A Study of Pet Rescue in Two Disasters

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Pet rescues endanger public and animal health in disasters and are a direct consequence of pet evacuation failure. This study characterized pet rescue attempts in two disasters. A random digit dial telephone survey was conducted of 397 households in Yuba County, California, where residents were under an evacuation notice due to flooding. A mail survey was conducted of 241 households in Weyauwega, Wisconsin, where residents evacuated from a hazardous chemical spill. Risk factors for pet rescue were identified using multivariate logistic regression. Case households were defined as those that evacuated without pets and later attempted to rescue them, while control households were those that evacuated without their pet.

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and did not attempt a rescue. Approximately 20 percent and 50 percent of pet-owning households that evacuated failed to take their pet with them in Luba County and Weyauwega, respectively. Approximately 80 percent of persons who reentered the evacuated area did so to rescue their pet. Attempts to rescue a pet was most common by households with children. Pre-disaster planning should, therefore, place a higher priority on facilitating pet evacuation so as to minimize the subsequent need to rescue pets.

Organized evacuations endeavor to improve public safety by relocating residents from disaster-threatened areas, thus preventing exposure to hazardous environments. This goal is common to both people and their pets. Both public and animal health issues can arise during evacuations. Public safety is placed at risk when animal owners fail to evacuate because of their animals. Animal health is threatened when owners evacuate and leave their animals behind. When owners evacuate without their animals but return later to rescue them, they put both themselves and their animals at risk of harm. Reentry of evacuees to an evacuated area before it has been determined to be safe threatens the safety of the public and disaster personnel who are responsible for rescuing these persons. Also, once residents have been evacuated from a site, emergency management organizations assume the responsibility for public safety by enforcing security of the site. Therefore, persons reentering a secured disaster site also present liability problems.

Despite these health and legal concerns, little is known about the phenomenon of reentry to disasters sites (Stallings 1991). There are few guidelines on when and how to safely reenter an evacuated area (Vogt and Sorensen 1992). Information about early reentry to disaster sites is scarce because it is an uncommon and illegal activity making it difficult to study. Also, when persons reenter an evacuation site such as a burning house and are injured or killed, it can be impossible to obtain firsthand information about their motivation for reentry.

People likely reenter a disaster site prematurely after evacuation because they did not take all of their valuables with them. Objects that people return to collect include medications, money, personal documents, and items with a strong personal attachment, e.g., photos, wedding dresses, and fur coats. Reentry of a disaster site because of pets has been reported in several large scale evacuations (Burton, Victor, and Whyte 1981; Nelson, Kurtz, and Hacker 1988, Drabek 1983). Up to 30 percent of persons who returned early to an affected area did so to rescue pets. Pet issues have been a prominent feature in several recent
evacuations such as a 1996 propane fire in Weyauwega, Wisconsin, where more than 1,000 households were evacuated (Roe 1996). There are reports of similar rescue efforts during a 1996 chlorine spill in Alberton, Montana, (Holien 1996) and in 1998 when a New York City scaffolding collapse forced the evacuation of a high-rise apartment building (Dantis and Miller 1998). The rescue of pets also occurred in Georgia in 1994 (Lundin 1994), Grand Forks, North Dakota, in 1997 (Suzik 1997), along the Ohio River in 1998 (Brakeman 1997), and in North Carolina after Hurricane Floyd in 1999 (Baumgardner 1999).

The motivation to rescue pets is not well understood. Paradoxically, owners will initially evacuate without their pets but later jeopardize their own safety to rescue them. Possible motivations for pet rescue include: (1) pets play an important role in child development and nurturing (Melom, Schwartz, and Beck 1997), therefore parents with children in the home who evacuate without their pets may be more motivated to later attempt a pet rescue; (2) in the train derailment of Weyauwega (Wilson 1996) and the scaffolding collapse in New York (Dantis and Miller 1998), the media played a prominent role in advocating the rescue of pets and brought national attention to this issue; and (3) pet rescue is preceded by pet evacuation failure which generally reflects a lack of preparedness by owners or circumstances beyond the pet owner’s control, such as being away from home at the time an evacuation occurs. A higher proportion of dogs are generally evacuated than cats. Therefore, cats will more likely be rescued than dogs. Studies are still needed to determine which of these or other factors underlie the phenomenon of pet rescue.

The objectives of this study were to compare pet-owning households that evacuated without their pets yet later attempted to rescue them, with pet-owning households that evacuated without their pets and did not attempt to rescue them. Two disasters were compared, a flood in which evacuees had two days to prepare for an evacuation and a hazardous chemical spill in which evacuees had only a few hours to prepare. The following hypotheses were tested:

The likelihood of pet rescue is increased in households with children and where there is a strong human-animal bond;
Cats are more likely to be rescued than dogs.
Methods

Description of the Two Disasters

Yuba County, California. On January 1, 1997, residents in Yuba County, California, were issued a voluntary evacuation notice because of flooding at the convergence of the Feather and Yuba Rivers ( Appeal Democrat 1997). A mandatory evacuation order was issued on January 2 that remained in effect until January 4, when residents were allowed to return to their homes. The floods inundated 1,000 residential, 15,500 agricultural, and 1,700 industrial acres of land. In all, 32 homes were destroyed, 497 suffered major damage, and 69 had minor damage.

