occurred as those with a behavioural health issue may have been more likely to respond and people may have forwarded the survey to others whom they knew or suspected suffered behavioural health events. However, this is balanced by reaching a ‘hidden’ community of veterinarians who have participated in a disaster event and may have suffered behavioural health symptoms and not been sent the survey. The small sample size precludes definitive statements on behavioural health issues for veterinarians. However, the responses provided and the criticality of this topic is sufficient information to identify potential areas of concern and a starting point for further research.

The scope of behavioural health issues in the study was reported across the geographical areas surveyed indicating it is a widespread issue. Respondents’ behavioural health issues were noted in all the categories of emergencies presented in the survey. This indicated that symptoms were not limited to transboundary disease responses. Behavioural health issues were also experienced equally across genders indicating that there was not a gendered difference. These results suggest that behavioural health issues are expanded across a wide range areas, genders and disaster types.

The scale of behavioural health issues in the study was that 50 per cent of respondents reported symptoms during the response and 32 per cent reported still having symptoms 6 months later. This suggests there is a high level of behavioural health issues associated with disaster response. Not all the behavioural health issues described are due to the stress and trauma of the event. Nett and co-authors (2015) describe the background level of behavioural health issues experienced in the veterinary profession and that these may be represented in the responses provided. However, the number and range of behavioural health symptoms reported suggests that behavioural health is a significant responder wellness issue. This was reflected in the free-text comments. An additional issue identified was the lack of awareness of standards, guidelines and operating procedures that prevent, mitigate or treat behavioural health effects. There was minimal reported training and behavioural health support during or after the event.

The responses in this survey were consistent with other studies on disaster responders that cited PTSD in multiple events. Australian volunteer firefighters exhibited PTSD at 32 per cent at 4 months post event (Bancroft 2019, Naushad *et al.* 2019) and a Western Australia report stated that 10 to 30 per cent of responders were at risk of developing PTSD (Western Australia Legislative Assembly 2012). In recognition of this issue, Phoenix Australia published a *Guide for Firefighters with Posttraumatic Stress Disorder* (Phoenix Australia Centre for Posttraumatic Mental Health 2013). Nurses responding to Hurricane Katrina reported 20 per cent with PTSD and depression was reported at 19 per cent in World Trade Center terror attack emergency medical service responders several years following event (Naushad *et al.* 2019).

Conclusion

This research used an online survey to garner 240 responses to identify a range of behavioural health issues experienced by veterinary responders. The survey considered large regions, all disaster types and gendered themes. Survey analysis indicated that the scale and scope of veterinary responders' behavioural health issues are significant and the findings indicate that further study and action to improve health outcomes is warranted.

Actions to address the behavioural health issues of veterinarians in disaster response:

1. OIE, in conjunction with UNFAO, develop guidelines and standards for veterinary behavioural health training, education and monitoring and incorporate these into documents such as the *Terrestrial Animal Health Code*, GEMP and OIE guidelines.
2. OIE incorporate behavioural health programs into standards for the provision of veterinary services.
3. National veterinary services in each country incorporate behavioural health training, education and processes into disaster preparedness and response programs.
4. National veterinary services establish and execute protocols and resources to support veterinary responders before, during and after responses.
5. National veterinary services develop and implement reporting and assessment protocols and procedures for health and wellbeing.
6. Professional organisations promote veterinary behavioural health as a critical issue and educate their members and stakeholders.
7. Veterinary training in veterinary curricula and continuing education settings need to address behavioural health for veterinarians who may be called on to take on the responder role.
8. Research funding to understand the underlying risk factors for responders, best practices to build resilience, best practices for responder support and mechanisms to mitigate behavioural health risks associated with disaster response. This research should include all animal responders such as veterinary technicians and nurses, administrative and support personnel and volunteers as well as communities and individuals.

This research provides evidence for the significant scale and scope of behavioural health risk for veterinarians responding to emergencies. To address this will take focus, effort and action by the veterinary profession to protect its members.

Acknowledgment

This paper reflects the views of the authors and no other organisation or entity.

