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Assessing and Improving the NWS Point-and-Click Webpage Forecast Information

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EXECUTIVE SUMMARY

A key goal of weather forecasting is to serve society by effectively communicating information that enhances people's decision-making and reduces their risk of harm.

The National Weather Service (NWS) is the governmental agency responsible for providing freely available weather forecasts, warnings, watches, and advisories for the protection of life and property. A primary channel through which NWS directly disseminates everyday and hazardous weather forecast products is its website, *www.weather.gov*. Among the more heavily accessed NWS webpages is the point-and-click (PnC) forecast webpage (Figure ES-1 is an example PnC forecast webpage). The PnC webpage has everyday and hazardous weather forecast information in graphical and textual formats for every 2.5×2.5 km grid over land in the United States. The PnC webpage contains forecast-at-a-glance information out to 4.5 days (commonly known for its forecast icons), a more detailed 7-day text forecast, links to hazardous weather forecast products (e.g., severe thunderstorm warning), current conditions, and links to other forecast and observation products.

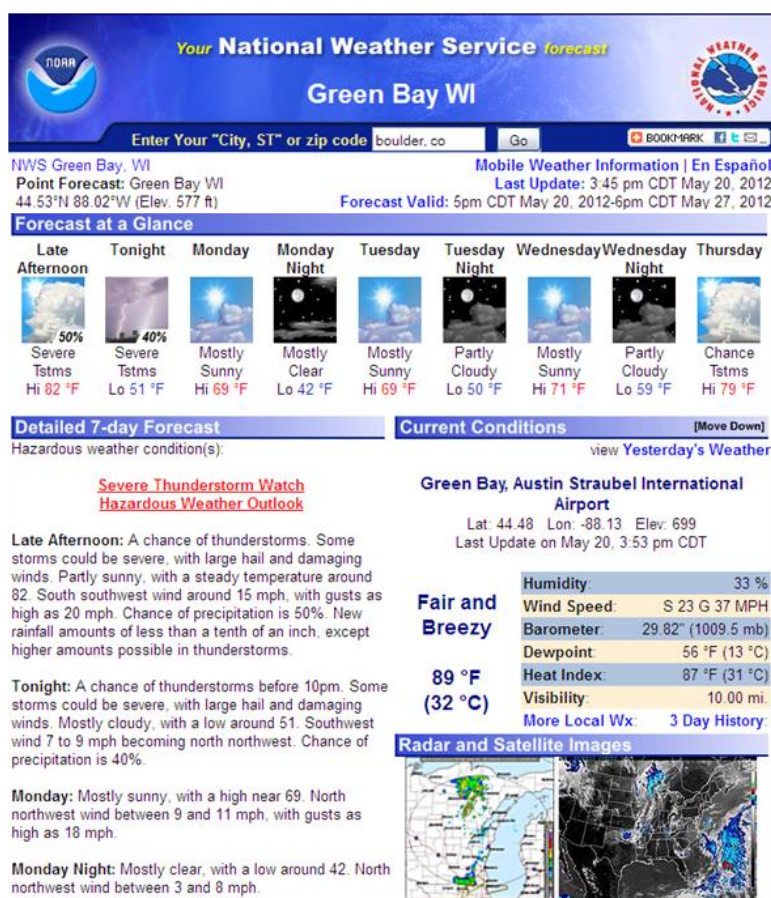


Figure ES-1. Example point-and-click forecast webpage (top-half) prior to the July 2, 2012, NWS re-design

Because the PnC webpage provides important—and, at times, potentially life-saving—weather information to its millions of users, it is important that the webpage effectively communicates forecast information. The NWS-funded research reported here aimed to assess and improve the PnC webpage forecast information through three overarching goals:

1. Characterize the key successes and limitations of the public forecast information currently being provided, and identify primary areas for improvement;
2. Assess users' interpretations of, uses of, and preferences for the public forecast information, including information currently provided and possibilities for future information; and
3. Identify and implement operational changes to the public forecast information resulting from the research and assess public feedback.

The research described here focuses on the first two goals. The third goal will be the subject of potential future work as the NWS determines how to move forward using the information reported here.

We gathered data for this research project through several steps using multiple qualitative and quantitative methods. We collected data in two major phases—an initial exploratory research phase that informed a second research phase focused on communication of hazardous weather. Table ES-1 summarizes all research steps, methods, and samples employed in this study. Based on our empirical analysis, we identify key findings that can inform more effective communication of forecast information on the PnC webpage to better serve PnC users.

Table ES-1. Summary of research steps, methods, and samples			
Research Steps and Methods	Participant Group	Dates	Number of Participants
Exploratory Research			
Expert focus groups	Weather forecast providers	April 2010	9
Focus groups	Members of the public	April–May 2010	15
Usability evaluation	PnC webpage users	November 2010	8
Exploratory survey (Survey 1)	PnC webpage users	December 2010	5,153
Public Survey	Members of the public	December 2010	2,059
Focused Research on Hazardous Weather Communication			
1 st hazardous weather communication survey (Survey 2) – Short-fused weather threat	PnC webpage users	October 2011	4,358
1 st hazardous weather communication survey (Survey 2) – Long-fused weather threat	PnC webpage users	October 2011	2,118
2 nd hazardous weather communication survey (Survey 3) – Short-fused weather threat	PnC webpage users	March 2012	3,766
2 nd hazardous weather communication survey (Survey 3) –Long-fused weather threat	PnC webpage users	March 2012	3,795
Total Number of Research Participants			21,281

Methods – Exploratory Research

The target population for this study is all users of all NWS PnC pages, yet no such comprehensive list of users exists. To acquire data from individuals who are as closely representative as possible of the population of NWS PnC users, we developed a sampling frame—that is, a subset of the population of PnC users with their contact information. We worked with the NWS Web Tactical Team to systematically recruit 88,191 unique PnC users to our sampling frame via the PnC webpage. We randomly sampled from this list to select participants for the data collection steps with PnC users.

We began assessing the PnC webpage by characterizing the PnC users and identifying strengths and limitations of the PnC webpage. We started with focus groups with weather forecast providers to understand the PnC webpage itself, the processes involved in generating the content, and the weather providers' operational needs. We also conducted focus groups with members of the public (i.e., not known PnC webpage users) to get initial, broad input about the PnC webpage and its forecast information. Next, we partnered with Colorado State University to conduct a usability evaluation of the webpage with PnC users to assess the design, organization, and content of the PnC webpage.

The results of the focus groups and usability evaluation together informed development of a nationwide, Internet-based survey of PnC users, particularly regarding uses of the PnC webpage, the provision of hazardous weather information, the temporal resolution of forecast information, and the webpage layout and navigability.

To supplement this first survey on the NWS PnC forecast webpage, we also implemented a controlled-access Internet-based survey of members of the general public in parallel with the NWS PnC user survey. The public survey included a subset of questions from the PnC user survey, namely on individuals' sources, preferences, and uses regarding weather forecast information. Responses to the general public survey will allow for a future comparative analysis of weather attitudes and behaviors between NWS PnC users and the general public.

Results – Exploratory Research

The initial research steps resulted in a wealth of data characterizing participants' uses of the PnC webpage information. Most respondents are long-term, frequent users of the PnC webpage. More than 82.2% of respondents have used it for more than 3 years, and 83.0% of respondents access the webpage on at least a daily basis, with a majority accessing it two or more times a day. Respondents access the webpage in more than one way, with 86.9% commonly accessing it using a bookmark and 55.0% going through the NWS homepage or their WFO homepage. The parts of the PnC webpage that are used regularly (more than half the time on average) by most respondents are the forecast-at-a-glance, the detailed 7-day text forecast, the hazardous weather conditions, and the current conditions. Forecasts of all lead-times—from 0–6 hours up to 5–7 days—are regularly sought (more than half the time on average) by a majority of respondents. Most commonly sought is nowcast (0–6 hour) and short-term forecast (6 hour to 3 day) information, particularly 12–24 hour forecasts. When asked about reasons for using the PnC

forecast information, more than 75% of respondents indicated they use it to know about important weather information in general and as it changes and to inform a specific decision or task.

The focus groups, usability evaluation, and survey data together revealed several findings about strengths of the PnC webpage, summarized below:

- **Finding 1:** The forecast-at-a-glance icons are regularly used and perceived by most PnC survey respondents as effective overall—that is, they are understandable and representative of the weather. Some respondents, however, perceive the icons as unrepresentative of the weather.
- **Finding 2:** The primary strengths of the PnC webpage are that it provides accurate, up-to-date forecast information for a specific area in easy-to-use formats both at-a-glance and in greater detail to its users.
- **Finding 3:** The detailed point forecast map is commonly used and useful for PnC users who want to obtain a forecast for a specific location or a location without a known geographic referent (i.e., rural and remote areas).
- **Finding 4:** The absence of advertisements on the PnC webpage is an important feature to many PnC users.
- **Finding 5:** The fast download time of the PnC webpage is an important feature to many PnC users, and it particularly serves populations who have slower Web connections.

Although many strengths of the PnC webpage emerged, three issues emerged, illustrating limitations of and areas for improving the communication of the PnC webpage information:

- **Finding 6:** Hazardous weather information is not effectively communicated on the PnC webpage. Three particular limitations are that (a) the existence and importance of a hazardous weather threat can be unclear, and the provision of hazardous weather information can be misleading (e.g., with the Hazardous Weather Outlook); (b) accessing hazardous weather details can be cumbersome; and (c) temporal and spatial information about a hazardous weather threat is not explicitly conveyed on the PnC page.
- **Finding 7:** Many PnC webpage users want (a) higher temporal resolution of forecast information for nowcast and short-term forecast periods, and (b) forecast information out to 10 days.
- **Finding 8:** The usability of some PnC information is limited by the webpage design. Two issues are that (a) many PnC users either are not aware of or do not attend to the information under the “Additional Forecasts & Information” section, yet this section includes some information that respondents indicated they would like to have; positioning the most accessed and desired information in the top half of the webpage

viewing area would be beneficial, and (b) many users want the ability to customize the PnC page.

Because effective communication of hazardous weather information is central to NWS's mission to protect life and property, we further investigated how to better communicate this important information in follow-on, focused research with an emphasis on improving communication of the existence and timing of hazardous weather threats.

Methods – Focused Research on Hazardous Weather Communication

Based on the exploratory research findings, we conducted two follow-on nationwide, Internet-based surveys to explore ways to better communicate hazardous weather information on the PnC webpage.

For the first hazardous weather communication survey, we worked closely with the NWS to develop three new simple and operationally feasible attributes that could be added to the PnC webpage when hazardous weather threatens in attempt to better communicate the threat existence and timing. The three individual attributes were:

- (1) A **bar** placed underneath the forecast-at-a-glance icons with the position and length representing the time period over which the threat is in effect. The bar was colored red for warnings and orange for watches, and it included text identifying the threat.
- (2) **End-time text** indicating until when the threat is in effect added to the red, underlined text that is currently used to indicate the threat.
- (3) A **box** around the first forecast-at-a-glance icon. The box included text identifying the threat. The box was tested only for short-fused events because its intent was to alert people for imminent hazardous weather threats. As such, the box was colored red.

We created experimental forecasts with separate sets for a short-fused weather hazard (i.e., a severe thunderstorm warning) and a long-fused hazard (i.e., a flood watch). All three attributes and all possible combinations of them—for a total of eight possible conditions—were tested for the short-fused forecast. Only the bar and end-time text were tested for the long-fused forecast, for a total of four possible conditions. We employed an experimental design to evaluate the forecasts wherein (a) participants were randomly invited to participate in either the short- or long-fused survey and then (b) within each survey, participants were randomly assigned to one of the experimental forecasts and asked a series of survey questions about the design with which they were presented. These questions included participants' assessments of the existence and timing of the threat and their perceptions of the design.

There were mixed results regarding the three attributes from the first hazardous weather communication survey; the presence of end-time information confused respondents with respect to the event start-time (see Finding 9) and the bar did not effectively communicate the threat timing (see Finding 10). Building on these findings, we conducted a second survey on communication of hazardous weather. Again, there were three attributes, but the bar was omitted, start-time text was added, and the box was added for the long-fused events, so the three individual attributes were:

- (1) **Start-time text** indicating when the threat goes into effect added to the red, underlined text that is currently used to indicate the threat.
- (2) **End-time text** indicating until when the threat is in effect added to the red, underlined text that is currently used to indicate the threat.
- (3) A **box** around the forecast-at-a-glance icons that represents the time period over which the threat is in effect. The box included text identifying the threat and was colored red for warnings and orange for watches.

Again, we created experimental forecasts with separate sets of designs for a short-fused weather hazard (i.e., a severe thunderstorm warning) and a long-fused hazard (i.e., a flood watch). All individual attributes and all possible combinations of them were tested for both the short- and long-fused hazards. Figure ES-2 shows example images of all the attributes combined. As with the previous survey, we employed an experimental design by randomly assigning participants to either the short- or long-fused survey and then randomly assigning them to one of the experimental forecasts. Survey questions similar to the first hazardous weather communication survey were designed—and in some cases the exact same questions were used—to evaluate respondents' assessments of the existence and timing of the threat and their perceptions of the design they were given.

Results – Focused Research on Hazardous Weather Communication

The surveys on communication of hazardous weather produced valuable empirical data on NWS PnC users' understanding, perceptions, and preferences regarding the attributes that were created in an attempt to better communicate hazardous weather information on the PnC webpage. The two hazardous weather communication surveys revealed the following about which attributes and combinations thereof were effective and which were not.

- **Finding 9:** Including text that explicitly conveys the end time of a hazardous weather threat appears to mislead most people into thinking the event has already begun. This is particularly problematic for long-fused events that go into effect at a future time. This suggests that, if end time is indicated, text that explicitly conveys the start time of a hazardous weather threat should be coupled with it to minimize confusion with respect to threat start time.
- **Finding 10:** The bar underneath the forecast-at-a-glance icons—which was intended to convey the timing of hazardous weather threats through its position and length—does not effectively communicate this information to most survey respondents.
- **Finding 11:** The box is perceived favorably by respondents as being useful, visually appealing, and attention-getting, and for prompting additional information-seeking. In addition, more than 90% of respondents prefer to have the box than not to.

Assessing and Improving the NWS Point-and-Click Webpage









Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code Go [BOOKMARK](#) [f](#) [t](#) [e](#)

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Now (until 6 PM)	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
 40% Severe Thunderstorm Warning	 20% Slight Chc Tstms Lo 43 °F	 40% Chance Rain Hi 57 °F	 80% Heavy Rain Lo 44 °F	 90% Heavy Rain Hi 56 °F	 80% Heavy Rain Lo 45 °F	 70% Showers Likely Hi 63 °F	 30% Chance Showers Lo 45 °F	 30% Chance Showers Hi 67 °F

Detailed 7-day Forecast **Detailed Point Forecast** [\[Move Down\]](#)


Hazardous weather condition(s):

Severe Thunderstorm Warning (Now until 6 PM)
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Click Map for Forecast [Disclaimer](#)



(a)

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code Go [BOOKMARK](#) [f](#) [t](#) [e](#)

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Late Afternoon	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
 40% Chance Showers Hi 59 °F	 20% Slight Chc Tstms Lo 43 °F	 40% Chance Rain Hi 57 °F	 80% Heavy Rain Lo 44 °F	 90% Heavy Rain Hi 56 °F	 80% Heavy Rain Lo 45 °F	 70% Showers Likely Hi 63 °F	 30% Chance Showers Lo 45 °F	 30% Chance Showers Hi 67 °F

Flood Watch (from 6 AM Thu, until 6 PM Sat)

Detailed 7-day Forecast **Detailed Point Forecast** [\[Move Down\]](#)

Hazardous weather condition(s):

Flood Watch (from 6 AM Thu, until 6 PM Sat)
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Click Map for Forecast [Disclaimer](#)



(b)

Figure ES-2. Experimental forecast showing the combined start-time text, end-time text, and box for a (a) short-fused and (b) long-fused weather threat

- **Finding 12:** Together, the start-time and end-time text attributes are favorably perceived and are effective ways of communicating when short- and long-fused hazardous weather threats go into effect (or if one is in effect already) and until when they are in effect.
- **Finding 13:** When a single hazardous weather threat (i.e., NWS product) is in effect, the box attribute coupled with the start-time and end-time text attributes helps effectively communicate the existence and timing of short-fused and long-fused hazardous weather threats, and is favorably perceived, particularly for its visual prominence.

Because NWS issues multiple types of hazardous weather products (watches, warnings, and advisories) and because multiple products often can be in effect for a given location, we also developed a limited set of experimental forecasts to test respondents' perceptions and preferences for the start-time, end-time, and box attributes in these types of scenarios. Based on the limited ways we were able to test respondents' box preferences for different levels of hazardous weather products, a slim majority prefers having the box for all three types of short-fused weather products—that is, for warnings (as a red box), watches (as an orange box), and advisories (as a yellow box). Based on the limited ways we were able to test respondents' box perceptions and preferences when two hazardous weather threats exist, respondents like having a different box for each product, regardless of the hazard type (same weather hazard or not) or temporal nature (overlapping or not). When more than two hazardous weather threats exist, respondents like having a single box that indicates there are multiple hazards. Because we were only able to test a limited number of scenarios, however, additional research should be done to further evaluate respondents' perceptions and preferences for different types of weather products and for multi-hazard situations.

Summary

This NWS-funded research project assessed the primary strengths and weaknesses of the weather forecast and observation information on the PnC webpage and identified ways to more effectively communicate this information. In doing so, the research illustrated the importance of gathering robust empirical data from a sample of individuals that more fully represents the population of interest than do anecdotal data. It further illustrated the importance of empirically testing new ways of communicating information to ensure that recipients interpret the information as intended and that they do not critically misinterpret the information.

This project began with an exploratory data collection phase and then focused on improving the communication of the existence and timing of hazardous weather information. Yet, other limitations exist in how hazardous weather information is currently provided that are worthy of future research in support of NWS's mission to protect life and property, including (a) addressing the issuance of a Hazardous Weather Outlook when no hazardous weather is occurring or for weather events for which what is deemed "hazardous" is subjective, (b) improving the content and format of information in all hazardous weather text products so that key information can be extracted quickly and accurately, and (c) providing spatial information about hazardous weather threats in simple, understandable ways on the PnC webpage.

Assessing and Improving the NWS Point-and-Click Webpage

This work focused on current users of the PnC webpage, most of whom are long-term, frequent users. We did not attempt to evaluate why non-users do not use the webpage. The supplemental survey we conducted with the public might offer insight into this issue if it reveals differences between the general public and the PnC users. This analysis was beyond the scope of this report but will be part of future analysis.

In summary, this research project illustrates that broadly representative, rigorous data from hard-to-reach populations—in this case, NWS PnC webpage users—can be collected with a thoughtful research design. Doing so revealed a wealth of empirical data about PnC webpage users' uses of, perceptions of, and preferences for the information as well as ways to improve the webpage information to better serve its users. Such robust approaches are particularly essential when considering policy changes that affect people's lives and well-being, as the PnC forecast information—and particularly hazardous weather forecast information—does. Indeed improvements made to the PnC webpage based on the results from this project have the potential to translate to tremendous positive real-world impacts for its millions of users.

1. INTRODUCTION

A key goal of weather forecasting is to serve society by effectively communicating information that enhances people's decision-making and reduces their risk of harm.

The National Weather Service (NWS) is the governmental agency responsible for providing freely available weather forecasts, watches, warnings, and advisories. Its mission states (NOAA 2012a):


The National Weather Service (NWS) provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community.

A primary channel through which NWS directly disseminates its forecast products is its website, www.weather.gov. The website contains a wealth of forecast information, including forecasts of everyday weather, warnings, watches, and advisories of hazardous weather (e.g., convective and severe weather, fire weather, winter weather, tropical cyclones). NWS provides its forecast information in several textual and graphical forms at varying levels of geographical and technical specificity via many webpages on its website.

Among the more heavily accessed NWS webpages is the point-and-click (PnC) forecast webpage (Figure 1-1 is an example PnC forecast webpage). No NWS directive exists solely to define the purpose of the PnC webpage; however, the directive for all web-based services states the purposes of web-based products relative to NWS's mission to "deliver NWS forecasts in an efficient and accessible form" (NOAA 2012b, p. 3). To this end, the PnC webpage provides supplies a summary of forecast and observation information for a specific location.

The PnC webpage provides everyday and hazardous weather forecast information in graphical and textual formats at the highest spatial resolution offered by the NWS; there is a unique point-and-click forecast for every 2.5×2.5 km grid over land in the United States. The PnC webpage provides three main types of forecast information: (1) a forecast-at-a-glance out to 4.5 days that includes forecast icons, high and low temperature, sky cover, and chance of precipitation; (2) a more detailed 7-day text forecast; (3) and links to hazardous weather forecast products. The PnC forecast information is populated by the Graphical Forecast Editor (GFE) forecast grids that are updated at least twice daily by forecasters in each Weather Forecast Office. The webpage also provides current conditions, including links to current radar and satellite data. Additional links to other forecast and observation products are also provided, although the exact links vary by Weather Forecast Office.



Assessing and Improving the NWS Point-and-Click Webpage



Your National Weather Service forecast

Green Bay WI

Enter Your "City, ST" or zip code

BOOKMARK  

NWS Green Bay, WI

Point Forecast: Green Bay WI










44° 53'N 88° 02'W (Elev. 577 ft)

Forecast Valid: 5pm CDT May 20, 2012-6pm CDT May 27, 2012

Mobile Weather Information | En Español

Last Update: 3:45 pm CDT May 20, 2012

Forecast at a Glance

Late Afternoon	Tonight	Monday	Monday Night	Tuesday	Tuesday Night	Wednesday	Wednesday Night	Thursday
								
50% Severe Tstms Hi 82 °F Lo 51 °F	40% Severe Tstms Hi 69 °F Lo 42 °F	Mostly Sunny Hi 69 °F Lo 42 °F	Mostly Clear Hi 69 °F Lo 42 °F	Mostly Sunny Hi 69 °F Lo 42 °F	Partly Cloudy Hi 71 °F Lo 59 °F	Mostly Sunny Hi 71 °F Lo 59 °F	Partly Cloudy Hi 71 °F Lo 59 °F	Chance Tstms Hi 79 °F Lo 59 °F

Detailed 7-day Forecast

Hazardous weather condition(s):

Severe Thunderstorm Watch
Hazardous Weather Outlook

Late Afternoon: A chance of thunderstorms. Some storms could be severe, with large hail and damaging winds. Partly sunny, with a steady temperature around 82. South southwest wind around 15 mph, with gusts as high as 20 mph. Chance of precipitation is 50%. New rainfall amounts of less than a tenth of an inch, except higher amounts possible in thunderstorms.

Tonight: A chance of thunderstorms before 10pm. Some storms could be severe, with large hail and damaging winds. Mostly cloudy, with a low around 51. Southwest wind 7 to 9 mph becoming north northwest. Chance of precipitation is 40%.

Monday: Mostly sunny, with a high near 69. North northwest wind between 9 and 11 mph, with gusts as high as 18 mph.

Monday Night: Mostly clear, with a low around 42. North northwest wind between 3 and 8 mph.

Tuesday: Mostly sunny, with a high near 69. North wind at 5 mph becoming southeast.

Tuesday Night: Partly cloudy, with a low around 50.

Wednesday: Mostly sunny, with a high near 71.

Wednesday Night: Partly cloudy, with a low around 59.

Thursday: A chance of showers and thunderstorms. Partly sunny, with a high near 79.

Thursday Night: A chance of showers and thunderstorms. Mostly cloudy, with a low around 58.

Friday: Partly sunny, with a high near 74.

Friday Night: A chance of showers and thunderstorms. Mostly cloudy, with a low around 54.

Saturday: Partly sunny, with a high near 70.

Saturday Night: A chance of showers and thunderstorms. Mostly cloudy, with a low around 54.

Sunday: Partly sunny, with a high near 66.

Current Conditions [\[Move Down\]](#)

view [Yesterday's Weather](#)

Green Bay, Austin Straubel International Airport

Lat: 44.48 Lon: -88.13 Elev: 699

Last Update on May 20, 3:53 pm CDT

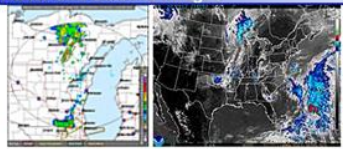
Humidity:	33 %
Wind Speed:	S 23 G 37 MPH
Barometer:	29.82" (1009.5 mb)
Dewpoint:	56 °F (13 °C)
Heat Index:	87 °F (31 °C)
Visibility:	10.00 mi.

Fair and Breezy

89 °F
(32 °C)

[More Local Wx](#) [3 Day History](#)


Radar and Satellite Images




Detailed Point Forecast [\[Move Up\]](#)

[Click Map for Forecast](#) [Disclaimer](#)


Map Satellite Terrain



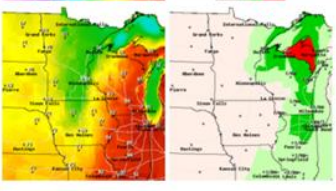
Map data ©2012 Google - [Terms of Use](#)

Requested Location  Forecast Area

Lat/Lon: 44.53°N 88.02°W Elevation: 577 ft

 **XML**

National Digital Forecast Database



Additional Forecasts & Information

Zone Area Forecast for Brown County, WI

Forecast Discussion	Air Quality Forecasts
Printable Forecast	Text Only Forecast
Hourly Weather Graph	Tabular Forecast
Quick Forecast	
International System of Units	About Point Forecasts
Hazardous Weather	Regional Weather Conditions
Past Weather Information	Marine Weather
Home	

Webmaster
National Weather Service:
Green Bay, WI

[Back to Previous Page](#)

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Figure 1-1. Example point-and-click forecast webpage. Layout and content are how the webpage was presented for over a decade up until the July 2, 2012, webpage re-design.

The PnC webpage provides important—and at times potentially life-saving—weather information to the millions of people who use it (and who may also relay the information to others). Thus, it is important that the PnC webpage effectively communicates forecast information so that its users can readily find and interpret important weather information. Recognizing this need, the NWS’s Office of Science and Technology (OST) and Office of Climate, Water, and Weather Services (OCWWS) provided a grant to assess and improve the PnC webpage forecast information.

The overarching goals of this research project were to:

1. Characterize the key successes and limitations of the public forecast information currently being provided, and identify primary areas for improvement;
2. Assess users’ interpretations of, uses of, and preferences for the public forecast information, including information currently provided and possibilities for future information; and
3. Identify and implement operational changes to the public forecast information resulting from the research and assess public feedback.

This research focuses on the first two goals. The third goal will be the subject of potential future work as the NWS determines how to move forward using the information reported here.

To assess and improve the weather information on the PnC webpage, we conducted multiple research steps and employed multiple methods. Throughout the research project, regular interactions with and feedback from the NWS project manager and other NWS staff offered valuable research input and refinement.

