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The National Capabilities for Animal Response in Emergencies (NCARE) Study: An Assessment of US States and Counties

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Abstract:
Communities with well-developed animal response plans, along with trained and equipped animal response teams, are typically better able to protect resident livestock and companion animals during a disaster, with fewer animals lost, higher human evacuation compliance rates, and a greater percentage of pets staying with their families. The NCARE Study is a cross-sectional descriptive survey designed to assess, among US states and counties, the level of preparedness for managing animals in an emergency. Overall, 65% of participating states (31/48) reported having a State Animal Response Team (SART), while 48% (16/33) of counties with >1 million population (large counties) and 23% (131/565) of a random sample of counties with <1 million population (small counties) reported having a County Animal Response Team (CART). Only 50% of small counties reported having plans for collocated or cohabitational emergency shelters, compared to 73% of states and 80% of large counties. In stratified analyses, the proportion of counties with a CART ranged from 2% in FEMA Region X to 69% in Region II. Our results demonstrate that many regions of the US have taken some important initial steps towards establishing the capabilities necessary for managing animals in a disaster, while other regions have areas for improvement.

Keywords: animals, disaster planning, emergencies, preparedness, response capabilities, survey
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1 Introduction

When disasters such as hurricanes, tornados, floods, or wildfires strike a community, the impact reaches not only people but also resident livestock and companion animals. The impact for animals can include, on a large scale, death, stranded animals requiring rescue, and permanent separation of companion animals from their owners. In 1999, for example, Hurricane Floyd and the ensuing widespread flooding caused approximately 2.9 million pets and livestock to be killed, and thousands more companion animals were permanently separated from their owners (Federal Emergency Management Agency 2004). In two communities impacted by Floyd, more than 1150 rescued small animals were housed by local universities, and 80% of these were never reunited with their owners (Federal Emergency Management Agency 2004). There are no precise counts of the number of animals affected when Hurricane Katrina struck Louisiana in 2005, but The Louisiana SPCA estimates that 15,500 companion animals in the New Orleans needed to be rescued (Louisiana SPCA) and the Department of Agriculture estimates that millions of chickens were killed in both Louisiana and Mississippi (Clark 2005). As with Floyd, reunification was difficult: an estimated 80–85% of rescued companion animals were never reunited with their owners. Preventing pet abandonment and separation is important for the well-being of both animals and their owners. Previous studies have shown that, among disaster survivors, pet loss is strongly associated with high levels of psychological distress, including post-traumatic stress disorder, even after controlling for other causes of trauma, such as displacement (Hunt, Al-Awadi, and Johnson 2008; Lowe et al. 2009).

Past disasters have also highlighted the need for community emergency response plans to include provisions for pet evacuations and to communicate relevant information to residents with pets. Two commonly reported barriers to evacuation are lack of transportation for pets and lack of availability of pet friendly sheltering (or uncertainty about its availability). As a result, some residents in disaster-affected areas risk their own lives and endanger the lives of responders in order to remain with their pets (Federal Emergency Management

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Agency 2015). In a survey of North Carolina residents, for example, pet owners were approximately half as likely as non-pet owners to report evacuating during Hurricane Bonney and were even less likely to report willingness to evacuate in hypothetical future hurricane scenarios (Whitehead et al. 2001). Similarly, a study of residents impacted by 1997 flooding in Yuba County, CA demonstrated that the likelihood of evacuation failure was associated with the number of household pets (Heath et al. 2001). As another example of the impact of inadequate coordination, the high number of companion animals that were never reunited after Katrina has been attributed, at least in part, to the lack of coordination and planning by animal welfare organizations that transported animals away from the affected communities (Louisiana SPCA).

Including animals in emergency response plans in the US is important, given that an estimated 56% of American households now have at least one companion animal, and American society places value on the lives of pets, seeing them as part of a family and holding emotional and sentimental value (Walsh 2009; American Veterinary Medical Association 2012). Because of the high value placed, it is critical that emergency response planning considers how residents will make decisions about their pets in the event of a disaster and can accommodate the expectations of pet owners. The need for strong animal response capabilities may also grow over time based on three expected trends: projections that the US human population will increase by approximately 40 million by the year 2030, projections that an increasing numbers of US residents will live in areas that are prone to natural disasters, and the possibility that the frequency and intensity of natural disasters may increase over time due to climate change (van Aalst 2006; Barros et al. 2012; Colby and Ortman 2015).

There has been some progress in emergency preparedness for animals over the last decade. In 2006, the US government passed the Pets Evacuation and Transportation Standards (PETS) Act which requires all community planning entities to have an evacuation plan that includes animals (Pets Evacuation and Transportation Standards Act of 2016). Furthermore, many counties and states have established animal response teams, dedicated to preparing and planning for, and responding to animal emergencies in their states and communities. As witnessed by responders during Hurricane Gustav in 2008 and Hurricane Sandy in 2012, state and local authorities advanced considerably in terms of inclusion of pets in their emergency plans (Burns 2008; Federal Emergency Management Agency 2013a; 2013b).

Despite improvements over the last decade, there have nevertheless been indications that there is still a critical need nationwide to enhance animal response resources and capabilities at the state and local level. For example, a 2014 study of Vermont towns, conducted by the Humane Society of the United States (HSUS) found that less than half of officials reported having an adequate location for evacuation of people and pets, and only 10% of respondents reported having animal supplies on hand in their municipality (Gelb 2014). In some areas of the country, there have also been anecdotal reports that response teams have dwindled in size and become largely inactive due to a lack of training and response opportunities.

