

# QUICK RESPONSE REPORT

## **The January 5-6, 2008, California Winter Storm: Assessing information sources, actions, and damages**

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*The views expressed in the report are those of the authors and not necessarily those of the  
Natural Hazards Center, the University of Colorado, the National Weather Service, or the  
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## INTRODUCTION AND RESEARCH OBJECTIVES

Winter storms in the United States pose a significant threat to life and property, especially if they include a mixture of high winds, heavy snow, ice, and intense rain. In early January 2008, just such a storm impacted parts of the Western United States, ranging from southern California to Nevada and southern portions of Washington. In the San Francisco Bay Area, winds gusted up to 110 mph, with rainfall of 8-10" reported in the Santa Cruz Mountains south of San Francisco and also in Sonoma County north of San Francisco. Extending east into the Sierra Nevada Mountains, the rain turned to snow and more than 6 feet of snow fell.

The specific impacts of any winter storm vary based on exposure to the storm, such as how long an area is inundated with rain; sensitivity to the storm, including population density; and adaptation, which includes whether people take protective action ([Grothmann and Reusswig, 2006](#)). Recent advances in the hydrometeorological sciences are now generating a range of new products and methodologies for forecasting weather conditions, and advances in engineering and technology are providing new pathways to provide this information, such as cell phones, satellite radio, and in-vehicle navigation systems. Combined, these and other advances and policies offer the weather enterprise with an opportunity to improve peoples' ability to access weather and warning information.

In a perfect world, we would expect that providing better weather and warning information would lead to increased protective action. However, there is a rich social science literature indicating that people do not respond to warnings and weather information in a linear manner (e.g., [Sorenson, 2000](#)). Information systems comprise both scientific technologies and the people who use them. Importantly, people bring significant perceptual and behavioral histories to the decision-making table.

A whole suite of information — including people's sources, perceptions, and experiences relating to weather events — needs to be understood and carefully addressed to maximize the possible benefits of scientific advances and technologies. However, there is limited information about people's knowledge and actions regarding weather in general, and even less is known

about major events such as the January 2008 winter storm. Thus, this storm serves as a good opportunity to gather and learn from empirical data.

Using an internet survey, this project examines people's knowledge of and decision-making pertaining to the January 5-6, 2008, winter storm. In addition, we included questions specifically focused on the in-car environment, because of the large number of transportation-related deaths and injuries related to weather events. Finally, because such major events can have huge economic impacts, we also tried to ascertain people's personal losses. The five research questions that guided this research were:

1. What is respondents' awareness of common weather-related driving campaign messages?
2. What were respondents' main sources for obtaining weather information for the January 5-6, 2008, winter storm?
3. Did weather forecasts and/or current weather conditions influence respondents' travel decisions during the event, and if so, how?
4. Did respondents take self-protective actions to prevent damage to their homes?
5. What were the respondents' perceptions of the accuracy of the weather forecasts?

## **DATA COLLECTION AND ANALYSIS METHODS**

### *Survey Design & Implementation*

In order to explore the above research questions as they pertained to this event, we conducted an Internet survey of Californians soon after the storm. We focused on California because it was the hardest hit region and also because California was affected by both heavy rain and snow. Prior to sending out the survey, we pre-tested all questions with family and friends; additionally, some of the questions used here were asked on other surveys that also used more extensive pre-testing (e.g., Drobot, 2007; Lazo et al., 2008). The complete set of questions is available from the authors.

Working through Survey Sampling International (<http://www.surveysampling.com/>), we obtained 324 responses over a two-week timeframe from California residents. Internet sampling is an attractive option for this type of exploratory study, because it can facilitate gathering data quickly for these type of post-event assessments and it allows for better control over

respondents' access to the questions (i.e., they cannot jump ahead or go back and change their answers based on information in a subsequent question).

Estimates of internet access vary widely, but based on the most recent [U.S. Census data \(2003\)](#), about 55 percent of U.S. households (n ~ 62 million) have internet access at home; for California, the National Telecommunications and Information Administration estimates between 55.6% and 57.9% of Californians access the internet ([NTIA, 2004](#)). As such, using the Internet to conduct the survey inevitably excludes some populations from responding, so it is important to note that the results are not representative of the entire population of California or the rest of the United States. Moreover, future research may warrant using other research methods that can better access hard-to-reach populations.

[Table 1](#) presents selected socio-economic and demographic characteristics of the respondents. In comparison with U.S. Census information for the state of California, the response pool for this survey contained a higher portion of females, was better educated, and was slightly wealthier.

## **MAJOR FINDINGS**

*Research Question #1: What is respondents' awareness of common weather-related driving campaign messages?*

Flooding remains the leading cause of weather-related deaths in the USA, and over half of all flood deaths occur when vehicles are driven into flooded roads ([NOAA, 2008](#)). Snow- and ice-related deaths take fewer lives annually, but remain a continuing problem in much of the country (e.g., [FHWA, 2008](#)). In an effort to reduce the loss of life with respect to driving and hazardous weather, the NWS developed the "Turn Around, Don't Drown" campaign, and the Department of Transportation (DOT) created the "Ice and Snow, Take it Slow" campaign. Both of these efforts are intended to inform people of the dangers of driving in hazardous weather conditions before they encounter such weather. To evaluate the effectiveness of such campaigns, the first step is to determine whether or not members of the public are aware of the messages. Such knowledge can inform the NWS, DOT, and others about how well the messages have permeated the public conscious.

