

## Session No. 11

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**Course Title: Social Dimensions of Disaster, 2<sup>nd</sup> edition**

**Session 11: Community Evacuation Behavior**

**1 hr.**

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### **Objectives:**

- 11.1 Discuss the percentages of community populations that typically evacuate after a warning is issued.
- 11.2 Describe the actions and types of information that most convince people to evacuate
- 11.3 Discuss the impacts of false alarms on subsequent evacuation behavior
- 11.4 Discuss four social factors that constrain people who evacuate unnecessarily after a warning is issued
- 11.5 Describe where people seek shelter when they evacuate
- 11.6 Identify at least three social factors that constrain sheltering requirements
- 11.7 Identify six examples of “special populations”
- 11.8 Describe the modes of transportation used by evacuees.

### **Scope:**

This session enables students to understand basic principles of community evacuation behavior.

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### **Readings:**

#### *Student Reading:*

Dow, Kirstin and Susan L. Cutter. 1998. “Crying Wolf: Repeat Responses to Hurricane Evacuation Orders.” *Coastal Management* 26:237-252.

#### *Professor Readings:*

Heath, Sebastian E. 2002. "The Public and Animal Health Considerations of Pet Ownership in Disasters." *Journal of the American Society of Professional Emergency Planners* 9:58-63.

Drabek, Thomas E. 1999. *Disaster-Induced Employee Behavior*. Boulder, Colorado: Institute of Behavioral Science, University of Colorado (Chapter 4 only, entitled "Evacuation Behavior," pp. 82-104.

Atwood, L. Erwin and Ann Marie Major. 1998. "Exploring the 'Cry Wolf' Hypothesis". *International Journal of Mass Emergencies and Disaster* 16:279-302.

*Background References:*

Dow, Kirstin and Susan L. Cutter. 2000. "South Carolina's Response to Hurricane Floyd" (Quick Response Report #128). Boulder, Colorado: Natural Hazards Research and Applications Information Center, University of Colorado.

Drabek, Thomas E. 1986. *Human System Responses to Disaster: An Inventory of Sociological Findings*. New York: Springer-Verlag (Chapter 4 only, entitled "Evacuation and Other Forms of Pre-Impact Mobilization," pp. 100-131).

Heath, Sebastian E., Philip H. Kass, Alan M. Beck and Larry T. Glickman. 2001. "Human and Pet-Related Risk Factors for Household Evacuation Failure During a Natural Disaster." *American Journal of Epidemiology* 153:659-665.

Sorensen, John H. and Dennis S. Mileti. 1988. "Warning and Evacuation: Answering Some Basic Questions." *Industrial Crisis Quarterly* 2:195-209.

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**General Requirements:**

Overheads (11-1 through 11-9 appended).

See individual requirements for each objective.

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**Objective 11.1 Discuss the percentages of community populations that typically evacuate after a warning is issued.**

**Requirements:**

Start this session with student exercise and proceed with lecture material specified below.

Use Overheads 11-1 through 11-3.

**Remarks:**

I. Introduction.

A. **Exercise.**

1. **Remind** students of exercise procedures.
2. **Divide** class into four groups and assign student roles.
  - a. Chair.
  - b. Reporter.
  - c. Timer.
3. Announce time limit: 5 minutes.

B. **Display** Overhead 11-1; “Workshop Tasks”.

1. Group 1 – According to Dow and Cutter, what social factors constrain community evacuation behavior?”
2. Group 2 – According to Dow and Cutter, what percentages of the populations threatened by hurricanes actually have evacuated?
3. Group 3 – According to Dow and Cutter, what actions and information most convinced people to evacuate prior to Hurricanes Bertha and Fran?
4. Group 4 – According to Dow and Cutter, how do false alarms affect subsequent evacuation behavior?

C. **Start** discussion.

D. **Stop** discussion.

E. **Explain** that reports from Groups 2 through 4 will occur periodically throughout the session.

II. Social constraints in evacuations.

A. Group 1 report (2 minutes).

B. **Display** Overhead 11-2; “Social Constraints: Dow and Cutter”.

C. **Review** constraints listed and integrate examples with Group 1 report as necessary.

1. **Personal risk perception.**
2. **Message characteristics**, e.g., timeliness, credibility of source.
3. **Evaluation of housing safety.**
  - a. “Hard house” vs. mobile home.
  - b. Home location.
4. **Use of probability information.**
5. **Communication linkages.**
  - a. Relatives.
  - b. Friends.
  - c. Neighbors.
  - d. Other.