In order to address the unmet needs for animal emergency preparedness in the US, the emergency management community must first conduct a needs assessment to understand the gaps in existing infrastructure and capabilities. To our knowledge, no systematic assessment has been conducted to determine the United States' level of preparedness for managing animals in an emergency and to determine which jurisdictions or regions have critical deficiencies. To address this knowledge gap, the American Society for the Prevention of Cruelty to Animals (ASPCA) designed and conducted the National Capabilities for Animal Response in Emergencies (NCARE) Study.

2 Research Design

The NCARE study is a cross-sectional descriptive survey of officials who oversee emergency preparedness in US states and counties. The survey was administered through the internet and by telephone. The full survey content is reported in Appendix 1 (state version) and Appendix 2 (county/city version). In brief, the survey covered the following items: presence of a State or County Animal Response Team (SART/CART) or equivalent organization, organization and membership of the SART/CART, activities conducted by the SART/CART in the previous 12 months, the jurisdiction's active typed animal teams, equipment owned by the SART/CART, presence and size of supply caches for managing small animals (dogs and cats) and large animals (horses and livestock), plans to allow people and their pets to shelter in one location, and perceived training or planning needs for the jurisdiction. Questions for state officials also covered details of other organizations involved in emergency response: veterinary reserve corps (or equivalent), livestock organizations, private animal shelters, and university extension programs. The survey was pretested with 5 counties and wording was adjusted based on feedback provided.

2.1 Survey Respondents

All US states and all US counties and cities with a population of ≥1 million (n = 8 cities and 41 counties, hereafter referred to as "large counties") were selected for survey contact. In addition, in each of 45 states, we selected a random sample consisting of 25% of the counties (or county equivalent) with a population of <1 million ("small counties", n = 766). These 45 states include AK, for which the sampling was conducted among boroughs and census areas and LA, for which it was conducted among parishes. For the remaining 5 New England states (CT, MA, NH, RI, VT), we did not select counties for the study because those states do not organize emergency preparedness at the county level. The US Census estimate for 2014 was used for determining population (U.S. Census Bureau Population Division 2015).

We developed an initial contact list consisting of the official for each selected jurisdiction whom we expected to have access to the information needed to answer the survey questions. In most cases, that person was an emergency manager, emergency director, or represented the state veterinarian's office. To ensure a high response rate, we attempted up to 5 contacts per person. First, an informational email was sent to each state's contact describing the purpose of the survey and providing a contact for any questions about the survey. Then we delivered an email to each state's contact with a link to the online survey and asking the director to distribute the link to each of their county contacts. Two follow up reminder emails were sent to both the states and county contacts. Non-responders were then contacted by telephone and given the opportunity to complete the survey by telephone. If the original contact person indicated they did not have all the information needed to complete the survey, we contacted additional representatives for that jurisdiction. In order to increase the likelihood of complete and accurate responses, county and city respondents were told that responses for individual jurisdictions would not be reported.

In order to be eligible for analyses, a survey response must have included, minimally, the name of the jurisdiction and an answer – either positive or negative – for 2 key questions: presence of a SART/CART and presence of a small animal supply cache. In some cases, multiple responses were received for the same jurisdiction. For those jurisdictions, a single set of responses was selected with priority given to the most complete survey (i.e. fewest missing answers) and to those completed by the official in the most relevant role for their jurisdiction. Responses for large cities were reported separately from their associated county if the respondents indicated that emergency response was managed independently. Otherwise, a single response for the county was included in the analysis. Study staff reviewed the open ended comments and common themes were coded for analysis.

2.2 Data Analysis

The objectives of the data analysis were to (1) summarize findings for the US as a whole (2) identify geographic variation in findings by FEMA region and (3) assess, among small counties, the association between the historical frequency of disasters and the presence of a CART. Data was summarized as percentages in aggregate and stratified by jurisdiction size (small county, large county, and state). The following results were also stratified by FEMA region for states and small counties: presence of SART or CART (or equivalent), presence of supply caches, and plans for collocated sheltering. Results for large counties were not stratified by FEMA region because, for some regions, only a single county has population >1 million and therefore, the results for individual counties may have been identifiable. Because the small counties were a random sample, we also calculated exact 95% confidence intervals for binomial proportions using the Clopper-Pearson method (Clopper and Pearson 1934). The confidence intervals can be used for making inferences for other small counties not included in the sample. Also, FEMA regions with non-overlapping confidence intervals can be considered significantly different from each other. Data on the historical number of declared disasters from 1953 to 2015 was taken from the FEMA Data Visualization Datasets webpage (Federal Emergency Management Agency 2016). The total for each county was the sum of the number of disasters declared in that county and the number of statewide disasters. For ease of interpretation, the number of historical disasters was categorized as 2–9, 10–19, 20–29, and ≥30 disasters. The association between these categories and probability of having a CART was assessed using Fisher's exact test (Fisher 1922). All analyses were conducted in Stata 13.1. The study was determined to be exempt from Institutional Review Board (IRB) oversight by the Chesapeake IRB.

3 Results

The study received eligible responses from 48 states (92%), 33 of 49 large counties (67%) (including 7 of 8 selected large cities), 506 of the 766 small counties in the random sample (66%), and 59 small counties not in the random

sample that responded spontaneously. In order to assess any bias from the 59 spontaneous responses that were not part of the random sample, we repeated analyses with these jurisdictions excluded. We found that no findings differed by more than 3 percentage points, indicating that there was no meaningful bias. Therefore, these spontaneous responses are included in analyses for small counties.