To assess people’s awareness of the weather-related driving campaigns, we asked the respondents if they could identify the correct message from a list of four possible choices—the correct choice and three additional choices crafted by the survey designers. We also offered an “I don’t know” option, so as not to force the respondents to choose an option if they truly did not know. The results are not encouraging. Only 8% of the respondents (Figure 1) felt that “Turn Around Don’t Drown” was the correct slogan. “I don’t know” was selected by the highest portion of the respondents (60%), followed by “Stay Alive Don’t Drive...Through Water”, which was selected by 14% of the people. The phrase “Boats Float Cars Don’t” was third with 13% of the respondents selecting it. For the winter weather campaign (Figure 2), “I don’t know” was again the modal selection (60%). The correct answer, “Ice and Snow, Take it Slow”, was chosen second overall, with 24% of the votes. “Winter Weather, Slower is Better” was chosen by 14% of the respondents.

At first glance, these results suggest that additional educational work is needed in California, as most survey respondents do not know campaign slogans for driving in hazardous weather conditions. However, the lack of awareness may be a function of lack of campaign advertisement, lack of a memorable slogan, or other factors. Further research is needed to evaluate the underlying factors behind these results. Additionally, we stress that these results may be particularly location-specific, and more research is needed to assess public awareness of these slogans in different regions. More importantly, because the purpose of these weather-related driving campaigns is to promote safer driving habits, the second step in determining the effectiveness of these weather-related driving campaigns is to assess how people’s awareness of these campaign messages affects their decision-making actions (if at all). Thus, additional behavioral modification research is needed as well.

*Research Question #2: What were respondents’ main sources for obtaining weather information for the January 5-6, 2008, winter storm?*

The message campaigns discussed above can provide members of the public with advance information on the dangers of driving in hazardous weather, and they can also provide static information in the form of road signs during events. However, the NWS and other agencies involved in contingency planning for hazardous weather would benefit from a better

understanding of where people are obtaining weather and warning information during "everyday" weather conditions, as well as leading up to and during severe weather conditions.

Looking first at “everyday” weather sources at home, results from this survey correspond closely with recent findings from [Drobot \(2007\)](#), [Hayden et al. \(2007\)](#), and [Lazo et al. \(2008\)](#) with respect to the main information-gathering sources. Over 80% of the California survey respondents obtain weather information from local television stations at least once a week ([Figure 3](#)). Friends/family/co-workers, radio stations, and cable television stations are also accessed at least once a week by over half of the survey respondents. Internet sources (National Weather Service or other webpages) are utilized at least once a week by about 40% of the survey respondents. In comparison, over 80% of the survey respondents rarely or never use cell phones. However, cell phone usage for weather information may increase rapidly in the coming years because of the blossoming amount of mobile weather information available from private vendors, and because emergency text alerts can now be disseminated to cell phones (Warning Alert and Response Network Act of 2006).

In addition to how our respondent population as a whole gets weather information, it is also useful to stratify the responses by generational age groupings<sup>1</sup>, because there is evidence to suggest differences in use by age ([Hayden et al., 2007](#)). Classifying [Figure 3](#) into two groups — one consisting of respondents that use a given information source at least once a month and one consisting of respondents that rarely or never use a particular source — there are statistically significant differences between age groupings with respect to use of NWS internet webpages, cell phones, and friends/family/co-workers ([Figure 4](#)). The younger generations are more likely to use each of these three sources than the older generations. With respect to NWS webpages, the [NTIA \(2004\)](#) report indicates that 70% of people aged 18-24 are internet users, compared with 68% of people aged 25-49, and only 45% of people aged 50+, so our results conform to general internet usage statistics. Similarly, the AARP reported that 55% of people aged 18-49 have a cell phone, compared to 50% for those 50-64, and 27% for those aged 65 and older, which provides some supportive evidence for our findings on the generational difference in using cell

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<sup>1</sup> Here, we classified respondents into the following generations, using grouping slightly altered from [Strauss and Howe \(1991\)](#): The Silent Generation (1930–1945), Baby boomers (1946–1953), Generation Jones (1954–1965), Generation X (1966–1982), and Generation Y (1983–1994). We had two respondents older than the Silent Generation cutoff, so we included them with the Silent Generation.

phones as a weather source (AARP, 2003). Although we have no corroborative evidence to explain the significant differences for the friends/family/co-workers result, the increasing importance of social networking for younger generations may play a role.

In addition to looking at use of a given source, we also computed the number of times a particular source is accessed each month, following the methodology of Lazo et al. (2008). Respondents answering “two or more times a month” were coded as 60 times per month, those answering “once a month” were coded as 30 times per month, and so forth to those who answered “rarely or never”, who were coded as 0 times per month. With this method, there is further evidence of a generational difference in the number of times a particular source is accessed. Notably, older generations access television, newspaper, and commercial radio sources significantly more often than younger generations (Figure 5), but the Silent Generation obtains weather information from friends/family/co-workers significantly less than the other generations. It may be that members of the Silent Generation have fewer people in their friends/family/co-workers network, which could partially explain these findings.

We also asked a question about respondents’ weather information gathering tendencies while on the road. This question is important because the most commonly accessed source of weather information at home (i.e., television) is not available while in transit. The results suggest that there are only two main information gathering sources while in transit: radio and friends/family/co-workers (Figure 6). Approximately 70% of respondents obtain weather information at least once a week from the radio, and nearly 40% access weather information via friends or family at least once a week. Most other sources are rarely or never used by the vast majority of the survey respondents.