D. **Ask students:** “How do these social constraints compare to those documented in previous readings and our discussions?”

1. **Similarities**, e.g., message qualities, perceived personal risk.
2. **Differences**, e.g., **not included** were various receiver characteristics, e.g., age, and other message characteristics, e.g., precision, consistency.

III. Evacuation rates.

A. Group 2 report (2 minutes).

B. **Display** Overhead 11-3; “Evacuation Rates”.

C. **Review** evacuation rates listed and integrate with Group 2 report as necessary.

1. **Hurricane Floyd** (1999) – 84% (not in assigned reading; based on Dow and Cutter 2000, p. 6).
2. **Hurricane Bonnie** (1998) – 44% (not in assigned reading; based on Dow and Cutter 2000, p. 6).

3. **Hurricane Bertha** (1996) – 41%.
4. **Hurricane Fran** (1996) – 57%.
5. **Hurricane Hugo** (1989) – 76%.
6. **Hurricane Diana** (1984) – 29% (rates listed in items 3-6 are from Dow and Cutter 1998, p. 245).

D. **Explain:** Sorensen and Mileti (1988) study.

1. 24 different disasters. Examples included:
  - a. Tsunami in Hilo, Hawaii.
  - b. Several flash floods.
  - c. Eight hurricanes.
  - d. Riverine floods.
  - e. Hazardous materials incidents.
2. **Evacuation rates** varied from 32% to 98%.
3. **Time required** to warn: lead time of 3-4 hours, 90-100 percent can be warned.

E. **Drabek literature survey** (1986) (see pp. 103-105).

1. Evacuation rates **varied** by study and event.
2. **Typical** rate was 50% (p. 103).
3. **Other** cases cited:
  - a. Volcano – 90%.
  - b. Nuclear incident (TMI) – 39% (evacuation advisory included only pregnant women and young children).

**Supplemental Considerations:**

Some professors may prefer to **lengthen** this section through more discussion of the range of **social factors** that constrain evacuation behavior. Comparisons could be made

to those specified by Dow and Cutter (1998) (assigned reading) and material presented in prior sessions. In this way disciplinary differences as well as variations in events, communities, etc. could be highlighted. The **message** is that the **precision** in this body of knowledge is growing. Different researchers, however, still **emphasize and report** different social factors and evacuation rates. **Discussion** of some of the factors that may account for the **differences** in the evacuation rates documented would enrich student understanding.

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**Objective 11.2 Describe the actions and types of information that most convince people to evacuate.**

**Requirements:**

None.

**Remarks:**

- I. Group 3 report (2 minutes).
- II. Elaboration (as necessary)
  - A. **Refer** students to discussion by Dow and Cutter (1998), pp. 246-248.
  - B. **Review** and illustrate such factors as these (p. 246).
    1. Multiple reasons given by many.
    2. Governor's order/advice.
    3. Local officials/emergency responders.
    4. Weather Channel/National Weather Service/local news.
    5. Actions/advice from friends or family.
    6. Severity of storm/probability of a "hit".
  - C. **Ask students:** "Based on your reading of Dow and Cutter (1998) and the summary given by Group 3, how might the reasons people give for evacuating change if the disaster agent was not a hurricane?"
    1. What about a **tornado**?
    2. What about an **earthquake**?

### 3. What about a **terrorist attack**?

#### **Supplemental Considerations:**

The message of this brief section is to encourage students to **think** about the types of **interpretations** and **rationales** people use to explain their behavior. As the **disaster agent** changes, some of the emphasis on certain factors, e.g., Weather Channel, will **differ** from Dow and Cutter (1998) documented for hurricanes.

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#### **Objective 11.3 Discuss the impacts of false alarms on subsequent evacuation behavior.**

#### **Requirements:**

None.