Table 1 summarizes the responses by jurisdiction size; Table 2 summarizes state responses stratified by FEMA region, and; Table 3 summarizes the responses from small counties (less than 1 million in population) stratified by FEMA region.

Table 1: Summary of State and County Resources and Planning by Jurisdiction Type.

	Jurisdiction type and size		
	States	**Counties and cities>1 million population**	**Counties <1 million population**
	***n*=48**	***n*=33**	***n*=565**
	%	**%**	**%**
CART/SART structure and activities			
Has own CART/SART or similar organization	65	48	23
Groups comprising CART/SART*			
State/county/city agencies	90	88	83
Private non-profit	90	44	52
Individuals	N/A	69	68
CARTs	65	N/A	N/A
CART/SART organizational structure*			
Directed by state or city/county agency	61	94	74
Private non-profit	35	6	24
CART/SART activities reported in previous 12 months*			
Met as a group	69	86	64
Newsletter	28	21	3
Web resources	41	50	34
Training/exercises	69	71	60
None	7	0	19
Equipment and supplies owned			
Rescue boats that can be used for animals	100	30	54
Small animal carriers or cages	90	83	54
Livestock panels	77	48	25
Small animal transportation vehicles	61	85	61
Large animal transportation vehicles	56	67	30
Cache of small animal supplies	73	77	41
Cache of large animal supplies	52	38	9
Other			
Plans to allow pets and their owners to shelter together	71	80	50
Additional needs identified			
Training	84	65	62
Subject matter experts to assist with planning	45	48	44
Rescue equipment for animals	71	68	62
Other	29	26	13
None	3	13	16
Other organizations engaged to provide support in emergency			
Veterinary reserve corps, or similar organization	75	N/A	N/A
Livestock organizations	89	N/A	N/A
University extension	90	N/A	N/A
Private non-profit organizations	69	N/A	N/A

*Among counties with CART/states with SART.

Table 2: State Resources and Planning by FEMA Region.

	FEMA region									
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**
Responded to survey, *n* (%)	5 (83)	2 (100)	5 (100)	8 (100)	6 (100)	5 (100)	4 (100)	6 (100)	3 (75)	4 (100)
Has SART or similar state organization, %	60	100	60	88	50	100	75	50	0	50
Has cache of small animal supplies, %**	80	100	100	75	50	100	75	50	33	75
Has cache of large animal supplies, %**	40	0	40	63	33	40	75	83	33	75
Plans to allow pets and their owners to shelter together, %**	75	50	100	63	50	80	100	100	67	50

**Among those who provided an answer (Those who were not sure or did not answer were excluded.)
SART, State Animal Response Team; N/A, not applicable because these questions were not asked of states without a SART.

Table 3: Small County Resources and Planning by FEMA Region.

		FEMA region								
	Total *n* = 561	**II** *n* = 16	**III** *n* = 48	**IV** *n* = 125	**V** *n* = 75	**VI** *n* = 93	**VII** *n* = 88	**VIII** *n* = 57	**IX** *n* = 17	**X** *n* = 42
Has CART or similar county organization, % (95% CI)	23 (20–27)	69 (41–89)	50 (35–65)	27 (20–36)	13 (7–23)	15 (8–24)	23 (14–33)	16 (7–28)	41 (18–67)	2 (0–13)
Has cache of small animal supplies, % (95% CI)**	41 (37–46)	87 (60–98)	73 (57–85)	50 (40–60)	49 (36–61)	22 (14–31)	27 (18–38)	24 (13–37)	94 (70–100)	29 (15–46)
Has cache of large animal supplies, % (95% CI)**	9 (7–12)	20 (4–48)	12 (4–25)	7 (3–14)	9 (3–18)	4 (1–11)	8 (3–16)	17 (8–29)	33 (11–62)	0 (0–10)
Plans to allow pets and their owners to shelter together, % (95% CI)**	50 (46–54)	67 (38–88)	57 (42–72)	42 (32–52)	44 (32–57)	47 (37–58)	71 (60–81)	36 (24–50)	65 (38–86)	41 (24–59)

**Among those who provided an answer (Those who were not sure or did not answer were excluded.)
CART, County Animal Response Team; CI, confidence interval.

Overall, 31 states (65%) reported having a State Animal Response Team (SART), while 48% of large counties and 23% of small counties reported having a County Animal Response Team (CART) (Table 1). When results were stratified by FEMA region, all regions had ≥50% of states who reported having a SART or similar state organization, except Region IX, in which none of the 3 responding states reported having a SART. All states (100%) in FEMA Regions II and VI indicated having a SART (Table 2, Figure 1). The proportion of responding counties with a CART ranged from 2% in Region X to 69% in Region II. (Table 3) In the previous year, ≥60% of CARTs and SARTs had met as a group and conducted some sort of training or exercises, but 19% of small county CARTs were not active at all. In free-text comments about CART activities, CARTs also spontaneously reported responding to an emergency in the previous year and conducting public outreach events. Among counties without a CART, 215 spontaneously reported relying on other local entities for emergency response (sheriff, humane society, ranchers, etc.) for emergency response, and 69 counties spontaneously reported relying on state or regional teams. Several of these counties emphasized that they rely on owners to manage their livestock, and that personnel from these entities are typically well adept at self-evacuation. A summary of findings for typed animal response teams is provided in Appendix 3.