The preceding findings provide valuable information on where people are obtaining weather information for “everyday” situations, but it is also necessary to be aware of people’s weather information sources for major weather events. Thus, we also asked respondents about their weather information sources specifically related to the January 5–6, 2008, California winter storm. Roughly 50% of the survey population relied mainly on local television both leading up to and during the event (Figure 7). All other sources were used as the main information source by less than 10% of the survey respondents. These results are consistent with research on the December 20–21, 2006, Colorado Front Range winter storm (Drobot, 2007), although local

television was the major source for about 67% of the respondents leading up to and 75% during that event. Combined, these results further emphasize the importance of traditional information sources. People are mainly relying on television while at home, and the radio while in transit, and there are some definite generational differences. Compared with previous studies ([Drobot, 2007](#); [Hayden et al., 2007](#); [Lazo et al., 2008](#)), utilization of some of the newer technologies, particularly the Internet, has increased. This likely will continue in the coming years, and the use of cell phones as a weather and warning information source may also increase in the near future. That so many people turn to local television for all types of weather information particularly highlights the important role that local broadcast meteorologists play in communicating weather information to members of the public (e.g., [NOAA, 1999](#); [Sherman-Morris, 2009](#)), which further supports the importance of public-private sector relationships ([NRC, 2006](#)).

Finally, there has been considerable discussion about the role of the NOAA weather radio for disseminating warning information, so we asked another set of questions of the respondents to determine if they have NOAA weather radio, if they have it continually turned on, and if they heard a warning from NOAA weather radio during this event. Overall, 10% of the survey respondents own a NOAA weather radio. Of the 31 people who own a NOAA weather radio, 7 people keep it turned on at all times, and 5 people heard a warning about the January 5–6, 2008, winter storm from their NOAA weather radio. Although these numbers indicate NOAA weather is utilized less often compared to other weather information sources, we stress that these results do not minimize the value of NOAA weather radio. It is important to note that there is regional variation in the use and promotion of NOAA weather radio (e.g., [Hayden et al., 2007](#)), and there is evidence to suggest increased use of NOAA weather radio in areas more prone to severe weather. Moreover, people get information from multiple sources, and the NOAA weather radio is a unique source that provides crucial information not readily available from some of the other sources.

*Research Question #3: Did respondents alter their travel patterns during the storm, and if so, what information and characteristics influenced that decision?*

Another key step in providing better information to members of the public is to understand how the currently provided information influences people's decision-making. Of

course, this is a highly complex issue, which this study was not scoped to fully investigate. In this project, we focused on determining whether respondents altered their travel patterns based on the weather and warning information they obtained during the January 5-6 event.

Overall, 53% of the respondents (n = 165) did not leave home at the usual time on the morning of January 5, 2008. Of these 165 people, 52 stated that the weather forecast played an important role in their decision not to leave at the usual time. The other 113 respondents indicated they did not go to work/school on January 5 for other reasons (e.g., they were on vacation, they typically work from home). Compared to the Colorado quick response grant case (Drobot, 2007), a smaller percentage stayed home based on the weather forecast in this case. There likely are many factors that could have influenced people's decisions to stay home, but two reasons could be the type and magnitude of the forecast event. In the Colorado case, the forecast was clearly calling for a major winter blizzard, whereas in the California case, much of the precipitation was forecast as rain. Further research is needed to evaluate how these and other factors may affect people's decision-making, and if decision-making in the face of hazardous weather varies geographically.

For those who left home, follow-up questions asked about their travel patterns. Overall, 33% of survey respondents (n = 32) altered their travel pattern in some way on the morning of January 5, 2008. When asked why, both the weather forecast and the observed weather conditions were cited as being "very important" or "extremely important" in making their decision to alter their travel (Figure 8). Known road closures played a smaller role. These results further confirm that weather forecasts play a role in people's decision-making process. The exact role the weather forecast plays most likely varies by event and further research is needed to ascertain what parts of the forecast influenced people's decision-making, as well as whether their decisions were based on their information source, their general weather salience, and their confidence in the weather and warning information.

*Research Question #4: Did respondents take self-protective actions to prevent damage to their homes?*

In addition to better understanding how people are using weather and warning information for driving, we also asked a series of questions to assess whether respondents took

any action to prevent damage to their homes. As with analysis of preceding questions, the decision to take protective action is complex and involves numerous non-linear steps. There are many theories as to what promotes people to take preventative action (e.g., [Rosenstock, 1974](#); [Ajzen, 1991](#); [Bandura, 1997](#); [Floyd et al., 2000](#); [Sorensen, 2000](#)), but there are comparatively few assessments of what protective actions people take in specific contexts (e.g., winter storms) to prevent damage to personal property. Therefore, these questions can help both the NWS and the broader research community.

Preceding the storm, 24% (n = 77) of the respondents took some form of preventative action. Of this subsample, 48% spent no money on preventative action, another 30% spent no more than \$50, and only 1 respondent stated that they spent more than \$1,000 on preventative action. When asked to approximate how much cost in property damages they would have incurred if they had not taken preventative action, 27% replied that they did not know, and another 27% said between \$0 and \$100. Approximately 20% felt they would have incurred between \$101 and \$500 in damages, and one respondent believed they would have had over \$25,000 in damages had they not taken preventative action.

Overall, 55 respondents (18%) suffered some property damage during the storm, with a modal damage cost of between \$101–\$1,000 (5 respondents did not know how much damage they incurred). Only 3 people sustained damages greater than \$5,000. Of those who took preventative action, 29% still suffered some property damage, and of those that took no preventative measures, 14% suffered some property damage.