Weyauwega, Wisconsin. On March 4, 1996, at 5:30 A.M., 35 cars from a train derailed in the immediate proximity of Weyauwega (Roe 1996), and several of the fifteen cars carrying propane caught fire. Because of the concern of a major explosion, at 7:00 A.M., all residents were instructed to evacuate. To further reduce the risk of explosion, the electricity and gas supply to Weyauwega were cut off.

In the first few days after the derailment, once a mandatory evacuation was enforced, many residents expressed concern about their pets' well-being, and several illegally reentered the evacuation zone to rescue pets. To reduce these security risks, personnel at the Emergency Operations Center organized an official pet rescue on March 8. The rescue was conducted under the supervision of the National Guard which, using armored vehicles, escorted pet owners back to their houses. In preparation for the pet rescue, pet owners were required to identify themselves and report the number of animals that needed to be rescued to the Department of Emergency Government (DEG). The evacuation ended on March 21. In order to compare this evacuation with that of Yuba County, the mandatory evacuation period was defined as the times between March 4 and 7 and March 9 to 21 and the voluntary evacuation period as March 8.

Sample Populations

Yuba County. A detailed description of the study population is provided elsewhere (Heath et al. 2000a). Briefly, a population survey of the area was conducted in July 1997 using random digit dialing methods. First, four screening questions were used to determine if the respondent could represent the entire household, if the household had been under an evacuation order, if the household had evacuated, and if
There were pets of any type in the household. Second, based on the responses to the screening questions, households under evacuation notice were placed into one of four groups, depending on their evacuation behavior and pet ownership status, and were interviewed in detail. The four evacuation behavior groups were: (1) evacuated and owned pets; (2) evacuated and did not own pets; (3) did not evacuate and owned pets; and (4) did not evacuate and did not own pets. For this study only the first group was examined after being subdivided further into pet owners who evacuated with or without their pets. For the purpose of this study, "household" was defined by its human members not pets. In the detailed part of the survey, "pets" were defined as dogs or cats. The sample population consisted of 37 households that evacuated without their pets and later attempted to rescue their pets, and 67 households that evacuated and did not attempt to rescue pets.

Weyauwega. At the time of the derailment, Weyauwega had a population of approximately 1,700 people living in 1,022 households. The details of the methods of investigation are provided elsewhere (Heath, Voeks, and Glickman, 2000b). Briefly, approximately one year after the evacuation a mail survey was conducted in cooperation with the Humane Society of Waupaca County. The sample populations consisted of 98 households that evacuated without their pets and later attempted to rescue their pets, and 24 households that evacuated and did not attempt to rescue pets.

Questionnaires

Yuba County. Detailed information was obtained through a structured telephone interview. Each questionnaire targeted a single household. All respondents were asked about the number and age of household members at the time of the evacuation. Questions were designed to ascertain the evacuation behavior of each member of the household, such as where they stayed and how far they traveled if they evacuated. Questions were also designed to determine whether households evacuated at all, some, or none of their pets. All households that evacuated were asked if they returned to the area before the mandatory evacuation notice had been lifted. Questions were designed to determine if these households also owned pets and if these pets were the reason they returned, the number of dogs and cats that owners attempted to rescue, and the time at which the rescue was attempted. Sociodemographic information was based on the head of the household and included educational attainment, ethnic background, and household income.
For pet-owning households, the primary pet care provider was requested to answer for the household or, if this was not possible, for the respondent to answer on behalf of the primary pet care provider. General information was collected on the number and types of all pets. Detailed information was obtained on up to two dogs and two cats (total of four pets) and included the pet’s age, the number of years owned, weight (dogs only), pedigree, and if licensed (dogs only). The questions also asked whether the pet had a carrier for transport, had received regular veterinary care in the year prior to the study, usually lived indoors or outdoors, required special feed or medication at the time of the flood, and where the owners and pets stayed if evacuated.

Two components of the human-animal bond, namely attachment (Johnson, Garrity, and Stallones 1990) and commitment (Staats et al. 1996), were measured. Twelve questions from the Lexington Attachment to Pets Scale (LAPS) were used to characterize and quantify owner-pet attachment. In answering questions on attachment, owners were asked to think of their favorite pet. The response to each question was recorded on a four-point Likert scale. Higher scores indicate stronger attachment; the sum of the score to all questions measures the overall strength of attachment. The eight questions validated in the Miller Rada Scale were used to characterize and quantify owner-pet commitment. In answering questions on commitment, owners were asked to think of pets in general. The response to each question was recorded on a four-point Likert scale. Higher scores indicate stronger commitment; the sum of the score to all questions measures the overall strength of commitment. The order of questions on pet attachment and commitment was randomized for each respondent.