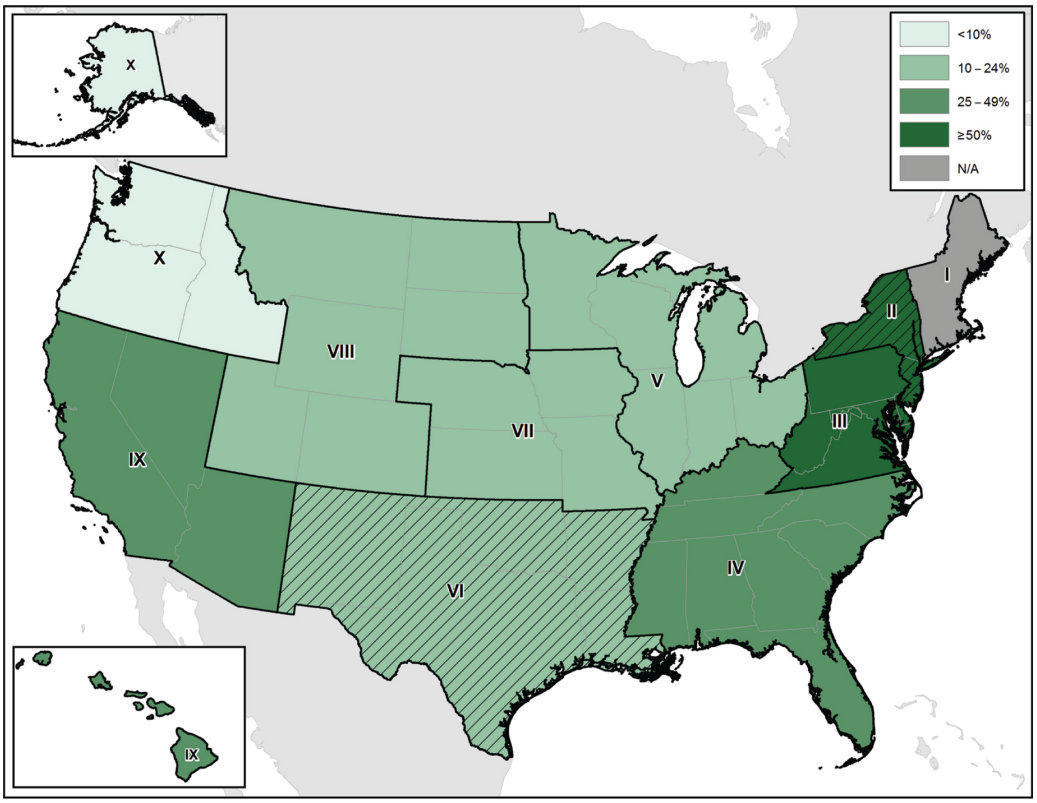

Figure 1: Proportion of Jurisdictions with County Animal Response Team (CART) or State Animal Response Team (SART), by FEMA Region.
Shading indicates percentage of small counties (<1 million in population) that indicated they have a CART. Hatching identifies the regions where all states (100%) reported having a SART. N/A = not applicable because emergency activities are not typically organized at county level in Region I.

Participants reported a variety of models for their CART's or SART's structure and membership. More than 80% of respondents reporting having government agencies such as Department of Agriculture or Department of Health as members of their SART/CART. Having private non-profit animal organizations as members was more common for SARTs (90%) than for large counties (44%) or small counties (52%). About 68% of counties with a CART reported having individual members of the community as members. In free-text comments, many jurisdictions also described being part of multi-county or regional animal response teams.

We found a statistically significant, but weak, association between the historical number of declared disasters and the likelihood of having a CART. (Fisher's exact $p < 0.005$, Table 4) Even among those counties with a high frequency of past declared disasters (≥30 since 1953), however, only 30% reported having a CART.

Table 4: Presence of CART by Historical Number of Declared Disasters.

Number declared disasters in county 1953–2015	Number of counties	Have CART % (95% CI)

2–9	46	7 (2–19)
10–19	268	22 (17–27)
20–29	207	28 (22–36)
30–63	63	30 (20–43)

Fisher's exact $p = 0.005$ for association.

3.1 Equipment/Supplies (Caches)

Nationally, 74% of states, 77% of large counties and 41% of small counties reported having a cache of supplies for managing small animals (dogs and cats) in an emergency. The proportion of states with a cache of small animal supplies ranged from 33% in Region IX to 100% in Regions II, III, and VI (Figure 2). Among small counties, Region IX had the highest percentage with a small animal supply cache (94%) and Region VI had the lowest (22%). Large animal supply caches (for horses or livestock) were less common with 52% of states, 38% of large counties, and 9% of smaller counties reporting having a cache of these supplies. When asked to estimate the number of animals that can be served by their caches, responses ranged from 1 to 1000 for large animals and up to 5000 for small animals. Among jurisdictions who could provide an estimate for their small-animal caches, about a third (34%) of counties indicated the cache could support at least 100 animals, and a similar proportion of states (37%) indicated that the cache could serve at least 250 animals. In free-text comments, 279 counties spontaneously reported using fairgrounds or public facilities for housing animals in emergencies.