These results provide some information on what preventative action people took and what damages they incurred for the January winter storm, but more research is needed to explore what motivates people to take protective action. For example, what role does forecast information play in preventative decisions? How does the person's ability to feel empowered to protect property in some way influence their actions? What is the relative importance of a person's financial ability to mitigate damage costs? Moreover, is there a maximum amount people are willing to pay on protective action? On a related note, research is needed to assess people's willingness to pay for improved forecasts, and in particular, what aspects of those forecasts (e.g., improved lead times) people are most willing to pay for. Finally, additional cases

studies are needed to assess how people's actions follow the theories noted above (e.g., [Rosenstock, 1974](#); [Ajzen, 1991](#); [Bandura, 1997](#); [Floyd et al., 2000](#); [Sorensen, 2000](#))

*Research Question #5: What were the respondents' perceptions of the accuracy of the weather forecast?*

Over the last few years, the idea of “social verification” has begun to emerge as a complimentary approach to traditional statistical verification, because measures such as the probability of detection and Brier skill score can only provide a certain level of information for verifying forecasts. Rather than focusing on the statistical skill of a forecast, one idea of social verification is to measure the public's perception of the forecast accuracy. This is valuable to the NWS because the public is one of the main customers for NWS products, and social verification measures can give the NWS a sense for how members of the public perceive the forecast quality.

In past studies (e.g., [Drobot, 2007](#)), we focused on measuring people's perception of forecast accuracy with respect to the timing of precipitation onset as well as the amount of precipitation that fell. Starting with the timing, a majority of respondents in this California case study (53%) felt that precipitation began about when it was forecast ([Figure 9](#)). Roughly 18% of the respondents did not know when precipitation was forecast to begin, 15% responded that they felt precipitation began sooner than forecast, and another 15% responded that they felt precipitation began later than forecast. Many respondents (44%) also felt that about the same amount of precipitation fell as was forecast ([Figure 10](#)). The next highest category (28%) included those who felt more precipitation fell than was forecast. A similar proportion of the sample (14% and 15%) felt that less precipitation fell than was forecast, or didn't know how much precipitation was forecast. In contrast to the Colorado case study ([Drobot, 2007](#)), there is no statistically significant difference in perception for either timing or amount between those who stayed home and those who left. This may be due to the greater magnitude of the Colorado event, but the relationship between the magnitude of an event and people's perception of the forecast accuracy could be a topic for future research.

There were some statistically significant differences in the perception of the forecast based on whether the respondents suffered property damage, their generation, and one personality scale, “excitement-seeking”. People who suffered some property damage were more

inclined to think that more precipitation fell than was forecast than those that had no damage (38% vs. 22%, respectively). This result echoes a finding from the Colorado case (Drobot, 2007) and further confirms that people's perception of the forecast is somewhat based on how the storm personally affects them. Stratified by generation, 30% of the Silent Generation felt that less precipitation fell than was forecast, but only 13% of the Silent Generation felt that more precipitation fell than was forecast. In contrast, fewer than 10% of Generation X and Y felt that less precipitation fell than was forecast, and more than 25% of the Silent Generation felt that more precipitation fell than was forecast. "Excitement-seeking" is based on 10 personality questions<sup>2</sup>, such as "I love action" and "I dislike loud music". In general, people that score higher on the excitement-seeking scale tend to seek out exciting and dangerous activities, and in our survey, people that scored higher on the excitement-seeking scale were significantly more likely to feel that more precipitation fell than was forecast and also that precipitation fell sooner. These results suggest that generational difference and individual personality differences exert an influence on people's perception of weather forecasts, but additional social verification studies are needed to better understand what factors influence people's perceptions of forecast accuracy.

## SUMMARY AND CONCLUSIONS

This report focused on identifying respondents' understanding of recent weather and driving information campaigns ; their everyday sources for obtaining weather information; their main sources for obtaining weather information for the January 5-6, 2008, winter storm; determining what percentage of respondents stayed home on the morning of January 5, 2008, and whether their decision to stay home was based on the weather forecast and/or other characteristics; looking at the fiscal damages of the storm; and assessing respondents' perceptions of the accuracy of the weather forecast. The following results emerged:

- Less than 10% of the respondents knew "Turn Around, Don't Drown" is the correct slogan, and only about 1 in 4 respondents correctly identified "Ice and Slow, Take it Slow" as the other correct slogan. The majority of respondents answered "I don't know"

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<sup>2</sup>These questions were taken from the International Personality Item Pool. Please see <http://ipip.ori.org/ipip/> and Goldberg *et al.* (2006) for more information.

for both questions. Further research is needed to evaluate the underlying factors behind these results, and also expand these results to other regions.

- The vast majority of respondents relied on local television to get weather information leading up to and during the storm, highlighting the important role local broadcast meteorologists play in conveying information to the general public during major meteorological events, and further emphasizing the importance of public-private sector relationships.
- For those that stayed home on January 5, their decision was more influenced by weather forecasts than by observed weather conditions or known road closures.
- Roughly 1 in 4 people took action to protect their homes prior to the storm, saving several thousand dollars in the process.
- A majority of respondents felt that the precipitation began to fall approximately when it was forecast to begin and also that about the same amount of precipitation fell as forecast. People's perception of the forecast is somewhat based on how the storm personally affects them, and age and personality traits also appear to play a role, but more studies are needed to better determine what factors influence people's perceptions of forecast accuracy

In conclusion, results from this study continue to develop a better understanding of people's information-gathering tendencies and their actions in hazardous weather conditions. This study also serves as a roadmap for additional studies, which ultimately should improve our understanding of the public's sources, uses, and perception of weather forecast information, as well as how forecasts, observed weather, and non-meteorological conditions combine to influence people's actions during hazardous weather events.