This report details our research methods and results. We began assessing the PnC webpage with an exploratory research phase during which we collected data through focus groups, usability testing in a computer lab, and a nationwide Internet-based survey; Section 2 describes these exploratory methods. Several findings emerged regarding respondents’ uses of, interpretations of, and preferences for the PnC forecast information, and corresponding strengths and limitations of the PnC; Section 3 summarizes these exploratory results. We found that forecast information about hazardous weather is highly important to PnC users but that it is not effectively communicated on the PnC webpage (Section 3.3), a limitation that is directly relevant to NWS’s mission. Based on this finding, we subsequently conducted two additional nationwide Internet-based surveys that were focused on improving communication of hazardous weather information; Section 4 describes the focused research methods and Section 5 summarizes the results. Table 1-1 summarizes all research steps, methods, and samples. All data collection instruments, implementation details, and data are in Appendices A–G.

Based on our multi-method empirical analysis, we identify key findings that can inform more effective communication of forecast information on the PnC webpage to better serve PnC users.

Table 1-1. Summary of research steps, methods, and samples			
Research Steps and Methods	Participant Group	Dates	Number of Participants
Exploratory Research			
Expert focus groups	Weather forecast providers	April 2010	9
Focus groups	Members of the public	April–May 2010	15
Usability evaluation	PnC webpage users	November 2010	8
Exploratory survey (Survey 1)	PnC webpage users	December 2010	5,153
Public Survey	Members of the public	December 2010	2,059
Focused Research on Hazardous Weather Communication			
1 st hazardous weather communication survey (Survey 2) – Short-fused weather threat	PnC webpage users	October 2011	4,358
1 st hazardous weather communication survey (Survey 2) – Long-fused weather threat	PnC webpage users	October 2011	2,118
2 nd hazardous weather communication survey (Survey 3) – Short-fused weather threat	PnC webpage users	March 2012	3,766
2 nd hazardous weather communication survey (Survey 3) –Long-fused weather threat	PnC webpage users	March 2012	3,795
Total Number of Research Participants			21,281

2. METHODS – EXPLORATORY RESEARCH

The NWS’s interest in assessing and improving the PnC webpage was motivated in part by a hypothesis that the forecast-at-a-glance icons were inconsistent and, at times, even misleading and therefore were not effectively communicating forecast information. This hypothesis was largely informed by anecdotes received via email to NWS webmasters from NWS PnC users volunteering their input. Although these data are instructive, their representativeness is unclear. Therefore, we began this project with an exploratory research phase during which we collected data to (a) characterize the users of the PnC webpage, (b) identify strengths of the PnC webpage, (c) assess the extent to which the forecast icons were problematic, and (d) identify other limitations of the PnC webpage, including unmet needs and confusing information.

We collected these data through multiple research steps (Figure 2-1). We gathered data from weather forecast providers (Section 2.1), members of the public (Section 2.2), and users of the NWS PnC webpage¹ (Section 2.4–2.5) through a combination of qualitative and quantitative methods. The first three exploratory research steps—focus groups with weather forecast providers, focus groups with members of the public, and usability testing with NWS PnC users—informed development of a controlled-access, Internet-based survey of NWS PnC users that was implemented nationwide.

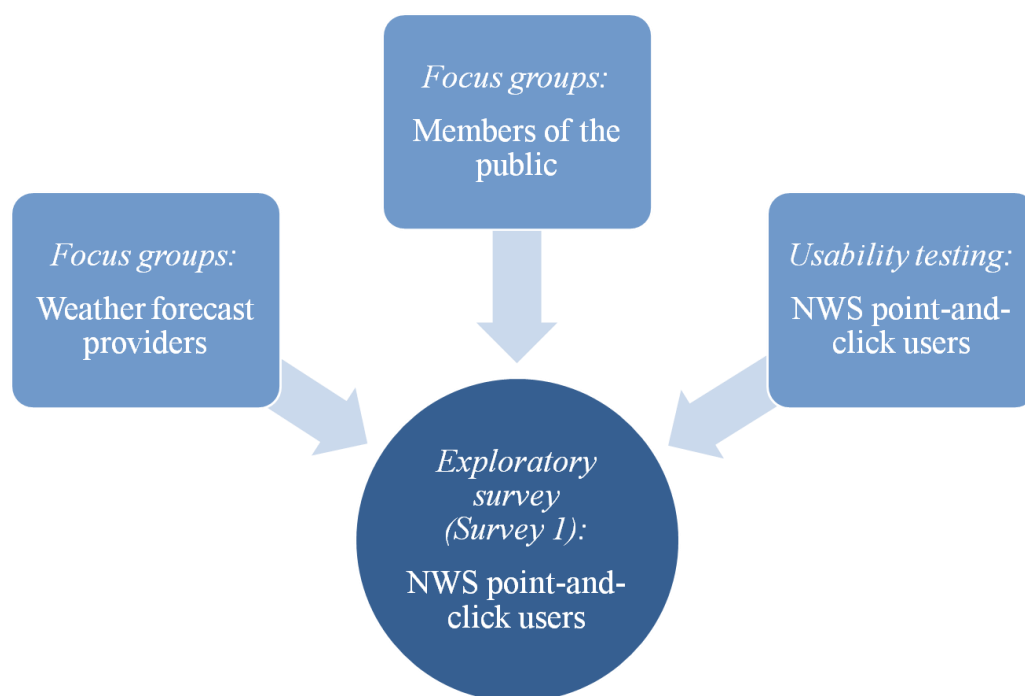


Figure 2-1. Exploratory research steps and methods

¹ Users of the NWS PnC webpage are heterogeneous in their composition. They may include NWS partners—such as local, state, and federal government employees (e.g., emergency managers, school officials, transportation departments) and private sector weather providers (e.g., broadcast meteorologists, weather vendors)—other specialized weather users (e.g., the energy industry), and members of the “general” public. We collectively refer to them all simply as NWS PnC users or simply users.

2.1. Focus Groups with Weather Forecast Providers

In April 2010, we conducted exploratory focus groups with weather forecast providers. The goal of these focus groups was to better understand the PnC webpage, the processes involved in generating the content, and the weather providers' operational needs. We held two focus groups via Web conferencing with nine purposively sampled forecast provider participants comprising seven NWS employees from Weather Forecast Offices across the United States, one WeatherBug employee, and one broadcast meteorologist. We gathered data about the forecast providers' job roles and their perceptions of the users, functioning, content, strengths, and challenges associated with the NWS point-and-click forecast information. Appendix A contains the set of questions that guided the focus group discussion. A key advantage of focus groups, however, is the flexibility in follow-up questioning, so discussion diverged from the established set of questions as warranted by the topics of conversation.

2.2. Focus Groups with Members of the Public

In April and May 2010, following the focus groups with the weather forecast providers, we conducted exploratory focus groups with members of the public who were not specific users of the PnC webpage. The goal of these focus groups was to elicit broad information about participants' understanding, perceptions, preferences, and uses of weather forecast information in general and with respect to the NWS point-and-click forecast information to guide follow-on research. We held 4 in-person focus groups with 15 non-meteorologist members of the public from the Boulder, Colorado, area. Appendix A contains the set of questions that guided the focus group discussion. Again, follow-up questions were asked based on the focus group discussions.

2.3. Sampling Frame Development for Data Collection with NWS PnC Users

The target population for this study is all users of all NWS PnC pages (i.e., for every location for which there is a unique PnC forecast webpage). Ideally, there would be a comprehensive list of the population of all PnC users with contact information so that researchers could randomly select and gather data from a probability sample.² Adequate sampling of web-based users is a common, difficult problem because no comprehensive list of users exists (e.g., Couper 2000; Couper and Miller 2008; Smyth and Pearson 2011). Indeed, Van Selm and Jankowski (2006) state that “achieving a random sample of Internet users is problematic, if not impossible” (p. 439). These challenges are no different for niche web groups (e.g., Li and Walejko 2008) such as NWS PnC webpage users.

To acquire data from individuals who are as closely representative as possible of the population of NWS PnC users, we invested considerable effort in developing a sampling frame—that is, a list of members with contact information from the population of PnC users. We systematically created the sampling frame by working with the NWS Web Tactical Team to consistently post

² Probability sampling means that each unit in the population has a known, non-zero chance of being sampled. This known, non-zero chance allows researchers to make statistical inferences about the population based on the results from the sample (Hayes 2005).

recruitment text to the same prominent location on every PnC webpage in the country for the same eight-week period. Appendix B contains more information about the sampling frame development.

A total of 88,191 people submitted unique contact information comprising our NWS PnC sampling frame. We randomly sampled from this list to select participants for all subsequent exploratory and focused data collection steps.

2.4. Usability Evaluation with NWS PnC Click Users

In November 2010, in collaboration with the Colorado State University Department of Journalism and Technical Communication,³ we conducted usability evaluations of the NWS PnC webpage (Zimmerman et al. 2010). Usability evaluation involves research techniques to assess the design, organization, and content of Internet information. Two common usability evaluation techniques are verbal protocol analyses and heuristic evaluation (Zimmerman and Akerelrea 2003). In verbal protocol analysis, participants are given a set of tasks to carry out on a webpage (e.g., find the high temperature for tomorrow), they are timed for each task, and they are asked to “think aloud” during the process to indicate what they are doing, why, and any problems or confusion they encounter. In addition, software programs may be used to track and capture such information as eye movement, keystrokes, and navigational sequences. Heuristic evaluations are systematic inspections of websites based on accepted usability guidelines.

The full usability research project involved evaluating two NWS webpages, one of which was the PnC webpage for the Fort Collins, Colorado, area. We conducted verbal protocol analysis with eight participants from the Fort Collins area who were randomly selected from the PnC sampling frame. Participants performed a set of 12 tasks to find different types of forecast information, hazardous weather information, and weather observations. We also conducted a heuristic evaluation of the PnC webpage based on the U.S. Department of Health and Human Service’s research-based usability guidelines for websites (DHHS 2006). Appendix C contains full details of the usability evaluation, including the verbal protocol task instrument and results and heuristic evaluation results.

2.5. Exploratory Survey with NWS PnC Users (Survey 1)

The final exploratory research step was an Internet-based survey that we implemented nationwide with NWS PnC users in December 2010. Questions for this survey were informed by findings from the first three research steps—focus groups with weather forecast providers, focus groups with members of the public, and usability testing with NWS point-and-click users. Questions also built on prior weather-specific research on individuals’ sources, preferences, and uses regarding weather forecast information (Lazo et al. 2009), weather salience (Stewart 2009),

³ This research was conducted in partnership with Dr. Donald Zimmerman of Colorado State University’s Department of Journalism and Technical Communication as well as Shaikhah Alghaith, Ashley Blickenstaff, Maryam Dadkhah, David Fry, Kristen Hemphill, Peggy Roberts, and Bevin Song from the Fall 2010 JTC-661 Information Design class.

and weather satisfaction (NOAA 2005). Communication concepts and theories also informed survey development, including questions on individuals' uses and gratifications of weather information sources (Katz et al. 1973; Papacharissi and Rubin 2000; Kaye and Johnson 2002; Foregger 2009); web experience (Wirth et al. 2009); source credibility (Meyer 1988; McComas and Trumbo 2001); and need for cognition, which measures one's tendency to prefer thoughtful, analytical cognitive activities (Cacioppo and Petty 1982; Hawkins et al. 2001). Questions specifically regarding the PnC webpage asked about participants' (a) uses of PnC information, including ways of access, experience level, frequency using different parts of the PnC webpage, forecast time periods sought, and reasons for getting PnC information; and (b) perceptions and preferences regarding PnC forecast information in general and for hazardous forecast weather information, and webpage layout and navigability.

The survey was developed, reviewed by a selected subset of NWS staff for scientific and technical accuracy, programmed for online implementation by ResearchExec, and pre-tested in person with members of the public for understandability, functionality, and timing. The final survey consisted of 42 questions, including socio-demographics. From the sampling frame of more than 88,000 PnC users, we randomly selected 9,995 people who were invited by email to participate in the controlled-access survey. Each person had a unique access code to complete the web survey and could respond only one time. Of the 9,995 email invitations, 212 bounced. Of the 9,783 remaining invitations, we received 5,153 completed responses (52.7% response rate) from across the United States (Figure 2-2). The median time to complete the survey was 32 minutes, suggesting that most participants gave substantial attention to their responses. Appendix D contains complete details on the survey implementation, questions, and descriptive statistics.

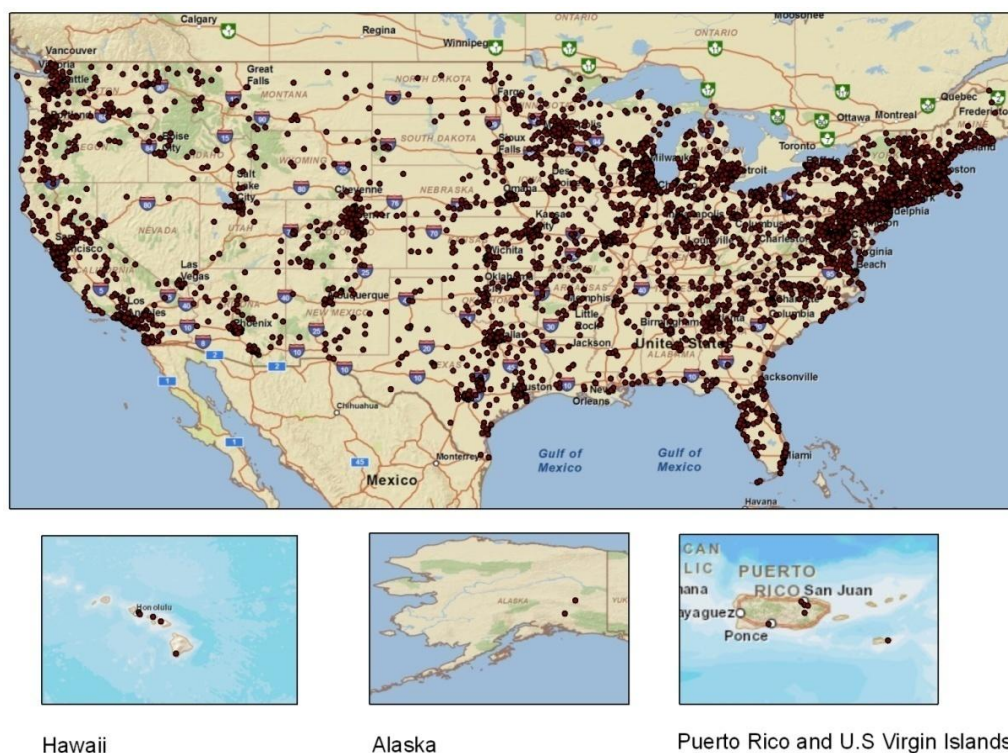


Figure 2-2. NWS PnC exploratory survey (Survey 1) respondents' locations (n=5,153)

2.6. Supplemental Survey with Members of the Public

To supplement the exploratory research regarding the NWS PnC forecast webpage, we also implemented a controlled-access Internet-based survey of members of the general public in December 2010 in parallel with the NWS PnC user survey. The public survey included a subset of questions from the PnC user survey, namely on individuals' sources, preferences, uses, and salience regarding weather forecast information in general and satisfaction and credibility of NWS information in particular. These survey data will allow a future comparative analysis of weather attitudes and behaviors between NWS PnC users and the general public.

ResearchExec developed and programmed the survey for online implementation. The final survey consisted of 26 questions, including socio-demographics. Another survey research company, Survey Sampling International, provided the nationwide sample. Individuals were invited by email to participate, had a unique access code to the web survey, and could respond only one time. We targeted approximately 2,000 completed surveys, received 2,059 from across the United States (Figure 2-3), and closed the survey after reaching that goal. Appendix E contains complete details on the survey implementation, questions, and descriptive statistics.

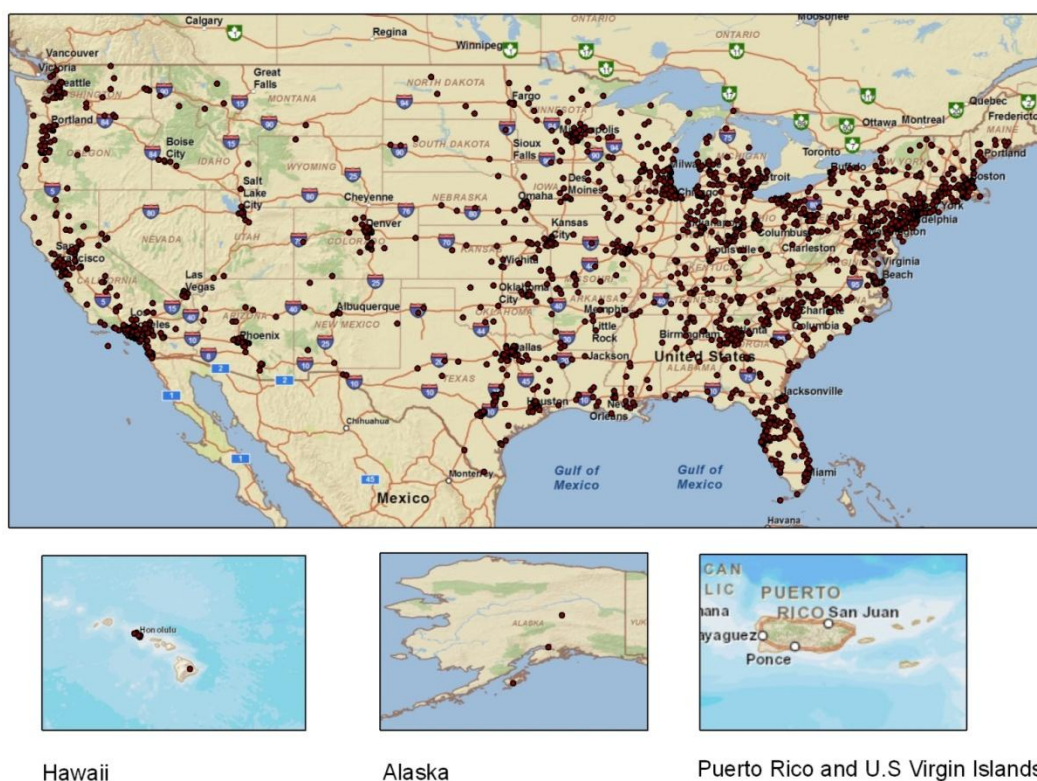


Figure 2-3. Public survey respondents' locations (n=2,059)

3. RESULTS – EXPLORATORY RESEARCH

The exploratory research steps resulted in a wealth of data about the NWS PnC webpage users. Here, we present the results most relevant to assessing and improving the PnC webpage. We first briefly summarize the exploratory survey (Survey 1) results pertaining to individuals' uses, perceptions, and preferences regarding the PnC information (Section 3.1). We do not provide a separate section with results from the focus groups or usability evaluation. Rather we integrate key results that emerged from those steps with results from Survey 1 to provide findings about the strengths of the PnC webpage (Section 3.2) and issues with it (Sections 3.3–3.5). The most critical issue and limitation—that hazardous weather information is not effectively communicated on the PnC webpage (Section 3.3)—informed the follow-on focused research (Section 4) and results (Section 5).

3.1. Results of Exploratory Survey with NWS PnC Users (Survey 1)

Two questions in Survey 1 served as validity checks to ensure that respondents (a) have heard of the NWS and (b) have ever used the PnC webpage. Accounting for the 12 and 63 respondents who said “no” to either question, respectively, the sample size for questions about the PnC forecast page is $n=5,078$.

3.1.1. Uses of the PnC Webpage Information

Several questions assessed respondents' uses of the PnC webpage information, including how they access the webpage (Figure 3-1); their overall level of experience using the webpage (Table 3-1); how frequently they use different parts of the webpage (Figure 3-2; Table 3-2); the time periods for which they seek forecasts from the webpage (Figure 3-3); and reasons for getting PnC information (Table 3-3).

Respondents access the PnC webpage in a variety of ways (Figure 3-1). Most (86.9%) access it via a bookmarked webpage. It is also common, however, to link to the PnC webpage via the NWS homepage (55.0%) or via the local WFO webpage (30.1%). Although respondents could indicate that they access the PnC webpage in more than one way, 33.3% of respondents access the PnC only with a bookmark; they do not ever access the PnC via the NWS or WFO homepages.

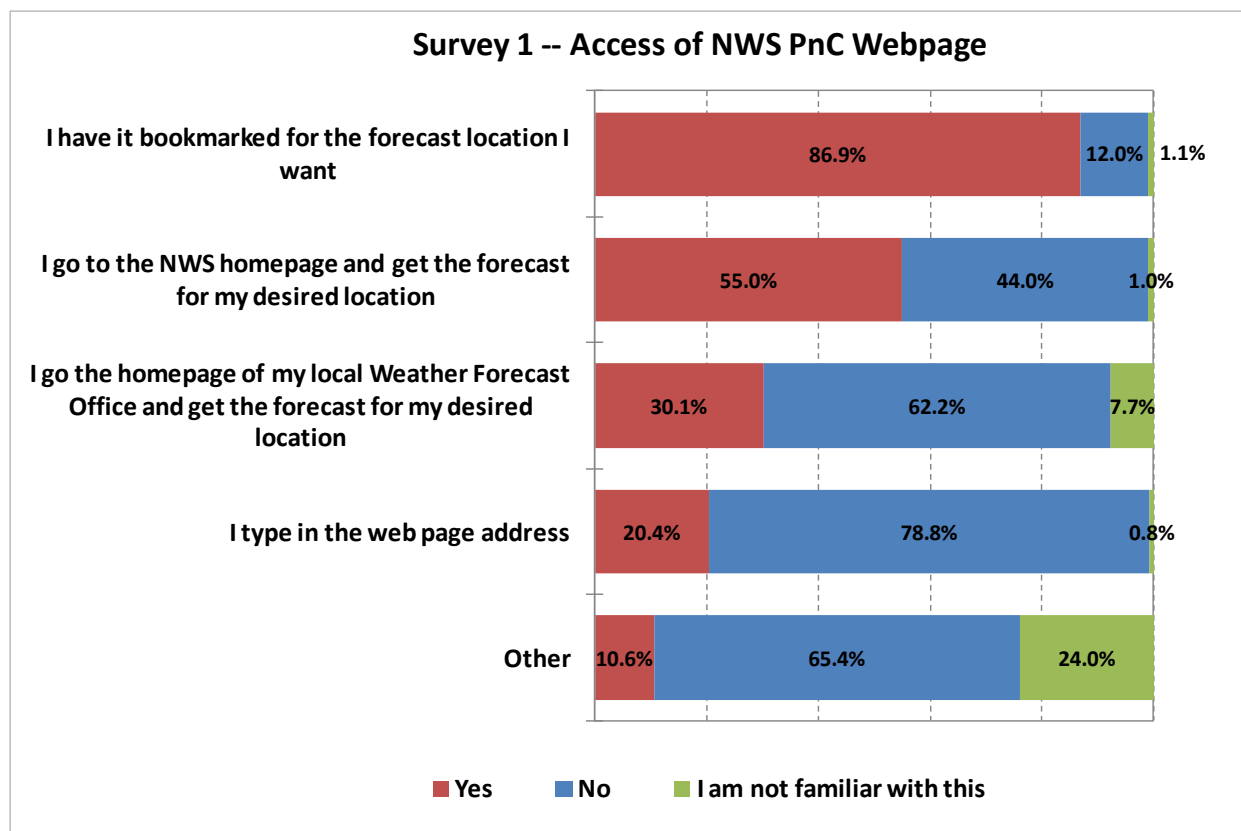


Figure 3-1. Respondents' access of the NWS PnC webpage. Respondents could indicate "yes" to more than one item. (n=5,078)

Measures of overall level of experience with the PnC webpage reveal that most respondents are long-term, frequent users of the PnC webpage. More than 97% of respondents have used the webpage for more than 1 year, 82.2% of whom have used it for more than 3 years (Table 3-1). The PnC webpage is accessed by 83.0% of respondents on at least a daily basis, and more than half (56.8%) of respondents access it two or more times a day. The majority of respondents use the PnC quickly, with 26.0% spending less than a minute gleaning their desired information and another 37.7% spending only 1–3 minutes on the webpage.

Table 3-1. Respondents' level of experience with the NWS PnC webpage (n=5,078)		
Variable	Category	Percentage
Length of time using the NWS PnC webpage	Less than 1 year	2.8
	1–3 years	15.0
	More than 3 years	82.2
Typical frequency of visiting the NWS PnC webpage	Never or rarely	0.7
	Once a month to twice a week	16.3
	Once a day	26.2
	Two or more times a day	56.8
Time spent on the NWS PnC webpage during a typical visit	Less than 1 minute	26.0
	1–3 minutes	37.7
	3–5 minutes	22.3
	Greater than 5 minutes	14.0

To assess how frequently respondents' use different parts of the PnC webpage, in the survey we included an image of the webpage with 12 parts circled and labeled A through L. Figure 3-2 shows the percentages of respondents who use the 12 different parts more than half the time on average. The two most frequently used parts of the webpage are the forecast-at-a-glance icons (Part C) and the detailed 7-day text forecast (Part E), with 91.9% and 87.9% of respondents, respectively, using them more than half the time on average. The next most frequently used parts are the links to hazardous weather products (Part D, 79.9%) and the current conditions (Part G, 79.3%), followed by the radar (Part H, 62.0%). The detailed point forecast map (Part J) and satellite (Part I) are also regularly used by 46.4% and 43.8% of respondents, respectively. All other parts of the PnC webpage are used more than half the time on average by less than 35% of the respondents.

