

Animal welfare impact following the 4 September 2010 Canterbury (Darfield) earthquake

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Abstract

At 4.35am on Saturday 4 September 2010, a magnitude 7.1 earthquake struck near the township of Darfield in Canterbury leading to widespread damage in Christchurch and the wider central Canterbury region. Though it was reported no lives were lost, that was not entirely correct. Over 3,000 animals perished as a result of the earthquake and 99% of these deaths would have been avoidable if appropriate mitigation measures had been in place. Deaths were predominantly due to zoological vulnerability of birds in captive production farms. Other problems included lack of provision of animal welfare at evacuation centres, issues associated with multiple lost and found pet services, evacuation failure due to pet separation and stress impact on dairy herds and associated milk production. The Canterbury Earthquake has highlighted concerns over a lack of animal emergency welfare planning and capacity in New Zealand, an issue that is being progressed by the National Animal Welfare Emergency Management Group. As animal emergency management becomes better understood by emergency management and veterinary professionals, it is more likely that both sectors will have greater demands placed upon them by national guidelines and community expectations to ensure provisions are made to afford protection of animals in times of disaster. A subsequent and more devastating earthquake struck the region on Monday 22 February 2011; this article however is primarily focused on the events pertaining to the September 4 event.

Key words: Canterbury, Darfield, earthquake, emergency, pets, animals, welfare, disaster, New Zealand.

Introduction

Animal welfare during a disaster has emerged as a critical component of modern emergency management. Many companion animals are considered part of the family and livestock are a primary source of income for many rural businesses. The strong emotional and financial bonds to these animals can result in humans endangering their own safety to save their animals during disaster events. Endangering actions include refusing to evacuate and leave their animals and/or trying to re-enter an unsafe area to rescue or tend to their animals (Glassey, 2010; Heath, 1999; Irvine, 2009). The impact of losing valued animals can also lead to psychosocial effects on humans following the disaster, reducing or delaying their ability to cope and ultimately recover (Hall, et al., 2004; Hunt, et al., 2008). In an online survey of Taranaki and Wellington pet owners, Glassey (2010)¹ reported that more than 63% of respondents (n=92) identified their pet as an important coping mechanism during times of stress and that 99% of the respondents also identified their pet as part of the family. Ninety one percent of respondents also wanted to be involved in the continued care of their pet if evacuated. Reputations could suffer if an individual, company or nation is perceived to be mistreating animals following a disaster, which could extend to financial impact. Thus, the treatment of animals during a disaster is also a significant issue for emergency management, which goes beyond basic animal rights.

This paper seeks to provide a preliminary analysis of impacts on animal welfare following the 4 September 2010 Canterbury earthquake. The scene is set with a brief review of relevant planning for animal welfare during disasters in New Zealand. Several key international case studies are analysed to identify lessons on relevant issues and give insight to potential problems which may develop during future disasters. Lessons for veterinarians and other relevant stakeholders are then presented. This paper does not consider the 22 February 2011 Christchurch earthquake. However, many more people were displaced and homes destroyed. Media

¹ This survey was part of a Master of Emergency Management research report to develop recommendations to enhance companion animal emergency management in New Zealand.

and anecdotal reports at the time indicated the loss of companion animals was a significant issue. Analysis of this event will provide rich data for future research into animal emergency welfare.

Animal emergency management arrangements in New Zealand

The framework for Civil Defence Emergency Management (CDEM) in New Zealand is established in the Civil Defence Emergency Management Act 2002. The act is based on Norton's² dispersed accountability model (Figure 1) that places emphasis for local government to facilitate community level disaster resilience, rather than provide a top down *command and control* environment. Local government is responsible for establishing a Civil Defence Emergency Management Group that is comprised of the regional council and respective local territorial authorities (Section 12, New Zealand Parliament, 2002). Regional CDEM Groups are responsible for the application of comprehensive emergency management, that being reduction of risk (mitigation), readiness, response and recovery – also known as the four R's. CDEM Groups are also required to develop an emergency management plan that is consistent with the National Civil Defence Emergency Management Plan. Group plans provide information on hazards as well as roles and responsibilities of local partners to the plan. Together with the associated guide outline (Glassey, 2010), plans identify that local territorial authorities are responsible for companion animals during an emergency supported by the Society for the Prevention of Cruelty to Animals (SPCA). Large and small animals are the responsibility of their respective owners; obligations under the Animal Welfare Act 1999 to afford appropriate care and attention remains during a declared state of emergency (Glassey, 2010). In the National Civil Defence Emergency Management Plan and Guide, the Ministry of Agriculture and Forestry (MAF) provides overall coordination and monitoring of issues relating to domestic animals at a national level. In 2006 the National Animal Welfare Emergency Management Liaison Group (NAWEM) was established as a cluster of agencies for the purpose of providing advice on animal welfare issues during emergencies through individual and multi-agency action. NAWEM was formed in response to adverse events that highlighted significant