#### **ACKNOWLEDGEMENTS**

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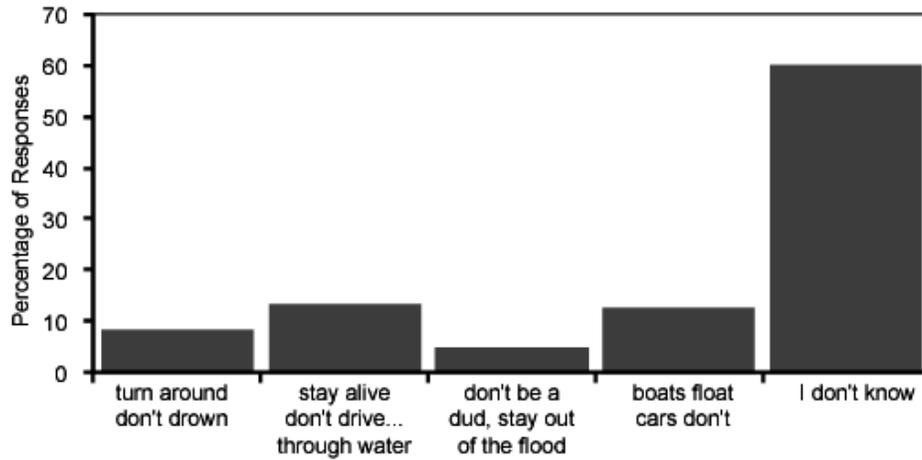
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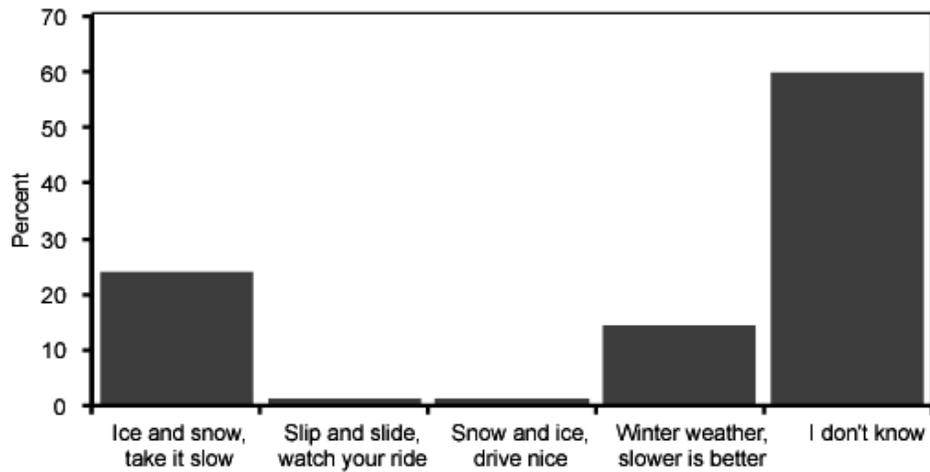
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<http://www.census.gov/prod/www/statistical-abstract.html>. Accessed September 18, 2008.

**Table 1** – Selected characteristics of the respondents.

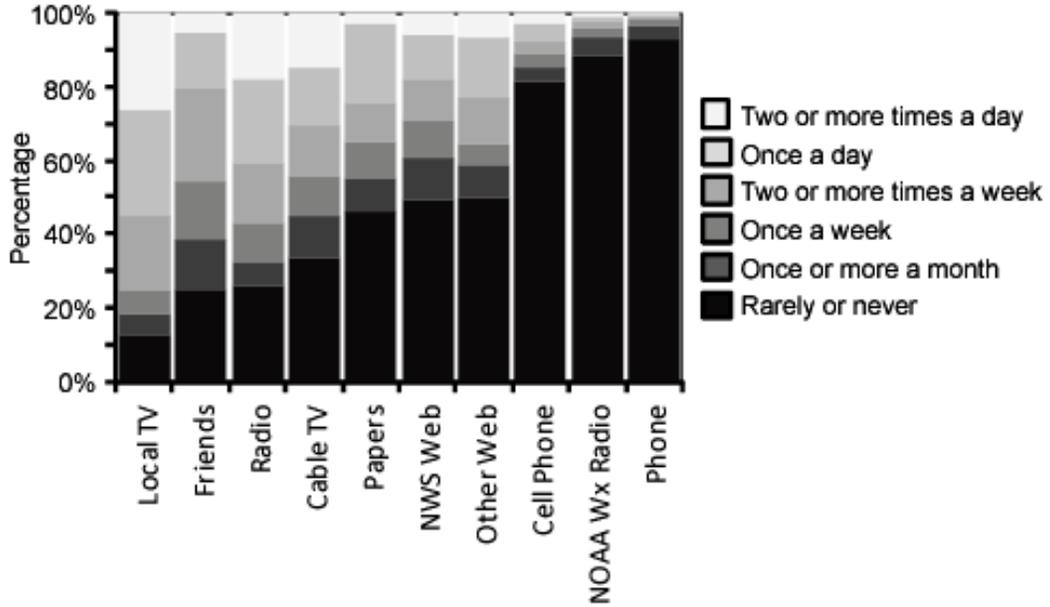
<b>Characteristic</b>	<b>Number</b>	<b>Survey Sample</b>	<b>Census<sup>1</sup></b>
<b>Gender</b>			
Male	89	30%	50%
Female	209	70%	50%
<b>Education</b>			
Less than 9th grade	0	0.0%	
9th to 12th grade, no diploma	2	0.7%	19.9%
High school graduate or equivalent	32	10.7%	23.2%
Some college or Associate's degree	138	46.2%	27.9%
Bachelor's degree	84	28.1%	18.6%
Graduate or professional degree	43	14.4%	10.4%
<b>Income</b>			
Less than \$10,000	20	6.8%	5.4%
\$10,000 to \$14,999	11	3.7%	5.0%
\$15,000 to \$24,999	25	8.5%	9.7%
\$25,000 to \$34,999	29	9.9%	9.3%
\$35,000 to \$49,999	44	15.0%	13.0%
\$50,000 to \$74,999	61	20.7%	18.0%
\$75,000 to \$99,999	46	15.6%	12.7%
\$100,000 to \$149,999	37	12.6%	14.6%
\$150,000 to \$199,999	12	4.1%	6.0%
\$200,000 or more	9	3.1%	6.2%
<sup>1</sup> Based on the 2006 (Education) 2007 (Gender and Income) American Community Survey from the U.S. Census Bureau for the state of California			