#### **Remarks:**

- I. Group 4 report (2 minutes).
- II. **Elaboration** (as necessary).
  - A. **Refer** students to discussion by Dow and Cutter (1998), pp. 248-250.
  - B. **Review** and illustrate.
    1. **Method:** Use of **hypothetical** questions.
    2. **Responses** documented (“Would you evacuate?”) (p. 248).
      - a. “It depends” – 48%.
      - b. “No” – 21%.
      - c. “Yes” – 31%.
    3. **Conclusion:** “The experience with ‘false alarms’ did not seem to sway their perception of risk.” (Dow and Cutter 1998, p. 248).
- III. Additional applications.
  - A. **Ask students:** “In tornado prone areas, alerts may be issued without subsequent damages. Would these ‘cry wolf’ experiences result in similar public responses?”

- B. **Ask students:** “What about flood prone areas? Would alerts that are not followed by damages evoke comparable public responses?”
- C. **Ask students:** “What about alerts regarding possible terrorist attacks? Would the ‘cry wolf’ reaction by the public be similar to what Dow and Cutter documented for the hurricanes they studied?”
- D. **Additional research needs.**

1. **Use student responses** to the above questions to highlight research needs proposed by Dow and Cutter (pp. 250-251).
  - a. Role of hazard information on decision making.
  - b. Impacts of repeated false alarms.
  - c. Message inconsistencies, e.g., electronic media report vs. governor’s advisories.
  - d. Local disaster culture.
2. **Discuss** the three questions posed as **unknowns** and underscore the need for more research on topics like these.

IV. Earthquake prediction application.

A. **Study context** (Atwood and Major 1998).

1. Iben Browning made earthquake prediction for New Madrid region.
2. Timing:
  - a. **Announced** at Missouri Governor’s Conference, December 12, 1989.
  - b. **Earthquake predicted** for December 2-3, 1990, plus or minus two days (p. 280).

B. **Methods** (pp. 288-289).

1. **Panel study design** (two sets of interviews).
  - a. November, 1990 (just prior to predicted date).
  - b. February, 1991.

## 2. Sampling procedures.

- a. Random-digit dialing process.
- b. Three Southeastern Missouri communities surveyed.
  - 1) Cape Girardeau.
  - 2) Jackson.
  - 3) Sikeston.
- c. Pre-prediction:  $n = 629$ .
- d. Post-prediction (only those who agreed to second interview):  $n = 290$  (60% of those [480] who agreed to the second interview).
- e. Data collection via telephone interviews.

### C. Key conclusions: (pp. 295-296).

1. **Support for false alarm effect hypothesis is significant.**
2. **Significant decrease in:**
  - a. “Perceived importance of the earthquake threat” (p. 295).
  - b. “Protective behavior” (p. 295).
  - c. “Time spent thinking about the prediction” (p. 295).
3. **Also, support for prior work** by Mileti and Fitzpatrick (1993): “. . . false alarms can enhance concern for future earthquakes, although the proportion of the public so affected seems to be quite small (16.7 percent of the panel) compared with those who adopt a false alarm effect position (46.1 percent).” Atwood and Major (1998), p. 295.

D. **Ask students:** “Why might this case study of the earthquake prediction have yielded results that differ somewhat from what Dow and Cutter documented for the hurricanes?” **Answer:** The **credibility** of Browning (**source**) was questioned seriously both before and especially after nothing happened on the predicted date.

E. **Share final conclusion:** “After the threat’s cancellation, cognitive reappraisal may have lead the false-alarm respondents to conclude that the whole episode was, so to speak, a bad joke in which they had played the fool, and as Breznitz

(1984) suggests, they downgraded the importance of the chronic earthquake threat.” Atwood and Major (1998), p. 296.

### **Supplemental Considerations:**

There are **two messages** in this section: 1) the **reality** of false alarms and subsequent impacts, and 2) the **minimal** research base regarding this topic. Student understanding can be **enhanced** through extended discussion of the **implications** of false alarms for **differing** disaster agents, e.g., tornados vs. terrorist attacks. Some professors may wish to treat this section **very briefly** while others will desire to **extend** it through discussion of **potential research studies** relevant to false alarms, potential impacts and implications of the earthquake prediction study by Atwood and Major (1998).

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### **Objective 11.4 Discuss four social factors that constrain people who evacuate unnecessarily after a warning is issued.**

#### **Requirements:**

Use Overhead 11-4.