Weyauwega. The questionnaire was developed with input from local and state departments of emergency services, local law enforcement agencies, elected officials, the humane society, veterinarians, and several residents. The questionnaire was 12 pages long. The target population of this survey included all pet-owning households in Weyauwega. The questions were similar to those used in Yuba County. Additional questions were whether pet rescue attempts were successful, home ownership status, and number of years owners had lived in their present home. Information on all pets (dogs and cats) was requested.

Data Analysis

Yuba County. The unit of study was defined as a “household” because all members usually exhibit the same evacuation behavior...
(Quarantelli 1960; Drabek 1968, 1969). To characterize households that attempted to rescue a dog or cat, pet rescue was studied as the primary outcome of interest (dependent variable). Predictor variables for pet rescue were sociodemographic variables and indicators of the standards of pet care. The measure of association between pet rescue and each putative risk factor was expressed as the odds ratio (OR) and 95 percent confidence intervals (CI). The OR were calculated using logistic regression, the CI for the regression coefficients were estimated using the maximum likelihood estimators (Hosmer and Lemeshow 1989, p. 25-35). All statistical analyses were conducted using EGRET (SERC 1994) and Epi-Info 6.04 (Centers for Disease Control and Prevention 1997) statistical software programs.

Two-tailed t-tests were used to compare the mean age of the head of the household, the distance traveled to an evacuation site, the number of pets, age and weight of dogs, and pet attachment and commitment between households that rescued their pets and those that did not rescue their pets. The χ² test for homogeneity was used to compare categorical variables such as the motivation to evacuate, whether household members stayed, time of evacuation, type of pet, pedigree of pet, whether the pet received routine veterinary care in the year preceding the flood, whether the pet usually lived indoors or outdoors, whether the pet had a carrier, or whether the pet required special feed or medication. The χ² test for trend was used to analyze ordered categorical variables, such as severity of the perceived threat of the flood and quantiles of attachment and commitment. Multivariate analyses were conducted using variables identified in univariate analyses at p ≤ 0.20 (Hosmer and Lemeshow 1989, p. 86). Individual results were considered statistically significant if p < 0.05. Assessment of the fit of the final model was by the LRS statistic, model deviance, and regression diagnostics (Selvin 1997, pp. 396-398; Neter 1989).

Weyauwega. The data analysis was similar to that used in the Yuba County survey for pet rescue. An estimate of the total number of animals rescued in Weyauwega was made by dividing the number of animals in the survey identified as having been rescued by the response rate (49.7 percent). The accuracy with which the Department of Emergency Government (DEG) estimated the number of animals that needed to be rescued was determined by comparing the number of animals that owners had identified to the DEG as needing to be rescued prior to the pet rescue and the total number of animals actually rescued as estimated in this study.
Results

Yuba County

Of 203 households that evacuated, 45 (22.2 percent) subsequently reentered the evacuated area prematurely. Thirty-seven (82.2 percent) of the 45 households that reentered the evacuated area prematurely did so to rescue their pets. Therefore, the proportion of all evacuated households that attempted premature reentry because of pets left behind was 18.2 percent. From the screening questions, it was estimated that 4.3 percent of all 863 households ordered to evacuate later attempted to rescue pets.

Seven (3.4 percent) of the 203 households in this study owned more than four pets. One hundred and one (22.2 percent) of 455 pet owning households that evacuated failed to evacuate all of their pets (Table 1). Thirty-seven (36.6 percent) of these 101 households later attempted to rescue pets at some point. Twenty-three (62.2 percent) of 37 rescue

Table 1. Comparison of Household Behavior towards Pets (Dogs or Cats) Following Tidewater Flooding in Wisconsin, Wisconsin, in 1986 and Floods in Yuba County, California, in January 1997.