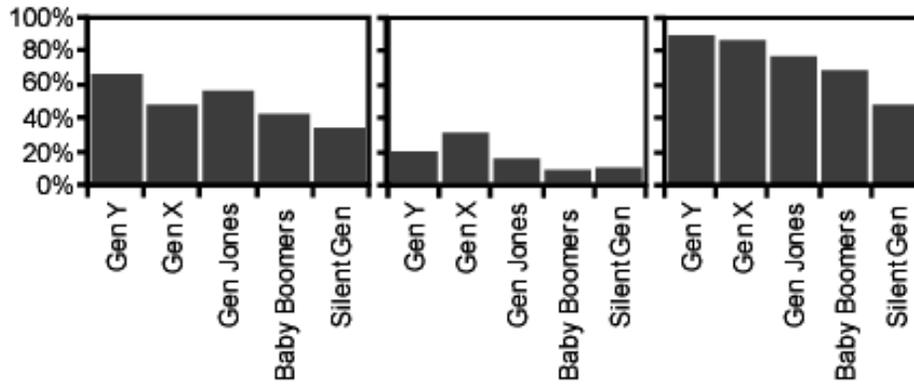
**Figure 1** – Answer to the question, “Which of the following is a National Weather Service (NWS) campaign slogan to warn people of the hazards of driving a vehicle through flood waters?” [n=321].



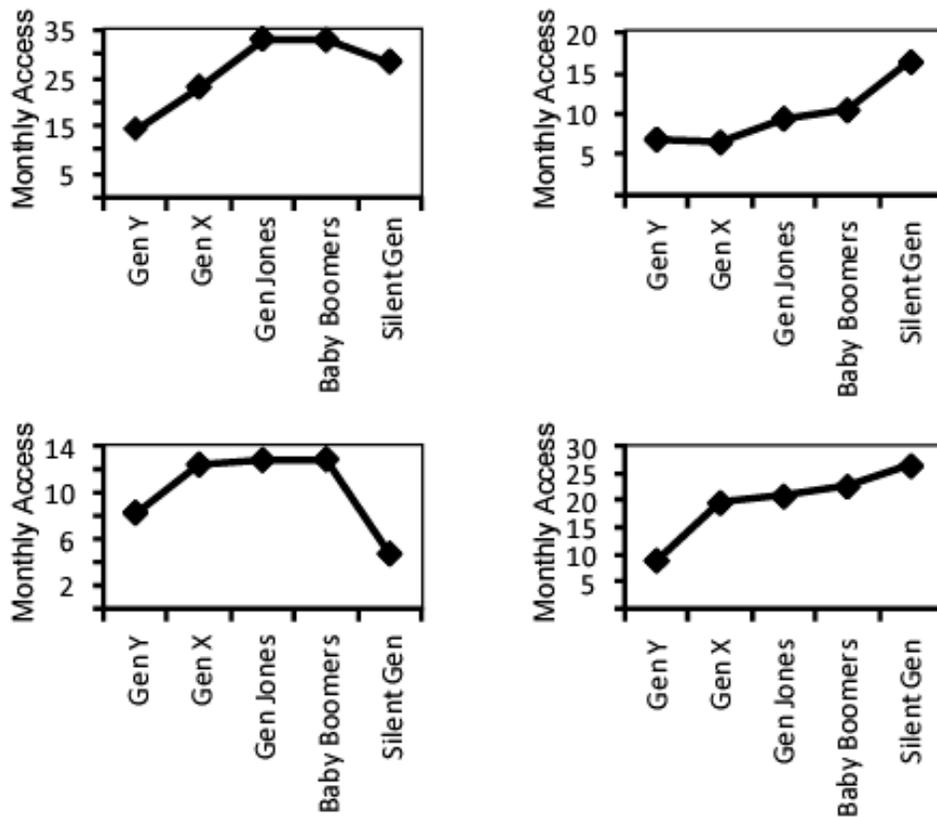
**Figure 2** – Answer to the question, “Which of the following is a Department of Transportation (DOT) campaign slogan to warn people of the hazards of driving in winter weather?” [n=321].



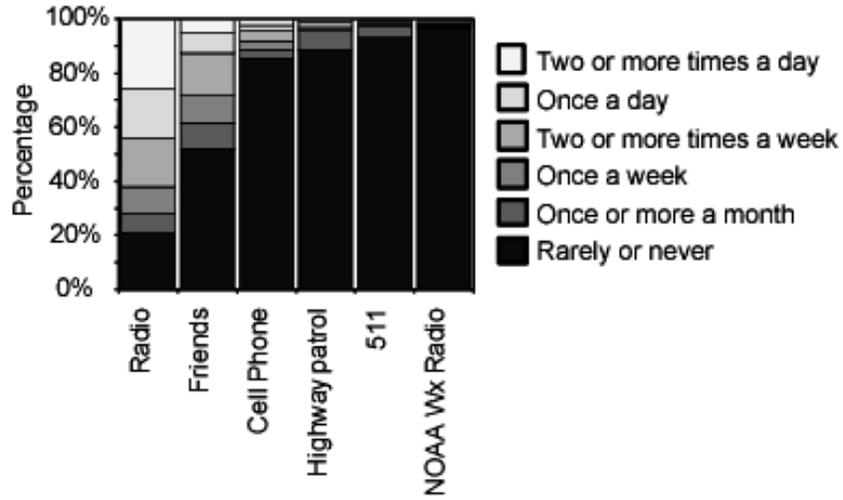
**Figure 3** – Response to question “While at home, how often do you normally get weather information from the sources listed below?” [n = 321]