#### **Remarks:**

- I. Unnecessary Evacuations.
  - A. **Explain:** Not always clear what defines “unnecessary”.
  - B. **Ask students:** “Given the modest damages induced by Hurricanes Bertha and Fran, were all of the evacuations unnecessary?” (**Answer:** given limited access routes for escape, variations in physical construction, fears of relatives, and other such factors, like unpredictability of exact point of landfall, most acted rationally and reasonably.)
  - C. **Other terms** used for same behavior.
    1. “Premature evacuation”: used by Dow and Cutter (1998, p. 249).
    2. “Shadow evacuation”: used by Gladwin and Peacock (1997, p. 64) and Baker (1991, p. 295).
    3. “Spontaneous evacuation”: used by Perry (1983) to contrast heightened fears following news of the Three Mile Island nuclear incident with evacuations during floods and volcanoes (see p. 46).
- II. Social factors.

- A. **Display** Overhead 11-4; “Factors Producing Unnecessary Evacuations”.
- B. **Explain:** Listing of factors reflects study of 24 evacuations by Sorensen and Mileti (1988).
- C. **Review** and illustrate the factors listed.
  - 1. People misinterpret warning information; believe they **reside inside** declared evacuation area.
  - 2. People believe **area** (location or home) is **risky**.
  - 3. People learn that **relatives** and/or **friends** have or are about to evacuate.
  - 4. People receive warning information from **nonofficial sources** who recommend evacuation, e.g., relatives, friends, co-workers, neighbors.
  - 5. People fear that they will be **advised later** to evacuate. They decide to **go now** and avoid a traffic jam.

**Supplemental Considerations:**

As Dow and Cutter (1998) point out very clearly (see pp. 248-249), the decision to evacuate is a **complex social process** and most families use a variety of source of information. This is especially true when the disaster agent permits a lengthy period of forewarning. Even in hurricane situations, however, the **changing projections** for the timing and location of landfall often results in **perceptions** of a relatively **short forewarning**. Many people report that they knew a hurricane was moving, but **ignore the evacuation decision** until their immediate area is identified. Elaborations like these will **enrich student understanding** of the list of social factors and help them understand the relevance for emergency managers.

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**Objective 11.5 Describe where people seek shelter when they evacuate.**

**Requirements:**

Use Overhead 11-5.

**Remarks:**

- I. Shelter locations.
  - A. **Display** Overhead 11-5; “Shelter Locations”.

B. **Explain:** Drabek study, 1999.

1. Reviewed events and communities in prior session, i.e., Session No. 10, “Public Warning Responses,” see Objective 10.4.

2. **Events included:**

a. Hurricane Fran (1996).

b. Floods (1997) in California and Nevada.

C. **Review** and illustrate the shelter locations listed; **highlight** the percentage who selected each location (Drabek 1999, p. 91).

1. **Relative’s home** – 38%.

2. **Friend’s home** – 31%.

3. **Private firm** – 16%.

4. **Work location** – 8%.

5. **Public shelter** – 7%.

6. **Short distance** – 1%.

a. Locations varied, e.g., went to bar or shopping mall.

b. Perception was that **duration** of evacuation would be very **short**.

II. Pattern variations.

A. **Explain:** while multiple events and disaster agents were studied, these shelter locations only reflect this **single study**.

B. Drabek (1986) review of **numerous studies** (pp. 117-119).

1. Most people evacuate to **homes of relatives** or friends regardless of disaster agent.

2. Official **public shelters** are selected by anywhere between 6% to 36% of all evacuees.

C. Certain **social factors** constrain sheltering requirements. Will be reviewed in next section as Objective 11.6.

## Supplemental Considerations:

The basic message of this section is that **most** disaster evacuees seek refuge in the **homes of relatives or friends**. Some professors may wish to use this section as a case example of **external validity**, i.e., to what can we generalize the study results? Each specific disaster studied will produce slightly **different distributions** of shelter locations that are selected. So the **research question** becomes: what factors influence such patterns? Future research may establish a sound shelter **selection prediction model** into which an emergency manager could input selected data. Given the characteristics of the disaster agent, population threatened, etc., an emergency manager could then calculate with good precision the shelter locations that might be selected. Discussion of this **application** would **enrich** student understanding of the **relevance** of social research for emergency management and serve as a **bridge** into the next topic, i.e., factors that constrain sheltering requirements.

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### Objective 11.6 Identify at least three social factors that constrain sheltering requirements.

#### Requirements:

Use Overhead 11-6.