Assessing and Improving the NWS Point-and-Click Webpage

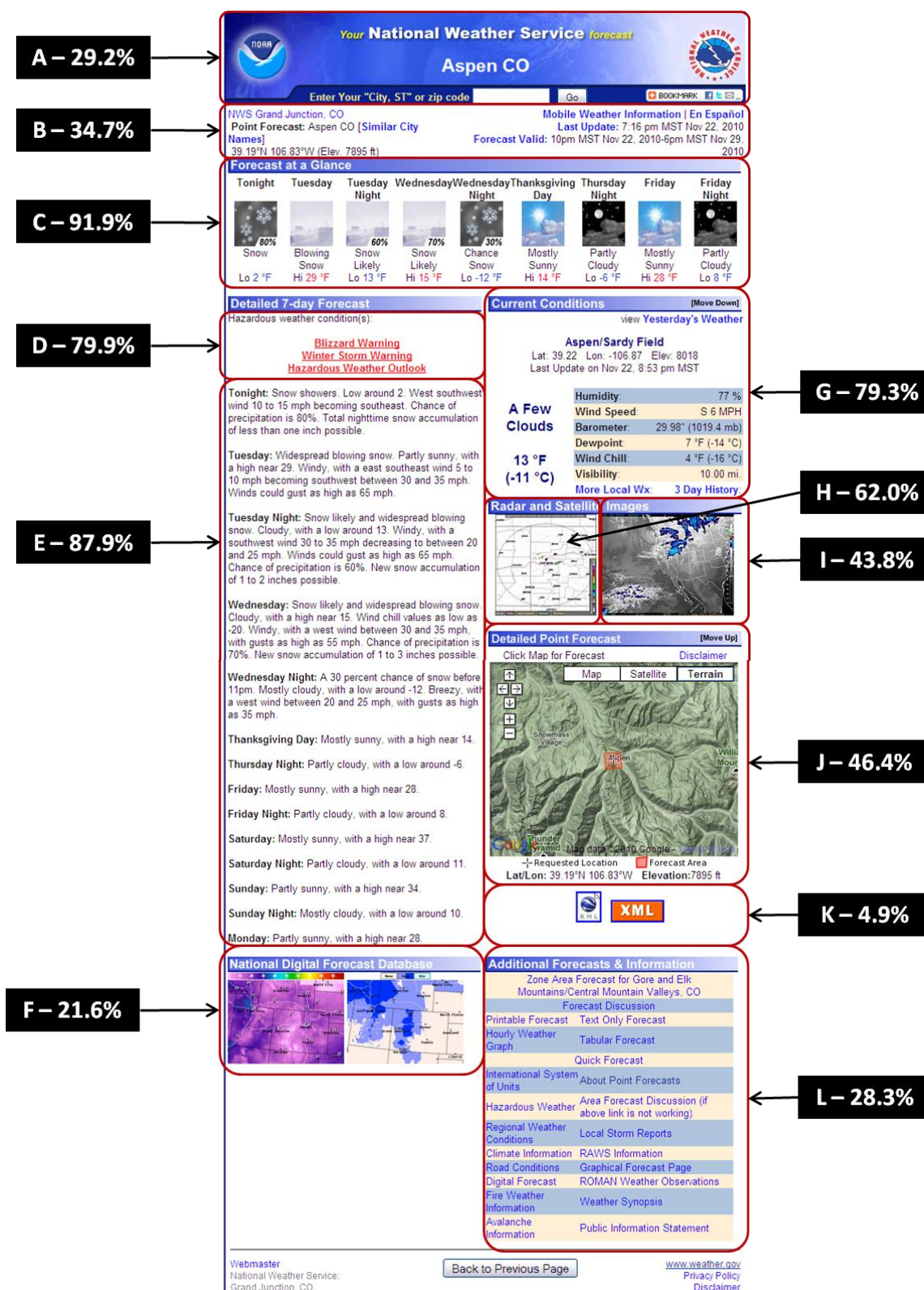


Figure 3-2. Percentages of respondents who use the different parts of the NWS PnC webpage more than half the time on average (n=5,078)

If respondents indicated they ever use Part L, any of the “Additional Forecasts & Information” links, they received an additional question asking how frequently they use the different links (Table 3-2). Of the 5,078 respondents, 1,569 (30.9%) indicated they rarely or never use any of the Additional Forecast & Information links, so only the remaining 3,509 received the additional question. Because many of the links vary by location, we asked only about links to the few forecast products that are consistent across PnC webpages. Of these 3,509 respondents, the forecast discussion is used by most, with 32.4% using it more than half the time on average, followed closely by the hourly weather graph, which is used by 28.9% of respondents. Overall, none of the links is regularly used by more than one-third of the respondents. However, as discussed in Section 3.5, the infrequent use of these links may be more indicative of webpage design weaknesses than a lack of desire for the information. Moreover, some of the forecast information such as the forecast discussion is available and can be accessed through other NWS webpage links.

Table 3-2. Respondents’ frequency of using the “Additional Forecasts & Information” links (n=3,509)		
Link	Percentage of Respondents Who Use the Link More Than Half the Time on Average	Percentage of Respondents Who Are Not Familiar with This
Forecast discussion	32.4	5.4
Hourly weather graph	28.9	5.9
Zone area forecast	23.7	7.0
Quick forecast	20.5	9.0
Tabular forecast	12.0	8.7
Text only forecast	9.2	5.4
Printable forecast	7.8	5.8

We also assessed how frequently respondents seek forecast information for various forecast lead times (Figure 3-3). Overall, a majority of respondents seek forecasts more than half the time on average for all the lead-times asked about, indicating that forecasts at all lead times are of interest to people. Most sought is nowcast (0–6 hour) and short-term forecast (6 hour to 3 day) forecast information (the 12–24 hour time period in particular); a majority of respondents usually or always seek this forecast information, and more than two-thirds do so more than half the time on average.

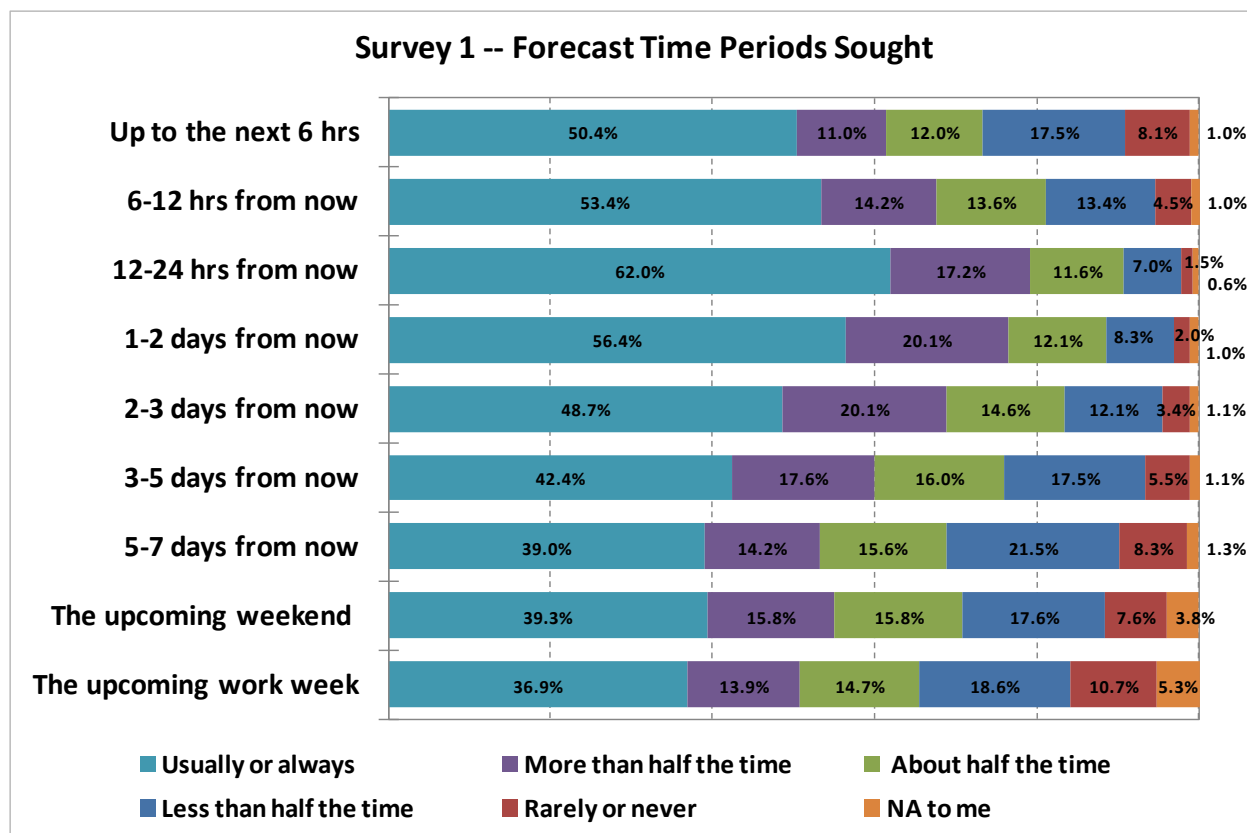


Figure 3-3. Frequency with which respondents seek forecast information from the NWS PnC webpage for the time periods listed (n=5,078)

Finally, we asked about respondents' general reasons for getting PnC forecast information (Table 3-3). More than 75% of respondents agreed that they use PnC forecast information to know about important weather information in general and as it changes or to inform a specific decision or task. Interestingly, 56.8% of respondents use the PnC to avoid advertisements, which do appear on private sector weather companies' forecast webpages.

Table 3-3. Respondents' reasons for using PnC forecast information (n=5,078)	
Reason	Percentage of Respondents Who Agree or Strongly Agree
To be aware of potential changes in the weather	97.0
To find out about important weather information	96.4
To go directly to important weather information	93.7
To seek weather information for a specific decision I need to make	91.3
To seek weather information for a specific task I need to do	88.7
To keep up with what is going on with the weather	89.1
To learn about the major weather events of the day	75.6
To avoid advertisements	56.8
To find out about interesting weather	54.6
Because I enjoy talking about the weather to others	34.5
Because it is entertaining	27.2
Because it is exciting	24.2
As a way to get to other links on that webpage	25.6
To learn about things to discuss with other people	20.3

Because it relaxes me	11.4
Because it passes the time, particularly when I'm bored	8.8
So I can forget about school, work, and other things	5.3
To belong to a group	2.1

3.1.2. Perceptions of and Preferences for the PnC Webpage Information

Several questions assessed respondents' perceptions of and preferences regarding PnC webpage information, including such topics as temporal detail of forecast information, the forecast-at-a-glance icons, hazardous weather information, and webpage layout and navigability. Data on these topics from the exploratory survey are briefly summarized here; we further discuss issues and limitations regarding some of these topics in Sections 3.3 through 3.5.

In general, respondents tend to want the highest temporal resolution in the shortest lead-time forecasts and less temporal detail with longer lead times (Figure 3-4). For forecasts out to 24 hours, more than 75% of respondents want forecast information provided at a greater temporal resolution than every 12 hours, with 26.9% wanting forecasts every 6 hours, 28.2% wanting forecasts every 3 hours, and 26.5% wanting hourly forecasts. For 1–2 day forecasts, there is nearly a median split at the 12-hour detail level, with nearly half of respondents wanting forecast information every 1 to 6 hours and the other half wanting information every 12 to 24 hours. Beyond these lead times, the majority of respondents want forecasts every 12 hours 2–3 days out (60.4%) and 3–5 days out (55.4%), and a majority wants forecasts every 24 hours 5–7 days out (51.5%) and 7–10 days out (63.3%). These results most likely reflect most respondents' decreasing need for detailed forecast information at longer lead times but also their decreasing confidence in forecast accuracy at longer lead times (Morss et al. 2008). We further discuss users' preferences for additional temporal forecast information in Section 3.4.

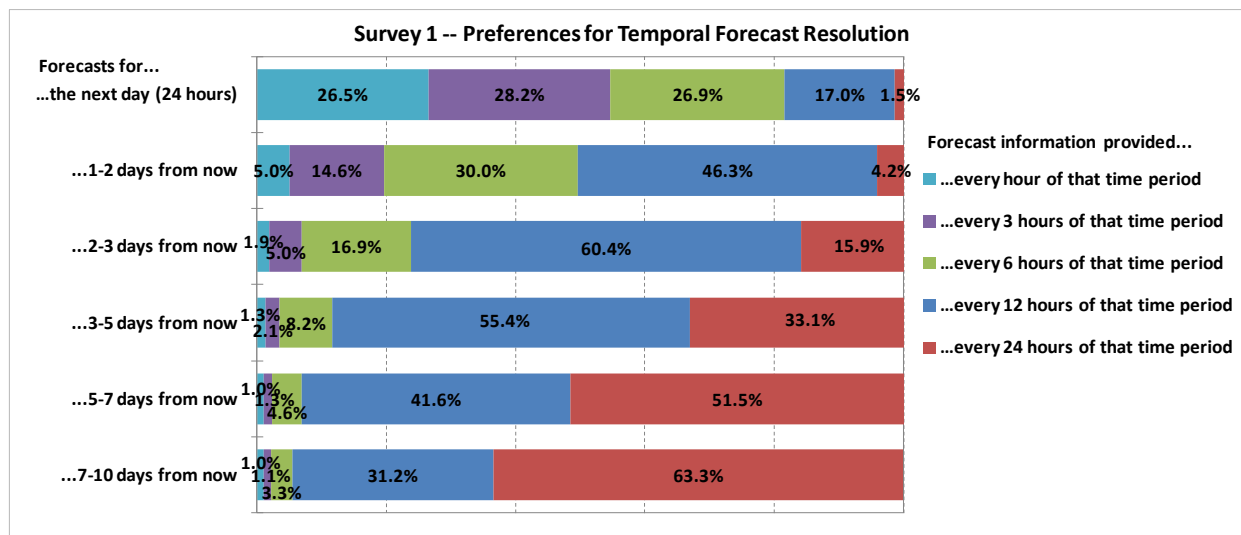


Figure 3-4. Respondents' preferences for temporal detail of forecast information at various forecast lead times (n=5,078)

Overall, respondents generally appear to have favorable impressions of the PnC webpage information (Table 3-4). As previously noted, one hypothesis going into this research effort was that the forecast-at-a-glance icons were problematic. Some respondents indeed noted their

frustrations with the icons in their responses to the open-ended questions, by indicating such things as:

“‘Forecast at a glance’ icons could be a bit more informative (20% chance of precip currently looks like a storm).”

“Forecast icons (i.e. snowflakes, sunshine, clouds) are sometimes misleading; oftentimes, a simple image cannot accurately capture the essence of weather conditions.”

Overall, however, only 9.0% of survey respondents think the icons makes the forecast seem worse than the weather will be. Most respondents think the icons communicate the weather effectively (85.8%). This sentiment was confirmed by several respondents’ written survey comments indicating such things as:

“Icons are instantly understandable.”

“Forecast at a Glance section is great! Love the icons and easy to look at forecast. I feel it does just what is intended.”

“Icons give instant visual indication of forecast, they are easy to understand and very representative of the forecast conditions.”

“The visual information (small icons) relay accurate, useful information paired with important (high/low, precip) verbal information.”

“I LOVE the weather icon set you use for the forecast at a glance.”

“I really like your little weather icons. Somehow they are very descriptive and suit the page. Better than a boring sun shape/cloud shape.”

“Graphical display of the weather, showing a difference between night and day. (The icons were great when my youngest was pre-reading. She could check the weather each day before school and understand what the day would bring.)”

Finding 1: The forecast-at-a-glance icons are regularly used and perceived by most PnC survey respondents as effective overall—that is, they are understandable and representative of the weather. Some respondents, however, perceive the icons as unrepresentative of the weather.

Because the forecast-at-a-glance icons do not appear to be a substantial problem for most PnC users, we did not further investigate this issue, opting instead to focus on PnC limitations that were more prevalent.

The closed-ended survey responses about hazardous weather information on the PnC webpage (Table 3-4) show a majority of respondents have favorable impressions about the PnC webpage readily conveying hazardous weather potential (77.6% of respondents agree or strongly agree).

However, there is a lack of overwhelmingly positive responses to other statements about how hazardous weather information is conveyed, and this is supported by other exploratory research (see Section 3.3). Given that a majority of respondents are open to changes in how hazardous weather information is conveyed—and particularly given that providing hazardous weather forecast information is central to NWS’s mission to protect life and property—this suggested a need to further investigate and address this issue (see Sections 4 and 5).

Finally, most respondents indicated that they like the overall layout and navigability and that they can easily find the information they want. Only 13.2% of respondents think the webpage is too cluttered. However, as we discuss in Section 3.5, some limitations regarding the webpage usability emerged from other exploratory data. This suggests that respondents have a favorable impression of the webpage on average—which most likely is why they use the PnC webpage—but that there are some areas for improvement.

Table 3-4. Respondents’ perceptions and preferences regarding PnC webpage information* (n=5,078)			
Perceptions and Preferences Regarding PnC Webpage Information	Percentage of Respondents Who Disagree or Strongly Disagree	Percentage of Respondents Who Are Neutral	Percentage of Respondents Who Agree or Strongly Agree
General Forecast Information			
I can easily tell the location that the forecast applies to	2.0	5.9	91.9
I think the information provided in the forecast pictures and text is consistent	2.5	7.5	89.1
I think the forecast pictures communicate the weather effectively	3.2	10.5	85.8
I would like more information about the uncertainty associated with a forecast	11.3	29.2	58.6
I would like to have the ability to select the size of the area that a forecast represents	10.8	34.4	53.2
I would like to be able to personalize the webpage with the types of forecast information that I want	16.5	31.6	50.4
I would like to have links to tutorials, definitions, or help pages so that I can better understand the information provided on the webpage	17.9	33.8	47.4
I think the forecast pictures make the forecast seem worse than the weather will be	67.7	22.2	9.0
Hazardous Weather Information			
It’s easy to tell if there is a potential for hazardous weather	6.8	14.4	77.6
I would like to have a map on the point-and-click page showing me the area that is under a hazardous weather threat	3.6	18.5	76.6
I can easily tell the area for which hazardous weather is forecast	14.2	19.4	64.6
I can easily tell for what time period hazardous weather is forecast	14.5	19.4	64.2
I like the way hazardous weather information is currently conveyed	10.5	26.4	61.7
When there are multiple hazards being forecast, it’s easy to tell which ones are most important	22.3	26.0	47.2

I think that, when it occurs, hazardous weather should be presented more prominently than it is now	20.4	38.2	39.9
I don't want any changes to how hazardous weather information is conveyed	21.3	41.7	33.9
Webpage Layout and Navigability			
I can easily find the information I'm looking for	2.0	5.7	91.9
I think the webpage is easy to navigate	2.8	7.0	89.9
I like the overall layout of the webpage	4.1	11.6	84.0
I think the webpage is too cluttered	62.1	24.3	13.2
* For each statement, the percentage of respondents who indicated "I don't know" is not included.			

3.2. Strengths of the NWS PnC Webpage

Finding 2: The primary strengths of the PnC webpage are that it provides accurate, up-to-date forecast information for a specific area in easy-to-use formats both at-a-glance and in greater detail to its users.

These strengths are supported by respondents' frequent use of the forecast-at-a-glance icons and the detailed 7-day text forecasts (Figure 3-2); their use of the PnC to go directly to and find out about important weather information (Table 3-3); and their perceptions that the icons communicate forecast information effectively overall (Table 3-4 and related comments). In addition, these strengths were stated thousands of times in response to the open-ended survey question that asked respondents what they like about the PnC webpage. A selection of respondents' comments is below:

"The visuals are quick and easy to interpret, the expanded forecast gives detailed information and is updated regularly. Generally, the page provides thorough, easy-to-read, usually accurate information."

"There's A LOT of information on it and it's easy to read. The pictures are clear (as to conditions)—at a glance. ... Easy to see at a glance what weather is occurring in Seattle or Monticello, Iowa, for instance. I think you're generally doing a great job! You're the most accurate source I know of for up-to-date weather information, and by far the easiest for me to use."

"It's fast and easy to get an accurate forecast for a very specific area."

"It is accurate, easy to read, updated during the period, shows the trend over the week. The picture portion provides a quick look, the lower portion provides detail. The entire page is easy to use."

"All the information that I need is in one centralized, easy to read location. It is accurate and updated very frequently."

"Clear and easy to understand—with information up to date and accurate—pinpointing my location."

“It's all very good—easy to use and read with lots of good info, but we REALLY like the detailed point forecast and use it a lot. We go up into the mountains to remote areas for days. It's incredibly unwise to go up there based on a forecast for a town miles away and hundreds/thousands of feet lower in elevation. It blows me away that the forecast is able to adjust so much for elevation and in relatively small areas. HUGE HELP. Also amazes me how accurate the forecasts are.”

“Easy to read, user-friendly format; very accurate weather predictions that are updated regularly; icons allow review at-a-glance.”

“Nice to have an accurate (98% so!), succinct, concise forecast with current conditions right there.”

“It's convenient and easy to find the information I want. The 'forecast at a glance' has all the main information in an easy to read format and if I want more I can go to the detailed forecast.”

“Forecast at a Glance section is great! Love the icons and easy to look at forecast. I feel it does just what is intended. If I want more detailed information, then I always look to the Detailed forecast.”

Finding 3: The detailed point forecast map is commonly used and useful for PnC users who want to obtain a forecast for a specific location or a location without a known geographic referent (i.e., rural and remote areas).

As shown in Figure 3-2, 46.4% of survey respondents use the detailed point forecast map more than half the time on average. In addition, all participants of the usability evaluation were able to easily and quickly complete the task in which they had to use the map to find a forecast for a rural location (Table C-1). In response to the open-ended survey question that asked respondents what they like about the PnC webpage, several respondents indicated their use of the map as illustrated by these quotes:

“I can get forecasts using longitude and latitude. I get forecasts for my residence. We are in a very rural area of NE California. I use the map feature for planning trips through the desert and national forests.”

“The point-and-click feature lets me focus in on an area; this is very important to me because I work and play in rural areas outside of towns and cities, and I can check the forecast for those areas rather than extrapolating (usually erroneously) from cities and towns.”

“I can pick a very specific location, whether in an urban area or in a rural area, such as a location where I'm going backpacking or skiing.”

“Allows me to get pinpoint location forecasts, very important especially for Colorado mountain activities where weather can vary widely by location. My family and I depend on that pinpoint accuracy when deciding on activities like hiking, camping, skiing, etc. I like the clickable map that lets me move around and click on locations for a forecast. Many locations are not cities but just some place in the rural mountains we are interested in going.”

“The map with the more specific area of forecast is handy as well as. I live near a lot of rural areas that don’t necessarily have a town name or a zip code that I know.”

Finding 4: The absence of advertisements on the PnC webpage is an important feature to many PnC users.

This feature of the PnC webpage emerged during the exploratory focus groups with the public, and it was supported in the exploratory survey by a majority of respondents who indicated that avoiding advertisements was a reason they use the PnC webpage. This strength was also commonly mentioned in the public focus groups and in response to the open-ended survey questions as illustrated below:

“I despise ads of any kind and this is why I like the NWS website for my weather forecasts.”

“No advertisements, pop-ups, or other clutter. Very clean and easy to read.”

“Clear and concise without annoying advertisements.”

“Honestly, I appreciate a detailed presentation of facts without the overload of 'cute' graphics and advertisements on other sites.”

“No advertisements!!! Thank you!”

“Complete information all on one advertisement-free page!”

“I respect the fact that there are NO ADVERTISEMENTS!”

Finding 5: The fast download time of the PnC webpage is an important feature to many PnC users, and it particularly serves populations who have slower Web connections.

As a public sector weather provider meant to serve society at large, the NWS PnC webpage is fast to download, making it easily accessible to populations who have slow Web connection. Webpage usability guidelines suggest the importance of minimizing webpage download time, and the heuristic evaluation showed that the PnC webpage easily meets this guideline (Appendix C). This feature most likely is enhanced by the absence of advertisements (see Finding 4) and other animations on the webpage. This strength was also commonly mentioned in response to the open-ended survey questions:

“Please remember that some of us only have dial-up internet access and currently this site is accessible to low speed connections. Thank you.”

“It loads fast (no silly Flash gadgets).”

“The 'low-tech' (non-javascript) nature of the site and how fast and simple it loads is a huge plus.”

“I have this as my home page it loads fast and don't have a lot of extra unnecessary information.”

“Lots of information and is faster loading for a dial up connection than [another website].”

“Very simple and loads quickly even over dial-up internet.”

“The NWS website loads fast and gives me the information I need right about without much hassle.”

3.3. Issue with the Provision of Hazardous Weather Information

Finding 6: Hazardous weather information is not effectively communicated on the PnC webpage. Three particular limitations are that (a) the existence and importance of a hazardous weather threat can be unclear, and the provision of hazardous weather information can be misleading (e.g., with the Hazardous Weather Outlook); (b) accessing hazardous weather details can be cumbersome; and (c) temporal and spatial information about a hazardous weather threat it is not explicitly conveyed on the PnC page.

Getting information about potential hazardous weather threats is important to users of the PnC webpage as indicated by most respondents' frequent use of the hazardous weather links (Figure 3-2) and their use of the PnC to know about major or important weather information (Table 3-3). This sentiment was also supported by the focus groups and in the open-ended survey responses. Despite the importance of hazardous weather information, however, this information is not effectively communicated on the PnC webpage.

Per Finding 6a, the existence and importance of a hazardous weather threat can be unclear, and the provision of hazardous weather information can be inconsistent. Hazardous weather threats are not prominently indicated, rather they are only denoted with red links under the “Hazardous weather condition(s)” portion of the PnC webpage. The focus groups revealed that for less familiar PnC users, it is not immediately clear that the red text is a link to a text product. Webpage usability guidelines suggest highlighting critical data by visually distinguishing webpage information that requires user attention, particularly when those items are displayed infrequently. Moreover, there is no easy visual distinction among them other than their ordering; for example, a Hazardous Weather Outlook is presented in the same way as a tornado warning. When multiple products are in effect, less than half (47.2%) of survey respondents say it is easy

to tell which are most important (Table 3-4). Several survey respondents offered comments about improving how hazardous weather forecast information is conveyed:

“I'd move the hazardous-weather alerts above the a-a-g [at-a-glance] icons.”

“Maybe have a little more interaction from the hazardous weather warnings. A simple link can begin to blend into the background after you have looked at a screen long enough, and maybe folks need to be reminded of events that will affect them in the next few hours.”

“The Hazardous weather links could use more... Brilliance, they should be more pronounced. For example if there is a Tornado Warning for my area, the link should be noticed first...”

“I think if there is a Hazardous Weather Outlook it could be a bit bolder or more noticeable.”

“Maybe make it more apparent when there is extreme weather in the area.”

“Things like Hazardous Weather ... should be more prominent.”

In addition, focus group and survey participants noted that the provision of hazardous weather information can be misleading if there is no hazardous weather occurring and because what is deemed “hazardous” can be subjective. Some related comments include:

“It seems you've gotten overzealous with the 'hazardous weather' alert/outlook. Almost anything now qualifies as hazardous weather. I would like to see this kept for real emergencies.”

“I get anxious (in an acceptable way) when I see the red Hazardous Weather Outlook, but get very frustrated when I click on it and learn 'there is no hazardous weather' anticipated at this time.”

“I hate it when you tell us down here in S. Texas that we've got hazardous weather because it's going to be hot today. You do this all summer long. What I'm interested are hurricanes and summer storms. Of course it's going to be hot in Corpus Christi, TX! This is normal, not hazardous!”

Per Finding 6b, the access of hazardous weather details can be cumbersome. When hazardous weather is forecast and especially when it is imminent, many users want to see the details on the main PnC webpage rather than having to click on an additional link to get the information. This is reflected in the following survey respondents' comments indicating what they dislike or would like to have:

“I would like to see 'hazardous weather' info for our area on the same page as the regular forecast rather than have to click to another page.”

“Must go to another page to see hazardous weather forecast. Brief summary on same page would be good.”

“To see the detailed Hazardous weather you have to click on Hazardous Weather Outlook, otherwise you don't get the full story of hazardous weather.”

“Hazardous Weather information should be visible on the page and not a separate 'click.’”