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Exploratory study: the COVID-19 pandemic and community-based animal organisations and households in the USA

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SUBMITTED
30 March 2021

ACCEPTED
7 May 2021

DOI
www.doi.org/10.47389/36.3.85



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Introduction

In the United States of America (USA), over 546,000 have people died of COVID-19 (Centers for Disease Control and Prevention 2021a), unemployment dramatically increased (Power 2020) and households and organisations faced new challenges associated with social and physical distancing and other protocols that were necessary to slow the spread of the virus. When people are affected by disasters and crises, animals can also experience adverse outcomes (Irvine 2009). Several studies on the COVID-19 pandemic and human-animal outcomes indicate some positive trends in companion animal adoption and fostering (Sydlowski & Gragg 2020). Other studies highlighted issues related to zoonotic disease transfer and risk from people to animals and vice versa (McNamara, Richt & Glickman 2020). At the organisational level, animal shelters reported record-breaking animal adoptions and fostering during the spring of 2020 (Sydlowski & Gragg 2020). Speculations exist that the sudden uptick in people working from home caused the increase in fostering and adoption because people felt they had extra time to devote to animals and as a way to cope with the stress they experienced during the pandemic (Bussolari *et al.* 2021). Other studies show that bonding between people and their companion animals increased during pandemic lockdowns (Kogan *et al.* 2021a).

There are complex effects for companion animals with shifts of work and life patterns. Early research on dogs in the United Kingdom suggests that daily activities for dogs such as walking outside have been reduced (Christley *et al.* 2021). In addition, owners expressed concerns about limited veterinary visits and other physical changes due to lockdowns (Kogan *et al.* 2021a, Ratschen *et al.* 2020) and specific concerns about the affordability of care for companion animals (Kogan *et al.* 2021b). Bowen and co-authors (2020) suggest that, in addition to human stress that increased during the pandemic, companion animals may also display signs of increased stress.

While the positive aspects of animal services have been broadened by mainstream media (such as increased

Abstract

The COVID-19 pandemic has changed many aspects of human systems. Gaps in community services for people with companion animals can prevent people from seeking care during a pandemic or create other issues. This paper describes exploratory research to identify some key challenges and successes for animal services providers and for households with companion animals. Using data from 19 USA states were gathered using an online survey and respondents were from 13 animal services organisations and 90 households. Themes were identified based on organisational-level challenges or successes, as well as themes at the household level. These findings may be useful for emergency managers and planners who design outreach and support services for people with companion animals, for example, planning for low-cost animal boarding services for people hospitalised or unable to care for their animal.

fostering and adoption), this growing body of initial research is showing that issues (i.e. cost of veterinary care) will become prevalent as possible results of unemployment and disparities in wealth and health. Based on work on animals and social systems in disasters (DeYoung & Farmer, in press), the changes in the consequences for animals will not be uniform. This is examined at 2 main levels: the organisational level and the household level.

Rationale

This exploratory study serves as the basis for future research on the ways in which animal service organisations and households with companion animals are effected by pandemics. It is critical to identify the challenges that organisations and households face to identify ways to improve planning and preparedness. An issue raised was that in guidelines provided by the Centers for Disease Control (2021b), people were encouraged to find alternatives for caring for their companion animals if they or someone in the household contracted COVID-19. However, the guidance on how to specifically navigate this process was hard to find. Additionally, people may make decisions about seeking care or other behaviours during the pandemic because of their attachment to their companion animals. These decisions can influence their appropriate responses (e.g. timely evacuation to a shelter or relocation of animals to suitable holding places before a hazardous event). Human-animal attachments can influence decision-making (Hosey & Melfi 2014), including in disasters (Thompson 2013).

For animal services organisations, they indicate resilience to the pandemic depending on their ability to ‘leverage’ the situation to increase adoption or fostering events. This would be consistent with research by (DeYoung & Farmer, in press) covering multiple disasters in which some organisations were better at capturing media attention, mobilising volunteers and conducting during and after disaster or hazard events. Organisations that can adapt during disasters may have better outcomes (Linnenluecke, Griffiths & Winn 2012) and animal services organisation were most likely to experience this during the pandemic. However, it is unclear what specific mechanisms or organisational characteristics facilitate this adaptivity. This study explored some aspects of organisational resilience during the pandemic.