<table>
<thead>
<tr>
<th>Behavior towards pets</th>
<th>Weyanega</th>
<th>      </th>
<th>      </th>
<th>      </th>
<th>Yuba County</th>
<th>      </th>
<th>      </th>
<th>      </th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (Total)</td>
<td>% (Total)</td>
<td>% (Pet evacuation failure)</td>
<td>N (Total)</td>
<td>% (Total)</td>
<td>% (Pet evacuation failure)</td>
<td>N (Total)</td>
<td>% (Total)</td>
</tr>
<tr>
<td>Households that rescued pets</td>
<td>98</td>
<td>40.7</td>
<td>80.3</td>
<td>37</td>
<td>13.4</td>
<td>36.6</td>
<td>14.7</td>
<td>11.2</td>
</tr>
<tr>
<td>Rescue during voluntary evacuation</td>
<td>71</td>
<td>29.5</td>
<td>58.5</td>
<td>23</td>
<td>5.1</td>
<td>27.8</td>
<td>5.8</td>
<td>17.2</td>
</tr>
<tr>
<td>Rescue during the mandatory evacuation notice</td>
<td>29</td>
<td>11.2</td>
<td>22.1</td>
<td>14</td>
<td>5.1</td>
<td>13.9</td>
<td>7.3</td>
<td>13.9</td>
</tr>
<tr>
<td>Households that did not evacuate or rescue pets</td>
<td>24</td>
<td>10.0</td>
<td>19.7</td>
<td>64</td>
<td>16.7</td>
<td>63.4</td>
<td>7.0</td>
<td>17.2</td>
</tr>
<tr>
<td>Total</td>
<td>122</td>
<td>50.0</td>
<td>100</td>
<td>100</td>
<td>22.2</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Voluntary evacuation period in Weyanega refers to March 8, 1986, the day of the official pet rescue.

Mandatory evacuation period in Weyanega refers to March 4-7 and March 9-21, 1986, when pet rescues were not permitted.

<table>
<thead>
<tr>
<th>Outcome for dogs</th>
<th>Waukesha</th>
<th>Tulare County</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (Total)</td>
<td>% (Total)</td>
</tr>
<tr>
<td>Number of dogs evacuated</td>
<td>120</td>
<td>56.6</td>
</tr>
<tr>
<td>Number of dogs not evacuated</td>
<td>92</td>
<td>43.4</td>
</tr>
<tr>
<td>Dogs rescued in voluntary evacuation period*</td>
<td>47</td>
<td>22.2</td>
</tr>
<tr>
<td>Dogs rescues in the mandatory evacuation period*</td>
<td>21</td>
<td>9.9</td>
</tr>
<tr>
<td>Total dog rescues</td>
<td>68</td>
<td>32.1</td>
</tr>
<tr>
<td>Number of dogs were not evacuated or rescued</td>
<td>24</td>
<td>11.3</td>
</tr>
<tr>
<td>Total number of dogs in study</td>
<td>212</td>
<td>100</td>
</tr>
</tbody>
</table>

*Voluntary evacuation period in Waukesha refers to March 8, 1996, the day of the official pet rescue.

*Mandatory evacuation period in Waukesha refers to March 4 – 7 and March 9 – 21, 1996, when pet rescues were not permitted.

**Tulare County estimate is ** based on information on two dogs per household.

At least 14 (37.8 percent) pet rescues occurred during the mandatory evacuation period. Sixty-four (14.1 percent) of 455 pet owning households that evacuated without their pets made no pet rescue attempts. There were no reports of unsuccessful rescue attempts. Twenty-seven (73.0 percent) of the 37 households that rescued pets also collected other items during their effort. Nine (24.3 percent) of 37 households collected clothing, 8 (21.6 percent) collected personal or financial documents, and 7 (18.9 percent) collected pictures; only 3 (8.1 percent) households collected medications. No pet deaths were reported. Nineteen (59.4 percent) households that attempted to rescue a pet thought it was appropriate to risk human lives to do so. Households that attempted to rescue a pet were more likely to stay further from their home (30.4 ± 22.4 [mean ± S.D.] km) than households that did not attempt to rescue a pet during the evacuation (21.0 ± 17.8 km; p = 0.06). The sex of the pet's primary care provider was not associated with pet rescue. One hundred and twenty-three (69.5 percent) of 177 respondents who did not evacuate their pets thought they would not be gone for long, and seven (4.0 percent) indicated they did not know where to take their pets. One hundred and thirty-one (89.7 percent) of 146 evacuated pets stayed at the same location as their owners. Ten (6.8 percent) pets stayed with friends or family but at a different location, and five (3.4 percent) were boarded at a kennel.

Forty-four (13.5 percent) of 325 non-evacuated dogs were rescued (Table 2). Compared with households that did not rescue dogs, house-

<table>
<thead>
<tr>
<th>Outcome for cats</th>
<th>Wausau</th>
<th></th>
<th>Yuba County</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (Total)</td>
<td>% (Total)</td>
<td>N (Total)</td>
<td>% (Total)</td>
<td></td>
</tr>
<tr>
<td>Number of cats evacuated</td>
<td>52</td>
<td>23.5</td>
<td>143</td>
<td>59.8</td>
<td></td>
</tr>
<tr>
<td>Number of cats not evacuated</td>
<td>169</td>
<td>76.5</td>
<td>96</td>
<td>40.2</td>
<td></td>
</tr>
<tr>
<td>Cats rescued in the voluntary evacuation period</td>
<td>57</td>
<td>25.8</td>
<td>15</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>Cats rescued in the mandatory evacuation period</td>
<td>6</td>
<td>7.2</td>
<td>16</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>Total cat rescues</td>
<td>73</td>
<td>33.0</td>
<td>31</td>
<td>13.0</td>
<td></td>
</tr>
<tr>
<td>Number of cats were not evacuated or rescued</td>
<td>96</td>
<td>43.4</td>
<td>65</td>
<td>27.2</td>
<td></td>
</tr>
<tr>
<td>Total number of cats in study</td>
<td>221</td>
<td>100</td>
<td>239</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