Moreover, even when users do click on a hazardous weather product link, the content and format of the hazardous weather product are too technical and cumbersome for many, making it difficult to extract key information quickly and accurately. Members of the focus groups indicated that they would not make the effort to read past the dense information in the header that they did not find meaningful (e.g., about geographical areas for which a product is in effect). The following comments from survey respondents illustrate these frustrations:

“The hazardous weather info is not well displayed or easy to understand. Clicking on any of the warnings brings up a message in ALL CAPS that seems written for a computer and is very hard to understand the areas affected and exactly what is the danger.”

“While I can link to the hazardous info readily enough, it's a little cryptic.”

“Links in section D, 'hazardous conditions' (based on previous experience—not very recent) usually to go to pages that are very technical and so general (covering a very large area) that they are of little use.”

“When there is a Hazardous Weather forecast and you click on that link, you get a jumble of county-specific information. It can be confusing, especially in a long weather event.”

“Hazardous weather warnings/watches are hard to read (font, organization).”

Per Finding 6c, temporal and spatial information about hazardous weather threats are not explicitly conveyed on the PnC page. The lack of temporal threat information was first raised in the focus groups when participants noted that it is not always clear for what time period hazardous weather is forecast. Moreover, as noted previously, even if a user clicks on the hazardous weather product link, it can be difficult to easily extract timing information. In addition, more than one-third of survey respondents do not think it is easy to determine the time referent for hazardous weather (Table 3-4). Open-ended comments from survey respondents also raised this issue:

“Doesn't provide more detailed times ... that anticipated hazardous conditions may occur.”

“Forecast has vague timing for storms and other large weather events.”

“[The PnC page] should also indicate the timing of an event.”

The lack of spatial information on the PnC webpage about a hazardous weather threat is also a limitation. As discussed in Section 3.1 in association with Figure 3-1, one-third of survey respondents only access the PnC webpage directly with a bookmark rather than by going through the NWS or WFO homepages. The NWS and WFO homepages have the watch-warning-advisory (WWA) maps, so individuals who bypass these webpages may not get spatial information about hazardous weather threats that the WWA maps provide. Also, 76.6% of survey respondents explicitly indicated that they would like to have a map on the PnC page showing the area that is under a hazardous weather threat. This issue also emerged in comments from survey respondents about what information they would like:

“Include a color coded map, showing which counties are being or potentially will be affected by the hazardous weather event(s).”

“A mini-map of the surrounding areas and hazardous weather conditions going on in them. That map is handy in knowing where the tornado/blizzard watches are.”

“Graphical hazardous weather alert rather than text.”

“Overlay map showing hazardous weather conditions.”

Because effective communication of hazardous weather information is central to NWS’s mission to protect life and property, we further investigated how to better communicate this important information in follow-on, focused research (Sections 4 and 5) with an emphasis on improving communication of the existence and timing of hazardous weather threats. Additional research to improve communication of the provision, content, and format of hazardous weather and spatial information about hazardous weather threats would build on the research conducted here.

3.4. Issue with Temporal Forecast Information

Finding 7: Many PnC webpage users want (a) higher temporal resolution of forecast information for nowcast and short-term forecast periods, and (b) forecast information out to 10 days.

Per Finding 7a, many respondents want higher temporal resolution of forecast information. More than 80% of survey respondents want forecast information for the next 24 hours at higher temporal resolution than the current 12-hour resolution forecast, and nearly half of respondents want higher temporal resolution than the current 12-hour forecasts for 1 to 2 days from now (Figure 3-4). In response to a survey question asking what forecast information respondents would like to have, many indicated they want higher temporal resolution forecast information—particularly hourly forecasts—as illustrated by these comments:

“An hourly estimate of cloud cover, particularly during the night.”

“I’d love to see an hourly forecast graph for three days.”

“Hourly temperature trends expected during the day so I can see when the front is expected to roll through or see when the temperatures will peak.”

“Yes, I would like to know hourly precipitation—I go to [a private sector company] for an hourly forecast when I need to know exactly when it will start raining and the chance of precip by the hour.”

“Hourly forecasts.” (This simple statement was made by many survey respondents. Some were slightly more specific by indicating they would like hourly forecasts for temperature and precipitation.)

“Precip and temp forecast with 3- or 4-hour granularity.”

Higher temporal resolution forecast information is provided on other NWS webpages—including pages linked under the “Additional Forecasts & Information” portion of the PnC webpage (i.e., hourly weather graph, quick forecast)—but as discussed in the subsequent finding (Finding 8), most respondents are not aware of or do not attend to these links. Because respondents want information at different temporal resolutions (hourly, 3-hourly, and 6-hourly forecasts) for different forecast time periods, it would be useful to further explore how to convey this information to best meet users’ needs (e.g., allowing users to “drill down” to obtain more detailed information or to customize their own PnC webpage with their preferred temporal specificity).

Per Finding 7b, many users want forecast information out to 10 days. Forecast information currently is not provided out to 10 days on the PnC webpage because the NWS does not go out that far in their forecast grids. NOAA’s Climate Prediction Center issues 6–10 day outlooks, but they convey only probabilistic forecasts of temperature and precipitation as above, below, or near normal. More than half of survey respondents (53.2%) seek forecast information for 5 to 7 days from now (Figure 3-3), suggesting that many users find forecast information at longer lead times to be useful in some way. Moreover, the focus group participants and many survey respondents explicitly indicated they want forecast information out to 10 days, as illustrated by these comments:

“I’d love to see an ‘at-a-glance’ graph of max and minimum temps for the upcoming 10-day period.”

“Also a couple more days forecasted further out would be helpful. To get a 10-day forecast, I have to go to [another website]”

“It would be nice to have a 10-day forecast somewhere in there.”

“Possibly a link for a 10-day forecast just to get an idea of what may be coming a little more than a week out.”

As shown in Figure 3-4, 63.3% of respondents indicated they only want 24-hour resolution forecast information out this far (i.e., in the 7–10 day forecast period).

3.5. Issue with the Webpage Design

Finding 8: The usability of some PnC information is limited by the webpage design. Two issues are that (a) many PnC users either are not aware of or do not attend to the information under the “Additional Forecasts & Information” section, yet this section includes some information that respondents indicated they would like to have; positioning the most accessed and desired information in the top half of the webpage viewing area would be beneficial, and (b) many users want the ability to customize the PnC page.

Per Finding 8a, a wealth of information exists under the “Additional Forecasts & Information” section of the PnC webpage, but 30.9% of respondents rarely or never access any of these links. Only 28.3% of survey respondents use the “Additional Forecasts & Information” links more than half the time on average (Figure 3-2), and of the respondents who do, only about one-third regularly use any of the links we asked about (Table 3-2). In the usability evaluation, three tasks required participants to use one of the links found in the “Additional Forecasts & Information” section; these tasks had the lowest successful completion rate because participants were largely unfamiliar with that part of the PnC page despite being users of the PnC. Yet many respondents indicated they want forecast information that is provided in one of the “Additional Forecasts & Information” links, especially hourly forecast information (see Finding 7). The exploratory survey reminded some participants of the information in the “Additional Forecasts and Information” section, some of whom indicated they would start using the links per these comments:

“I didn’t even realize [the hourly weather graph] was there until doing this survey.”

“I would like an hourly forecast for the current 24 hours, and amount of precipitation expected and when. But perhaps that is in part L [from Figure 3-2] and I just do not know how to access it.”

“Because it does not all fit on my screen, I forget that the information toward the bottom is there.”

Webpage usability guidelines suggest placing important items and links closer to the top of a webpage where users can better anticipate finding them (Appendix C). Thus, positioning the most commonly accessed and desired information in the top half of the webpage viewing area would be beneficial to the PnC webpage users.

Per Finding 8b, approximately half of survey respondents (50.4%) indicated they want the ability to customize the webpage with the types of forecast information they want (Table 3-4). Moreover, webpage usability guidelines suggest providing users with a good way to reduce options (Appendix C), but currently the PnC webpage does not allow its users to do this.

Assessing and Improving the NWS Point-and-Click Webpage

Supporting open-ended comments by survey respondents' regarding things they dislike about the PnC webpage include:

“Cannot change/customize layout (except move sections up).”

“It has some things on it that I don't need, and some things that I do look at are down at the bottom. It would be nice if I could customize it more to fit my needs.”

“I would like to customize the content so I don't get national digital [forecast database] portlet and additional forecasts [and information] portlet.”

“My suggestion would be ... to allow people to sign up for an account and have the site portalized so that they could customize their weather page, like a myweather.gov so that people could pick which things they want as part of their home page, and still be able to go to other areas of the site as desired.”

4. METHODS – FOCUSED RESEARCH ON HAZARDOUS WEATHER COMMUNICATION

Of the many important findings that emerged from the exploratory research, a critical finding is that hazardous weather information is not effectively communicated on the PnC webpage, reducing the utility of the forecast information. What constitutes effective communication of a weather threat is a multi-faceted problem. Among the important aspects are that information must be communicated in a way that individuals, first, receive the message that a threat exists and, subsequently, are able to readily extract relevant details to understand and personalize their risk, including for when and where the threat is relevant and how to get additional information. Yet, data from the exploratory research suggest that the existence of a hazardous weather threat is not always clear, the temporal and spatial information of the threat is not explicitly conveyed on the PnC webpage, and details of the threat can be unclear and cumbersome to access.

These weaknesses in the communication of hazardous weather information on the PnC webpage are central to NWS's mission to protect life and property. Based on these key findings from the exploratory research phase, we conducted follow-on focused research to begin assessing and improving the communication of hazardous weather information. We could not address all aspects of this problem, so we primarily focused on improving communication of hazardous weather threat existence and timing. We designed and implemented an initial nationwide Internet-based survey of NWS PnC users (Section 4.1). We used the results to refine the design of a second nationwide Internet-based survey of NWS PnC users (Figure 4-1).

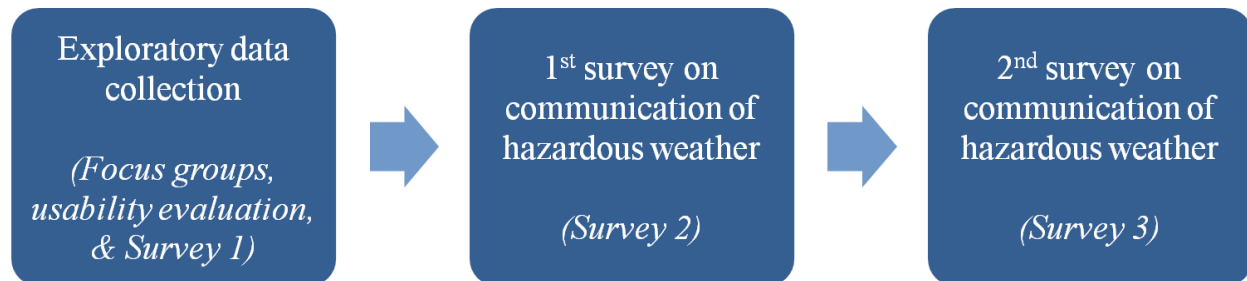


Figure 4-1. Research process from exploratory to focused research

4.1. 1st Survey on Communication of Hazardous Weather with NWS PnC Users (Survey 2)

We worked closely with the NWS to develop three new attributes (i.e., a new graphical or textual piece of information) that could be added to the PnC webpage when hazardous weather threatens in attempt to better communicate the threat existence and timing. Recalling that there is a unique PnC forecast for every 2.5×2.5 km grid in the United States, the attributes had to be simple enough that they could be automatically and quickly generated by NWS without requiring excessive computing power and bandwidth.

Because communication of hazardous weather information differs for short-fused (i.e., imminent or already in effect) versus long-fused (i.e., going into effect in the future) weather threats, we developed separate sets of experimental forecasts for a short-fused weather hazard (i.e., a severe thunderstorm warning) and a long-fused hazard (i.e., a flood watch). The experimental forecasts are the NWS PnC webpage presentation to which we added the experimental forecast attributes. The three individual attributes were:

- (1) A **bar (B)** placed underneath the forecast-at-a-glance icons with the position and length representing the time period over which the threat is in effect. The bar was colored red for warnings and orange for watches, and it included text (that could be hyperlinked to the product operationally) identifying the threat (see Figure 4-2 for an example). The bar was used for both the short-fused and long-fused forecasts.
- (2) **End-time text (U for “until”)** indicating until when the threat is in effect added to the red, underlined text that currently is used to indicate the threat (see Figure 4-3 for an example). The end-time text was used for both the short-fused and long-fused forecasts.
- (3) A **box (X)** around the first forecast-at-a-glance icon. The box included text (that could be hyperlinked to the product operationally) identifying the threat. The box was tested for only short-fused events because its intent was to alert people about imminent hazardous weather threats. As such, the box was colored red (see Figure 4-4 for an example). No box was tested for long-fused events in this survey.

Assessing and Improving the NWS Point-and-Click Webpage

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Late Afternoon	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
								
40%	20%	40%	80%	90%	80%	70%	30%	30%
Chance Showers	Slight Chc Tstms	Chance Rain	Heavy Rain	Heavy Rain	Heavy Rain	Showers Likely	Chance Showers	Chance Showers
Hi 59 °F	Lo 43 °F	Hi 57 °F	Lo 44 °F	Hi 56 °F	Lo 45 °F	Hi 63 °F	Lo 45 °F	Hi 67 °F

Severe Thunderstorm Warning

Detailed 7-day Forecast **Detailed Point Forecast**

Hazardous weather condition(s):

Severe Thunderstorm Warning
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Click Map for Forecast Disclaimer

Map Satellite Terrain



(a)










Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Late Afternoon	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
								
40%	20%	40%	80%	90%	80%	70%	30%	30%
Chance Showers	Slight Chc Tstms	Chance Rain	Heavy Rain	Heavy Rain	Heavy Rain	Showers Likely	Chance Showers	Chance Showers
Hi 59 °F	Lo 43 °F	Hi 57 °F	Lo 44 °F	Hi 56 °F	Lo 45 °F	Hi 63 °F	Lo 45 °F	Hi 67 °F

Flood Watch

Detailed 7-day Forecast **Detailed Point Forecast**

Hazardous weather condition(s):


Flood Watch
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Click Map for Forecast Disclaimer

Map Satellite Terrain



(b)

Figure 4-2. Survey 2 experimental forecast with the bar for the (a) short-fused and (b) long-fused event

Assessing and Improving the NWS Point-and-Click Webpage



Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code Go [BOOKMARK](#) [f](#) [t](#) [e](#)

NWS City, State Mobile Weather Information | [En Español](#)
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Late Afternoon	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
 40%	 20%	 40%	 80%	 90%	 80%	 70%	 30%	 30%
Chance Showers	Slight Chc Tstms	Chance Rain	Heavy Rain	Heavy Rain	Heavy Rain	Showers Likely	Chance Showers	Chance Showers
Hi 59 °F	Lo 43 °F	Hi 57 °F	Lo 44 °F	Hi 56 °F	Lo 45 °F	Hi 63 °F	Lo 45 °F	Hi 67 °F

Detailed 7-day Forecast **Detailed Point Forecast** [\[Move Down\]](#)


Hazardous weather condition(s):

Severe Thunderstorm Warning (until 6 PM Wed)
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Click Map for Forecast [Disclaimer](#)



(a)

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code Go [BOOKMARK](#) [f](#) [t](#) [e](#)

NWS City, State Mobile Weather Information | [En Español](#)
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Late Afternoon	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
 40%	 20%	 40%	 80%	 90%	 80%	 70%	 30%	 30%
Chance Showers	Slight Chc Tstms	Chance Rain	Heavy Rain	Heavy Rain	Heavy Rain	Showers Likely	Chance Showers	Chance Showers
Hi 59 °F	Lo 43 °F	Hi 57 °F	Lo 44 °F	Hi 56 °F	Lo 45 °F	Hi 63 °F	Lo 45 °F	Hi 67 °F

Detailed 7-day Forecast **Detailed Point Forecast** [\[Move Down\]](#)

Hazardous weather condition(s):

Flood Watch (until 6 PM Sat)
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Click Map for Forecast [Disclaimer](#)



(b)

Figure 4-3. Survey 2 experimental forecast with the end-time text for the (a) short-fused and (b) long-fused event

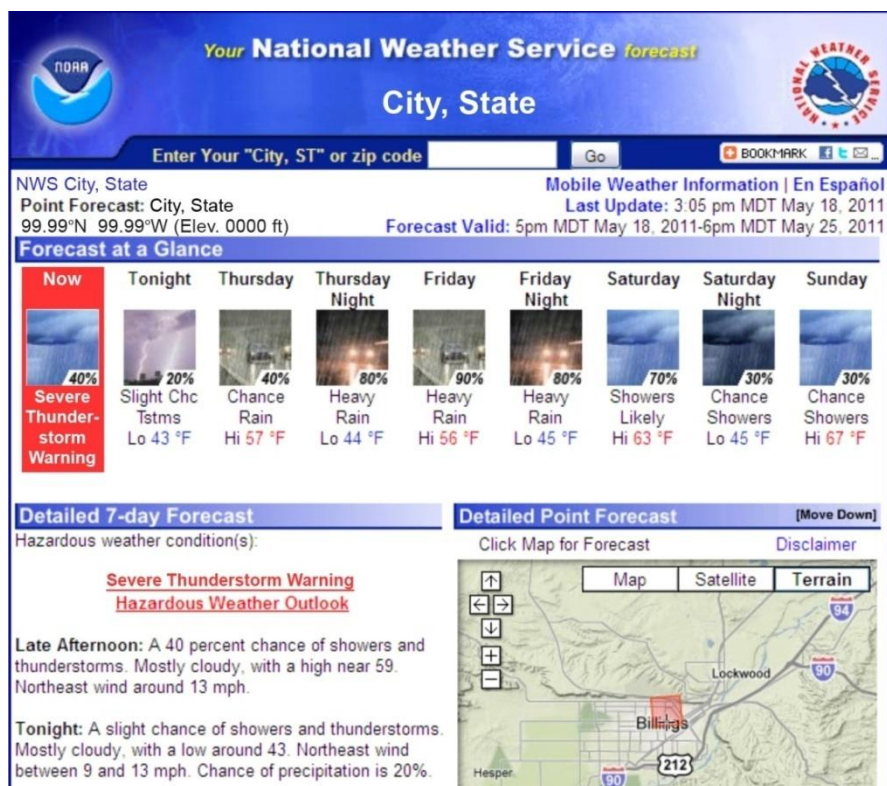


Figure 4-4. Survey 2 experimental forecast with the box, tested for the short-fused event only

We created experimental forecasts of all individual attributes (e.g., the bar only) and all possible combinations of them (e.g., the bar and end-time text). Thus, there were eight designs for the short-fused event and four designs for the long-fused event (Table 4-1). One design for each type of event was a control (C) that had none of the attributes—in other words, it represented the way forecasts are currently provided. Appendix F has images of all the experimental forecasts (Figures F-1 through F-12). Following standard guidelines for experimental research design, the attributes were the only variables “manipulated” in each forecast design. Any other variations among forecast designs could be confounding variables; that is, they could influence respondents in ways that are unknown and immeasurable, contaminating the data (Singleton and Straits 2010). Thus, all other information in the experimental forecasts—such as the icons, text forecast information, map, generalized location information, date and time—were held constant across all short-fused and long-fused forecast designs.

We employed an experimental design to evaluate the forecast designs. Participants were randomly invited to participate in either the short- or the long-fused survey. Within each survey, participants were randomly assigned to one of the experimental forecasts and then asked a series of survey questions about the design with which they were presented. The survey questions were designed to evaluate (a) respondents accurately noticing the existence of the hazardous weather threat; (b) respondents accurately understanding the threat timing; (c) respondents’ perceptions of how well the forecast communicated the existence, timing, and other details of the threat; and (d) respondents’ preferences for attributes. We analyzed responses to these questions across all

respondents to compare and contrast the different experimental forecasts designs in effectively communication hazardous weather information.

Table 4-1. Survey 2 set of experimental forecasts				
Short-Fused (Severe Thunderstorm Warning) Experimental Forecasts				
	No Box		Box	
	Bar	No Bar	Bar	No Bar
End-time Text ("Until 6 PM Wed")	Experimental forecast 1 (BU)*	Experimental forecast 2 (U)	Experimental forecast 3 (BUX)	Experimental forecast 4 (UX)
No End-time Text	Experimental forecast 5 (B)	Experimental forecast 6 (C)	Experimental forecast 7 (BX)	Experimental forecast 8 (X)
Long-Fused (Flood Watch) Experimental Forecasts				
	No Box		Box	
	Bar	No Bar	Bar	No Bar
End-time Text ("Until 6 PM Sat")	Experimental forecast 9 (BU)	Experimental forecast 10 (U)	n/a	n/a
No End-time Text	Experimental forecast 11 (B)	Experimental forecast 12 (C)	n/a	n/a
* "B" indicates the bar, "U" indicates the end (or until) time, and "X" indicates the box. These letters and their combinations indicate which attributes are part of each experimental forecast. The control design with no attributes is labeled "C".				

After the survey was developed, a selected subset of NWS staff reviewed it for scientific and technical accuracy, it was programmed for online implementation by ResearchExec, and then pre-tested in person with members of the public for understandability, functionality, and timing. The final survey consisted of 40 questions, including socio-demographics. From the sampling frame of more than 88,000 PnC users, we randomly selected⁴ 10,000 people for the short-fused survey and 5,000 people for the long-fused survey. Survey respondents were randomly assigned to one of the eight short-fused experimental forecasts or one of the four long-fused experimental forecasts. Thus, we invited twice as many people for the short-fused survey because there were twice as many experimental designs. We fielded the survey in October 2011. Individuals were invited by email to participate in the controlled-access survey, had a unique access code to the web survey, and could only respond one time. Of the 10,000 short-fused survey email invitations, 442 bounced, and we received 4,358 completed responses (45.6% response rate). Of the 5,000 long-fused survey email invitations, 223 bounced, and we received 2,118 completed responses (44.3% response rate). Figure 4-5 shows the pooled samples of respondents are nationwide. The median time to complete the survey was 24 minutes for both the short- and long-fused surveys, suggesting that most participants devoted substantial time to responding. Appendix F has complete details on the survey implementation, questions, and descriptive statistics.

⁴ The people who were invited to participate in Survey 1 were removed from the sampling frame before randomly sampling for this survey.

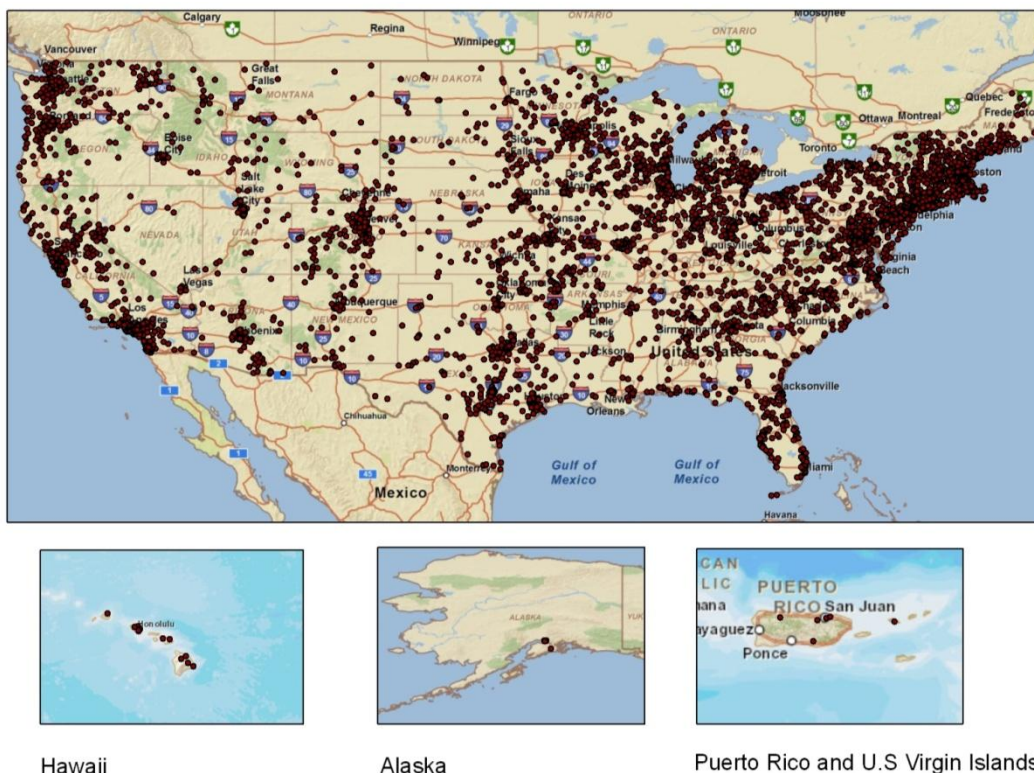


Figure 4-5. Locations of respondents of the NWS PnC 1st communication of hazardous weather survey (Survey 2) based on respondent-supplied zip codes (short-fused survey n=4,358; long-fused survey n=2,118)

4.2. 2nd Survey on Communication of Hazardous Weather with NWS PnC Users (Survey 3)

As discussed in detail in Section 5.1, there were mixed results of the three attributes from the first survey on communication of hazardous weather. The bar was not particularly effective at communicating the timing of the hazardous weather threats. The end-time text was effective for conveying how long a threat is in effect until, but it can cause confusion about when a threat goes into effect. The box generally was effective in conveying the threat existence and timing.

Building on these findings, we conducted a second survey on communication of hazardous weather. Again, there were three attributes, but the bar was omitted, start-time text was added, and the box was added for the long-fused events. We created experimental forecasts of all individual attributes and all possible combinations of them for a short-fused weather hazard (i.e., a severe thunderstorm warning) and a long-fused hazard (i.e., a flood watch). The three individual attributes, used for both the short- and long-fused events, were:

- (1) **Start-time text (S)** indicating when the threat goes into effect added to the red, underlined text currently used to indicate the threat (see Figure 4-6 for an example).

- (2) **End-time text (U for “until)** indicating until when the threat is in effect added to the red, underlined text currently used to indicate the threat (see Figure 4-7 for an example).
- (3) A **box (X)** around the forecast-at-a-glance icons that represents the time period over which the threat is in effect. The box included text (that could be hyperlinked to the product operationally) identifying the threat and was colored red for warnings and orange for watches (see Figure 4-8 for an example).



(a)



(b)

Figure 4-6. Experimental forecast with the start-time text for the (a) short-fused and (b) long-fused event.