regional variation in local community's ability to cope, and the need for heightened national coordination among relevant agencies³ (H. Squance personnel communication 2010). The NAWEM Liaison Group is co-chaired by the New Zealand Veterinary Association and the World Society for the Protection of Animals. The group also includes representatives of MAF, Federated Farmers, SPCA, Massey University, Ministry of Civil Defence and Emergency Management (MCDEM); New Zealand Companion Animal Council (NZCAC) and Local Government (through the New Zealand Institute of Animal Control Officers). NAWEM operates on minimal funding, with all agencies providing in-kind support to progress the NAWEM mandate. One of the current projects being undertaken by NAWEM is the publication of a Companion Animal Emergency Planning Guideline which is due for release in 2011. Currently, there is no statutory requirement for CDEM Groups to ensure animal welfare is considered in their emergency plans and the Groups are only slowly accepting the consensus of scholars that protecting companion animals, in turn protects their human guardians. Authorities in Taranaki, Taupo, Rotorua and Wellington are now championing efforts in this area – however other areas' progress is limited or non-existent, as is not seen as a priority to decision makers or insufficient resources hinder further development. Without a statutory mandate such as a Directors Guideline, it is difficult to expect local authorities to expend ratepayer funds to establish adequate plans and capabilities to manage animal welfare during emergencies.

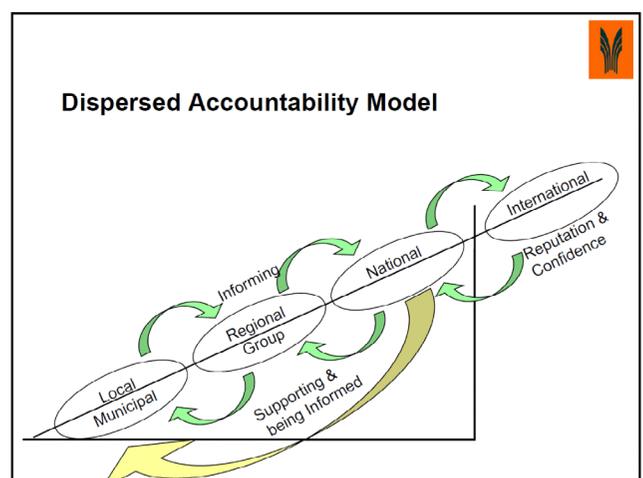


Figure 1: Norton's Dispersed Accountability Model (Angus, 2005).

² John Norton was the Director of Civil Defence, Ministry of Civil Defence & Emergency Management, New Zealand for eight years ending in June 2006.

³ NAWEM was founded Dr. Ian Dacre (H. Squance, personal communication, 2011)

Experience From Elsewhere

Hurricane Katrina

In 2005 the impact of Hurricane Katrina on New Orleans and the Gulf Coast led to the largest natural disaster to affect a developed country. During the disaster, one of the largest organised human evacuations in history occurred, with over 1 million people evacuating from New Orleans before the arrival of Katrina. However, a large number of people (estimated over 100,000) did not evacuate resulting in significant societal consequences.

Federal government policy at that time did not require state and local emergency management agencies to have operational plans (including evacuation plans) to “take into account the needs of individuals with household pets and service animals prior to, during, and following a major disaster or emergency” (Congressional Research Service, 2006). There is a need for clearly mandated emergency management practices to be adopted that go beyond the issuing of voluntary codes or guidelines.

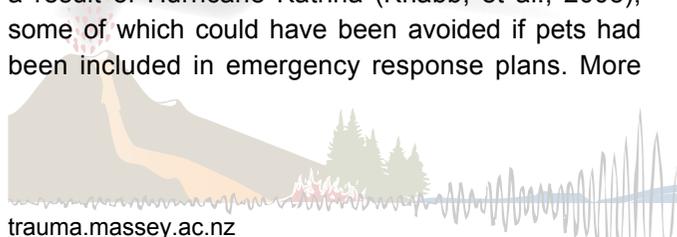
Subsequent research revealed that 44% of those who chose not to evacuate did so in part because they did not want to leave behind their pets (Fritz Institute, 2006). This was the second highest causal factor in this group for evacuation non-compliance (n=430). In addition, over 50,000 companion animals died during and after Hurricane Katrina, mainly due to forced or circumstantial abandonment (Shiley, 2006; Woodard, 2005). Factory and laboratory animals were the most zoologically vulnerable. There were over 635 million farm animals in the area affected by the hurricane (Irvine, 2009). Sanderson Farms had 1,874 broiler houses in the Mississippi region and an estimated three million broiler chickens died in affected facilities (Irvine, 2009).