#### Remarks:

- I. Introduction.
  - A. **Ask students:** “Given the variations in the types of places evacuees select for temporary sheltering, what social factors might explain this? For example, what conditions might result in a much higher proportion of evacuees going to a public shelter?”
  - B. **Record:** list student responses on a chalkboard as they are proposed.
  - C. **Explain:** Drabek (1996) study of transient evacuations.
    1. **Sites included:** Hurricanes Iniki in Hawaii and Andrew (Florida) in several counties.
    2. **Later session:** will detail this study, i.e., Session No. 28, entitled “Tourism and Disaster: Preparedness, Responses and Impacts.”
    3. **Sample included:** 520 tourists.
    4. **Places of refuge selected** (n = 381) (Drabek 1996, p. 215).

- a. Returned home – 24%.
- b. Private firm – 20%.
- c. Relative or friend home – 10%.
- d. Public shelter – 23%.
- e. Went a short distance – 1%.
- f. Other – 21%.

5. **Illustration:** large proportion of tourists resulted in **very few** having relatives or friends available, hence, **more went** to a public shelter.

II. Factors that constrain sheltering requirements.

A. **Display** Overhead 11-6; “Constraints on Shelter Selections”.

B. **Compare and contrast** the listing on Overhead 11-6 to the student generated list on the chalkboard.

1. Availability of relatives.
2. Availability of friends.
3. Length of forewarning.
4. Anticipated length of departure.
5. Level of community preparedness.
6. Nature of threat.
7. Degree of urbanization.
8. Socioeconomic level of evacuees.

**Supplemental Considerations:**

This brief section could be **expanded easily** and some professors may wish to do so. Each of the constraining factors could be **illustrated** and **discussed**. For example, why would the socioeconomic level of the evacuees constrain shelter selection? **Answer:** more higher income people will book into a hotel, motel, or some other private firm whereas poorer evacuees will seek out a public shelter. The **key message** is to insure that

students thoroughly grasp the role of various **social factors** as a **constraint** on the **decisions** people make when they choose a place of refuge.

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**Objective 11.7 Identify six examples of “special populations”.**

**Requirements:**

Use Overhead 11-7.

**Remarks:**

- I. Introduction.
  - A. **Ask students:** “Recalling the types of social constraints we just discussed, what are examples of ‘special populations’ that emergency managers must be sensitive to in evacuation planning?”
  - B. **Record:** list student generated examples on the chalkboard.
- II. Special populations.
  - A. **Display** Overhead 11-7; “Special Populations”.
  - B. **Compare and contrast** the student generated list with the examples listed on Overhead 11-7.
    1. **Ethnic and racial minorities.**
    2. **Non-English speaking persons.**
    3. **Physically challenged persons.**
      - a. Blind.
      - b. Deaf.
      - c. Physically handicapped.
    4. **Institutionalized populations.**
      - a. Hospitals.
      - b. Nursing homes.
      - c. Prisons.

d. Half-way homes (e.g., drug, alcohol, mental retardation).

**5. Children/students/other.**

- a. School.
- b. Day care.
- c. University and college.
- d. Convent and monastery.

**6. Extreme elderly.**

- a. Homebound.
- b. Assisted living.

**7. Transients.**

- a. Tourists.
- b. Business travelers.
- c. Migrant workers.
- d. Homeless persons.

**8. Pets.**

- a. Dogs.
- b. Cats.
- c. Other.

**III. Pets and evacuation failures.**

**A. Explain:** Heath (2002) study.

**B. Events:**

1. Train derailment and chemical spill.

- a. March 4, 1996.

- b. Weyauwega, Wisconsin.
- 2. Flood.
  - a. January, 1997.
  - b. Yuba County, California.
- C. **Finding:** more people with pets **failed to evacuate** in Yuba City; all households in Weyauwega evacuated (p. 59).
- D. **Finding:** many evacuated, but **left pets at home**.
  - 1. Most common reason: assumed a short evacuation time.
  - 2. Event difference: Weyauwega – 51% left pets versus Yuba County – 22% left pets.
- E. **Conclusion:** “owning pets appeared to be the most significant reason why households without children failed to evacuate.”
- G. **Policy implication:** to protect pet owners, which includes significant proportions of the population, emergency managers **must include provisions** for pet evacuation in their planning.
- H. American Veterinary Medical Association.
  - 1. AVMA has prepared the **Disaster Preparedness and Response Guide**, 2001.
  - 2. A 500 page, 3-ring binder of disaster resource information.
  - 3. Designed for veterinarians, vet techs and emergency managers.
  - 4. This guide facilitates planning for animals in disasters (adapted from AVMA web site; February 9, 2003).
  - 5. Location: 1931 N. Meacham Rd., Suite 100, Schaumburg, Illinois 60173 (800-248-2861, X-6632).