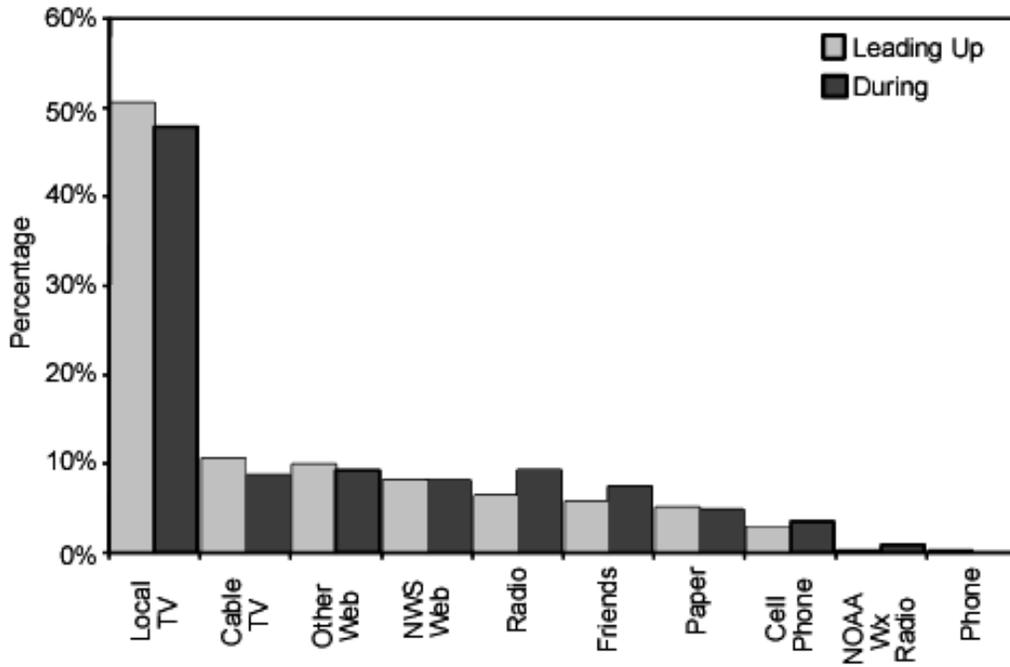
**Figure 4** – Percentage of respondents that obtain weather information at least once a month from (left) NWS webpages; (center) cell phones; (right) friends/family/co-workers. [n = 298].



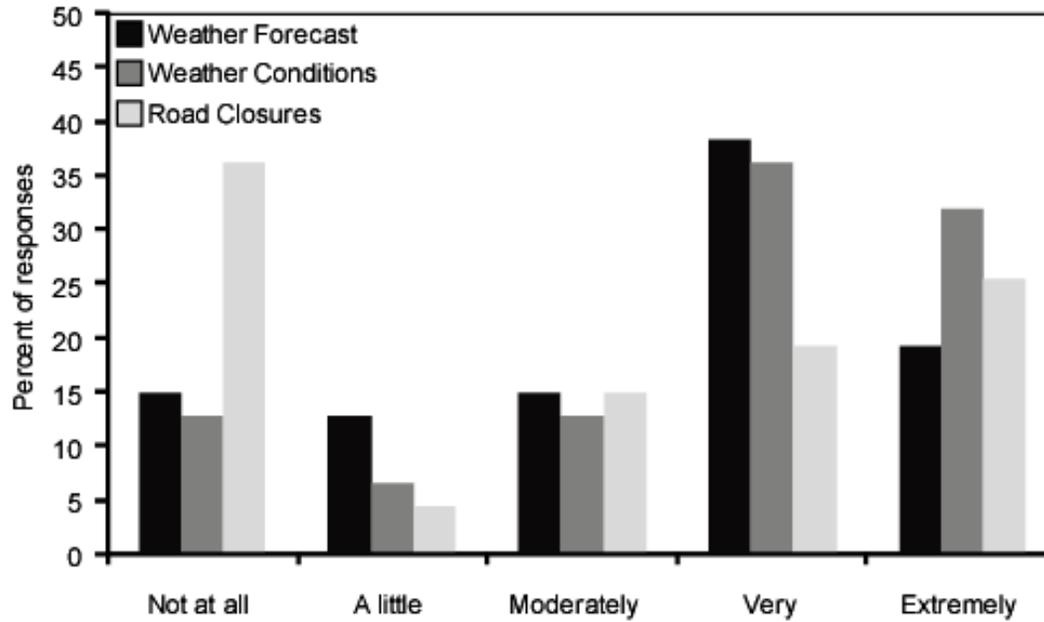
**Figure 5** – Number of times per month that that respondents access weather information from (top left) local television; (top right) newspaper; (bottom left) friends/family/co-workers; (bottom right) commercial radio. [n = 298].