Following Hurricane Katrina specific legislation known as the Pet Evacuation Transportation and Standards (PETS) Act 2006 was passed by the United States Congress. The PETS Act placed requirements on local and state emergency management to ensure companion and service animals were included in their emergency plans, provided funding for related preparedness activities, and required emergency management authorities to ensure these animals were to be rescued, cared for and sheltered during emergencies (Edmonds & Cutter, 2008). Over 1,833 human lives were lost as a result of Hurricane Katrina (Knabb, et al., 2005), some of which could have been avoided if pets had been included in emergency response plans. More

broadly, there is consensus within academic emergency management literature that saving pets, saves people through increased evacuation compliance and reduced psychosocial impact (Anderson & Anderson, 2006; Edmonds & Cutter, 2008; Heath, 1999; Irvine, 2009; Leonard & Scammon, 2007). However, the New Zealand Ministry of Civil Defence & Emergency Management has declined to seek a review of legislation in this area, in distinct contrast to the actions taken by their American counterpart, the Federal Emergency Management Agency. A further issue that will be later discussed is the importance of micro-chipping and a central micro-chip register and reunification database. Following Hurricane Katrina over 50,000 pets were stranded in New Orleans. Eighty to ninety percent of these stranded pets died. Ten to fifteen thousand pets were rescued and only one fifth of these were reunified with owners (Anderson & Anderson, 2006; Shiley, 2006). Pets were relocated outside of their respective States and there was no central database for lost and found pets. Pet collars with associated identification discs became separated, or in some cases thrown away purposefully by spontaneous animal rescue volunteers who felt their owners did not deserve them (Shiley, 2006).

2008 Chaitén Eruption

In May 2008 the largest volcanic eruption in nearly 20 years occurred at Chaitén volcano in southern Chile. Volcanic ash was erupted over 20 km into the atmosphere for up to 5 days and eventually over 1 km³ of volcanic ash was deposited over 100,000 km² of Chile and neighbouring Argentina (Lara, 2009). Chaitén town was located 10 km to the south of the volcano and was evacuated within 36 hours of the eruption's onset due to fears of a pyroclastic flow (fast moving cloud of hot gas and ash) from the volcano (Lara, 2009). Over 4,500 people were evacuated to other regional centres, such as Puerto Mont and due to the haste arrived with little more than the clothes on their back (Lara, 2009). Due to time and space requirements, pets were forbidden from evacuation transport (Leonard, et al., 2010). In Puerto Mont, senior emergency management officials reported that within days psychosocial impacts began to develop within the evacuated population, with families often devastated from leaving their pets behind. Observing televised images of their pets roaming the ash covered streets scavenging for food was particularly distressing. This prompted strict media controls by the Chilean government (Leonard, et al., 2010). Lobbying from evacuees and NGOs such as People for the



Ethical Treatment of Animals (PETA) also resulted in an extraordinary decision to deploy the army to rescue as many pet as possible from Chaitén, despite the continuing threat of a pyroclastic flow engulfing the town from the on-going eruption (Leonard, et al., 2010). A senior emergency manager reflected that significant social harm and political influence would have been avoided had the pets been allowed to evacuate with their owners (Leonard, et al., 2010). In rural areas over 10,000 cattle were evacuated from ash covered farmland (Wilson, et al., 2009). Farmers decided not to evacuate in favour of trying to tend to their livestock. Hundreds to thousands of sheep and cattle were estimated to have perished from starvation due to thick ash covering pastures. As livestock meat, wool and milk represent farmers' main source of income, the eruption has had a significant economic impact on individuals and the local economy (Wilson, et al., 2009).

The 4 September Canterbury earthquake

At 04:36 on 4 September 2010, a M7.1 earthquake struck near the township of Darfield, located south east of Christchurch. The earthquake was relatively shallow at a depth of approximately 11 kilometres. The earthquake caused significant damage in the Canterbury Region and was felt as far away as Auckland (GNS Science, 2010). The previously unmapped Greendale fault ruptured along a 29 km trace through high intensity arable and pastoral (mainly dairy) farmland in central Canterbury. The earthquake was the most damaging earthquake since the 1931 Napier earthquake, which claimed 256 lives (Department of Prime Minister and Cabinet, 2007). In contrast, it has been reported there were no lives lost in the Canterbury earthquake. However over 3,000 animals died. Most of these were avoidable deaths. A brief review of media reports and limited assessment of 10 farms on the Greendale fault indicated at least 3,000 chickens (Fox, 2010), 8 cows (T. Wilson, et al., 2010), 1 lemur (NZPA, 2010), 1 dog (Bellis, 2010) and 150 tanked fish died as a result of the earthquake.