1 Voluntary evacuation period in Wausau refers to March 8, 1996, the day of the official pet rescue.

2 Mandatory evacuation period in Wausau refers to March 6 – 7 and March 9 – 15, 1996.

3 When pet rescues were not permitted.

4 Yuba County estimates are based on information on ≤ two cats per household.

holds that attempted a rescue had more dogs per household (1.5 ± 1.5 dogs versus 1.3 ± 0.5; p = 0.33) or more cats (2.5 ± 3.0 cats versus 1.2 ± 0.6; p = 0.22) than households that did not rescue pets. Households that attempted to rescue a dog were less likely to have a disaster preparedness plan for pets (93.0 percent versus 70.7 percent; p = 0.08), an animal carrying crate (93.8 percent versus 77.8 percent; p = 0.08), and did not know how to transport their dog(s) (57.6 percent versus 32.4 percent; p = 0.12) than households that did not rescue pets.

Thirty-one (13.0 percent) of 96 nonevacuated cats were rescued (Table 3). Households that attempted to rescue cats owned more cats (2.2 ± 1.8 cats versus 1.8 ± 1.4; p = 0.45) or more dogs (1.6 ± 0.9 dogs versus 1.2 ± 0.4; p = 0.13) than households that did not attempt to rescue pets. Households that attempted to rescue cats were less likely to have a disaster preparedness plan for pets at the time of the evacuation (25.0 percent versus 48.8 percent; p = 0.08). These households were less likely to have been able to catch their cat(s) during evacuation (85.4 percent versus 79.5 percent; p = 0.59), had no carrier for their cat(s) (70.8 percent versus 51.7 percent; p = 0.11), or did not know how to transport their cat(s) (65.6 percent versus 47.8 percent; p = 0.12) than households that did not attempt to rescue cats.

Risk factors that were significantly associated with an increased likelihood of households rescuing a pet included having children (OR 2.7; CI 1.0 – 7.7). Households that had been given instructions to not evacuate their pets were less likely to attempt to rescue a pet (OR 0.3; CI 0.1 – 0.8) (Table 4).
Table 6. Comparison of Risk Factors Associated with Households Attempting to Rescue Their Pets (Dogs or Cats) after an Evacuation Because of a Thundstorm in Waukesha, Wisconsin, in 1996 and a Flood in Yuba County, California, in 1997 (Multivariate Analysis).

<table>
<thead>
<tr>
<th>Item</th>
<th>Waukesha</th>
<th>Yuba County*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Attempted</td>
<td>Did Not Attempt</td>
</tr>
<tr>
<td></td>
<td>Rescue</td>
<td>Rescue</td>
</tr>
<tr>
<td>Sex</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Male</td>
<td>24</td>
<td>72.5</td>
</tr>
<tr>
<td>Male</td>
<td>14</td>
<td>50.0</td>
</tr>
<tr>
<td>Instructions Given</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>None</td>
<td>83</td>
<td>63.3</td>
</tr>
<tr>
<td>&quot;Dug&quot;</td>
<td>3</td>
<td>40.0</td>
</tr>
<tr>
<td>&quot;Did not use pet&quot;</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Coastline Score</td>
<td>Low</td>
<td>34</td>
</tr>
<tr>
<td>High</td>
<td>56</td>
<td>75.8</td>
</tr>
<tr>
<td>Prior Experience with Disasters</td>
<td>Yes</td>
<td>4</td>
</tr>
<tr>
<td>No</td>
<td>64</td>
<td>85.4</td>
</tr>
<tr>
<td>Perceived Threat</td>
<td>High</td>
<td>17</td>
</tr>
<tr>
<td>Low</td>
<td>11</td>
<td>88.5</td>
</tr>
<tr>
<td>Education of Head of Household</td>
<td>Less than HS</td>
<td>16</td>
</tr>
<tr>
<td>More than HS</td>
<td>52</td>
<td>91.3</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>83.3</td>
</tr>
</tbody>
</table>

*Statistical analysis: YH: df = 10; LHS: p < 0.01.
**Statistical analysis: YH: df = 10; LHS: p < 0.01.
*OR: Adjusted odds ratio, adjusted for all variables in the model.
**C: 95% Confidence interval for adjusted odds ratios.