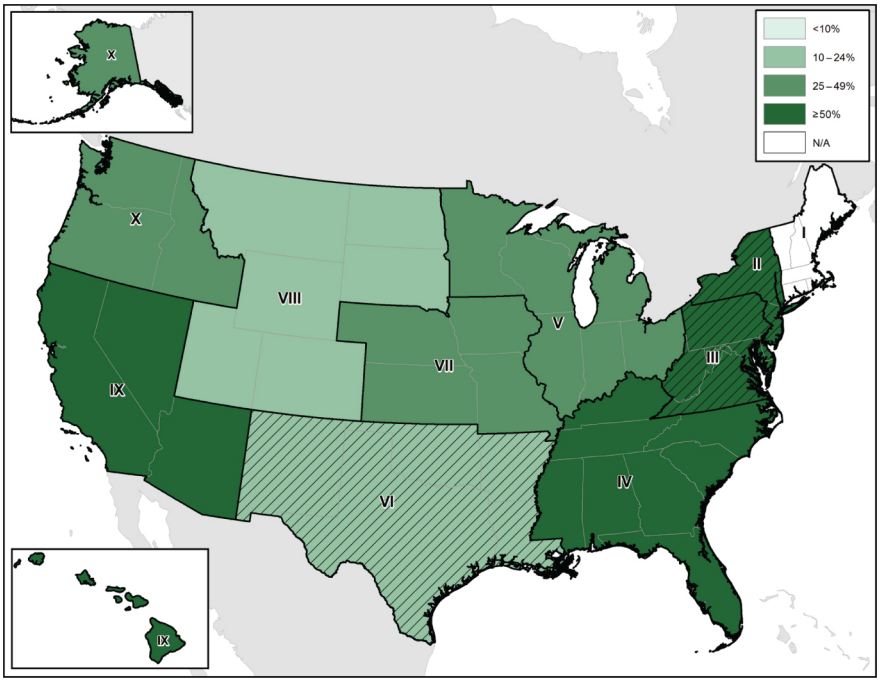

Figure 2: Proportion of Jurisdictions with a Cache of Small Animal Supplies, by FEMA Region.
Shading indicates percentage of small counties (<1 million population) that indicated they have a cache of small animal supplies. Hatching identifies the regions where all states (100%) reported having a small animal supply cache. N/A = not applicable because emergency activities are not typically organized at county level in Region I.

3.2 Collocated or Cohabitational Sheltering

We asked respondents if their jurisdiction had plans to allow people and their pets to shelter in one location. In responding, participants may have included collocated sheltering, in which people and pets are sheltered in proximity to each other, and/or cohabitational sheltering, in which people and animals share the same space). Only 50% of small counties reported having plans for collocated or cohabitational emergency shelters, compared to 73% of states and 80% of large counties. By region, the percentage of states with plans for collocated or cohabitational emergency shelters ranged from 100% in Regions II, VII, and VIII to a low of 50% in Regions II, V, and X. For small counties, the range went from 36% in Region VIII to 71% in Region VII (Table 3 and Figure

3). In free-text comments, some counties reported limitations on companion animals in their shelters such as being open only to service animals in cohabitational sheltering.

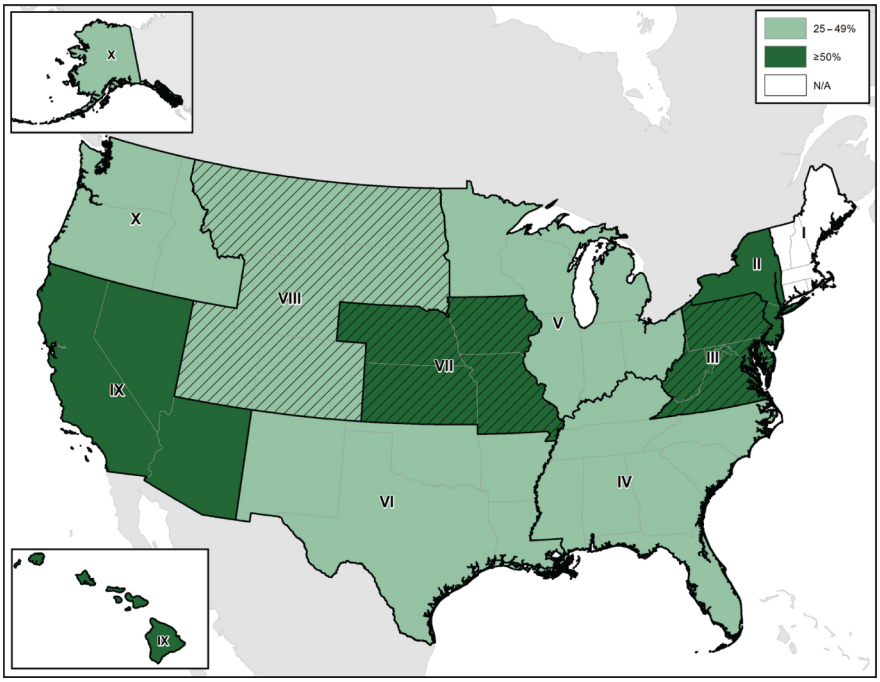

Figure 3: Proportion of Jurisdictions with Plans for Collocated or Cohabitational Shelters, by FEMA Region.
Shading indicates the percentage of small counties (<1 million population) that reported having plans for collocated or cohabitational shelters. Hatching identifies the regions where all states (100%) reported having plans for collocated or cohabitational shelters. N/A = not applicable because emergency activities are not typically organized at county level in Region I.

3.3 Other Organizations Engaged by States

75% of states have a Veterinary Reserve Corps, or similar organization, with the number of members ranging from 10 to over 2,000. Additionally, private non-profit animal welfare organizations are engaged to provide support in emergency in 69% of states, while 89% of states indicated livestock organizations are engaged.