The Canterbury earthquake caused significant damage in Christchurch and the wider central Canterbury region. As of 22 August 2011, the Earthquake Commission (EQC) had received 156,935 insurance claims relating to the 4 September 2011 earthquake (Earthquake Commission, 2011). The scale of damage included over severely damaged 12,000 homes and some 300 resident evacuations to civil defence welfare centres immediately after the earthquake, while others affected

stayed in their homes or relocated elsewhere. One of the key characteristics of this event was the low number of displaced persons, given the severity of the earthquake, which has been attributed to the time of day and strict building codes. With no mass evacuation, there were few problems of companion animal related, evacuation non-compliance and therefore, animal issues were not a serious operational issue for emergency coordinators for this event. The Canterbury Branch of the SPCA were also a member of the local Welfare Management Committee (Christchurch City Council, 2008), which benefited the response through establishing a mandated role and forming pre-event relationships.

Animal welfare impact

Companion Animals

Under the local Christchurch City Council emergency management arrangements, the Animal Control division of the Council assumes the lead for companion animal emergency management, which is consistent with the National Civil Defence Emergency Management Plan responsibilities. Under these arrangements, evacuated animals are sent to an animal control facility (including species other than dogs) with any overflow accommodated at the local SPCA shelter.

There were numerous anecdotal accounts of companion animals being deeply scared or 'spooked' by the earthquake event and running away from home. This caused stress for owners, but in most cases the companion animals returned on their own within several days. The local SPCA took a lead role in reunification of lost and found pets through their existing user pays *track-a-pet* service and they also launched a disaster appeal to provide financial support to those affected with pets. The Canterbury SPCA had 460 pets registered as lost for the month following the earthquake, in comparison to only 77 for the same period the previous year (G. Sutton, personal communication, 5 October 2010). The SPCA effort was supported by local veterinary clinics and hospitals providing advice on reunification of animals.

Several companion animals are known to have died, with one dog left behind by its owners, found dead from a heart attack when the owners returned (Bellis, 2010). Another dog was also treated for poisoning after contact with contaminated flood water (J. Mitchell, personal communication, 15 November 2010). Numerous animals were injured as they fled houses or buildings

during the earthquake, including cuts from broken glass and other bruises and abrasions (Muir, 2010). In the days to weeks after the event, many companion animals were exhibiting symptoms of on-going anxiety and stress which prompted veterinarians to advise how to deal with traumatised companion animals as advice included keeping pets indoors for several days and trying to maintain their normal routines (RadioNZ, 2010).

To cater for affected residents following the earthquake, "six welfare centres were established throughout the three affected Territorial Authorities. The maximum number presenting on any one day at a welfare centre was >250, with a total of approximately 4,000 individual visits to welfare centres occurring during the response phase" (Canterbury CDEM Coordinating Executive Group, 2010). One of the issues raised in the debrief report was the lack of provision for companion animal care at welfare centres (Canterbury CDEM Coordinating Executive Group, 2010). This included an allegation that an evacuee reliant on her disability support dog was refused entry to a civil defence welfare centre and attempts were made by staff to separate the dog from its owner (confidential personal communication, 2010), in contrary to Section 75 of the Dog Control Act 2002 that makes for the provision of disability assistance dogs to be given access to public places.

"Christchurch didn't go smoothly from what I saw and heard. More animals than resources. People turned up to the welfare centre with animals and were told to take them to SPCA, but had no transport to get them there, and were more or less just turned away. At one stage when I was manager at a welfare centre I had to do battle as there was a woman with a hearing dog, not only that the woman had mental health issues. I had to fight to get the staff to let them in, then the other staff kept trying to remove her. They had all never heard of a hearing dog before, great learning for them, however extremely traumatic for the woman who spent hours in tears" (confidential personal communication, 2010).

Although another firsthand account challenge the circumstances of this event (confidential personal communication, 2011), the issue over status, access and identification of disability support dogs in emergencies remains unclear. Additionally, as evacuated families sought new rental accommodation due to their homes being uninhabitable, there was a lack of empathy by landlords to allow dogs and a shortage of pet-friendly rental accommodation which created more stress on pet owners (J. Mitchell, personal communication, 2010).

Livestock

The greatest number of animal fatalities in the Canterbury earthquake was at the Weedons Poultry farm where two out of the three stands collapsed, killing 3,000 chickens from the total stock of 26,000 (Fox, 2010). There were few other reports of direct livestock fatalities due to the earthquake (A. Baird, Rural Recovery Coordinator, personal communication, 2010); and typically these only occurred close to the fault where strong shaking led to peak ground accelerations in excess of 0.5 g (acceleration due to Earth's gravity). For example, eight cows waiting to be milked on a concrete pad in Hororata less than 1 km from the fault were knocked over, resulting in broken legs and pelvises. These had to be destroyed (Wilson, et al., 2010). Other cows only several metres away from the concrete pad on a (softer) gravel and soil track did not suffer any injuries.