Waukesha

One hundred and twenty-two (50.6 percent) of 241 pet-owning households failed to evacuate all of their pets (Table 1). Ninety-eight (80.3 percent) of the 122 households that failed to evacuate all of their pets later attempted to rescue their pets. Seventy-one (72.4 percent) of 98 rescue attempts occurred on March 8, on the day of the official pet rescue, while 27 (27.6 percent) of the pet rescues occurred at times when reentry was not permitted. Twenty-four (10.0 percent) of 241 pet-
ing households that evacuated made no further attempt to rescue pets.
All 98 households that reentered Weyauwega did so to rescue a pet. In
65 (66.3 percent) of the 98 households that rescued pets, persons also
collected a purse or wallet when they returned to their home. The total
number of pet rescues represented an early reentry rate of approximately
20 percent of all evacuated households. Forty-two (70.0 percent) of 60
households that rescued pets thought that it was appropriate to risk
human life to do so. Households that attempted to rescue a pet tended
to stay further from their home (69.4 ± 123.5 km) than households that
did not attempt to rescue a pet during the evacuation (59.7 ± 63.0 km;
p = 0.60). The sex of the pet's primary care provider was not associ-
ated with pet rescue. Two hundred and twenty-one (96.5 percent) of
229 respondents who did not evacuate their pets thought they would not
be gone for long, and 167 (87.4 percent) indicated they thought their
pets would be safe. The most common "other" reason given for failing
to evacuate pets given by 78 (45.3 percent) of 172 households was they
were at work when the derailment occurred. Fifty-two (22.7 percent)
respondents indicated that they did not know where to take their pet.
One hundred and ninety-three (71.4 percent) of 270 evacuated pets were
kept at the same location as their owners, whereas 50 (18.3 percent) pets
stayed with friends and family at a different location from their owner,
and 27 (10.0 percent) pets were boarded at a kennel.
Sixty-three (86.6 percent) of 73 rescue attempts were made by the
owner of the pet or another family member, whereas only 10 (13.7 per-
cent) pet rescues were made by other persons in Weyauwega. A detailed
review of the disclaimers signed by persons rescuing pets on the day of
the official pet rescue indicated that, at most, three (3.1 percent) house-
holds had their pets rescued by persons who did not live in Weyauwega.
The mean number (1.6 ± 2.0) of pets per household that were rescued
tended to be higher on the day of the official pet rescue than at other
times (1.0 ± 1.2; p = 0.22).
Sixty-eight (73.9 percent) of the 92 dogs that were not evacuated
were rescued (Table 2). Forty-seven (69.1 percent) of 68 rescued dogs
were rescued on the day of the official pet rescue. Seventy-three (43.2
percent) of 169 cats that were not evacuated were rescued (Table 3).
Fifty-seven (78.1 percent) of 73 rescued cats were rescued on the day
of the official pet rescue. The only pet deaths that were reported
occurred in a terminally ill cat, six psittacine birds, and one iguana.
Risk factors were identified that were significantly associated with an
increased likelihood of households rescuing a pet (Table 4). An increased
likelihood of pet rescue was associated with households that had children
(OR 5.3; CI 1.5 - 19.3), and had no prior experience with evacuations (OR 6.8; CI 1.0 - 47.2). Households with high pet commitment scores (OR 0.2; CI 0.0 - 0.9) were less likely to attempt to rescue a pet.

The success rate of pet rescue was similar (86.7 percent) on the day of the official pet rescue when compared to pet rescues attempted at other times (77.3 percent; p = 0.43). Only eight (6.2 percent) of 129 pets could not be successfully rescued on the day of the official pet rescue, and, similarly, eight (11.8 percent) of 68 pets could not be successfully rescued at other times (p = 0.17).

The DEG correctly estimated that 136 dogs needed to be rescued but overestimated the number of cats by more than 170 percent. The DEG estimated that 250 cats would need to be rescued, but only 146 cats were rescued. Similarly, the number of pets other than dogs and cats was overestimated by the DEG by more than 330 percent (113 versus 34). The number of persons outside of the pet owner’s family who rescued pets was overestimated by 270 percent (27 versus 10).

Discussion

Major Findings

Frequency of Pet Rescue. In these disasters approximately 80 percent of persons who reentered the evacuated areas attempted to rescue pets. Therefore, pet ownership had important public health implications in both evacuations. In Weanawega and Yuba County nearly 80 percent and 40 percent of pet-owning households, respectively, that evacuated without their pets returned later to rescue them. Over 60 percent of households that attempted to rescue pets thought it was appropriate to risk human lives in the process. Although in neither of these evacuations were persons who reentered the area killed or injured, the potential for these adverse outcomes is great. Despite many differences in the threat from the two disasters, their rate of onset, and other geophysical characteristics, there were many similarities in the characteristics of households that rescued pets. These characteristics included households with children, a larger number of dogs or cats, and staying further away from home than households that did not rescue pets.

Household Profile. Households that attempted to rescue pets were best characterized by having children and owning a larger number of dogs or cats than households that did not attempt to rescue a pet. Households that rescued their pet(s) were more likely to perceive the
threat of the disaster to be low and to have been given no instructions on evacuating pets. Once evacuated, these households were more likely to stay with friends and family and at a greater distance from their homes than those that did not attempt to rescue pets. These characteristics provide a preliminary profile of households that are more likely to attempt early reentry to a disaster site and to rescue pets.