3.4 Additional Needs

More than 75% of respondents reported additional needs for emergency preparedness, such as training, expertise and equipment. Training needs were identified by 84% of states, 65% of large counties, and 62% of smaller counties. A similar level of need was indicated for rescue equipment: 71% of states, 68% of large counties, and 62% of smaller counties. Subject matter expertise to assist with planning was listed as a need by approximately 45% of the jurisdictions regardless of type/size.

4 Discussion

We found that most areas of the US have, at the very least, taken some important initial steps towards establishing the capabilities necessary for managing animal in a disaster. In every FEMA region, for example, at least some of the counties and states have established a cache of supplies for sheltering small animals and have plans in place for collocated or cohabitational sheltering. Despite these indications of progress, we nevertheless identified many areas for improvement. In particular, the study findings point to some common deficiencies in county-level organization for animal emergency response. These deficiencies were particularly notable in FEMA regions V, VI, VII, VIII, and X, where fewer than 25% of counties had a CART or similar organization. In contrast, FEMA regions II and III were noteworthy for the high number of counties with a CART. The presence of a CART was positively, but only weakly, associated with historical frequency of declared disasters by

county. Among counties that would be expected to have the highest need for a CART based on a high historical frequency of disasters (more than 30 since 1953), only about a third have a CART. Even among the counties that have a CART, many appeared to be relatively inactive, as evidenced by having no meetings or activities in the previous year. Our study also demonstrated that jurisdictions with smaller human populations were less likely to have a CART or have taken other steps to prepare for animals in an emergency. In some of these counties, however respondents reported in comments that the farmers or horse owners take care of themselves and their neighbors in an emergency and do not expect or require any help from the county in an emergency.

FEMA has stressed the important of enhancing emergency-response capabilities by local government (Federal Emergency Management Agency 2011; Pittman 2011). Organization at the county (or city) level is critical for emergency response to occur quickly enough to prevent animal emergencies. In our experience with emergent disasters – such as fire, flash floods, earthquakes, tornadoes, or chemical explosions – most animal deaths occur within the first 24–48 h of a disaster onset (i.e. before state or national responders who can assist with animals typically have a chance to arrive). In those situations, rescuing humans will always be the first priority, with responders for animals typically attempting rescue only when it is safe and when it will not interfere with other rescue activities. It is not always possible, of course, to clearly separate the two different operations, especially when residents have pets and do not want to leave them behind. In that situation, having collocated or cohabitational shelters available and making their presence known to local residents could reduce the number of people at risk by increasing the likelihood that pet owners will evacuate early. As mentioned in the paragraph below on private animal organizations, one way that localities can prepare for animal rescue is to include, in the local emergency plan, private animal-rescue organizations that can take on responsibilities for animal rescue as soon as such activities are safe, but while other first responders need to be focused on rescue activities for humans.

Key steps towards county-level organization include creation of a CART or a similar organization, cultivation of skilled, experienced and motivated animal responders, and including animals in the county's Emergency Operation Plan. In addition to establishing a CART, coordination with one or more adjacent counties (through, for example, an inter-local agreement) is also a simple step for boosting response capabilities to localized emergencies. One benefit of taking these steps is that counties with a CART, particularly if it is active and recognized by the local emergency management agency, are less likely to need outside assistance in an emergency, and response activities can happen quickly when they are more likely to save animal lives. Establishing a CART takes time, however, often requiring a year or more to establish key functions and approvals. Fortunately, the initial establishment of a CART does not require the governing body to first authorize its formation through legislation or changes of ordinance, minimizing one potential barrier to getting a CART started. For those counties wishing to develop a CART, there are guides available, such as Colorado State University's Community Animal Disaster Planning Toolkit (Colorado State University Extension 2017). Other resources to support CART development are available from the ASPCA and the US Department of Health and Human Services (U.S. Department of Health & Human Services 2015; ASPCA 2016) There are also a variety of models for organizing an entity that covers the functions of a CART. Some of our survey respondents, for example, reported successfully establishing multi-county CARTs or regional animal response teams.

About a third of states do not have a SART or similar organization. In general, the SART's function is not as a first responder. Instead, SARTs typically provide a critical role in coordination between counties, and serve as a conduit for communication between counties and the state government. When a SART is lacking, intra-county coordination may be more challenging. SARTs also provide a critical role in coordinating the state response and in assisting counties with identifying and securing in-state resources including responders, equipment, and supplies.

We found that only about half of counties with a CART had private non-profit animal organizations as members of their CART. In contrast, the overwhelming majority of SARTs include private organizations as members. The responsibility for managing animals in an emergency may lie with a variety of different agencies, but in the immediate aftermath of a disaster, government agencies may be limited in their capacity to respond to situations involving animals. In some jurisdictions, for example, the local animal control agency alone does not have the staff capacity, equipment, or training to respond to an emergency, and government employees, regardless of role, may get dispatched for human rescue operations. Similarly, the local emergency management agency's priority is typically to save human lives. Therefore, many communities can benefit from identifying a community organization that can be charged with managing companion animals in an emergency. In order for them to respond quickly, however, agreements with these organizations (such as a memorandum of understanding) should be executed as part of planning activities, along with including official recognition of the animal organization in the local emergency plan and establishment of mechanisms for coordinating activities.