Numerous farmers reported their livestock were spooked (stressed) by the earthquake and the continuing aftershocks. This was exacerbated by the number of dairy sheds that were unable to milk cows due to structural damage from ground shaking or fault rupture beneath the shed itself, or the loss of electricity due to outage across a large part of the Selwyn district. This required herds to use neighbouring milking sheds and often required a reduction in milking from twice to once a day. This perpetuated stress amongst dairy herds led to significant increases in milk somatic cell counts. In an effort to assist farmers, Fonterra and Synlait milk companies waived high somatic cell count and temperature gradient standards penalties for over a week following the earthquake. In the central section of the 29 km rupture zone where horizontal and vertical displacement was greatest, the land surface was broken with fractures up to 1 m deep and 0.5 m wide across a 5-20 m wide zone (Figure 2). Some farmers were concerned that livestock may injure themselves in the ground fissures, particularly if spooked. However, farmers simply removed livestock from paddocks impacted by the surface fault rupture if they had not been able to flatten or close fractures with a heavy roller or cultivator (see Almond P, et al., 2010 for further information). This became particularly important for roadside paddocks, where strong interest in viewing the surface fault rupture meant some properties were at times visited by hundreds of people per day, creating an additional risk that livestock would be spooked (A. Baird, Rural Recovery Coordinator, personal communication, 2010). Another concern was that livestock were exposed to the increased risk of infectious disease transference if

the general public were allowed to go from farm to farm (H. Squance personnel communication 2010). The fault rupture also severed buried water pipes for supplying livestock, damaged pumps and affected the ground water table. Whilst there were not significantly hot or dry conditions immediately following the earthquake (such as would be expected in January or February), restoration of livestock water was still a high priority for farmers to ensure animal welfare. Most farms had repaired pipes or shifted livestock to paddocks with reliable water supplies within hours to days of the earthquake.



Figure 2: Surface rupture of the Greendale fault, close to Highfield Road, North Canterbury viewed from the air and ground (inset). At this point there was about 4 m horizontal movement and over 1 m vertical movement on the fault (Main photo: Russel Green, GEER; Inset: University of Canterbury).

Laboratory Animals

The University of Canterbury maintains a range of animals and arthropods for teaching and experimental purposes. Their welfare was an immediate concern for staff, however controlled access to buildings was required by the university’s incident management team until structural stability of buildings could be checked. Electricity was disrupted at the University for 12 hours and when restored it was only to some buildings due to structural and non-structural damage. Those with animal welfare requirements were made a priority. Immediate welfare concerns were ensuring animals had access to food, water and a safe living environment. In rat laboratories, water bottles tipped over in cages, but these were replaced within 6-12 hours. The strong shaking created large oscillating waves in laboratory fish tanks which in an extreme case lead to a small number of freshwater fish dying after they were washed over the side of one tank. In a tank of snapper (*Lutjanidae*) the excessive wave motion caused the fish to vomit. Heating was lost for the tropical fish which require a regulated temperature (25°C), however, there were no deaths or

mortality related to this. Fruit fly breeding was also set back by the loss of heating.

Where tanks and inhabited containers were physically tied down, on shelves with a lip, or on a braked trolley there were few instances of damage. However, unsecured tanks and containers fell from selves but fortunately resulted in surprisingly few deaths. The worst instance was a tank containing ~2,000 cockroaches that fell and smashed within the arthropod laboratory. Whilst most cockroaches survived the fall, retrieving them was deemed too difficult. After other valuable insects were removed from the room, it was fumigated and cleaned.

On-going aftershocks continued to stress animals. For example, rat breeding was reported to be reduced by less than 10% in the following weeks and snapper ceased eating for up to a week, despite a change in water within 12 hours of the main earthquake. The stress to animals delayed various experiments for up to several weeks or halted them completely in extreme cases.

The loss of electrical power increased the difficulty of providing the animals with automated feed and water, and environmental control processes, such as changing fish water, had to be laboriously done by hand (Prof. W. Davison personnel communication 2010).

The university also maintains a number of secure facilities in accordance with New Zealand Biosecurity legislation. Communication was made with Biosecurity New Zealand on the day of the earthquake to assure them that facilities were still secure. Several days later a structural engineering assessment was also delivered to assure the regulatory body of laboratory integrity.

Discussion

The events that unfolded after the Canterbury earthquake highlight the value of effective planning and offer a glimpse of what impacts emergency managers may need to cope with regarding animals following a disaster where large numbers of people are displaced, such as after Hurricane Katrina. It is clear that despite the considerable damage and lack of human casualties; there are areas for improvement that require the attention of emergency managers, pet owners and animal welfare professionals. The improvements are not unique to this event, but add to our collective knowledge. The highlighted lack of capacity in animal emergency management in New Zealand compounds progress to protect animals and ultimately, people.