This study also considered the barriers in access to resources that lower-income households experience and the challenges related to companion animal care. One way to measure this is to identify the relationship between household income and actual adoption and fostering rates. Specifically, the hypothesis is that higher-income households will be more likely to adopt a pet as well as foster new animals because they have additional resources to care for animals. In addition, because people view companion animals as pets, the study might show evidence of companion animals being buffers against stress during the pandemic.

Method

This research was approved by the University of Delaware Institutional Review Board (approval number 1693678-1). Data collection was carried out between January and February 2021.

A systematic social media recruitment approach in which a detailed list of organisations is created in spreadsheet for recruitment in groups that are specific to the topic of research (DeYoung & Mangum 2021, Mongold *et al.* 2020) was used to gather responses from people in the USA regarding their perceptions of issues related to companion animals and animal services organisations during the COVID-19 pandemic. A systematic list of animal-focused groups covering broad geographic regions was used to recruit people to take the survey. Many of the groups recruited focused on general animal issues (lost and found) or animals and disasters. Two main groups of people were targeted:

- people who work or volunteer in animal services organisations
- households with companion animals.

A Qualtrics (Provo, UT) survey contained 15 items: 11 items for household respondents and 4 additional items for respondents from organisations. There were also 3 open-ended questions and all respondents had the option to respond to the final question ‘What else would you like to share?’. The questions included demographics (income, state of residence, ethnic background) and Likert-scale questions. For example:

Please indicate your agreement with the following statements, with 1 being the least amount of agreement and 5 being the highest level of agreement. ‘My organisation has had to change internal operations and protocols because of COVID-19.’

(Question specifically for organisational respondents, 5 point disagree to agree)

Regarding your HOUSEHOLD, please indicate the following:

‘I needed someone to care for my animal when someone in my household had COVID-19 but was unable to find someone.’

(Question specifically for household respondents, yes/no response).

The average time a respondent spent completing the survey was 5 minutes after filtering for ‘false’ responses (people who clicked on the survey and then immediately closed out of it). Numeric data were analysed using Statistical Package for Social Sciences (SPSS) and open-ended items were coded in Excel using a content-analysis approach (Miles, Huberman & Saldaña 2018).

Results

Before filtering and cleaning data based on response time, there were 107 survey responses. If respondents indicated ‘no’ to agreeing to participate or if they did not complete the survey beyond 1 survey item, the response was excluded from analysis. Respondents were mostly Caucasian with varied household incomes (Figure 1). Eleven respondents were from organisations (1 from Pennsylvania, 3 from California, 1 from Colorado, 1 from Florida, 1 from Delaware, 4 not listed) and 90 were from households, for a total of 101 respondents.

Respondents came from 19 USA states as well as 1 respondent from Puerto Rico. Respondents were from California (n=9), Illinois (n=9), Pennsylvania (n=9), Delaware (n=7), Kentucky (n=4), Maryland (n=3), North Carolina (n=3), Florida (n=3) and Georgia (n=3). Approximately 46 per cent (n=50) of household respondents indicated they adopted a new companion animal during the pandemic and 20 per cent (n=22) of household respondents indicated they fostered a companion animal during the pandemic.

To test for relationship between income and fostering an animal, a Chi-square analyses was conducted on respondent income. Specifically, the categories between 'Less than \$10,000' and '\$50,000-\$59,000' were recoded as 0 and categories for \$60,000 or higher were recorded as 1 (see Figure 1). The Chi-squares compared the recoded income with indications of adopting or fostering a new pet. There were no significant findings for either comparison:

- for adoption and income, $X^2=2.599$ (1), $p=0.107$
- for fostering and income, $X^2=0.008$ (1), $p=0.929$.

The scope and size of animal services organisations varied and included clinical veterinary services and fostering and adoption networks. They ranged in organisational type from limited liability companies and private organisations for profit to small and large-scale not-for-profit agencies.

The final open-ended question was independently coded and consensus was established on first- and second-round codes for themes (Saldaña 2014). There were 7 themes identified; 2 across organisations and 5 for households. The organisational themes

corresponded with items asking about challenges and successes, while the remaining 5 codes came from the open-ended item that had a variety of responses about the pandemic experience. To check for inter-rater reliability of the open-ended data of the survey question, 'What else would you like to share with us regarding pets, animals, and the COVID-19 pandemic?' an intra-class correlation analysis was conducted in SPSS and the Kappa score among the 2 analysts as raters was $K=0.74$.