**Pet Evacuation Failure.** The best method to prevent pet rescues is to encourage pet evacuation. Failure to evacuate pets is most common in households with multiple pets, without carriers for cats, and with outdoor dogs (Heath et al. 2000b). The hindrances to pet evacuation that these households face could be readily overcome by providing carriers for cats, leashes, and, in some cases, cages for dogs. Making these items available at the time of evacuation is likely to increase the number of pets evacuated, thus reducing the subsequent need for pet rescues. Personnel responsible for recommending evacuations appear to have considerable impact on the decision whether pet owners will evacuate their pets or not, because the recommendation to not evacuate pets was associated with lower likelihood of pet rescue. Such recommendations may improve public safety; however, the recommendation to not evacuate pets is often not appropriate, because failing to evacuate pets is a threat to their safety. Recommending that animals should not be evacuated may also violate some animal welfare laws.

**Motivations to Rescue Pets.** Possible motivations to rescue pets include feelings of guilt, separation anxiety, and pressure put on pet owners by other family, friends, and the media (Roe 1996; Melson et al. 1997; Danis and Miller 1998). Households with children are more likely to evacuate than households without children, regardless of the number of pets owned (Heath et al. 2000a). However, having children is not associated with pet evacuation. Children who are used to playing with and confiding in their pets (Melson et al. 1997) may become distressed over an abandoned pet and, therefore, also put pressure on their parents to rescue it. This may explain why households with children that evacuate without their pets are more likely to attempt pet rescue than households without children. Pets may also be therapeutic for children dealing with the stress of an evacuation (Stern 1996).

The media probably plays an important role in households' decisions to rescue pets. Households that attempted pet rescue were more likely to evacuate to sites further from their homes and perceived the threat of the disaster to be lower than those that did not attempt a pet rescue. Evacuees who stayed furthest away from the disaster site were more likely to rely on media reports as a source of information rather
than on reports issued locally. For example, in Weyauwega evacuees who stayed close to their homes were able to attend town hall meetings organized by the DEG. At these meetings the threats posed by the derailment and the safety measures needed to successfully rescue pets were discussed. Evacuees who relied on media reports about the town hall meetings would have received delayed notice of the planned pet rescue and may have gained a lesser understanding of the dangers than persons attending the meetings. Therefore, relying on media reports may have contributed to some owners’ low perception of threat and their independent decision to attempt pet rescue.

In Weyauwega media reports about pets focused more on the threat of starvation, dehydration, and death of animals (Culhane 1996) than on human safety. In a similar evacuation in New York in 1998, the media and special interest groups, by emphasizing these concerns, fostered separation anxiety in owners in an attempt to encourage the rescue of pets (Dann and Miller 1998). However, only a few pets died in these incidents, which is typical of most disasters. This type of publicity puts emergency managers and public officials under considerable pressure to respond to public sentiment rather than to proceed using established safety protocols. Adherence to established procedures and priorities in disasters can in turn give the impression that emergency management officials are not sensitive to pet related issues and that only pet owners and activists care enough to attempt to rescue pets. This perception can lead to breaches in security and hostility between emergency management officials and the public.

Disaster management officials place top priority on saving and protecting human life and secondarily on preventing damage to property and the environment. Animals are considered personal property by emergency management officials and therefore have lower priority than protection of public health. Pet rescues also have low priority in conventional emergency management terms because human life should never be placed in jeopardy to save property (animals). The public, however, may have a different perception of priorities in disasters and of the definition of property than do emergency management officials. Many households consider their pets (and livestock) to be “family” members (Katcher and Goodman 1989). Therefore, some animal owners expect similar priorities and resources to be allocated to the care of animals as are expended to protect humans.
Implications

Preventing Reentry

It is best if premature reentry to secured sites can be prevented. In some areas, emergency managers recommend that people evacuate with the “3 P’s”—pets, pills, and purses. However, most evacuees carry pills (medications) and purses (money and personal documents) anyway or, if not, could probably replace them without returning home. However, most attempts to rescue pets could only be prevented if owners initially evacuate with them.

The most common reasons given for not evacuating pets were that owners thought they would not be gone for long and the evacuated area was safe for the animal. Very few owners failed to evacuate their pets because they did not know where to house them. Therefore, the greatest increase in pet evacuation is likely to come from increased awareness that pets should be evacuated whenever possible. Pet owners and emergency managers should understand that most conditions that are unsafe for people are also unsafe for pets. Most owners who evacuated their pets found a place for them to stay. This self-reliant behavior should be encouraged.