From anecdotal evidence following the Canterbury earthquake, supplemented by existing literature, the following key lessons can be drawn:

Key Lessons

Veterinary Professionals

Veterinary professionals are likely to be become involved in response operations during disasters and need to ensure they are prepared for operating in a civil defence emergency management environment. Each Civil Defence Emergency Management Group convenes a Welfare Advisory Group (WAG), on which animal welfare should be represented. Likewise, Rural Support Trusts will be heavily involved in any disaster affecting rural communities, so should also have provisions within their structures and systems for inclusion of veterinary and animal welfare expertise. Veterinary professionals should liaise with these representatives to ensure they can be effectively integrated into emergency plans, training and exercises (Lovern, 2003). Micro-chipping is an important tool for the effective identification and reunification of lost companion animals, in particular following mass displacement during emergencies. Veterinary professionals should continue to actively promote micro-chipping of pets and could consider offering discounts during *Get Ready* (disaster preparedness) week, as well as reminding pet owners to ensure their animals are included in household emergency plans during consultations. Pet owners should also be strongly encouraged to ensure they have a pet carrier for each animal, and a muzzle and lead for each dog – as lack of pet carriers is a casual factor for evacuation failure (Heath, 2001). Following hazard events such as flooding, earthquake, volcanic eruption and hazardous materials incidents, it is likely that veterinary professionals may be presented with contaminated animals. Veterinary professionals should familiarise themselves with decontamination procedures such as those offered by Soric et al (2008). Key competencies for animal emergency responders are currently being compiled by H. Squance (personal communication, 2010) and this research will be of interest to many veterinary professionals. Veterinary practices also need to ensure they have sufficient business continuity arrangements to continue to provide services, not only to animals in hospital care, but to any potential surge of injured animals (Wingfield & Palmer, 2009), including development of evacuation plans and identification of alternate facilities. Further research is

needed to analyse whether any companion animals attended veterinary clinic consultations following the Canterbury earthquake due to stress (H. Squance, personal communication, 2010).

Emergency Management

Emergency management organisations need to ensure that pets and service animals are included in emergency plans and that staff and volunteers are familiar with the protocols for handling pets and their owners. Operational personnel need to understand that it is not appropriate to evacuate people without their pets, as this may create significant repercussions including evacuation non-compliance, illegal re-entry to evacuated areas by pets owners to retrieve their pets, psychosocial impacts from forced abandonment of pets or pet loss, refusal of medical treatment by pet owners until the needs of pets are met, as well as potential criminal liabilities (Glassey, 2010). The lead agency approach of having the local authority animal control coordinate the companion animal emergency welfare function, with support from the local SPCA appeared effective in Canterbury. There needs to be greater recognition that local authorities as a whole take responsibility for this mandate and not assume that generally under-resourced charities will fill the void. Following the response phase, it is likely during recovery that welfare agencies supporting displaced families will encounter a demand for medium term accommodation that is able to cater for pets and this may well be in short supply. Recovery plans should consider this issue and encourage family units (pets and their owners) to be accommodated together. There is an opportunity for the MCDEM Consistent Messaging programme to also ensure information is included on dealing with traumatised pets.

Legislation

The importance of specific animal welfare emergency management legislation has not been realised in New Zealand, in contrast to the passage of the Pet Emergency Transportation and Standards (PETS) Act 2006 by US lawmakers to address major lessons learned following Hurricane Katrina (Glassey, 2010). The PETS Act 2006 required local and state emergency management plans to include arrangements for pets and service (disability assistance) animals; funding for state and local pet and service animal emergency preparedness; and lastly, requirements that pets were rescued, cared and sheltered during emergencies (Edmonds & Cutter, 2008).

An outdated and fragmented regulatory framework for animal welfare emergency management is spread across the Animal Welfare Act 1999, Civil Defence Emergency Management Act 2002 and Dog Control Act 1996. The issue around disability assist dog status, access and identification has been highlighted by the September earthquake event. Under the Dog Control Act 1996 a “disability assist dog means a dog certified by one of the following organisations as being a dog trained to assist (or as being a dog in training to assist) a person with a disability” including Hearing Dogs for Deaf People New Zealand, Mobility Assistance Dogs Trust, New Zealand Epilepsy Assist Dogs Trust, Royal New Zealand Foundation of the Blind, and Top Dog Companion Trust. With no nationally required external identification of dogs, it is difficult for welfare centre staff during emergencies to ascertain whether an accompanying dog is a genuine disability assist dog or not. *Bona fide* disability assist dogs are eligible to be registered as such, which provides a right to access and remain in public places with such legal provisions overriding any other enactment or bylaw (Section 75, Dog Control Act 1996). This legitimises the right for those with disability assist dogs to access and remain in welfare centres, whether a state of emergency is in effect or not. Although the laws around disability assist dogs are clear and appropriate; it would appear these are not well understood by the emergency management sector.