Assessing and Improving the NWS Point-and-Click Webpage

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code Go [BOOKMARK](#) [f](#) [t](#) [e](#) [...](#)

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Late Afternoon	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
40%	20%	40%	80%	90%	80%	70%	30%	30%
Chance Showers	Slight Chc Tstms	Chance Rain	Heavy Rain	Heavy Rain	Heavy Rain	Showers Likely	Chance Showers	Chance Showers
Hi 59 °F	Lo 43 °F	Hi 57 °F	Lo 44 °F	Hi 56 °F	Lo 45 °F	Hi 63 °F	Lo 45 °F	Hi 67 °F

Detailed 7-day Forecast **Detailed Point Forecast** [\[Move Down\]](#)

Hazardous weather condition(s):

Severe Thunderstorm Warning (until 6 PM)
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Click Map for Forecast [Disclaimer](#)

Map ☒ Satellite ☐ Terrain ☐

(a)

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code Go [BOOKMARK](#) [f](#) [t](#) [e](#) [...](#)

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Late Afternoon	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
40%	20%	40%	80%	90%	80%	70%	30%	30%
Chance Showers	Slight Chc Tstms	Chance Rain	Heavy Rain	Heavy Rain	Heavy Rain	Showers Likely	Chance Showers	Chance Showers
Hi 59 °F	Lo 43 °F	Hi 57 °F	Lo 44 °F	Hi 56 °F	Lo 45 °F	Hi 63 °F	Lo 45 °F	Hi 67 °F

Detailed 7-day Forecast **Detailed Point Forecast** [\[Move Down\]](#)

Hazardous weather condition(s):

Flood Watch (until 6 PM Sat)
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Click Map for Forecast [Disclaimer](#)

Map ☒ Satellite ☐ Terrain ☐

(b)

Figure 4-7. Experimental forecast with the end-time text for the (a) short-fused and (b) long-fused event.

Assessing and Improving the NWS Point-and-Click Webpage







Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code [BOOKMARK](#) [f](#) [t](#) [e](#)...

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Late Afternoon	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
 40% Severe Thunderstorm Warning	 20% Slight Chc Tstms Lo 43 °F	 40% Chance Rain Hi 57 °F	 80% Heavy Rain Lo 44 °F	 90% Heavy Rain Hi 56 °F	 80% Heavy Rain Lo 45 °F	 70% Showers Likely Hi 63 °F	 30% Chance Showers Lo 45 °F	 30% Chance Showers Hi 67 °F

Detailed 7-day Forecast **Detailed Point Forecast** [\[Move Down\]](#)


Hazardous weather condition(s):

Severe Thunderstorm Warning
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Click Map for Forecast Disclaimer



(a)

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code [BOOKMARK](#) [f](#) [t](#) [e](#)...

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Late Afternoon	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
 40% Chance Showers Hi 59 °F	 20% Slight Chc Tstms Lo 43 °F	 40% Chance Rain Hi 57 °F	 80% Heavy Rain Lo 44 °F	 90% Heavy Rain Hi 56 °F	 80% Heavy Rain Lo 45 °F	 70% Showers Likely Hi 63 °F	 30% Chance Showers Lo 45 °F	 30% Chance Showers Hi 67 °F

Flood Watch

Detailed 7-day Forecast **Detailed Point Forecast** [\[Move Down\]](#)

Hazardous weather condition(s):

Flood Watch
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Click Map for Forecast Disclaimer



(b)

Figure 4-8. Experimental forecast with the box for the (a) short-fused event and the (b) long-fused event

Between the forecast designs with the individual attributes and all possible combinations of them, there were eight total designs each for the short- and long-fused events (Table 4-2), and each event type had a control (C) design that had none of the attributes (i.e., represented the way forecasts are currently provided). Appendix G has images of all the experimental forecasts (Figures G-1 through G-16). Again, the attributes were the only variables manipulated in each forecast design. All other information in the experimental forecasts—such as the icons, text forecast information, map, generalized location information, date and time—were held constant across all short-fused and long-fused forecast designs.

We again employed an experimental design to evaluate the forecast designs. Participants were randomly invited to participate in either the short- or the long-fused survey. Within each survey, participants were randomly assigned to one of the experimental forecasts and then asked a series of survey questions about the design with which they were presented. Survey questions similar to the first hazardous weather communication survey were designed—and in some cases the exact same questions were used—to evaluate (a) respondents accurately noticing the existence of the hazardous weather threat; (b) respondents accurately understanding the threat timing; (c) respondents' perceptions of how well the forecast communicated the existing, timing, and other details of the threat; and (d) respondents' preferences for attributes. We analyzed responses to these questions across all respondents to compare and contrast the different experimental forecasts designs in effectively communicating hazardous weather information.

Table 4-2. Survey 3 set of experimental forecasts				
Short-Fused (Severe Thunderstorm Warning) Experimental Forecasts				
	No Box		Box	
	Start-time Text ("Now")	No Start-time Text	Start-time Text ("Now")	No Start-time Text
End-time Text ("Until 6 PM Wed")	Experimental forecast 1 (SU)	Experimental forecast 2 (U)	Experimental forecast 3 (SUX)	Experimental forecast 4 (UX)
No End-time Text	Experimental forecast 5 (S)	Experimental forecast 6 (C)	Experimental forecast 7 (SX)	Experimental forecast 8 (X)
Long-Fused (Flood Watch) Experimental Forecasts				
	No Box		Box	
	Start-time Text ("From 6 AM Thurs")	No Start-time Text	Start-time Text ("From 6 AM Thurs")	No Start-time Text
End-time Text ("Until 6 PM Sat")	Experimental forecast 9 (SU)	Experimental forecast 10 (U)	Experimental forecast 13 (SUX)	Experimental forecast 14 (UX)
No End-time Text	Experimental forecast 11 (S)	Experimental forecast 12 (C)	Experimental forecast 15 (SX)	Experimental forecast 16 (X)
* "S" indicates the start time, "U" indicates the end (or until) time, and "X" indicates the box. These letters and their combinations indicate which attributes are part of each experimental forecast. The control design with no attributes is labeled "C".				

After the survey was developed, a selected subset of NWS staff reviewed it for scientific and technical accuracy, ResearchExec programmed it for online implementation, and it was pre-tested in person with members of the public for understandability, functionality, and timing. The final survey consisted of 35 questions, including socio-demographics. From the sampling frame

of more than 88,000 PnC users, we randomly selected⁵ 10,000 people each for the short-fused and long-fused surveys. Survey respondents were randomly assigned to one of the eight short-fused or long-fused experimental forecasts. We fielded the survey in March 2012. Individuals were invited by email to participate in the controlled-access survey, had a unique access code to the web survey, and could respond only one time. Of the 10,000 short-fused survey email invitations, 578 bounced, and we received 3,766 completed responses (40.0% response rate). Of the 10,000 long-fused survey email invitations, 579 bounced, and we received 3,795 completed responses (40.3% response rate). Figure 4-9 shows the pooled samples of respondents are nationwide. The median time to complete the survey was 23 minutes for the short-fused survey and 24 minutes for the long-fused survey, suggesting that most participants devoted substantial time to responding. Appendix G has complete details on the survey implementation, questions, and descriptive statistics.

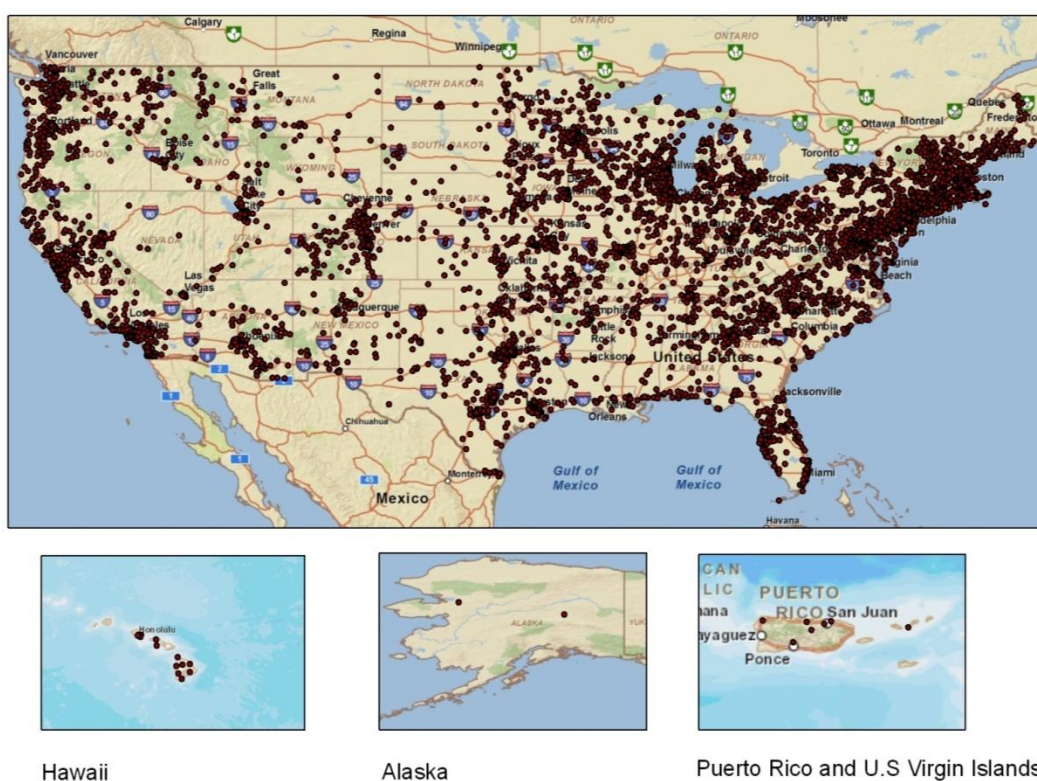


Figure 4-9. Locations of respondents of the NWS PnC 2nd communication of hazardous weather survey (Survey 3) based on respondent-supplied zip codes (short-fused survey n=3,766; long-fused survey n=3,795)

⁵ The people who were invited to participate in Surveys 1 and 2 were removed from the sampling frame before random sampling for this survey.

5. RESULTS – FOCUSED RESEARCH ON HAZARDOUS WEATHER COMMUNICATION

The communication of hazardous weather surveys provided valuable empirical data on NWS PnC users' actual understanding, perceptions, and preferences regarding the attributes that were created in attempt to better communicate hazardous weather information on the PnC webpage. Importantly, the surveys revealed which attributes and combinations thereof were effective and which were not.

Here we present the results that are most relevant to assessing and improving the PnC webpage; Appendices F and G contain all data for the two surveys, respectively. For both surveys, we analyzed the data separately for the short- and long-fused events. We present the data separately but discuss the results jointly except for where they differ significantly. We present the results from the first survey on communication of hazardous weather in Section 5.1 and the results from the second survey in Section 5.2.

In the charts and tables in this section, the different experimental forecasts are labeled with letters denoting which of the three individual attributes or combination of them were included in the experimental forecasts (see Tables 4-1 and 4-2 for full details). For the first hazardous weather survey, “B” indicates the bar, “U” indicates the end (or until) time, and “X” indicates the box. For the second hazardous weather survey, “S” indicates the start time, “U” indicates the end (or until) time, and “X” indicates the box. In both surveys, the control design with no attributes (i.e., how the forecast appears currently) is labeled “C”.

5.1. Results of 1st Survey on Communication of Hazardous Weather with NWS PnC Users (Survey 2)

As in Survey 1, two questions in Survey 2 served as validity checks to ensure that respondents (a) have heard of the NWS and (b) have ever used the PnC webpage. Accounting for the respondents who said “no” to either question, the sample size for the short- and long-fused surveys are $n=4,239$ and $n=2,081$, respectively.

5.1.1. Evaluation of Individual Experimental Forecasts

Participants were randomly invited to participate in either the short- or long-fused survey. Within each survey, participants were randomly assigned to one of the experimental forecasts and then asked a series of questions about the threat existence, threat timing, and their perceptions of the forecast information.

5.1.1.1. Threat Existence

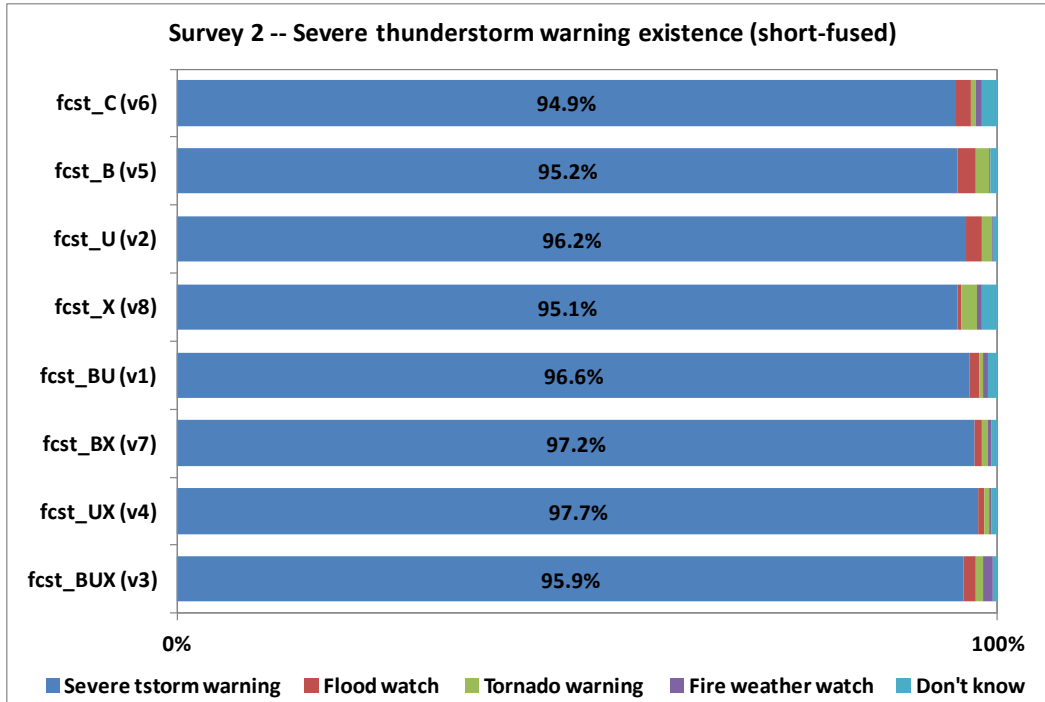
After receiving one of the experimental forecasts, respondents were asked which hazardous weather threat appears in the forecast (Figure 5-1⁶). The correct answers were “severe thunderstorm warning” for the short-fused designs and “flood watch” for the long-fused designs.

Overall, for all of the experimental forecasts, $\geq 94.9\%$ of respondents correctly identified the severe thunderstorm warning as the short-fused threat and $\geq 88.0\%$ correctly identified the flood watch as the long-fused threat. Thus, regardless of the experimental design, there were extremely high rates of respondents accurately noticing the existence of a hazardous weather threat, at least when specifically asked to do so. It is unknown what percentage of respondents would correctly identify the threats based on the different forecast design if they were not prompted.

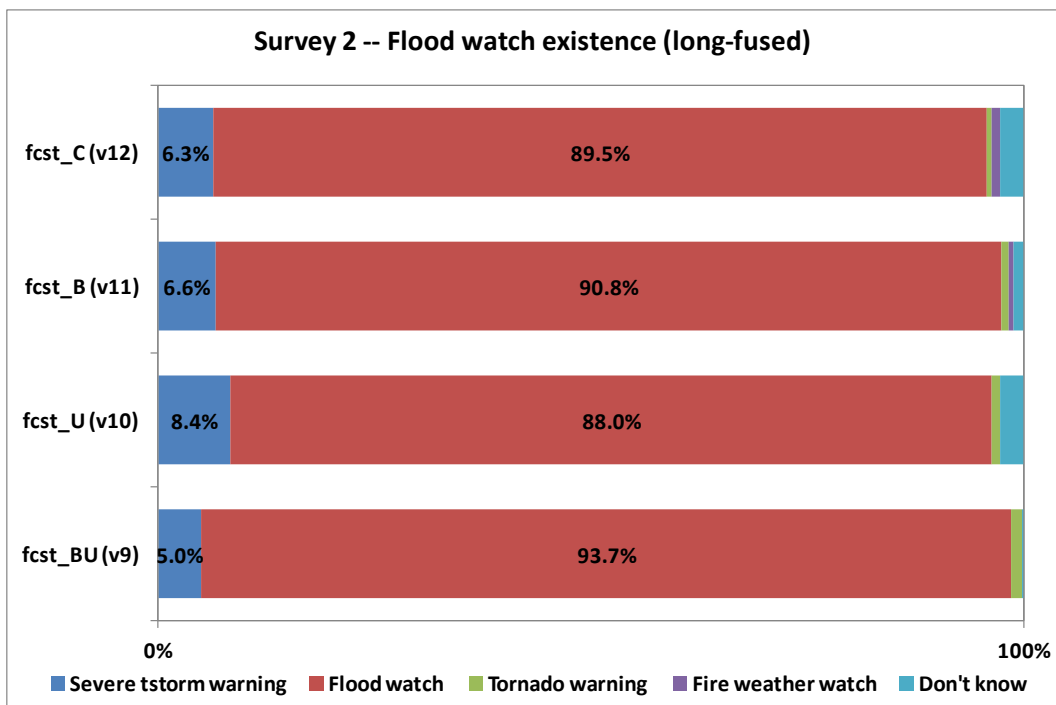
Statistically,⁷ there are no significant differences among the eight short-fused forecast designs regarding whether or not respondents correctly identified the threat (short-fused [SF]: $\chi^2[7, n = 4,239] = 10.59, p = 0.16$). On the other hand, there are significant differences in the long-fused forecast designs regarding whether or not respondents correctly identified the threat (long-fused [LF]: $\chi^2[3, n = 2,081] = 10.69, p < 0.05$). The long-fused forecast with both attributes (fcst_BU) is less associated with respondents identifying the wrong weather threat (LF: std res = -2.4).

⁶ For clearer presentation of results, throughout Section 5, data labels are not included on charts for response options selected by 3.0% or less of respondents.

⁷ Chi-squared (χ^2) tests of independence statistical tests are reported throughout Section 5. It tests whether the conditional distributions on the outcome variable (i.e., threat existence, threat start time, threat end time) are identical (i.e., independent) across the experimental forecast designs. In other words, independence means that the probability of any particular response is the same regardless of design. If the conditional distributions vary by design, they are dependent (i.e., they depend on the design). The standardized residual (std res) describes the pattern of association; values greater than or less 2 provides strong evidence of association in that particular direction (Agresti and Finlay 2009).



(a)



(b)

Figure 5-1. Respondents' identification of the (a) short-fused and (b) long-fused weather threats based on Survey 2 experimental forecast (short-fused survey n=4,239; long-fused survey n=2,081)

5.1.1.2. Threat Timing

Based on the experimental forecast received, respondents were also asked questions about what time the hazardous weather threat starts (Figure 5-2) and ends (Figure 5-3). The correct start-time answers were “It has already started” for the short-fused designs and “Sometime on Thurs” for the long-fused designs. The correct end-time answers were “6 PM on Wed” for the short-fused designs and “6 PM on Sat” for the long-fused designs. However, some of the other answer options are not necessarily incorrect. For instance, the control (i.e., the status quo) for the long-fused event does not have explicit information about the flood watch end time, so respondents who received this design may have indicated “I cannot tell” or “Other” to the timing questions. Although it is not incorrect for respondents to select these options, the goal is to assess and improve people’s understanding of the event timing, so we consider more precise, accurate answers as better.

Threat Start Time

Overall, there are mixed findings for how well the different attributes and combinations of them convey the short- and long-fused threat start times.

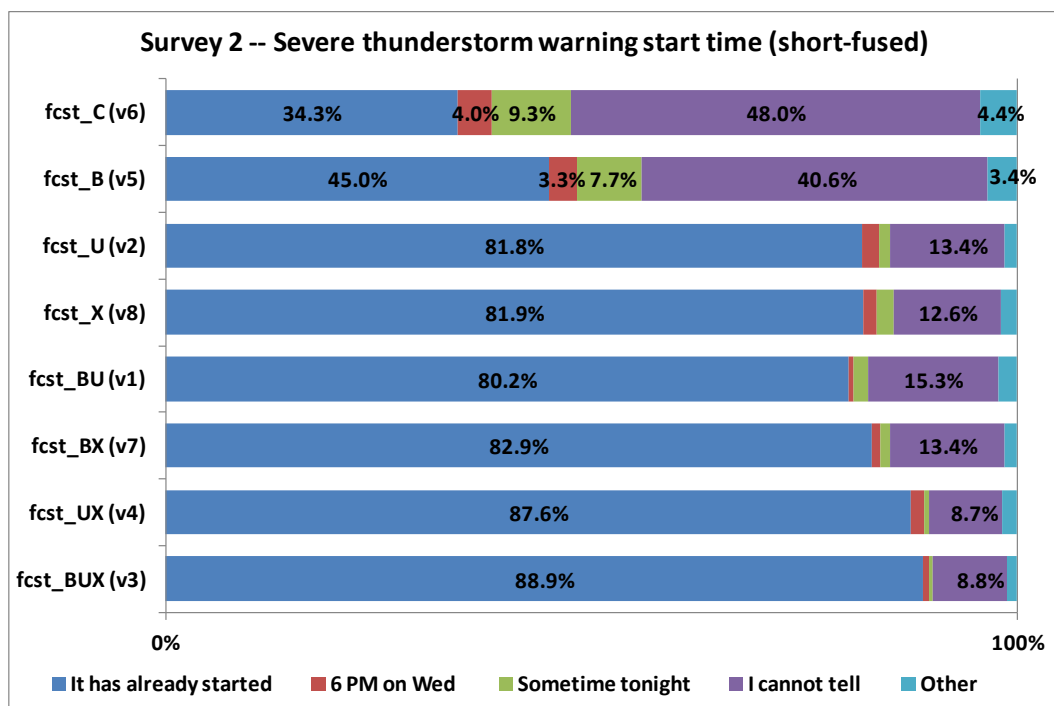
For the short-fused event, most ineffective are the control (fcst_C) and the bar only (fcst_B) designs; only 34.3% and 45.0% of respondents who received these designs, respectively, correctly understand the start time. All other designs are more effective with $\geq 80.2\%$ of respondents correctly identifying the start time. The designs for which most respondents correctly identify the start timing ($\geq 87.6\%$) are those with the coupled end-time and box attributes (fcst_UX and fcst_SUX).

For the long-fused event, none of the designs is particularly effective in helping respondents correctly identify the start time. Least effective are the two designs with the end-time information (fcst_U and fcst_BU), with $\geq 75.0\%$ of respondents incorrectly thinking that the flood watch has already started. Thus, having only the end-time information appears to mislead most respondents into thinking the threat is already in effect. This may also explain why, in the short-fused survey, fcst_U counter-intuitively is associated with 81.8% of respondents correctly identifying the start time despite this design not having any explicit start-time information. It is possible that these respondents may be applying their knowledge of severe thunderstorm warnings to infer the hazard has already begun. However, given that respondents who received the control (fcst_C) and bar only (fcst_B) did not similarly apply their knowledge, it is more likely that having the end-time only information in the short-fused event misled most respondents—albeit to the correct answer—to believe the hazard had already started.

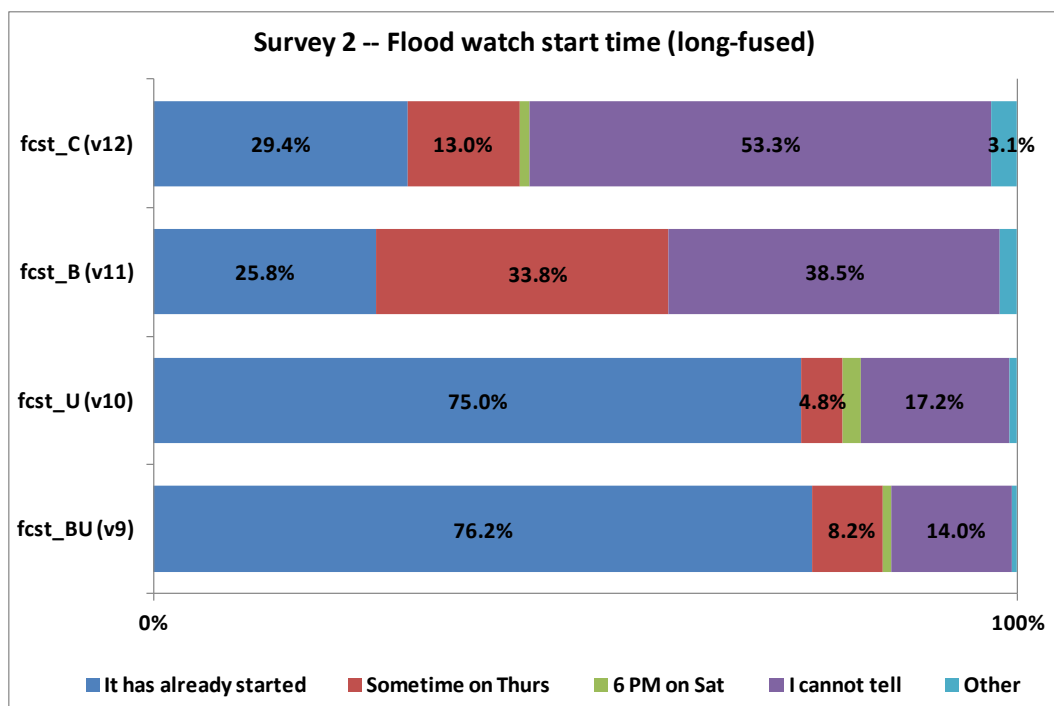
Finding 9: Including text that explicitly conveys the end time of a hazardous weather threat appears to mislead most people into thinking the event has already begun. This is particularly problematic for long-fused events that go into effect at a future time. This suggests that, if end time is indicated, text that explicitly conveys the start time of a hazardous weather threat should be coupled with it to minimize confusion with respect to threat start time.

Also for the long-fused event, the most effective design for identifying the start time relative to the others is with the bar only (fcst_B). However, a mere 33.8% of respondents who received this design correctly identified the start time. Another 25.8% of respondents thought the event had already begun and 38.5% indicated they could not tell, suggesting these respondents did not readily understand that the bar position was meant to indicate the threat timing.

Statistically, there are significant differences among the forecast designs regarding whether or not respondents correctly identified the start time (SF: $\chi^2[7, n = 4,239] = 814.24, p < 0.01$; LF: $\chi^2[3, n = 2,081] = 206.81, p < 0.01$). For the short-fused designs, the control (fcst_C) and forecast design with the bar only (fcst_B) are less associated with selecting the correct start time (std res ≤ -7.5) and more associated with selecting one of the other options (std res ≥ 12.3). Also, the designs with the coupled end-time and box attributes (fcst_UX and fcst_BUX) are more associated with selecting the correct start time (std res ≥ 3.9) and less associated with selecting one of the other options (std res ≤ -6.5). For the long-fused designs, both designs with the end-time information (U) are less associated with selecting the correct start time (std res $\leq -.9$).