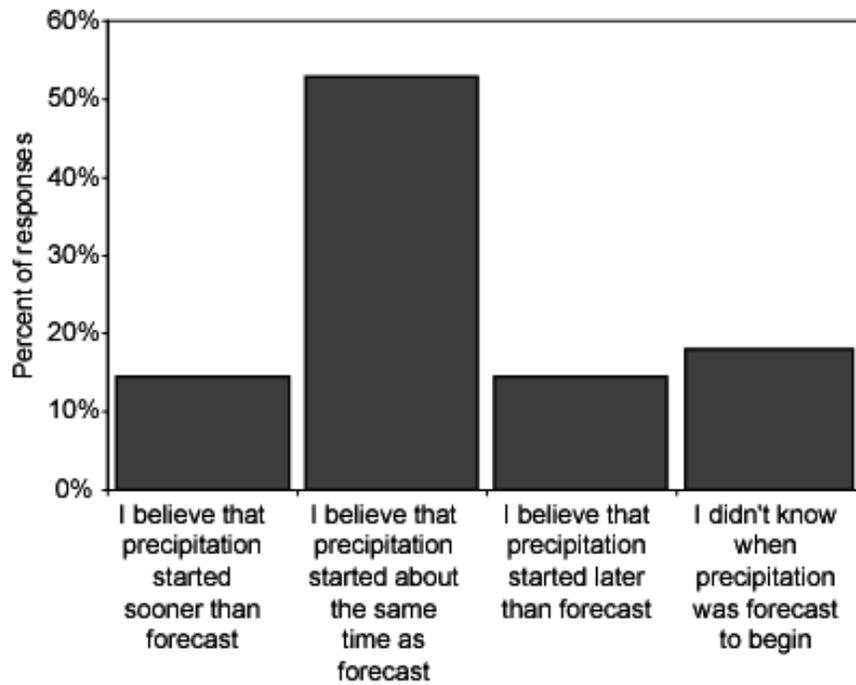
**Figure 6** – Response to question “While on the road, how often do you normally get weather information from the sources listed below?”



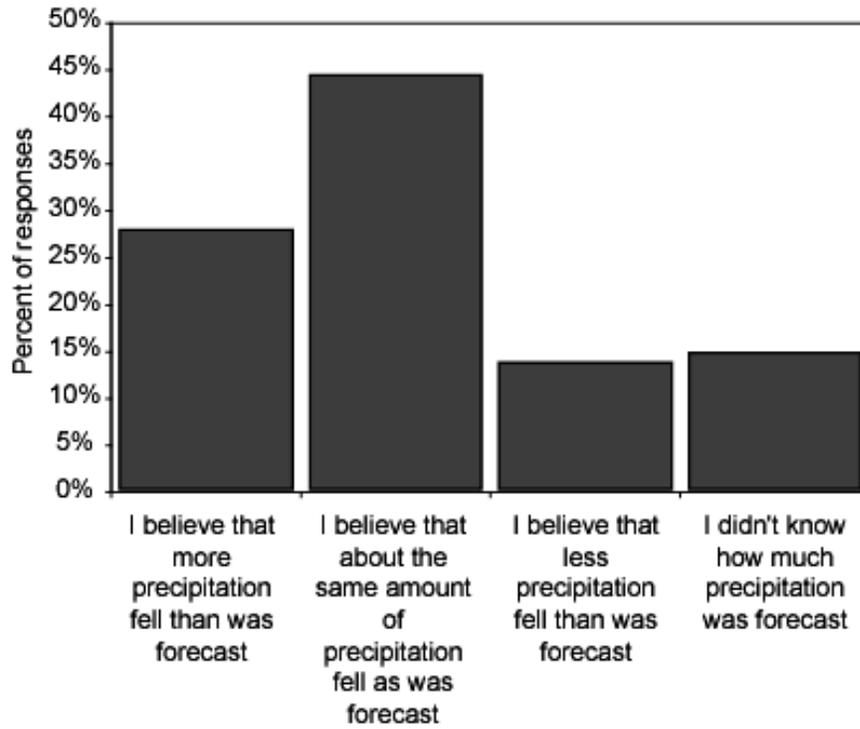
**Figure 7** – Main weather information sources leading up to and during the January 5–6, 2008, California winter storm. [n = 311]



**Figure 8** – Answer to the questions, “On Friday, January 5, 2008, to what degree was your decision to alter your travel pattern influenced by the [weather forecast, weather conditions, known road closures]?” [n=47].



**Figure 9** – Respondents’ perceptions of the timing of the beginning of precipitation on January 5, 2008. [n = 310]



**Figure 10** – Respondents’ perceptions of the amount of precipitation that fell during the January 5-6, 2008, winter storm. [n = 310]

## **Abstract.**

Winter storms pose a significant threat to life and property, and though recent advances in the hydrometeorological sciences are now generating a range of new products and methodologies for forecasting these weather conditions, people's perceptions and experiences need to be better understood and carefully addressed to maximize the possible benefits of scientific advances and technologies. To advance scientific understanding of people's knowledge of and decision-making pertaining to hazardous weather, this project used an internet survey of Californians after the January 5-6, 2008 severe winter storm. One major concern in winter storms is mortality and morbidity related to driving; both the National Weather Service (NWS) and the Department of Transportation (DOT) have recently implemented information campaigns warning of the dangers of driving in hazardous weather. However, less than 10% of this survey's respondents knew "Turn Around, Don't Drown" is the correct NWS slogan, and only about 1 in 4 respondents correctly identified "Ice and Slow, Take it Slow" as the correct DOT slogan. In assessing where people are obtaining weather and warning information, the vast majority of respondents relied on local television to get weather information leading up to and during the storm, highlighting the important role local broadcast meteorologists play in conveying information to the general public during major meteorological events, and further emphasizing the importance of public-private sector relationships. For those that stayed home on January 5, their decision was more influenced by weather forecasts than by observed weather conditions or known road closures. A majority of respondents also felt that the precipitation began to fall approximately when it was forecast to begin and also that about the same amount of precipitation fell as forecast. However, people's perception of the forecast was based on how the storm personally affected them, with age and personality traits playing a role in people's perception.