The 5 core household themes identified were 'owner financial concerns', 'owner wellbeing', 'animal behaviour', 'fostering/adoption issues' and 'other'. The 'other' responses included general comments about the pandemic, observations about changes in veterinary protocols and comments such as, 'Household pets are great, but don't forget to feed feral cats and provide them shelter if possible'.

Organisational themes

Respondents indicated that fundraising had been negatively affected by the pandemic. This was connected to the restrictions in conducting fundraising events that would normally be held face-to-face. For example, one respondent noted:

With the inability to do in-person fundraising, we only brought in about half in 2020 of what we did in 2019. Our big in-person fundraiser, which in 2019 raised \$20,000, this year raised \$7,000.

The inability to host face-to-face events spilled over into fostering and adoption. One respondent indicated that not being able to run adoption events or fundraisers was a challenge.

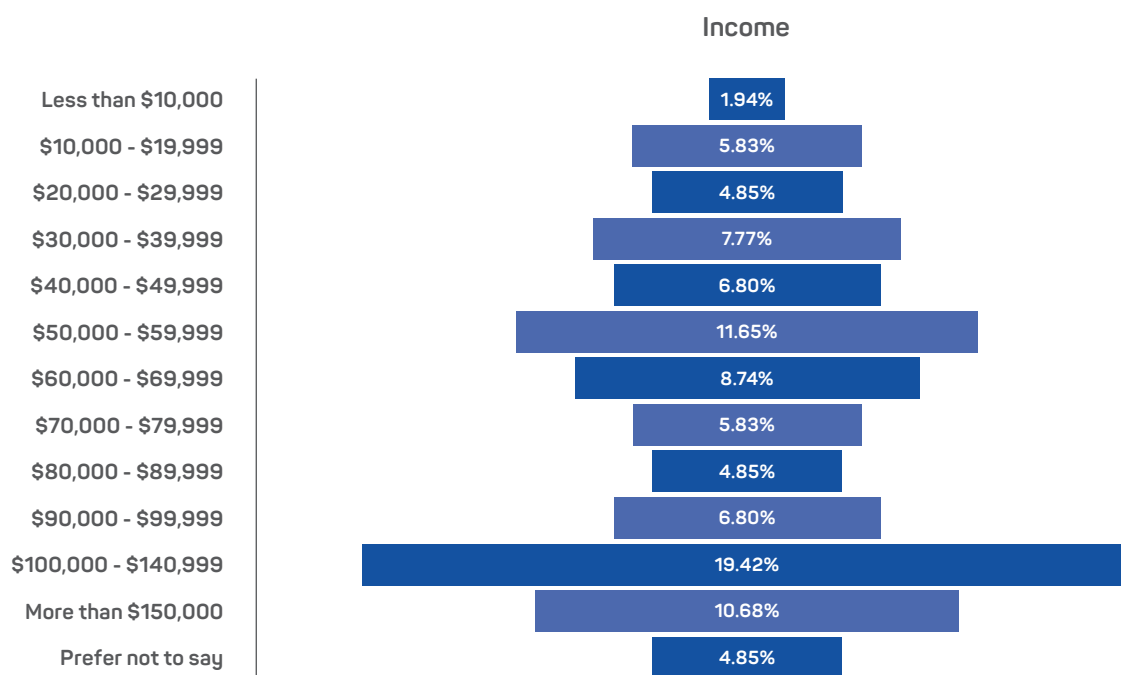


Figure 1: Percentage of respondents within each income category used in the survey.

Note: Categories are in USD.

Another problem that organisational respondents indicated was appropriate vetting of people who wanted to adopt an animal during the pandemic but who perhaps did not have adequate resources or time to care for the animal. One respondent noted ‘COVID adopters’ as a challenge:

Screening adopters that may have good intentions but fall into the category of being a ‘COVID adopter’, which will result in a return of [the] adopted dog.