The Civil Defence Emergency Management Act 2002 however is not so clear in its application to animal welfare during a state of emergency. Under Section 86, powers to evacuate may only be executed for the preservation of human life, and such evacuations only provide for the exclusion of persons or vehicles – not animals. Similarly, the power to requisition (Section 90) only applies for the preservation of human life. In the scenario of a poultry farm being flooded during a state of emergency, it appears that the powers outlined in the act, may not be able to be applied for the preservation of animal life. One of the provisions of the Civil Defence Emergency Management Act 2002 is that it shall not affect the functions, duties, and powers under other acts or general law (Section 6). This means the powers of the Chief Fire Officer (or delegated Officer in Charge) under the Fire Service Act 1975 and an Inspector and Auxiliary Officer appointed pursuant to the Animal Welfare Act 1999 remain largely unaffected. During the following 22 February 2011 earthquake in Christchurch, it was reported that defence and police personnel at

cordons did not permit access by SPCA Inspectors (R. Dawson, Chief Inspector, personal communication, 2011), contrary to the SPCA Inspectors’ power to do so under the Animal Welfare Act 1999 and the provision of Section 6 of the Civil Defence Emergency Management Act 2002. This again highlights the lack of legislative knowledge by officials which needs to be addressed. Finally, micro- chipping of pets is a proven mitigation tool according to the American Microchip Advisory Council for Animals (2007). Although New Zealand is fortunate to require all newly registered dogs to be micro- chipped under the Dog Control Act 1996 (Section 36A), other pets such as cats are not required to be micro- chipped. Counter productively, disability assist dogs are excluded from the requirement to be micro- chipped due to their classification as working dogs (Section 36(2A)). With the massive surge in displaced pets found following the 4 September 2011 earthquake, having the wider population of pets being micro- chipped would have significantly increased rates of reunification with their owners. Local authorities in their dual role for animal control and civil defence emergency management as well as animal welfare and veterinary professionals should encourage wider adoption of micro- chipping for all pets and disability assist dogs.

Animal Welfare Organisations

Currently, the New Zealand civil defence emergency management arrangements do not designate a lead agency for the management of lost and found pets following an emergency, or an agency responsible for pet/owner reunification. During the response to the 2010 Canterbury earthquake, the local SPCA (Canterbury SPCA) operated their independent track-a-pet service that incurs a \$10 fee to register lost animals and no charge to register found animals (Canterbury SPCA, 2010). Online newspapers and trading sites (e.g. www.trademe.co.nz) also advertised lost pets. This created some confusion about where to search for information on a lost pet. Evidence from the Canterbury earthquake and other disasters indicates coordination of lost and found pet information services is essential. For example, following Hurricane Katrina there was no single missing pet database which resulted in some owners visiting over fifty animal shelters in an attempt to locate their pet (Shiley, 2006). There would be considerable value, both in terms of time and resource, for one official lost and found database which is used by all current animal welfare providers, and information providers and is endorsed by CDEM to give the public confidence in

pet reunification. The current options are limited. For example, the free national online lost and found pets service “petsonthenet.co.nz” database has limited search capability, and “track-a-pet” is only a local service. Consideration needs to be given for a comprehensive system that meets the needs of all users. Related costs associated with the surge of lost and found notifications should be considered claimable under central government financial assistance arrangements.

In a wider sense, the Canterbury earthquake experience also highlighted the value of a single consolidated micro-chip database for companion animals, which would allow rapid searching of or identification of lost pets following a disaster. Currently, there are two commonly used databases: the National Dog Control Database operated by the Department of Internal Affairs and the New Zealand Companion Animal Register. The former only provides coverage to dogs, which automatically creates multiple systems to be searched. Again a lesson following Hurricane Katrina was the problems created through multiple lost and found databases of companion animals. An integrated national micro-chip database that covers all species and is accessible by all legitimate users would be of considerable value (Animal Control, SPCA, and Veterinary Clinics).

Other considerations

More than 99% of the known animal fatalities associated with the Canterbury earthquake occurred on a poultry farm. It is well established that caged production animals are zoologically vulnerable (Irvine 2009). The nature of the damage would suggest that such facilities would benefit from ensuring buildings and cage fittings are seismically restrained, as well as appropriate emergency plans being in place to protect these vulnerable animals. According to Irvine (2009), over a million hens were trapped in damaged cages following tornados at the Buckeye Egg farm in Ohio. Despite rescue efforts, tens of thousands of birds died of starvation, dehydration and exposure due to building damage as well as automated feeding, watering and waste systems being destroyed (Irvine, 2009). In committing to the philosophy of comprehensive emergency management, farm operators, public officials and the wider community have a responsibility to ensure such vulnerable animal groups are afforded appropriate mitigation, preparedness, response and recovery in a disaster management context. Compliance requirements for factory farms should include provision of emergency animal welfare planning.