Pet Evacuation Failure

Many animal control agencies have the necessary supplies and expertise to facilitate pet evacuations. However, for these groups to be effective during evacuations, they need to be integrated into local emergency operation plans as outlined in the Federal Emergency Management Agency’s (FEMA) State and Local Planning Guide (SLG 101) (FEMA 1996). Additional specific information on issues that surround animals in disasters and methods for dealing with these are described in the FEMA’s “Animals in Disasters” Independent Study Courses (FEMA 1998a, 1998b). Animal control and humane society personnel should also be trained in incident management and regularly participate in meetings such as those of the Local Emergency Planning Committee and Emergency Management Advisory Committee in order to acquire a common and realistic understanding of their responsibilities. This integrated effort is similar to how emergency management and other professionals such as paramedics, nurses, and doctors enhance the evacuation of “special needs” populations such as persons who depend on oxygen, electricity, or are bed ridden, and seniors in
convalescent homes (Southern California Earthquake Preparedness Project 1985).

There are circumstances when pets cannot be evacuated. For example, sudden evacuations can occur while owners are at work. Possible solutions for dealing with owners who did not evacuate their pets include having bereavement counselors help them cope with separation anxiety and feelings of guilt. Bereavement counselors may be most appropriate for short-term evacuations.

**Pet Rescues**

Clearly, neither allowing all pet rescues or a complete prohibition of pet rescues can be recommended as a comprehensive solution to ensure public and animal safety when pets are not evacuated. During an evacuation, solutions to this dilemma start with addressing media concerns and individual pet owner’s needs. The media should be briefed with accurate information on the health and well-being of animals that were both evacuated and left behind. Offering information on owners who evacuated with their pets exemplifies responsible behavior towards pets and reinforces that owners should be held accountable for the safety of their pets, not emergency managers. Information to the media should be provided by animal health professionals who can represent the emergency management agency, are trained in media relations, informed on the threats posed by the disaster, and knowledgeable of the likely health hazards to both animals and their owners.

During prolonged evacuations and those when access is severely compromised, such as in a building collapse, urban search-and-rescue teams could also rescue pets, if these teams are cross-trained in confined space access and animal handling. Rescuing pets also offers these teams an opportunity to practice for human rescues. Alternatively, supervised pet rescues can involve the public and are most applicable to prolonged evacuations where the threat from hazards can be controlled during the rescue effort. Weyauwega was an example of how this might occur.

**Assessment**

The DEG of Weyauwega overestimated the number of persons who rescued pets. Their estimates were based on responses to advertisements announcing the pet rescue in the local media, the responses of pet owners to a telephone hotline, and after the DEG contacted as many residents as possible directly by telephone. When fewer people registered
to rescue pets at the designated time, officials at the DEG interpreted this to be the result of a large number of pet owners who had already reentered Weyauwega without permission or supervision. This interpretation was reinforced by reports in the media of "night-stalkers" breaching security to rescue their pets and the inundation with phone calls, some of which were threatening, of the Wisconsin governor's office from many parts of the U.S. to encourage the rescue of animals that had not been evacuated (Wisconsin State Journal 1996). Based on our study, it appears that relatively few people reentered Weyauwega before the official pet rescue, indicating that security at the time was effective. Some of the pet owners may have not returned to rescue their pets because of repeated statements by the DEG at the beginning of the evacuation that pet rescues would be too dangerous to attempt. The estimates of the number of pets that had not been evacuated and needed to be rescued were made by the DEG in Weyauwega without input from local veterinary practices, animal control, or the humane society. It is likely that, had the DEG consulted with these local groups, the estimate of the number pets not evacuated and the number of potential rescues would have been more accurate. In the future, emergency management officials should come to an early decision on how to resolve public concerns over pets that were not evacuated. This may be achieved in consultation with local veterinarians and animal control and humane shelter operators.

Future Research

The role of owners' commitments to their pets, prior experience with disasters, and sociodemographic variables (e.g., level of education) on pet rescue are not clear from this study. The reasons for the differences in the association of pet rescue with these variables in these two disasters may in part be explained by differences in the nature of the threat, rate of onset, and other geophysical factors. The finding that a greater proportion of dogs than cats was evacuated likely reflects the greater ease with which dogs can be caught, restrained, and transported in evacuations (Heath et al. 2000b). However, the reason why a greater proportion of cats was rescued in Yuba County than were in Weyauwega is not clear and warrants further investigation.

Conclusions

Pet rescues were the most common reason people reentered evac-
uated areas early. Emergency management agencies have traditionally been reluctant to rescue pets in disasters, because of the threat to the public and personnel safety. Policies and procedures should be revised to increase pet evacuation rates because this will reduce the number of postevacuation pet rescues. Such policies and procedures would improve the safety of the public and emergency management personnel by reducing the risks associated with pet rescues. The results of this study imply that if pets were evacuated from disasters, the early reentry rate of households could be reduced by up to 80 percent.

Note

1. Copies of the questionnaires used in Yuba County and Weyerwege can be obtained from http://www.animaldisasters.com.

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