Respondents indicated that the physical location and processes for service delivery of their organisation were resilient if they were already outdoor-based activities:

Because TNR¹ is a fairly solitary endeavour, and our trap pick-up and training sessions have always been held outdoors, there wasn't much change. Even when taking cats to barn homes it was easy to socially distance and stay outdoors.

This comment indicates that the organisation had a system in place that was conducive to the social distancing requirements because trap pick-up and training was already conducted outdoors. This meant that the volunteers and project leaders did not have to make alternative plans and design new processes for their operations.

While some respondents from organisations indicated negative outcomes, other respondents indicated that their organisation was able to adapt in some way. However, they experienced challenges due to staffing and burnout:

Our animal hospital quickly adjusted to not allowing clients in buildings. We meet clients at their cars and discuss their pet's visit over the phone. Our biggest issue has been an overworked staff.

This demonstrates that veterinary services and other organisations adapted to the ‘kerbside’ model of care, but staff experienced fatigue and burnout from working long hours. On a positive note, a respondent indicated that the shift to ‘kerbside’ care improved the workplace environment for people at their workplace:

I think our vets have enjoyed the fact that the clients haven't been in the building! Our staff has pulled together...it's the best group we have ever had. With folks not being in the building we have had the opportunity to address a lot of issues that were plaguing our old building without disrupting business operations.

This idea of ‘pulling together’ is reflective of the sense of community that veterinary staff may have experienced as the pandemic continued. While they felt stressed because of the general state of the world, work-life challenges and other issues, they worked together to achieve the goal of continuity of care for their clients. Another respondent indicated:

While most businesses were struggling and there were many negative impacts of COVID, overall it had a positive outcome

for us. People found they had more time to work with their foster dogs, we gained new foster families when most were homebound, we were able to take in many more difficult cases due to the uptick in foster involvement and donations.

This shows that the organisation was able to harness the new resources (people willing to foster dogs) to bolster the organisation’s success and perhaps its visibility. While these positive factors were present in the data, it should be noted that respondents also indicated a sense of despair:

The pandemic made many animals homeless, by their owners having to give them up or by them passing away. Many more were born outside because TNR was suspended during the most crucial seasons. While many people adopted pets at the beginning of the pandemic, it did not make up for that.

In other words, some respondents were concerned about the effects that deaths from COVID-19 had on animals and the spill-over consequences such as pet overpopulation due to the delay in spay and neuter services during the pandemic.

Household themes

Financial concerns

Responses reported that financial concerns were directly related to their capacity to seek care for animals during illness. For example, respondents indicated that their role as a caregiver for their companion animal prevented them from seeking timely medical care for themselves—even if they were in a life-threatening situation:

I got COVID and delayed going to the emergency room because I couldn't find anyone to care for my fur kids. I waited until I networked with a group of friends and their friends to find several people to take my fur kids. I have 6 cats and a service dog. My fur kids are still in foster care 2 months later because I'm still sick, with the exception of 2 of my fur kids that have medical problems that were medically boarded and are home after being boarded for a month. They're only home because I couldn't afford the \$100 a day it costs to medically board them any longer and I couldn't find anyone who could foster them.

This highlights the need for expanded services for people without access to resources, extended family and social networks and other forms of support. This respondent revealed multiple layers of vulnerability (having a service dog and limited social networks of people who could care for their pets). This is a problem in disasters and pandemics and could be addressed through expanded services (such as federal incentives and subsidies for veterinary clinics to provide services on a sliding scale for households with extremely low income) and additional research on the vulnerabilities of households with companion animals.

1. Trap, neuter, return (usually a practice for sterilising feral cats).

Another respondent described how their financial situation restricted their ability to continue with their pet's routine veterinary care:

Finances are tight, so I've used the stimulus money for vet care this past cheque.

This theme was not surprising because rates of joblessness associated with the pandemic rose during 2020. While many animal food pantries and human meal delivery services were designed as stop gaps to support people, the cost of veterinary care (especially emergency veterinary care) can be a significant burden for owners.