(a)



(b)

Figure 5-2. Respondents' understanding of the (a) short-fused and (b) long-fused weather threat start times based on Survey 2 experimental forecast (short-fused survey n=4,239; long-fused survey n=2,081)

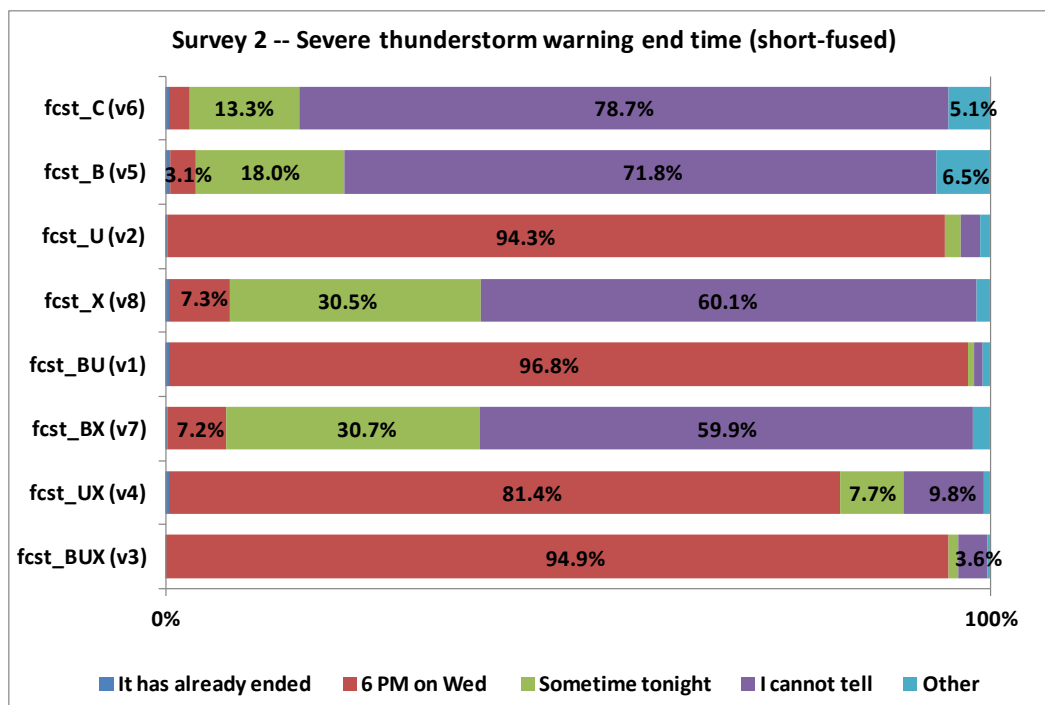
Threat End Time

Overall, all experimental forecasts that explicitly include the end-time (i.e., until) text (U) are associated with $\geq 81.4\%$ of respondents correctly understanding the short-fused end time and with $\geq 95.2\%$ of respondents correctly understanding the long-fused end time. Thus, including the end-time text, not surprisingly, effectively helps PnC users better understand until when a hazardous weather threat is in effect. For the short-fused event, the forecast designs that have the box without the end-time text (fcst_X and fcst_BX) appear to help approximately 30% of respondents infer the approximate time that the severe thunderstorm warning ends (i.e., sometime tonight), suggesting that these respondents may understand that the box conveys the threat timing. Nevertheless, explicitly including the end-time text is better at helping respondents understand the precise threat timing. Most ineffective at precisely conveying the timing for both the short- and long-fused events are the control (fcst_C) and design with the bar only (fcst_B). With the bar only design (fcst_B), 18.0–23.2% of respondents appear to have inferred the threat end time; however, 68.0–71.8% of respondents indicated they could not tell the threat end time, suggesting these respondents did not readily understand the bar position and length were meant to indicate the threat timing.

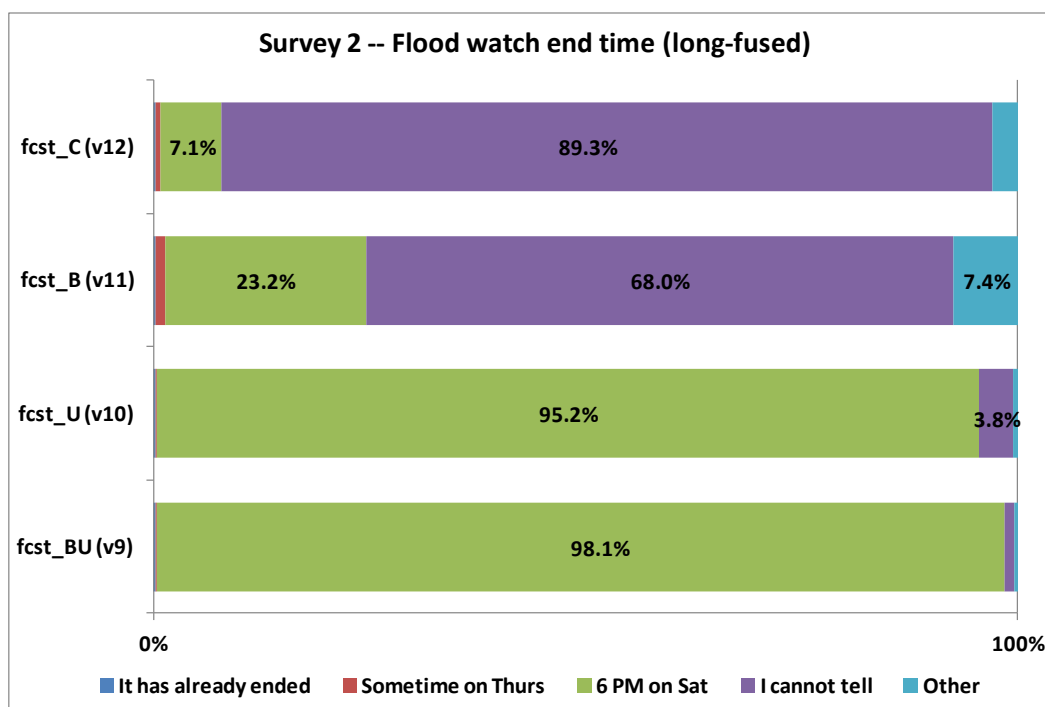
Finding 10: The bar underneath the forecast-at-a-glance icons—which was intended to convey the timing of hazardous weather threats through its position and length—does not effectively communicate this information to most survey respondents.

PnC users may be able to learn what the bar represents—and some respondents indicated that they eventually realized that the bar conveyed the threat timing toward the end of the survey—but this attribute is not readily understandable.

Statistically, there are significant differences among the forecast designs regarding whether or not respondents identified the precise, accurate end time (SF: $\chi^2[7, n = 4,239] = 3,236.09, p < 0.01$; LF: $\chi^2[3, n = 2,081] = 1,434.08, p < 0.01$). All forecast designs with the end time are less associated with selecting the wrong end time (SF: std res ≤ -10.5 ; LF: std res ≤ -13.5) and more associated with selecting the correct time (SF: std res ≥ 10.8 ; LF: std res ≥ 12.0). The control (fcst_C) and design with the bar only (fcst_B) are less associated with selecting the correct end time (SF: std res ≤ -13.6 ; LF: std res ≤ -9.9) and more associated with selecting one of the other options (SF: std res ≥ 13.3 ; LF: std res ≥ 11.2).



(a)



(b)

Figure 5-3. Respondents' understanding of the (a) short-fused and (b) long-fused weather threat end times based on Survey 2 experimental forecast (short-fused survey n=4,239; long-fused survey n=2,081)

5.1.1.3. Perceptions of Experimental Forecasts

Based on the experimental forecast received, respondents were also asked questions about their perceptions of how well the forecast conveys specific types of information (Table 5-1) as well as their assessment of the overall information, including the design usefulness, visual aspects, and prompting of additional information-seeking (Table 5-2).

Overall, as shown in Table 5-1, for all the experimental forecasts, respondents have favorable perceptions that the existence of the short- and long-fused threats is well conveyed; this is consistent with respondents' actual correct identification of the threat existence discussed. Respondents have less favorable perceptions overall of how well the experimental forecasts convey start and end times of the hazardous weather threats, but their perceptions are generally consistent with their actual understanding of the threat timing. For the short-fused event, designs with the coupled end time and box (fcst_UX and fcst_BUX) are perceived most favorably at conveying the start time, and the control (fcst_C) and design with the bar only (fcst_B) are perceived least favorably. For the long-fused events, the designs with the end-time information (fcst_U and fcst_BU) are perceived somewhat more favorably than the other two designs at conveying the start time; although the majority of recipients of these forecast designs thought the long-fused event had already begun, the mean perceptions of about 2.5 reflect that they did not think that the forecast designs communicate the start time well. For both the short- and long-fused events, designs with the explicit end-time text are perceived favorably at conveying the end time and more so than designs without this information.

Statistically, there are significant differences ($p < 0.01$) among all experimental forecasts for all the outcome variables (e.g., perceptions of threat existence communication). We do not report the detailed results of all statistical tests here.

Table 5-1. Mean* perceptions of communication of specific information (Survey 2)				
	Perceptions of Threat Existence Communication	Perceptions of Start-time Communication	Perceptions of End-time Communication	Perceptions of Imminence Communication
Short-Fused Experimental Forecasts				
fcst_C (v6)	4.01	2.34	2.19	2.75
fcst_B (v5)	4.19	2.43	2.25	2.86
fcst_U (v2)	4.26	2.66	4.14	3.26
fcst_X (v8)	4.25	2.78	2.38	3.50
fcst_BU (v1)	4.26	2.63	4.22	3.30
fcst_BX (v7)	4.36	2.80	2.27	3.56
fcst_UX (v4)	4.31	3.09	3.84	3.64
fcst_BUX (v3)	4.43	3.09	4.19	3.73
Long-Fused Experimental Forecasts				
fcst_C (v12)	3.78	1.95	1.80	2.36
fcst_B (v11)	3.99	2.28	2.12	2.80
fcst_U (v10)	4.05	2.54	4.08	3.10
fcst_BU (v9)	4.15	2.57	4.25	3.23
* Based on a response scale of 1 to 5, where 1 means does not communicate well at all and 5 means communicates extremely well.				

Respondents' perceptions of the experimental forecasts overall are favorable on average (Table 5-2). Consistent with the above results, the control and bar only designs (fcst_C and fcst_B) generally are perceived less favorably than the other designs. For the short-fused event, all designs with the box (fcst_X, fcst_BX, fcst_UX, and fcst_BUX) are perceived favorably compared to the other designs as being visually appealing, being attention-getting, and for prompting additional information-seeking.

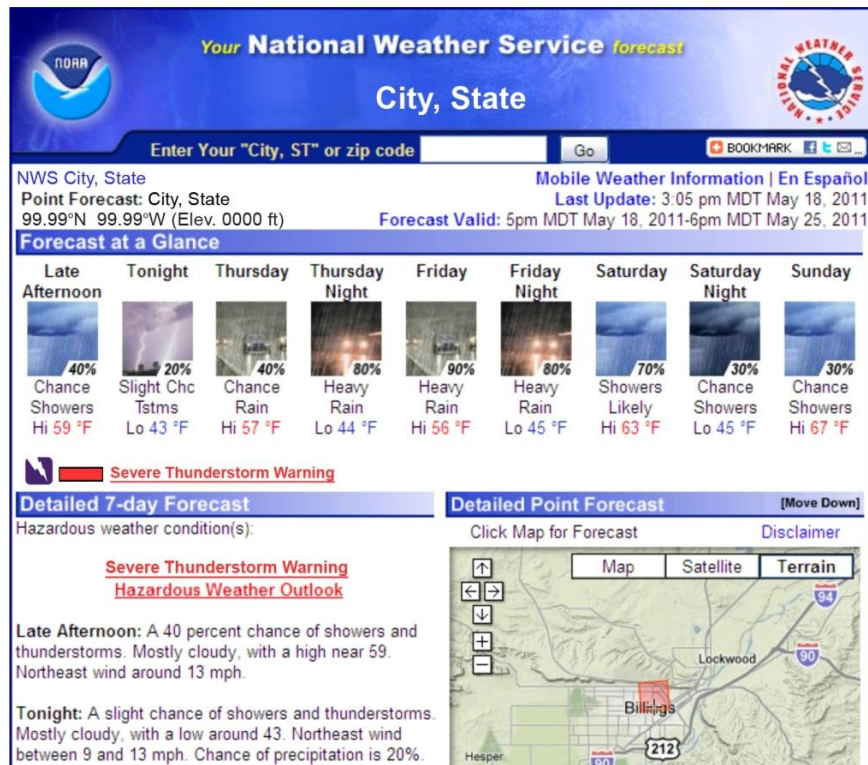
Statistically, there are significant differences ($p < 0.01$) among all experimental forecasts for all the outcome variables (e.g., usefulness of information). We do not report the detailed results of all statistical tests here.

Table 5-2. Mean* perceptions of communication of overall information (Survey 2)				
	Usefulness of Information	Visual Appeal of Information	Information is Attention-Getting	Information Would Prompt Additional Information-Seeking
Short-Fused Experimental Forecasts				
fcst_C (v6)	4.01	3.30	3.88	4.01
fcst_B (v5)	4.03	3.51	4.01	4.00
fcst_U (v2)	4.27	3.63	4.08	4.08
fcst_X (v8)	4.18	3.75	4.21	4.14
fcst_BU (v1)	4.22	3.58	4.11	4.09
fcst_BX (v7)	4.20	3.85	4.30	4.16
fcst_UX (v4)	4.33	3.89	4.27	4.16
fcst_BUX (v3)	4.30	3.88	4.34	4.08
Long-Fused Experimental Forecasts				
fcst_C (v12)	3.60	3.09	3.58	3.83
fcst_B (v11)	3.83	3.32	3.86	4.00
fcst_U (v10)	3.89	3.39	3.87	3.92
fcst_BU (v9)	3.93	3.44	4.02	3.94
* Based on a response scale of 1 to 5, where 1 means not at all true and 5 means extremely true.				

5.1.2. Preferences for Experimental Attributes

Following the true experimental portion of the survey in which respondents were randomly assigned one of the experimental forecasts and then were asked a series of evaluative questions (Section 5.1.1), respondents were asked to explicitly indicate whether or not they preferred each of the attributes (bar, end-time text, and box). For example, respondents were shown side-by-side the forecast design with the bar and the one without (i.e., the control), and they were asked to indicate which they preferred. This type of question was also asked for the end-time text and the box (for the short-fused respondents). In addition to these attributes, we also asked the short- and long-fused survey respondents to evaluate a forecast design that had a small thunderstorm or flood icon,⁸ respectively, next to the bar to represent the threat (Figure 5-4). All respondents received all of their respective short- or long-fused questions (see Section F.2, Questions 20–22; Section F.3, Questions 20–22).

⁸ The icons used are from NOAA's webpage.



(a)

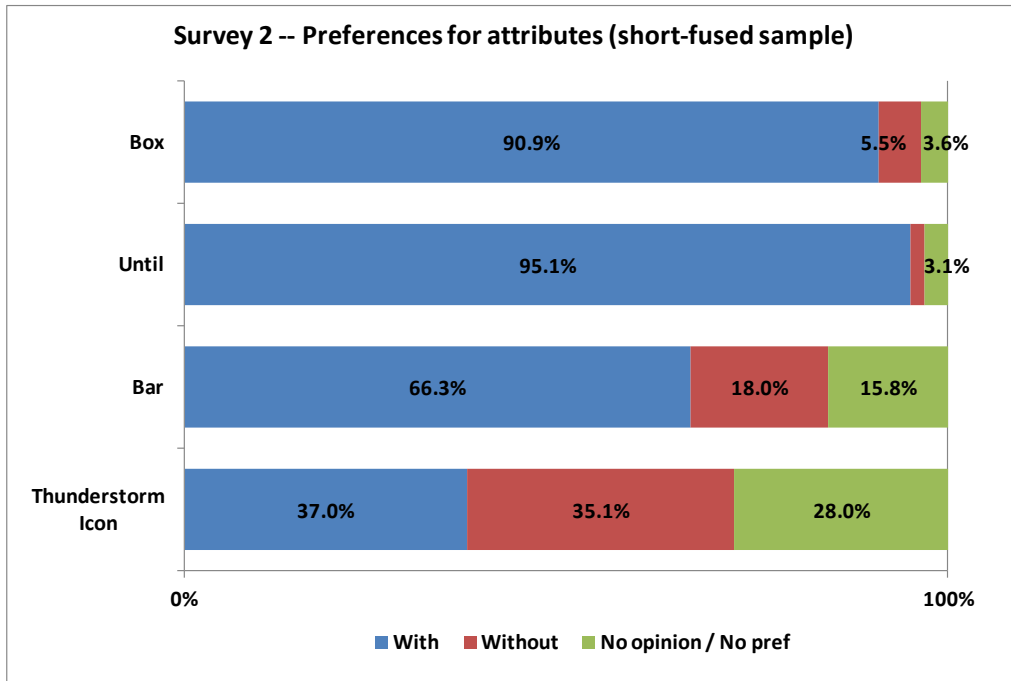


(b)

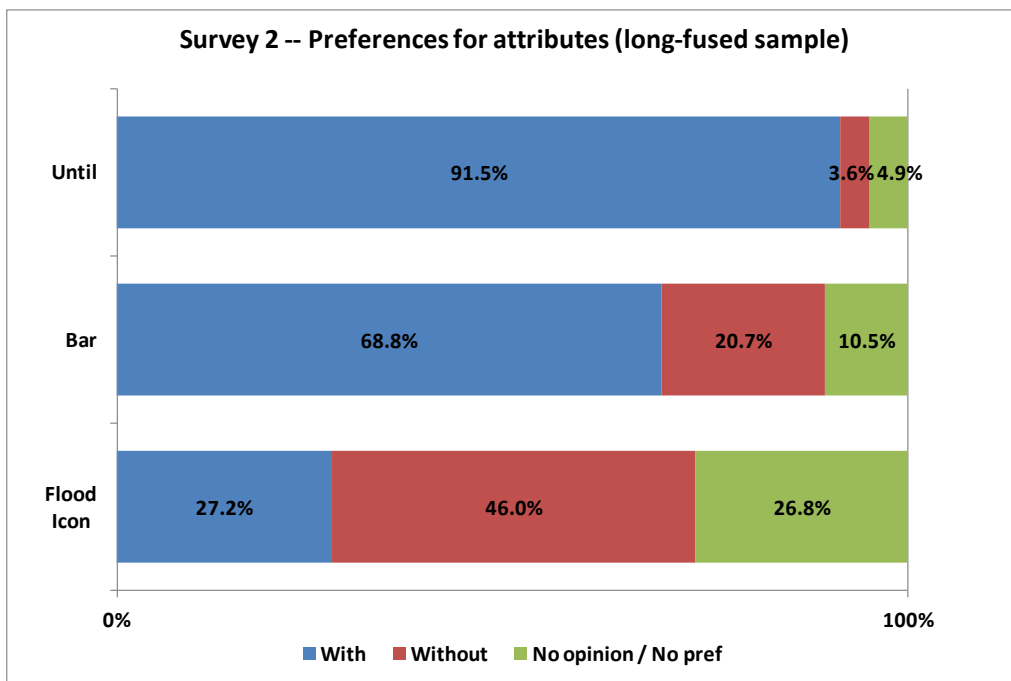
Figure 5-4. Survey 2 forecast designs with icons representing (a) a thunderstorm and (b) a flood (short-fused survey n=4,239; long-fused survey n=2,081)

Assessing and Improving the NWS Point-and-Click Webpage

Overall, the results shown in Figure 5-5 reveal that $\geq 90.9\%$ of respondents prefer the box and the end-time text attributes. Although 66.3–68.8% of respondents indicated they prefer having the bar, the results (Figures 5-2 and 5-3, and Finding 10) nevertheless suggest that the bar does not help most respondents accurately understand the threat timing. Least preferred are the thunderstorm icon (37.0%) and flood icons (27.2%).



(a)



(b)

Figure 5-5. Respondents' preferences for (a) short-fused and (b) long-fused Survey 2 individual experimental attributes (short-fused survey n=4,239; long-fused survey n=2,081)

Finding 11: The box is perceived favorably by respondents as being useful, visually appealing, and attention-getting, and for prompting additional information-seeking. In addition, over 90% of respondents prefer to have the box than not to.

5.2. Results of 2nd Survey on Communication of Hazardous Weather with NWS PnC Users (Survey 3)

Based on the results detailed above, we designed and implemented the second communication of hazardous weather survey in which we added start-time text (per Finding 9), omitted the bar (per Finding 10), and added the box for long-fused hazardous weather threats (per Finding 11).

As in Surveys 1 and 2, two questions in Survey 3 served as validity checks to ensure that respondents (a) have heard of the NWS and (b) have ever used the PnC webpage. Accounting for the respondents who said “no” to either question, the sample size for the short- and long-fused surveys are $n=3,717$ and $n=3,747$, respectively.

5.2.1. Evaluation of Individual Experimental Forecasts

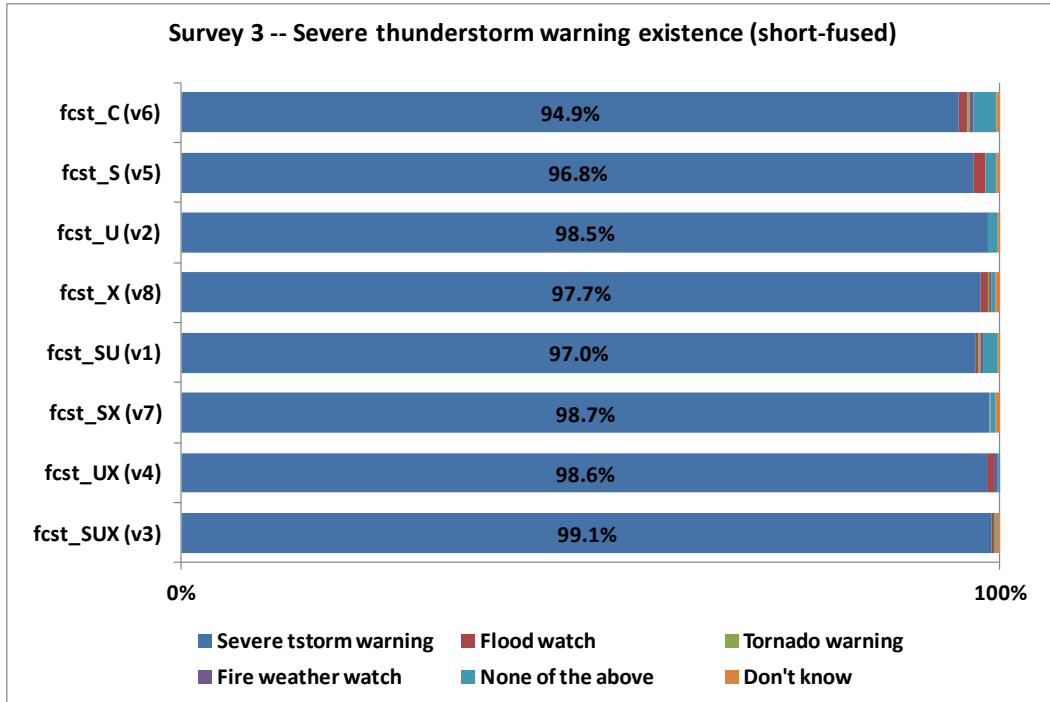
Once again, participants were randomly invited to participate in either the short- or long-fused survey. Within each survey, participants were randomly assigned to one of the experimental forecasts and then asked a series of questions about the threat existence, threat timing, and their perceptions of the forecast information.

5.2.1.1. Threat Existence

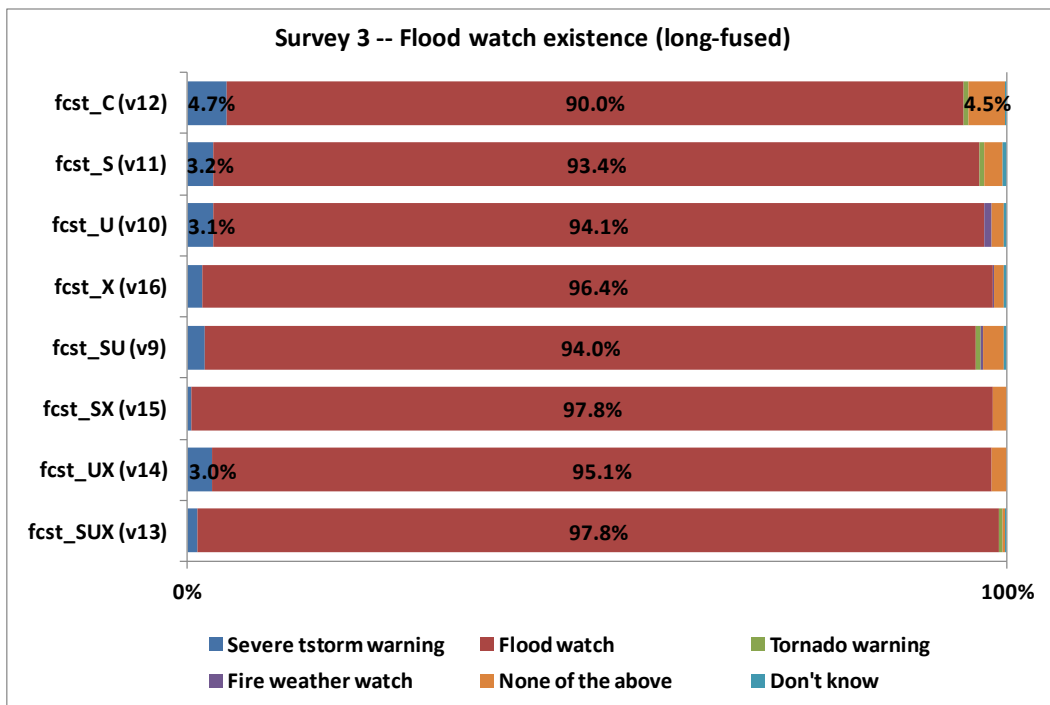
After receiving one of the experimental forecasts, respondents were asked which hazardous weather threat appears in the forecast (Figure 5-6). The correct answers were “severe thunderstorm warning” for the short-fused designs and “flood watch” for the long-fused designs.

Overall, for all the experimental forecasts, $\geq 94.9\%$ of respondents correctly identified the severe thunderstorm warning as the short-fused threat and $\geq 90.0\%$ correctly identified the flood watch as the long-fused threat. Thus, regardless of the experimental design, there were extremely high rates of respondents accurately noticing the existence of a hazardous weather threat, at least when specifically asked to do so. It is unknown what percentage of respondents would correctly identify the threats based on the different forecast design if they were not prompted.

Statistically, although all forecast designs are effective, there are significant differences among them regarding whether or not respondents correctly identified the threat (SF: $\chi^2[7, n = 3,717] = 26.83, p < 0.01$; LF: $\chi^2[7, n = 3,747] = 46.01, p < 0.01$). The forecast with all three attributes (fcst_SUX) is less associated with respondents identifying the wrong weather threat (SF: std res = -2.0 ; LF: std res = -2.8). The control (fcst_C) is more associated with the respondent identifying the wrong weather threat (SF: std res = 3.9 ; LF: std res = 4.8).