In our study, about half of small counties lacked plans for collocated or cohabitational sheltering. In our experience, these shelters can be implemented effectively and safely, with little or no risk of adverse health consequences (such as allergic reactions) for shelter residents. They also cost substantially less than other models

because the animal owners, rather than staff, provide care for the animals. It is important to remove barriers to evacuation, and in our experience with Hurricane Sandy, residents were more likely to comply with evacuation orders when collocated or cohabitational emergency shelters were available, their presence was known to local residents, and pet-friendly transportation to the shelters was available. CARTs can serve an important function in working with local emergency management to address sheltering needs and ensuring that residents will have access to transportation to get to shelters with their animals.

Our study has a few limitations. We trusted that responding officials answered truthfully and to the best of their knowledge. Some respondents willingly shared their deficiencies in great detail, perhaps partly motivated by the hope that it would aid in garnering future support, but it is possible that others may have erred on the side of over-reporting capabilities to avoid having their jurisdiction appear ill prepared. In order to minimize any tendency towards over-reporting, we communicated that results would not be publically reported for individual counties. Another limitation is that our study focused on state and county resources that could be easily quantified and reported in a survey format, but we were limited in our ability to capture expertise and capabilities of response teams and associated personnel. There are currently no recognized standards for defining capabilities of animal response personnel. The National Animal Rescue and Sheltering Coalition (NARSC) and the Southern Agricultural and Animal Disaster Response Alliance (SAADRA) have drafted recommendations for defining capabilities that may be available for future assessments. We also assumed that responding counties represented US counties more broadly. We hypothesize that if the response was biased, that counties with limited animal response capabilities may be less likely to respond to the survey. In that case, the true levels of response capabilities for counties may be even lower than what we report.

Appendix 1

Questionnaire for State Respondents.

Category	Questions
Respondent role	1. What is your current role in emergency management? *A state emergency manager or director, Other state-level role related to animal emergency preparedness and response, A county or city emergency manager or director, Other county or city role related to animal emergency preparedness and response, I am not involved with animal emergency preparedness in my current position*
State animal response team	2. In what state do you currently work? 3. Does your state have a State Animal Response Team (SART)? *Yes, No, Not sure/do not know* 4. What groups comprise your SART? Select all that apply. *State agencies (for example, department of agriculture or department of health), Private/non-profit organizations (for example, humane societies that are members), County Animal Response Teams (CARTs), Do not know/not sure, Other groups (please specify)* 5. How is the SART organized? *A private non-profit organization, Directed by the state agency having jurisdiction, Do not know/not sure, Other (please specify)* 6. In the last 12 months, which of the following activities has the SART engaged in? Please select all that apply. *SART has met as a group (either in person or via teleconference or webinar), A newsletter was distributed on a regular schedule (for example, every quarter or every year), Web-based resources/communication are currently available, Training or exercises, No activities in the last 12 months, Do not know/not sure, Other SART activities in the last year (please specify)* 7. Which of the following typed animal teams are active at the state level? (FEMA typed or SAADRA Animal Resource typing) Please select all that apply. *Small animal rescue, Small animal transport, Small animal sheltering, Large animal rescue, Large animal transport, Large animal sheltering, None of the above, Not sure/do not know*
Equipment	8. Please provide the following counts of rescue boats owned by the state or the SART that would be available for animal emergency response. *Jon boats, Inflatables, V hull. Total number, number that can be shared under EMAC* 9. Please provide the following counts of cages and panels owned by the state and/or the SART. *Plastic carriers for small animals (such as Vari Kennels), Wire cages (medium or larger), Livestock panels. Total Number, number that can be shared under EMAC*

	10. Please provide the following counts of transportation vehicles for animals owned by the state and/or the SART. *Number of animal control units, Number of specially designed transport trailers for small animals, Number of other transport vehicles for small animals, Number of horse trailers, Number of livestock transporters, Number of commercial transporters for large animals,* Please list the type and number of any other transport vehicles not listed above
Supply cache	11. Does the state have a cache of small animal sheltering supplies? (such as bowls, leashes, cleaning supplies) *Yes, No, Not sure/do not know* 12. Approximately how many animals can be served with the items in the cache of sheltering supplies? 13. Where is the cache of sheltering supplies stored? Select all that apply. *In a fixed storage location, such as a warehouse, On a mobile vehicle, such as CAMET (Companion Animal Mobile Equipment Trailer), Other (please specify)* 14. Does your state have a cache of supplies for managing large animals in an emergency? *Yes, No, Not sure/do not know* 15. Approximately how many large animals can be served with the items in the cache of supplies?
	16. How many counties in the state have an active County Animal Response Team (CART)? *Number of counties with active CART, Number of counties with no active CART*
Other organizations	17. Does your state have an organization of veterinary professionals trained to respond to emergencies? *Yes, No, Do not know/not sure* 18. What is the name of the organization of veterinary professionals for your state? *Veterinary Reserve Corps (VRC), Other name (please specify)* 19. How many members are in the organization of veterinary professionals? 20. Does your state have livestock industry organization(s) that are prepared to provide support for animal issues in an emergency? (For example, cattlemen's association or 4H) *Yes, No, Not sure/do not know* 24. How many private non-profit animal shelters could provide this type of support? 25. Does your state have any university extension organizations that could provide support for animal issues in an emergency? *Yes, No, Not sure/do not know* 26. Does your state have any additional organizations (not already mentioned) that could provide support for animal issues in an emergency? *No, they are all mentioned, Not sure/do not know, Yes (please list/describe the other types of organizations)*
Other questions	29. For state-run emergency shelters, are there plans in place that would allow people and their pets to shelter in one location during an emergency or disaster ("pet-friendly sheltering")? *Yes, No, Not sure/do not know* 127. What additional needs does your jurisdiction have (if any) related to managing animals in an emergency or disaster? Select all that apply. *Training on topics such as animal sheltering and rescue,Subject matter experts to assist with planning, Rescue equipment for animals, None – we have everything we need, Not sure/do not know, Other needs (please specify)*

Appendix 2

Questionnaire for County/City Respondents.