Owner wellbeing

Respondents indicated that their companion animals were a source of positive mental health coping during the pandemic. For example, respondents stated that the pandemic would not have been tolerable without their animals and that having an animal around created a sense of 'normalcy':

I moved to working at home 100 per cent of the time at the beginning of the pandemic and I would have probably had more issues with my mental health if I didn't have my dog and then the two kittens we adopted. They have been wonderful to have at home with me so I don't feel lonely all the time. I worry about them and how they will handle the separation once I do eventually return to some out-of-home work.

Another respondent indicated:

My kitten has been the light of my life through COVID, especially since I live alone.

This suggests that people who live alone may have been more likely to adopt or foster a new companion animal during the pandemic. The motivation to adopt or foster might be partially context-specific and, in some ways, dependent on household characteristics. It is also possible that families with small children may have viewed the lockdowns as an ideal time to adopt an animal if it was something they were considering before the pandemic.

Animal behaviour

Respondents described how the pandemic was associated with reduced opportunities for animal socialisation because of social distancing and changes in the daily activities of owners:

Our pandemic rescue puppy, adopted in September at around 3 months old, is definitely under socialised! So much of the typical advice about how to raise a puppy does not account for quarantine/isolation practices, and we are expecting that as he grows up he may be a little more reactive or standoffish than he otherwise would have been.

Some respondents described anticipatory concerns about how their pets would cope with 'regular' daily routines after the pandemic:

Pre-pandemic, my dog had diagnosed separation anxiety. Knowing that my time working from home exclusively will eventually end, I am worried about the financial and mental costs for me to overcome his anxiety again.

Some respondents described their experiences in contracting COVID-19 and waiting to seek care. Other respondents described how animals improved their mental health, or that because of special or functional and access needs, the animal played an important role in their life during the pandemic.

There was evidence on social media and in the news of people not being able to find care for their animals if someone in the household had COVID-19. However, this trend did not show in the data. Only 1 respondent indicated 'yes' to the question 'I needed someone to care for my animal when someone in my household had COVID-19 but was unable to find someone'. Three respondents indicated that they allowed someone else outside of the household to care for their pet because someone within their household had COVID-19.

Fostering and adoption

Respondent comments reflected on ways in which the pandemic facilitated decision-making for new fostering or adoption. For example, one respondent described working from home as a major factor in deciding to bring a new companion animal into the household:

We finally adopted because our jobs moved to remote work, and we had the flexibility in our jobs to take on a new pet (periodic breaks to go outside, house training, fun training).

There were also some comments that reflected how organisational processes made adoption more difficult:

Adoption was a pain, we pretty much had to find an org that was arguably flouting the rules to even be able to meet any cats before adopting one.

This suggests that during the pandemic it may have been challenging for some adopters spend time with the dog or cat at the physical shelter to see if the animal was a good match for the household prior to adoption. There were also instances in which some people said they had adopted an animal specifically because of mental health needs associated with the pandemic:

I had to get an emotional support letter from my doctor in order to adopt a pet. I would not have gone through these steps had we not been in a pandemic.

This comment might also be indicative of new procedures that some shelters required to ensure that animals would not be immediately surrendered after the pandemic ended. This is important to note because while the media and news stories focused on increases in adoptions and fostering, there were complexities that were less visible to the public related to shifts in operational protocols that created challenges in adoption or fostering.

Discussion

These findings indicate that:

- organisations did, in some way, have specific coping mechanisms for remaining operational and successful during COVID-19 (despite some challenges)
- households with companion animals had improved coping mechanisms for dealing with stress but that there were also concerns about finances and the impact on the socialisation and behaviour of their pet.

Respondents indicated a hesitation to seek medical care because of their companion animals and the logistics associated in finding boarding or care.

For organisations as well as for households, there was uncertainty about finances and this was associated with comments about stress. An hypothesis that households in higher-income categories would be more likely to adopt or foster was not evidenced. The Chi-square comparisons showed no significant effect in income and new adoptions or fostering. This does not necessarily mean that financial limitations did not have an effect on households. Respondents indicated that they worried about the cost of veterinary care. Additionally, while the Centers for Disease Control and Prevention recommended that people not have physical contact with their pet if they tested positive for COVID-19, it was not clear what people should do when they did not have others in their social network to care for their pets or if they could not afford boarding. One respondent raised this lack of government guidance or community care for people and animals during the pandemic:

As an occupational therapist in home health, I saw many homebound patients that had no awareness of best practices for pets in terms of need to have designated caregivers in case of hospitalisation, obtaining food and care services and precautionary disinfectant needs. No information from vets was provided to owners or to the community in general, therefore a lack of awareness.