(a)



(b)

Figure 5-6. Respondents' identification of the (a) short-fused and (b) long-fused weather threats based on Survey 3 experimental forecast (short-fused survey n=3,717; long-fused survey n=3,747)

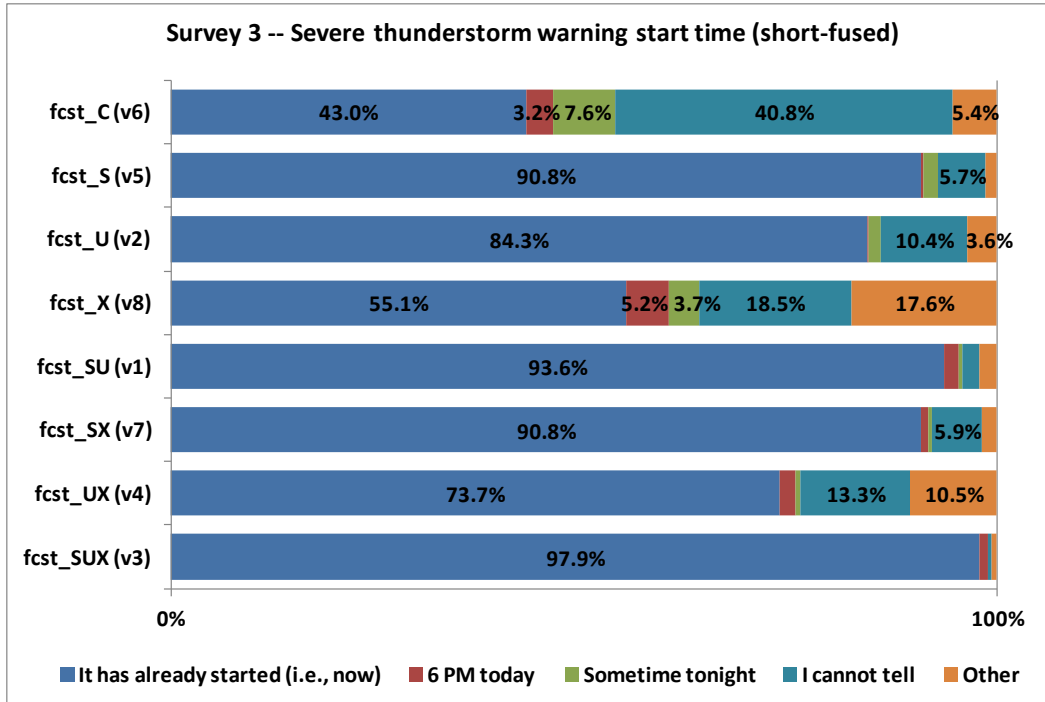
5.2.1.2. Threat Timing

Based on the experimental forecast received, respondents were also asked questions about what time the hazardous weather threat starts (Figure 5-7) and ends (Figure 5-8). The precise start-time answers were “It has already started (i.e., now)” for the short-fused designs and “6 AM on Thurs” for the long-fused designs. The precise end-time answers were “6 PM today” for the short-fused designs and “6 PM on Sat” for the long-fused designs. Some of the other answer options are not necessarily incorrect. For instance, the control (i.e., the status quo) for the long-fused event does not have explicit information about the flood watch start or end time, so respondents who received this design may have indicated “I cannot tell” or “Other” to the timing questions. Although it is not incorrect for respondents to select these options, the goal is to assess and improve people’s understanding of the event timing, so we consider more precise, accurate answers as better.

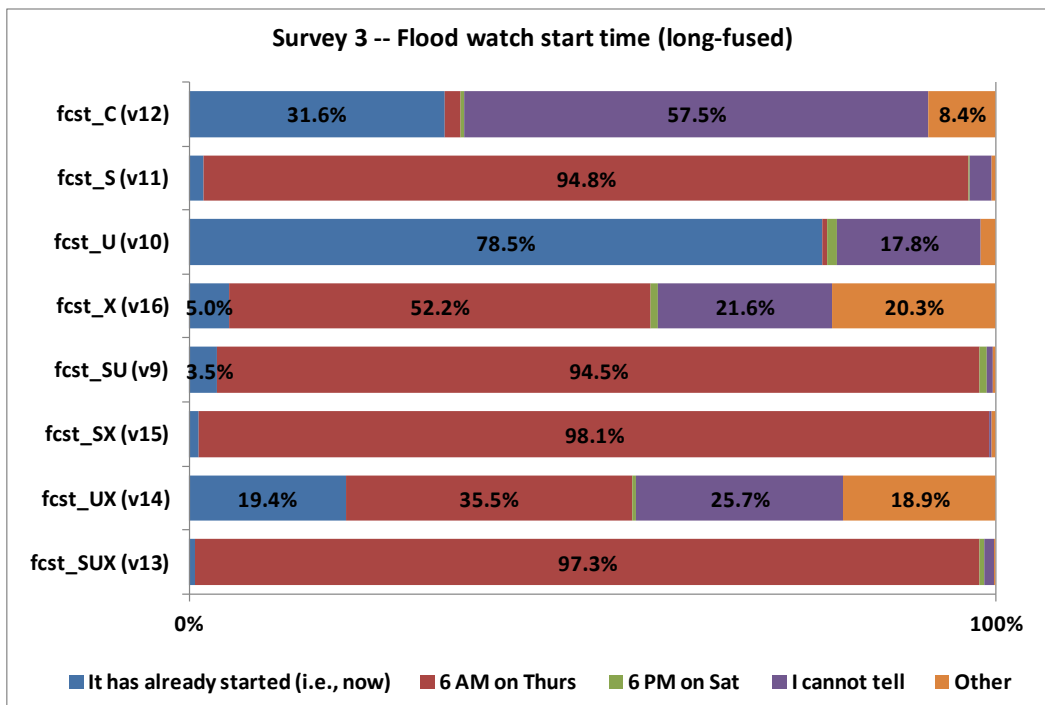
Threat Start Time

Overall, all experimental forecasts that explicitly include the start-time text (S) are associated with $\geq 90.8\%$ of respondents correctly understanding the short-fused start time and with $\geq 94.5\%$ of respondents correctly understanding the long-fused start time. Thus, the start-time text, not surprisingly, effectively helps PnC users better understand when a hazardous weather threat goes into effect. Ineffective at precisely conveying the timing for both the short- and long-fused events is the control (fcst_C). Also ineffective for the long-fused event is the forecast with only the end-time text (fcst_U); 78.5% of respondents who received this forecast incorrectly think the flood watch has already started. This suggests that for long-fused events that go into effect at a future time, having the end-time information only without the start-time can mislead people into thinking the threat is already in effect.

Statistically, there are significant differences among the forecast designs regarding whether or not respondents identified the precise, accurate start time (SF: $\chi^2[7, n = 3,717] = 802.67, p < 0.01$; LF: $\chi^2[7, n = 3,747] = 2,414.17, p < 0.01$). All forecast designs with the start time are less associated with selecting the wrong start time (SF: std res ≤ -5.0 ; LF: std res ≤ -11.3) and more associated with selecting the correct time (SF: std res ≥ 2.7 ; LF: std res ≥ 9.0). The control (fcst_C) is less associated with selecting the correct start time (SF: std res = -9.0 ; LF: std res = -17.8) and more associated with selecting one of the other options (SF: std res = 16.3 ; LF: std res = 22.4).



(a)



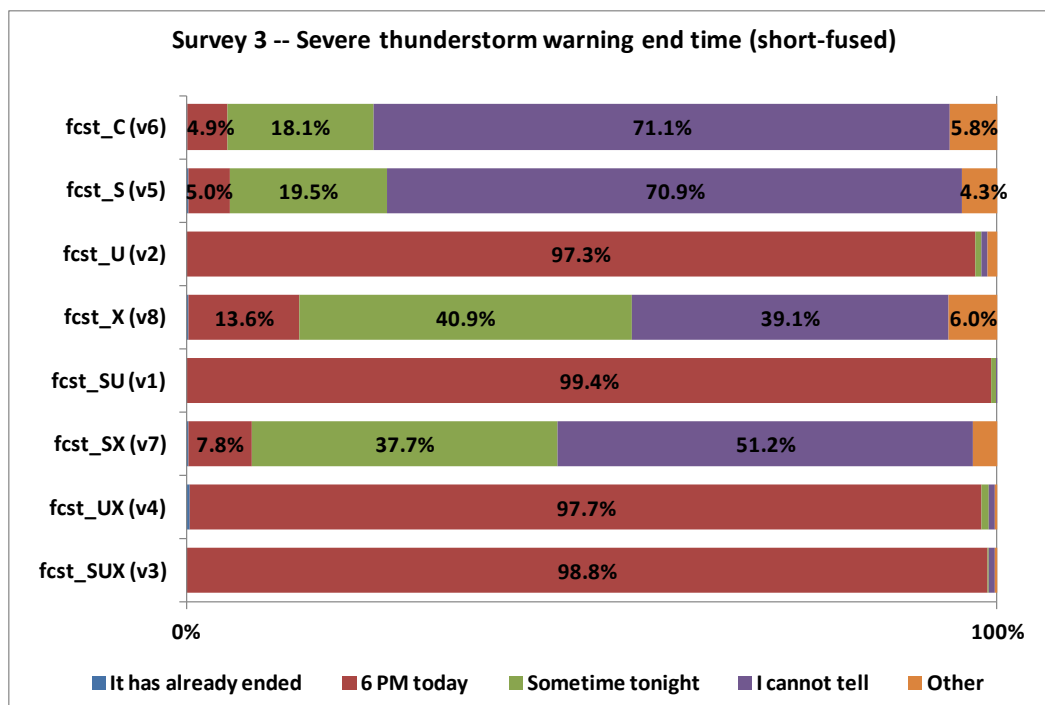
(b)

Figure 5-7. Respondents' understanding of the (a) short-fused and (b) long-fused weather threat start times based on Survey 3 experimental forecast (short-fused survey n=3,717; long-fused survey n=3,747)

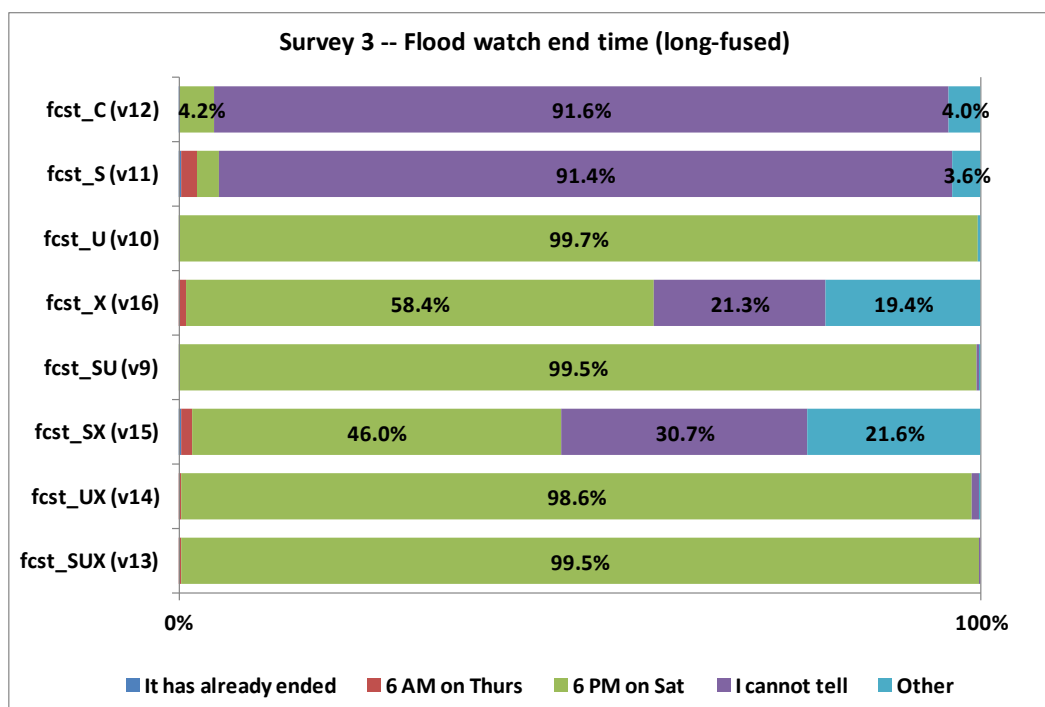
Threat End Time

Overall, all experimental forecasts that explicitly include the end-time (i.e., until) text (U) are associated with $\geq 97.3\%$ of respondents correctly understanding the short-fused end time and with $\geq 98.6\%$ of respondents correctly understanding the long-fused end time. Thus, the end-time text, not surprisingly, effectively helps PnC users better understand until when a hazardous weather threat is in effect. The forecast designs that have the box without the end-time text (fcst_X and fcst_SX) appear to help many respondents infer the approximate time that the hazardous weather threats end, particularly for the long-fused event, suggesting that these respondents understand the box is conveying the threat timing. Nevertheless, explicitly including the end-time text is better at helping respondents understand the precise threat timing. Most ineffective at precisely conveying the end timing for both the short- and long-fused events are the control (fcst_C) and design with the start-time text only (fcst_S).

Statistically, there are significant differences among the forecast designs regarding whether or not respondents identified the precise, accurate end time (SF: $\chi^2[7, n = 3,717] = 3,047.53, p < 0.01$; LF: $\chi^2[7, n = 3,747] = 2,521.51, p < 0.01$). All forecast designs with the end time are less associated with selecting the wrong end time (SF: std res ≤ -12.9 ; LF: std res ≤ -11.0) and more associated with selecting the correct time (SF: std res ≥ 11.7 ; LF: std res ≥ 8.7). The control (fcst_C) and design with the start-time text only (fcst_S) are less associated with selecting the correct end time (SF: std res ≤ -11.3 ; LF: std res ≤ -15.8) and more associated with selecting one of the other options (SF: std res ≥ 12.4 ; LF: std res ≥ 20.0).



(a)



(b)

Figure 5-8. Respondents' understanding of the (a) short-fused and (b) long-fused weather threat end times based on Survey 3 experimental forecast (short-fused survey n=3,717; long-fused survey n=3,747)

5.2.1.3. Perceptions of Experimental Forecasts

Based on the experimental forecast received, respondents were also asked questions about their perceptions of how well the forecast conveys specific types of information (Table 5-3) as well as their assessment of the overall information, including the design usefulness, visual aspects, and prompting of additional information-seeking (Table 5-4).

Overall, as shown in Table 5-3, for all the experimental forecasts, respondents have very favorable perceptions that the existence of the short- and long-fused threats is well conveyed; this is consistent with respondents' actual correct identification of the threat existence discussed above. Also, respondents' perceptions of how well the experimental forecasts convey start and end times of the short- and long-fused hazardous weather threats are consistent with their actual understanding of the threat timing—that is, designs with the explicit start- (end-) time text on average are perceived more favorably at conveying the start (end) time than designs without this information. Respondents' perceptions of how well the different forecast designs convey the imminence of the short-fused threat show that the start-time text individually (fcst_S) and coupled with the box (fcst_SX and fcst_SUX) are more favorably perceived than the other designs.

Statistically, there are significant differences ($p < 0.01$) among all experimental forecasts for all the outcome variables (e.g., perceptions of threat existence communication). We do not report the detailed results of all statistical tests here.

Table 5-3. Mean * perceptions of communication of specific information (Survey 3)				
	Perceptions of Threat Existence Communication	Perceptions of Start-Time Communication	Perceptions of End-Time Communication	Perceptions of Imminence Communication
Short-Fused Experimental Forecast				
fcst_C (v6)	4.09	2.09	1.88	2.75
fcst_S (v5)	4.17	2.97	1.94	3.78
fcst_U (v2)	4.31	2.35	4.54	3.23
fcst_X (v8)	4.48	2.90	2.49	3.34
fcst_SU (v1)	4.34	3.75	4.45	3.56
fcst_SX (v7)	4.37	3.21	2.21	3.96
fcst_UX (v4)	4.52	2.93	4.49	3.56
fcst_SUX (v3)	4.51	3.91	4.47	3.81
Long-Fused Experimental Forecast				
fcst_C (v12)	3.99	1.74	1.52	2.25
fcst_S (v11)	4.10	4.30	1.76	2.82
fcst_U (v10)	4.10	2.07	4.53	2.59
fcst_X (v16)	4.30	3.74	3.69	3.04
fcst_SU (v9)	4.26	4.59	4.59	3.08
fcst_SX (v15)	4.42	4.48	3.48	3.23
fcst_UX (v14)	4.40	3.47	4.56	3.10
fcst_SUX (v13)	4.41	4.57	4.56	3.16
* Based on a response scale of 1 to 5, where 1 means does not communicate well at all and 5 means communicates extremely well.				

Respondents' perceptions of the experimental forecasts overall are favorable on average (Table 5-4). For both the short- and long-fused events, all designs with the box (fcst_X, fcst_SX, fcst_UX, and fcst_SUX) are perceived favorably compared to the other designs. These four designs are associated with the top four mean values in terms of being visually appealing and attention-getting and for prompting additional information-seeking, and they are among the highest mean values in terms of providing useful information.

Statistically, there are significant differences ($p < 0.01$) among all experimental forecasts for all the outcome variables (e.g., usefulness of information). We do not report the detailed results of all statistical tests here.

Table 5-4. Mean* perceptions of communication of overall information (Survey 3)				
	Usefulness of Information	Visual Appeal of Information	Information is Attention-Getting	Information Would Prompt Additional Information-Seeking
Short-Fused Experimental Forecasts				
fcst_C (v6)	4.08	3.44	3.84	4.01
fcst_S (v5)	4.22	3.60	4.04	4.16
fcst_U (v2)	4.30	3.64	4.05	4.10
fcst_X (v8)	4.25	3.87	4.34	4.20
fcst_SU (v1)	4.32	3.66	4.05	4.12
fcst_SX (v7)	4.28	3.89	4.37	4.26
fcst_UX (v4)	4.41	3.98	4.44	4.19
fcst_SUX (v3)	4.42	4.04	4.43	4.20
Long-Fused Experimental Forecasts				
fcst_C (v12)	3.95	3.37	3.73	4.03
fcst_S (v11)	4.06	3.48	3.90	4.06
fcst_U (v10)	4.10	3.55	3.98	4.04
fcst_X (v16)	4.21	3.88	4.23	4.18
fcst_SU (v9)	4.27	3.72	4.11	4.21
fcst_SX (v15)	4.30	3.98	4.31	4.14
fcst_UX (v14)	4.28	3.93	4.32	4.18
fcst_SUX (v13)	4.34	4.00	4.32	4.18

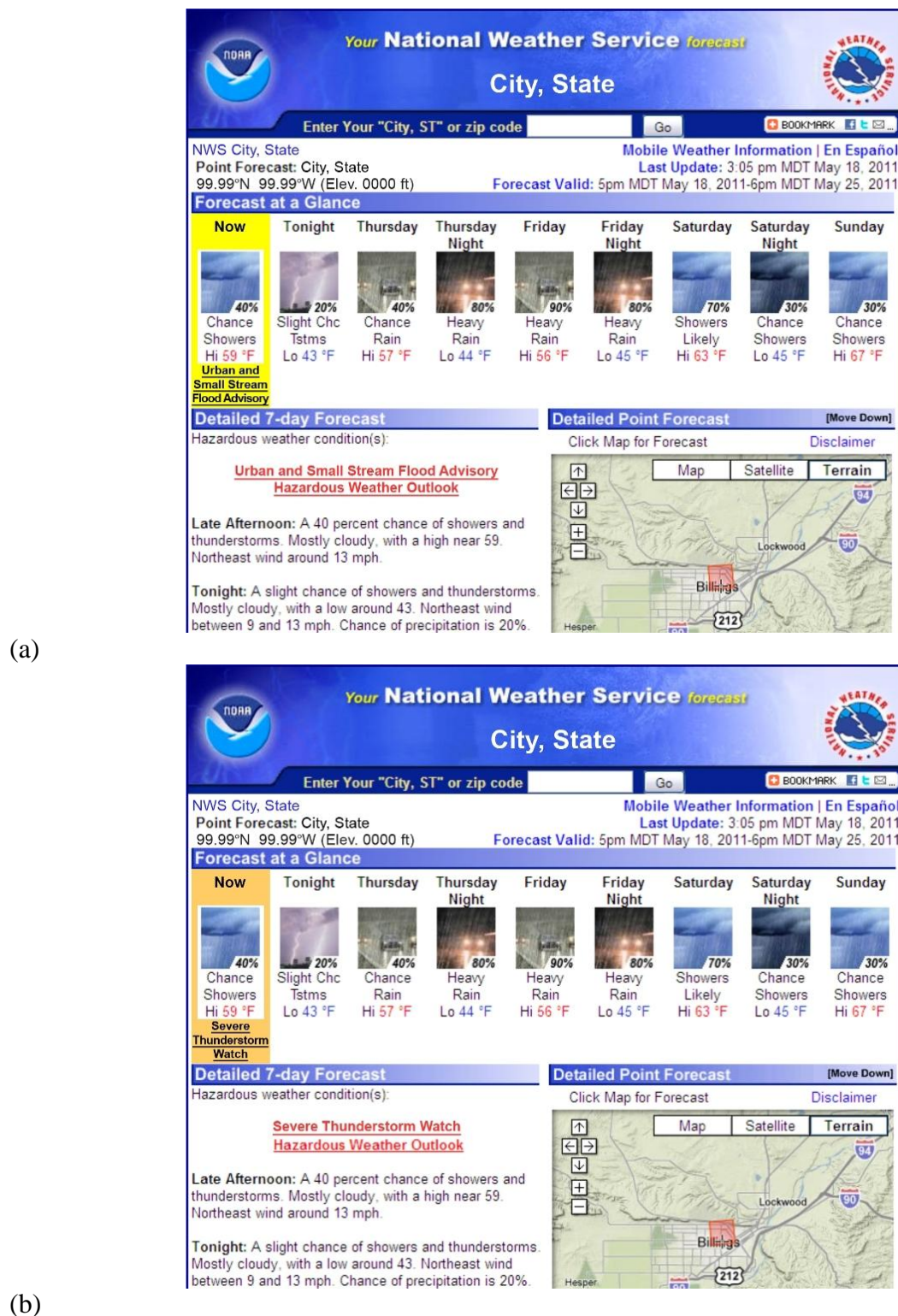
* Based on a response scale of 1 to 5, where 1 means not at all true and 5 means extremely true.

5.2.2. Preferences for Experimental Attributes

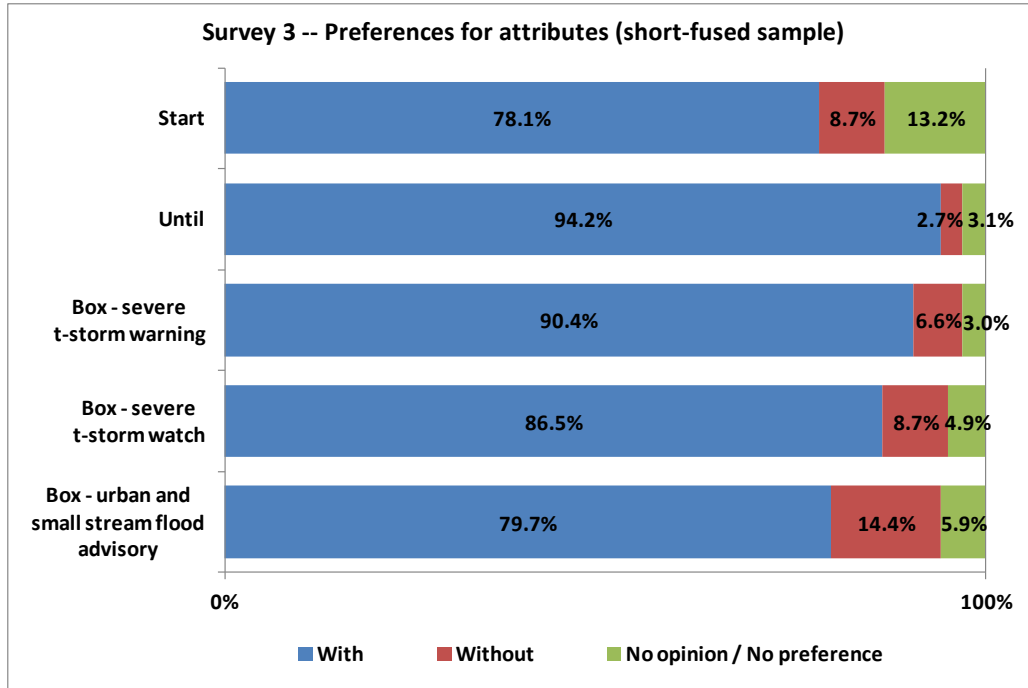
Following the true experimental portion of the survey in which respondents were randomly assigned one of the eight experimental forecasts and then were asked a series of evaluative questions (Section 5.2.1), respondents were asked to explicitly indicate whether or not they preferred each of the attributes (bar, end-time text, and box). For example, respondents were shown side-by-side the forecast design with the start-time text and the one without (i.e., control), and they were asked to indicate which they preferred. This type of question was also asked for the end-time text and box. In addition to the red warning box, we also asked respondents to evaluate an orange short-fused watch box and a yellow short-fused advisory box (Figure 5-9). Respondents of the long-fused survey also were asked to explicitly evaluate the orange long-

Assessing and Improving the NWS Point-and-Click Webpage

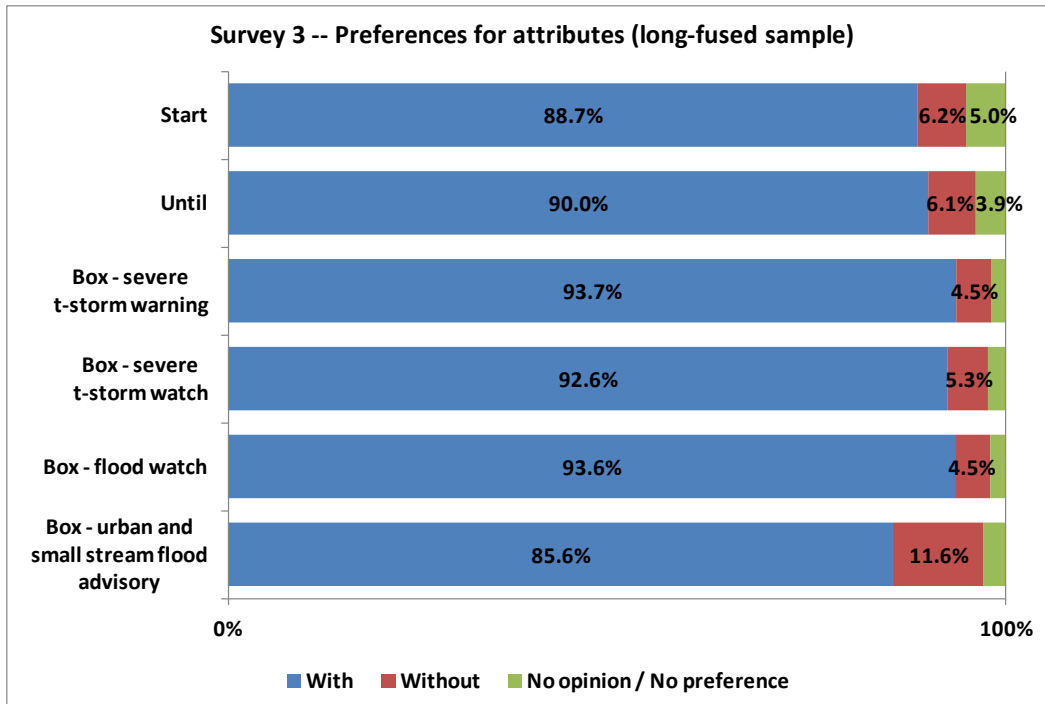
fused watch box. Otherwise, all respondents received all the other questions (see Section G.2, Questions 13–17; Section G.3, Questions 13–18). The results are shown in Figure 5-10.