Conclusion

The 2010 Canterbury earthquake provides valuable lessons for future emergency management in New Zealand. It highlights that animal emergency management is an important component of wider civil defence and emergency management.

Animals were vulnerable to a range of physical and psychological impacts, with some specific groups more acutely vulnerable, such as captive species, including factory farmed and laboratory animals. Large numbers of pets were reported lost, commonly traumatised by earthquake shaking. This put significant pressure on lost pet databases, and raised issues about how this is best managed. Feedback relationships were exposed, in that trauma to companion animals, and even farmed animals, can have serious knock-on psychosocial impacts on their human owners.

The 2010 Canterbury earthquake caused considerable distress and disruption to people or animals. However, the timing of the main earthquake was extremely fortuitous (early in the morning) and the relatively low number of displaced or injured persons did not put significant pressure on management of displaced companion animals. Nor were farms seriously impacted by feed damage or extended loss of essential services (such as electricity), mitigating any farmer desire to evacuate livestock, access significant supplementary feed supplies to maintain livestock, or destroy livestock on a large-scale. In contrast to companion animal emergency management, there is limited literature available on livestock emergency management practice and further research is required to ensure emergency management approaches in New Zealand are evidence based.

It is clear from the Canterbury earthquake that the integration of animal welfare organisations and veterinary professionals with wider civil defence emergency management will be essential for managing future disasters. As guardians of these animals, the human population has a moral obligation to afford protection to them in times of disaster. Veterinary professionals in New Zealand need to be proactive and engage in local civil defence emergency management arrangements before disaster strikes, as they will provide important services during major emergencies that affect people and their animals.

As new guidelines are published by NAWEM, further uptake of animal emergency planning is likely to occur

and this will see an increased demand for contributions by veterinary professionals to local civil defence emergency management. The uptake of companion animal emergency management by CDEM Groups would be strengthened if statutory mandate gave effect to the new NAWEM guidelines.

Whatever the future New Zealand disaster; pet owners, farmers, veterinarians, animal welfare officers and emergency managers need to collaborate to create resilient communities, with the understanding that animals too, are part of these communities.

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Resources

An animal emergency management special interest group has been established by the International Association of Emergency Managers. A group wiki to share information and resources is available from <http://animalemergency.wikispaces.com>

Postscript Note

While this paper was written to focus on the Sept 4 earthquake event, many more people were displaced and homes destroyed during the 22 February 2011 Christchurch earthquake. Media and anecdotal reports at the time indicated the loss of animals was a significant issue for displaced persons and an issue for the CBD cordon management, as people attempted to breach the cordon to rescue lost pets. Analysis of this event will provide rich data for future research into animal emergency welfare.

Abbreviations

CDEM	Civil Defence Emergency Management Group
EQC	Earthquake Commission

MAF	Ministry of Agriculture and Forestry
MCDEM	Ministry of Civil Defence & Emergency Management
NAWEM	National Animal Welfare Emergency Management Liaison Group
NZCAC	New Zealand Companion Animal Council
PETA	People for the Ethical Treatment of Animals
PETS	Pet Evacuation and Transportation Standards
SPCA	Society for the Prevention of Cruelty to Animals
WAG	Welfare Advisory Group
WSPA	World Society for the Protection of Animals

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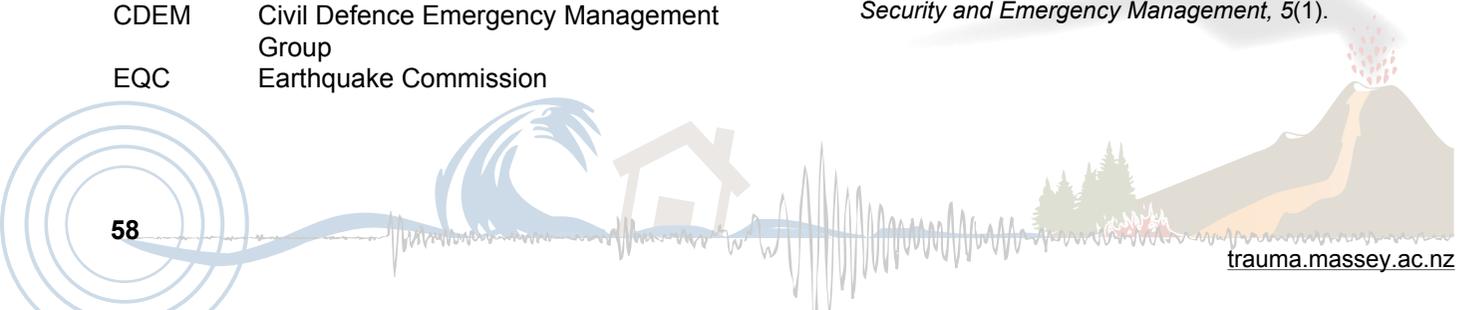
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