Category	Questions
Respondent role	1. What is your current role in emergency management? *A state emergency manager or director, Other state-level role related to animal emergency preparedness and response, A county or city emergency manager or director, Other county or city role related to animal emergency preparedness and response, I am not involved with animal emergency preparedness in my current position* 2. Please provide your title or a brief description of your role. 3. In what state do you currently work? 4. What is the name of the county (or city) that you work for?
State animal response team	5. Does your county (or city) have a County Animal Response Team (CART)? *Yes, No, Not sure/do not know*

	6. What groups comprise your county (or city) CART? Select all that apply. *County or city agencies (for example, animal control or department of health), Private/non-profit organizations (for example, humane societies that are members), Individual members of community, Not sure/do not know, Other groups (please specify)* 7. How is the CART organized? *A private non-profit organization, Directed by the county/city agency having jurisdiction, Not sure/do not know, Other (please specify)* 8. In the last 12 months, which of the following activities has the county (or city) CART engaged in? Please select all that apply. *CART has met as a group (either in person or via teleconference or webinar), A newsletter was distributed on a regular schedule (for example, every quarter or every year), Web-based resources/communication are currently available, Training or exercises, No activities in the last 12 months, Do not know/not sure, Other CART activities in the last year (please specify)* 9. Which of the following typed animal teams are active at the county level? (FEMA typed or SAADRA Animal Resource typing) Select all that apply. *Small animal rescue, Small animal transport, Small animal sheltering, Large animal rescue, Large animal transport, Large animal sheltering, None of the above, Not sure/do not know.*
Equipment	10. Please provide the following counts of rescue boats owned by the county/city and/or the CART that would be available for animal emergency response. *Jon boats, Inflatables, V hull. Total number, number that can be shared under EMAC* 11. Please provide the following counts of cages and panels. *Plastic carriers for small animals (such as Vari Kennels), Wire cages (medium or larger), Livestock panels. Total Number, number that can be shared under owned by the county/city and/or the CART EMAC* 12. Please provide the following counts of transportation vehicles for animals owned by the county/city and/or the CART. *Number of animal control units, Number of specially designed transport trailers for small animals, Number of other transport vehicles for small animals, Number of horse trailers, Number of livestock transporters, Number of commercial transporters for large animals,* Please list the type and number of any other transport vehicles not listed above.
Supply cache	13. Does the county/city have a cache of small animal sheltering supplies? (such as bowls, leashes, cleaning supplies) *Yes, No, Not sure/do not know* 14. Approximately how many small animals can be served with the items in the cache of sheltering supplies? 15. Where is the cache of sheltering supplies stored? Select all that apply. *In a fixed storage location, such as a warehouse, On a mobile vehicle, such as CAMET (Companion Animal Mobile Equipment Trailer), Other (please specify)* 16. Does the county/city have a cache of supplies for managing large animals in an emergency? *Yes, No, Not sure/do not know* 17. Approximately how many large animals can be served with the items in the cache of supplies?
Other questions	18. In the county/city, are there plans in place that would allow people and their pets to shelter in one location during an emergency or disaster ("pet-friendly sheltering")? *Yes, No, Not sure/do not know* 19. What additional needs does your jurisdiction have (if any) related to managing animals in an emergency or disaster? Select all that apply. *Training on topics such as animal sheltering and rescue, Subject matter experts to assist with planning, Rescue equipment for animals, None – we have everything we need, Not sure/do not know, Other needs (please specify)*

Appendix 3

Presence of Typed Animal Response Teams Among States and Counties, by FEMA Region.

	FEMA region									
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**
Active typed animal teams among states*, %										
Small animal rescue	0	100	100	71	50	75	100	50	**	0
Small animal transport	0	0	100	57	50	75	100	50	**	0
Small animal sheltering	100	100	100	100	100	100	100	100	**	100
Large animal rescue	0	100	100	57	0	50	50	50	**	0

Large animal transport	0	0	100	57	0	50	50	50	**	0
Large animal sheltering	0	100	100	57	0	50	0	100	**	100
None	0	0	0	0	0	0	0	0	**	0
Active typed animal teams among cities/counties*, %										
Small animal rescue	N/A	71	73	53	35	40	19	47	70	23
Small animal transport	N/A	53	59	45	35	34	17	45	67	23
Small animal sheltering	N/A	71	75	60	45	49	25	59	67	37
Large animal rescue	N/A	29	51	33	21	31	8	40	63	21
Large animal transport	N/A	24	41	23	17	26	8	33	63	21
Large animal sheltering	N/A	47	47	28	26	39	16	41	67	28
None	N/A	12	16	25	43	39	66	36	22	40

*Among those reporting having a CART (County Animal Response Team) or SART (State Animal Response Team).
**No data because states either did not respond to survey or did not report having a SART.
N/A: not applicable because emergency response activities are not typically organized at the county level in region I.

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