The growth in numbers of ‘COVID-19 adopters’ is interesting because it indicates a pattern in which people may want to adopt ‘hurricane dogs’ for the ‘brand’ or image of doing so. It is difficult to assess the valence of this because an increase in adoptions during a crisis (such as a hurricane or a pandemic) can be a positive outcome for the organisation and for the animals. It is also possible that the respondent may be concerned that the household would be affected by COVID-19 and the animal surrendered. Future qualitative research should include questions to understand the perceptions associated with adopting and fostering ‘pandemic animals’.

Limitations

There are several limitations to this study. The data were collected through purposive sampling that was focused on people who were already ‘interested’ or possibly enthusiastic about animal services and animal issues. The groups recruited were animal-centric and respondents may be more willing to adopt and foster animals than a member of the general population in the USA. Additionally,

the respondents were mostly Caucasian and were in the middle-to-upper income categories. This narrow diversity prevents making clear and meaningful interpretations about disparities in animal services organisations or household experiences with companion animals that might be related to other cultural, social or demographic factors (ethnic background, etc.). According to Bassett, Chen, and Krieger (2020), ‘Black and Hispanic people’ in the USA have experienced disproportionate deaths due to COVID-19. It is unclear to what extent this overlaps with issues related to companion animals. It should be noted that the respondent sample in the current study is representative of the population of people who own companion animals in the USA, since:

Pet ownership differs among racial and ethnic groups. The highest rate of pet ownership overall in 2016 was seen among White households (65 per cent), with Latino/Hispanic (61 per cent) next. The lowest rate was found among Black/African American households (37 per cent). (American Veterinary Medical Association 2018, p.5).

Another limitation is that the sample of 90 households and 11 animal care organisations is small, although it was designed to be exploratory and identify issues that should be examined.

Future research could explore if people who fostered animals during the pandemic were more likely to adopt the animal (also known as a ‘foster failure’). DeYoung and Farmer (in press) found evidence that people may ‘trauma bond’ during disasters where people who normally fostered a higher number of animals that were normally subsequently adopted by other people, chose to keep the fostered animal because there was a sense of having lived through the crisis together. It would be interesting to see if this is the case for special populations during the pandemic such as older people in isolation, frontline health workers, children with special needs and other groups that might experience emotional benefits or bonding with companion animals.

Conclusion

The COVID-19 pandemic, like many emergency scenarios, affected both humans and animals. This study highlighted some of the changes and effects for organisations and households in the USA. While there were challenges with raising money, as well as financial difficulties at the household level, there were also positive outcomes, such as higher rates of animal adoptions and fostering and effective adaptation by animal services organisations to provide kerbside vet care. Many individuals turned to their companion animal for comfort and coping. Some respondents indicated a delay in accessing medical care while they were unwell because of difficulties finding affordable care for their companion animals.

While the long-term consequences of the pandemic are unknown, the human-animal relationship continues to be affected in a variety of ways by emergencies and hazards. Implications from these findings include new potential policy solutions that would support animal management organisations (not-for-profit and government-run sheltering organisations) to maintain continuity of service during pandemics. This might include funding that supports temporary shifts in operational

protocols associated with social and physical distancing. Temporary support programs for veterinary clinical services can provide additional relief to small veterinary businesses.

Lessons for emergency management planning include clear mechanisms for providing low-cost care and safe boarding for companion animals for people in hospital due to COVID-19. This is similar to evacuation refusal, but more careful consideration for space, logistics and technical animal support services should be integrated in a mass care pandemic plan.

There may be benefits to households with companion animals if veterinary services and other organisations provided guidance on managing animal anxiety. While animals providing emotional support in crisis is not new, animal services organisations can leverage the ‘pandemic recovery’ timeframe to garner public support and private donations for adoption services and pet overpopulation programs. Event-leveraging has worked to bolster donations during past disasters. Recovery from this pandemic could be modelled on past disaster fundraising programs and efforts for animal service organisations.

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