**Supplemental Considerations:**

The key message of this section is that communities reflect considerable **diversity**. Aspects of this diversity can precipitate **evacuation failures**. Through student discussion and illustration of each of the special population types, this section could be **expanded**

easily. Review of Heath's research, for example, would allow for more depth regarding **pets** as could the Drabek research on transient populations such as **tourists** and **business travelers**.

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**Objective 11.8 Describe the modes of transportation used by evacuees.**

**Requirements:**

Use Overheads 11-8 and 11-9.

**Remarks:**

- I. Introduction.
  - A. **Ask students:** "What are the most common modes of transportation used by disaster evacuees?"
  - B. **Record:** list student responses on the chalkboard.
- II. Modes of transportation.
  - A. **Display** Overhead 11-8; "Modes of Transportation".
  - B. **Explain:** Lindell and Perry (1992) reported data from four Washington State communities threatened by flooding.
  - C. **Compare and contrast** student generated list to the data that comprise Overhead 11-8.
    1. Family vehicle – 73%.
    2. Relative's vehicle – 6%.
    3. Friend's vehicle – 7%.
    4. Official transportation – 13%.
    5. Other, e.g., walked – 1%.
  - D. **Policy implication:** automobile is **most common** mode.
    1. Reflects **continuity** of everyday life pattern.
    2. Necessitates **priority** in evacuation planning.

3. Lane direction shifts have become popular, but **implementation** remains difficult. New priority in evacuation planning.

III. Session summary.

A. **Display** Overhead 11-9; “Session Summary”.

B. **Review** each topic listed to integrate session.

1. **Evacuation constraints.**
2. **Evacuation rates.**
3. **What convinces people?**
4. **False alarms: responses and consequences.**
5. **Unnecessary evacuations.**
6. **Places of shelter.**
7. **Special populations.**
8. **Constraints on sheltering requirements.**
9. **Modes of transportation.**

**Supplemental Considerations:**

The key message of this section is that **most evacuees** depart in an **automobile**. This behavior reflects a **continuity** in their everyday life into the disaster response. It also highlights key **policy issues** in the **design** and **implementation** of community evacuation plans. This section could be expanded by introducing additional student exercises. For example, **transportation modes** could be **related** to **special populations**. Elderly, tourists, or institutionalized populations present very different **transportation requirements** than the general public. Additionally, during the **session summary**, students could be asked to identify a **key idea**, **research finding** or **policy issue** that they learned for each of the **topics** listed. These and other elaborations would **enhance** student understanding.

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**Course Developer References:**

- I. American Veterinary Medical Association. 2001. *Disaster Preparedness and Resource Guide*. Schaumburg, Illinois: American Veterinary Medical Association.

- II. Atwood, L. Erwin and Ann Marie Major. 1998. "Exploring the 'Cry Wolf' Hypothesis." *International Journal of Mass Emergencies and Disaster* 16:279-302.
- III. Baker, Earl J. 1991. "Hurricane Evacuation Behavior." *International Journal of Mass Emergencies and Disasters* 9:287-310.
- IV. Breznitz, Shlomo. 1984. *Cry Wolf: The Psychology of False Alarms*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- V. Dow, Kirstin and Susan L. Cutter. 2000. "South Carolina's Response to Hurricane Floyd" (Quick Response Report #128). Boulder, Colorado: Natural Hazards Research and Applications Information Center, University of Colorado.
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- XI. Heath, Sebastian E. 2002. "The Public and Animal Health Considerations of Pet Ownership in Disasters." *Journal of the American Society of Professional Emergency Planners* 9:58-63.
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- XV. Perry, Ronald W. 1983. "Population Evacuation in Volcanic Eruptions, Floods, and Nuclear Power Plant Accidents: Some Elementary Comparisons." *Journal of Community Psychology* 11:36-47.
- XVI. Sorensen, John H. and Dennis S. Mileti. 1988. "Warning and Evacuation: Answering Some Basic Questions." *Industrial Crisis Quarterly* 2:195-209.