Overall, most respondents prefer all the individual attributes. The start-time text is preferred by more respondents for the long-fused event (88.7%) than for the short-fused event (78.1%), most likely because the long-fused weather hazards are those for which the start time is unclear (i.e., in the current forecast presentation). On the other hand, the end-time text is preferred by slightly more respondents for the short-fused event (94.2%) than for the long-fused event (90.0%). This might suggest that the ending time of an ongoing weather threat is of more interest than a future weather threat to most users, perhaps because it may have more impact on most individuals' decision-making. The box is preferred by the most respondents for warnings, slightly less for watches, and slightly less still for advisories, but all are preferred by nearly 80% or more of respondents.



(a)



(b)

Figure 5-10. Respondents' preferences for Survey 3 individual experimental attributes (short-fused survey n=3,717; long-fused survey n=3,747)

Another question showed three experimental forecasts for short-fused weather hazards—one each with a red warning box, an orange watch box, and a yellow advisory box—and then explicitly asked respondents for which type of weather product they would prefer having a box

(see Section G.2, Question 18; Section G.3, Question 19). All respondents of the short-fused and long-fused event surveys received this question. A slim majority of respondents prefer having the box for all three types of short-fused weather products (Figure 5-11).

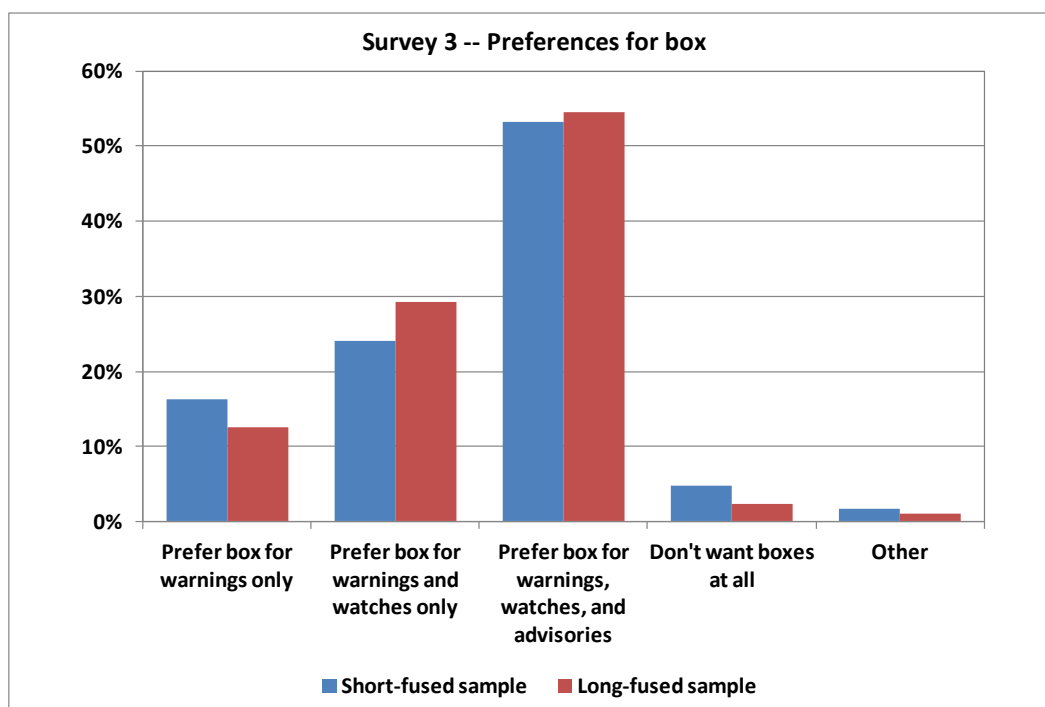


Figure 5-11. Respondents' Survey 3 box preferences for a short-fused warning, watch, and advisory (short-fused survey n=3,717; long-fused survey n=3,747)

5.2.3. Perceptions of and Preferences for Multiple Hazard Scenarios

Sections 5.2.1 and 5.2.2 presented evaluations of forecast designs for which there was only one hazardous weather threat (i.e., NWS product) in effect. Multiple products often are in effect for a given location, however. Thus, we developed additional experimental forecasts with multiple weather hazards occurring over the forecast period to evaluate respondents' perceptions and preferences for the start-time, end-time, and box attributes in these scenarios. It is beyond the scope of this research to test all possible combinations of all types of NWS products that could be in effect for a location. We developed five forecasts to test a small subset of scenarios (Figure 5-12):

- Version 1: two different weather hazards not overlapping in time
- Version 2: the same weather hazard with two different products overlapping in time
- Version 3: two different weather hazards overlapping in time
- Version 4: multiple hazards overlapping in time, the most hazardous of which is a warning
- Version 5: multiple hazards overlapping in time, the most hazardous of which is a watch.

Assessing and Improving the NWS Point-and-Click Webpage




Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code [BOOKMARK](#) [f](#) [t](#) [e](#)...

NWS City, State Mobile Weather Information | [En Español](#)
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Now (until 6 PM)	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
 40% Severe Thunder- storm Warning	 20% Slight Chc Tstms Lo 43 °F	 40% Chance Rain Hi 57 °F	 80% Heavy Rain Lo 44 °F	 90% Heavy Rain Hi 56 °F	 80% Heavy Rain Lo 45 °F	 70% Showers Likely Hi 63 °F	 30% Chance Showers Lo 45 °F	 30% Chance Showers Hi 67 °F

Flood Watch (from 6 AM Thu, until 6 PM Sat)

Detailed 7-day Forecast **Detailed Point Forecast** [\[Move Down\]](#)


Hazardous weather condition(s):

Severe Thunderstorm Warning (Now until 6 PM)
Flood Watch (from 6 AM Thu, until 6 PM Sat)

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Click Map for Forecast Disclaimer



Version 1



Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code [BOOKMARK](#) [f](#) [t](#) [e](#)...

NWS City, State Mobile Weather Information | [En Español](#)
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Now (until 6 PM)	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
 40% Severe Thunder- storm Warning	 20% Slight Chc Tstms Lo 43 °F	 40% Chance Rain Hi 57 °F	 80% Heavy Rain Lo 44 °F	 90% Heavy Rain Hi 56 °F	 80% Heavy Rain Lo 45 °F	 70% Showers Likely Hi 63 °F	 30% Chance Showers Lo 45 °F	 30% Chance Showers Hi 67 °F

Severe Thunderstorm Watch (Now until 9 PM)

Detailed 7-day Forecast **Detailed Point Forecast** [\[Move Down\]](#)


Hazardous weather condition(s):

Severe Thunderstorm Warning (Now until 6 PM)
Severe Thunderstorm Watch (Now until 9 PM)

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Click Map for Forecast Disclaimer



Version 2

Assessing and Improving the NWS Point-and-Click Webpage










Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code Go [BOOKMARK](#) [f](#) [t](#) [e](#) [m](#)

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Now (until 6 PM)	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
 40% Severe Thunderstorm Warning	 20% Slight Chc Tstms Lo 43 °F	 40% Chance Rain Hi 57 °F	 80% Heavy Rain Lo 44 °F	 90% Heavy Rain Hi 56 °F	 80% Heavy Rain Lo 45 °F	 70% Showers Likely Hi 63 °F	 30% Chance Showers Lo 45 °F	 30% Chance Showers Hi 67 °F

Flood Watch (Now until 9 PM Fri)

Detailed 7-day Forecast [\[Move Down\]](#)

Hazardous weather condition(s):
[Severe Thunderstorm Warning \(Now until 6 PM\)](#)
[Flood Watch \(Now until 9 PM Fri\)](#)
[Hazardous Weather Outlook](#)


Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Detailed Point Forecast [\[Move Down\]](#)

Click Map for Forecast [Disclaimer](#)

Map ☒ Satellite ☐ Terrain ☐



Version 3










Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code Go [BOOKMARK](#) [f](#) [t](#) [e](#) [m](#)

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 8:42 am CDT Jun 28, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 10am CDT Jun 28, 2011-6pm CDT Jul 4, 2011

Forecast at a Glance

Now	Tonight	Wednesday	Wednesday Night	Thursday	Thursday Night	Friday	Friday Night	Saturday
 60% Multiple Hazards in Effect (see below)	 Partly Cloudy Lo 73 °F	 Mostly Sunny Hi 92 °F	 Mostly Clear Lo 71 °F	 Sunny Hi 94 °F	 Mostly Clear Lo 73 °F	 Hot Hi 97 °F	 Mostly Clear Lo 78 °F	 Hot Hi 99 °F

Detailed 7-day Forecast [\[Move Down\]](#)

Hazardous weather condition(s):
[Severe Thunderstorm Warning \(Now until 915 AM\)](#)
[Flash Flood Warning \(Now until 1030 AM\)](#)
[Severe Thunderstorm Watch \(Now until noon\)](#)
[Hazardous Weather Outlook](#)
[Short Term Forecast](#)

Today: Showers and thunderstorms likely. Some of the storms could be severe. Mostly cloudy, with a high near 91. Calm wind becoming north northwest between 10 and 15 mph. Chance of precipitation is 60%. New rainfall amounts between a tenth and quarter of an inch, except higher amounts possible in thunderstorms.

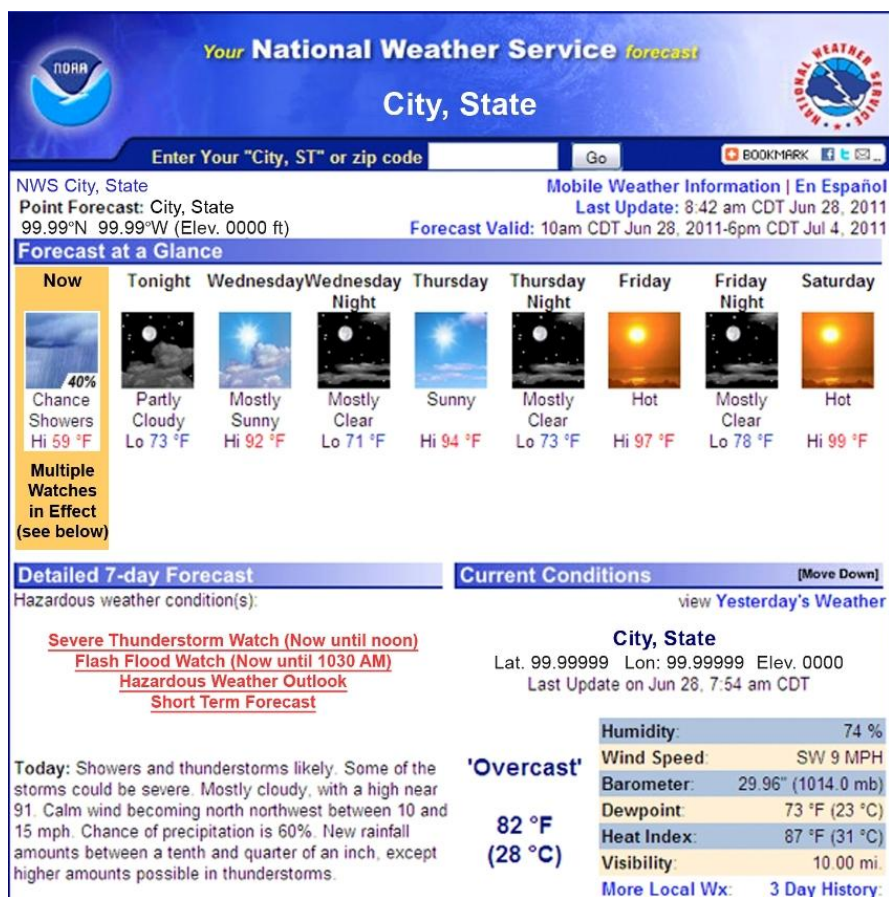
Current Conditions [\[Move Down\]](#)

City, State
 Lat. 99.99999 Lon: 99.99999 Elev. 0000
 Last Update on Jun 28, 7:54 am CDT

'Overcast'
 82 °F
 (28 °C)

Humidity: 74 %
 Wind Speed: SW 9 MPH
 Barometer: 29.96" (1014.0 mb)
 Dewpoint: 73 °F (23 °C)
 Heat Index: 87 °F (31 °C)
 Visibility: 10.00 mi.
 More Local Wx: [3 Day History](#)

Version 4



Version 5

Figure 5-12. Survey 3 forecast designs showing five multiple hazard scenarios (short-fused survey n=3,717; long-fused survey n=3,747)

Respondents were randomly assigned to one version and were asked the extent to which they disagreed or agreed with a series of statements. The statements primarily were meant to reveal whether respondents had negative perceptions and preferences regarding the forecast designs for multiple hazard scenarios. The statements addressed such topics as whether the attributes were confusing, made the forecast look cluttered, were preferred only in certain situations, or were simply too much information overall. Other statements addressed such topics as the box colors and usability.

Overall, no strongly negative attitudes about the multiple hazard forecasts emerged for any of designs tested for any of the topics asked about (Table 5-5). The only exception is the very last statement, which was tested for versions 4 and 5. Respondents of the short-fused survey on average agree that it is hard to tell which of the multiple hazards in these two forecast designs are most serious; on the other hand, respondents of the long-fused survey have more neutral perceptions. The short-fused survey respondents received forecast designs with only a single short-fused event throughout the preceding portions of the survey, so they may be comparatively more critical of the more complicated, multi-hazard forecast designs. Regardless, that respondents indicated it is hard to know which of the hazards in versions 4 are 5 are most serious may be unrelated to the experimental forecast—which simply indicates that multiple hazards are

in effect and points the user to the details below—and may instead be a more general commentary about the way NWS presents its list of red hyperlinks when multiple hazardous weather products are in effect.

Table 5-5. Mean* perceptions of and preferences for forecasts conveying multiple hazards (Survey 3)

	Short-Fused Sample					Long-Fused Sample				
	Ver1**	Ver2	Ver3	Ver4	Ver5	Ver1	Ver2	Ver3	Ver4	Ver5
Perceptions of and Preferences for the Box										
Ver 1-3*** : The “warning” and “watch” boxes help me better notice that there are different weather hazards	4.66	4.25	4.39	4.27	4.19	4.71	4.40	4.45	4.34	4.26
Ver 4-5 : The box helps me better notice that there are multiple weather hazards [multiple watches]										
Ver 1-3 : The “warning” and “watch” boxes help me better understand when the different weather hazards are in effect	4.59	4.18	4.37	4.08	4.02	4.65	4.38	4.44	4.14	4.13
Ver 4-5*** : The box helps me better understand when the multiple weather hazards [multiple watches] are in effect										
Ver 1-3 : Having more than one box is confusing	1.95	2.21	2.10	2.11	2.16	2.00	2.10	2.01	2.12	2.24
Ver 4-5*** : Having only one box when there are multiple weather hazards is confusing										
Ver 1-3 : I like that there are different colors for the “warning” and “watch” boxes	4.59	4.39	4.48	4.16	3.82	4.62	4.51	4.52	4.25	3.98
Ver 4-5*** : I like that the box indicating there are multiple hazards in effect is [red/orange]										
All Ver : The boxes make the forecast look cluttered	2.31	2.24	2.13	2.15	2.09	2.22	2.15	2.07	2.09	2.07
All Ver : I would like to be able to click on each box to get information about that weather hazard	4.35	4.08	4.13	3.87	3.89	4.36	4.15	4.15	3.91	4.00
All Ver : I would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard	3.63	3.77	3.78	3.59	3.57	3.58	3.76	3.70	3.63	3.61
Ver 1-3 only : I only want the boxes for warnings and <u>not</u> for watches	2.17	2.27	2.21			2.11	2.10	2.14		
All Ver : I would prefer <u>not</u> to have the boxes	1.66	1.78	1.69	1.73	1.78	1.58	1.62	1.59	1.66	1.74
Ver2 only : I do <u>not</u> want a “watch” box if it overlaps with a “warning” box. For instance, in this forecast, I do <u>not</u> want the “Severe Thunderstorm Watch” box since it overlaps with the “Severe Thunderstorm Warning” box.		2.61					2.46			
Ver3 only : I do <u>not</u> want a “watch” box if it overlaps with a “warning” box. For instance, in this forecast, I do <u>not</u> want the “Flood Watch” box since it overlaps with the “Severe Thunderstorm Warning” box.			2.31					2.23		
Perceptions of and Preferences for the Start- and End-Time Text										
All Ver : Having the start and end time information (e.g., “Now until 6 PM”) for more than one weather hazard is confusing.	1.97	2.19	2.15	2.20	2.07	1.99	2.25	2.09	2.28	2.19
All Ver : The start and end time information (e.g., “Now until 6 PM”) makes the forecast look cluttered	1.97	2.12	2.06	2.24	2.11	2.10	2.22	2.10	2.36	2.17
All Ver : I would prefer <u>not</u> to have the start and end time information (e.g., “Now until 6 PM”) in the boxes	1.78	1.95	1.83	1.92	1.79	1.93	2.04	1.88	1.98	1.93

All Ver: I would prefer <u>not</u> to have the start and end time information (e.g., "Now until 6 PM") in the red, underlined text/link	1.75	1.80	1.81	2.15	2.05	1.90	1.91	1.91	2.21	2.10
Perceptions of Forecast Overall										
All Ver: With the boxes and the start and end time information written out, there is too much information in this forecast	1.84	2.11	2.03	2.92	2.85	1.96	2.16	2.01		
Ver 4 and 5 only: It's hard to know which of the multiple hazards in this forecast is most serious				4.27	4.19				2.94	3.00
* Based on a response scale from 1 to 5, where 1 means strongly disagree and 5 means strongly agree. Respondents were also allowed to answer "I don't know"; those respondents were excluded from the calculation of the mean.										
** Versions refer to those shown in Figure 5-12.										
*** These statements had slightly different wording, as indicated, for Versions 1-3 and for Versions 4-5.										

Another question explicitly assessed respondents' box preferences for the scenarios in which there were two hazardous weather products overlapping—one with the same type of weather hazard (i.e., a severe thunderstorm warning and a severe thunderstorm watch) and one with different weather hazards (i.e., a severe thunderstorm warning and a flood watch). The forecast designs used were the same as in Figure 5-12, Versions 2 and 3. The exact same question was asked of the short- and long-fused survey respondents. A majority of respondents (56–59.7%) prefer to have the overlapping watch and warning boxes in both cases, and only approximately a quarter of respondents (23–26.5%) prefer the boxes only for different weather hazards (Figure 5-13).

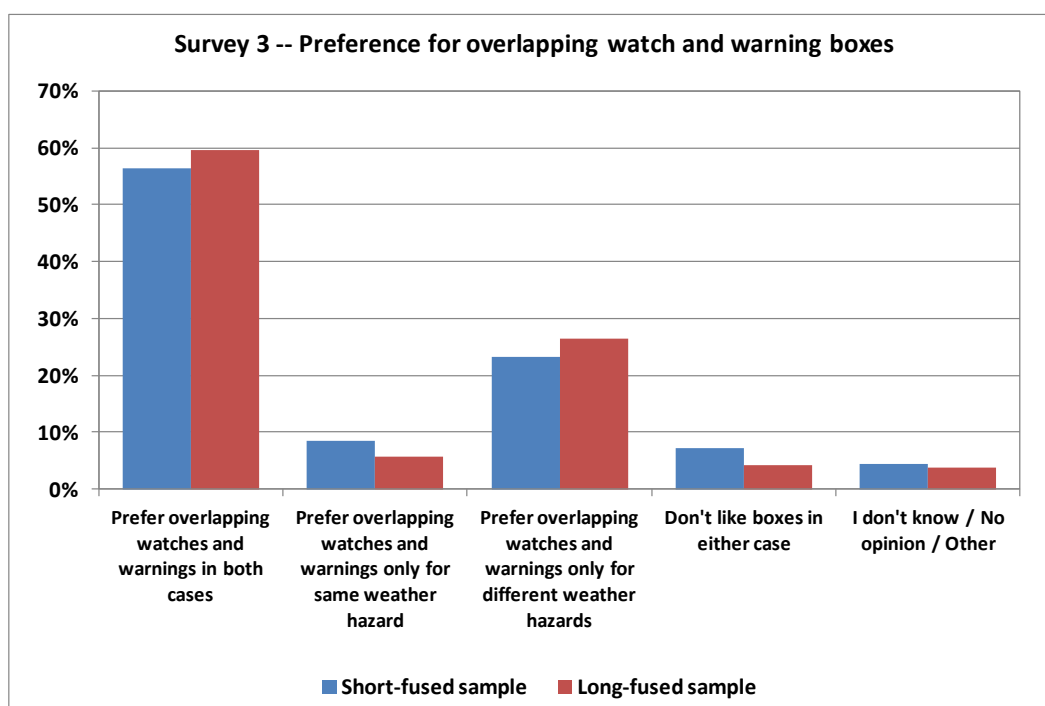


Figure 5-13. Respondents' Survey 3 box preferences for multiple hazard scenarios (short-fused survey n=3,717; long-fused survey n=3,747)

The following findings emerged based on the collection of results presented in Section 5.2:

Finding 12: Together, the start-time and end-time text attributes are favorably perceived and are effective ways of communicating when short- and long-fused hazardous weather threats go into effect (or if one is in effect already) and until when they are in effect.

Finding 13: When a single hazardous weather threat (i.e., NWS product) is in effect, the box attribute coupled with the start-time and end-time text attributes helps effectively communicate the existence and timing of short-fused and long-fused hazardous weather threats, and is favorably perceived, particularly for its visual prominence.

Based on the limited ways we were able to test respondents' box preferences for different levels of hazardous weather products, a slim majority prefers having the box for all three types of short-fused weather products—that is, for warnings (as a red box), watches (as an orange box), and advisories (as a yellow box). Based on the limited ways we were able to test respondents' box perceptions and preferences when two hazardous weather threats exist, respondents like having a different box for each product, regardless of the hazard type (same weather hazard or not) or temporal nature (overlapping or not). When more than two hazardous weather threats exist, respondents like having a single box that indicates there are multiple hazards. Because we were only able to test a limited number of experimental forecast scenarios, however, additional research should be done to further evaluate respondents' perceptions and preferences for different types of weather products and for multi-hazard situations.

6. SUMMARY

This NWS-funded research project aimed to assess the primary strengths and weaknesses of the weather forecast and observation information that is provided on the PnC webpage and to identify ways to more effectively communicate this important—and, at times, potentially life-saving—information. We gathered data through focus groups, a webpage usability evaluation, and six nationwide Internet-based surveys. These multiple qualitative and quantitative methods collectively provided a highly informative, detailed portrait of the PnC webpage largely through the eyes of its users.

Collectively, the research revealed that the PnC webpage has many strengths, the primary ones being that it gives its users accurate, timely, geographically specific forecast information both at a-glance and in greater detail. The forecast-at-a-glance icons—which were hypothesized to be perceived by PnC users as inconsistent and misleading based on prior sporadic, volunteer feedback—were found to be perceived as effective by the vast majority of participants. Generally, this finding illustrates the importance of gathering robust empirical data from a sample of individuals that more fully represents the population of interest than do anecdotal data.

Despite its strengths, there are issues with what and how some of the information on the PnC webpage is conveyed. The most critical issue that emerged is that hazardous weather information is not effectively communicated on the PnC webpage. Three issues in particular are limitations: (a) the existence and importance of a hazardous weather threat can be unclear, and the provision of hazardous weather information can be misleading; (b) the access of hazardous weather details can be cumbersome; and (c) temporal and spatial information about a hazardous weather threat is not explicitly conveyed on the PnC page. Because effective communication of hazardous weather information is central to NWS's mission to protect life and property, we focused on investigating how to better communicate this important information with an emphasis on conveying the existence and timing of hazardous weather threats.

We conducted two nationwide, Internet-based surveys of PnC users in which we employed an experimental design to evaluate forecasts with new information attributes aimed to communicate the existence and timing of a hazardous weather threat. In the first survey, the attributes were (a) a bar placed underneath the forecast-at-a-glance icons aimed to represent the time period of a threat, (b) end-time text to explicitly indicate until when a threat is in effect, and (c) a box for short-fused (imminent) events aimed to alert people to its existence.

The results revealed that two of the attributes did not always communicate the intended information. First, most respondents did not accurately understand that the bar was intended to communicate the threat timing; some indicated that they learned this as the survey progressed, but it was not immediately understandable. Second, the end-time text misled most respondents into thinking the weather threat had already begun, which is particularly problematic for long-fused events that go into effect at a future time. This result suggested the need to couple explicit information about the start time with the end time of a threat. Generally, these findings illustrate the importance of empirically testing new ways of communicating information to ensure that recipients interpret the information as intended and that they do not critically misinterpret the information.

Based on the results of the first survey, we conducted a second survey that employed an experimental design to evaluate forecasts comprising a modified set of attributes: (a) start-time text to explicitly indicate when a threat goes into effect, (b) end-time text to explicitly indicate until when a threat is in effect, and (c) a box for both short- and long-fused events aimed to alert people to its existence. The results revealed that these attributes were more accurately understood and favorably perceived. Specifically, when coupled, the start-time and end-time texts are simple, effective ways of communicating the timing of hazardous weather threats. Moreover, when coupled with the start-time and end-time texts, the box effectively communicates the existence and timing of hazardous weather threats and is favorably perceived, particularly for its visual prominence. We further tested perceptions and preferences of the box when multiple weather hazards existed during a forecast period. Although individuals responded favorably, we were able to evaluate only a limited number of multi-hazard scenarios; further research to more fully evaluate the box in these scenarios would be prudent.

This project began with an exploratory data collection phase and then focused on improving the communication of the existence and timing of hazardous weather information. Yet, other limitations exist in how hazardous weather information is currently provided that are worthy of future research in support of NWS's mission to protect life and property, including (a) addressing the issuance of a Hazardous Weather Outlook when no hazardous weather is occurring or for weather events for which what is deemed "hazardous" is subjective, (b) improving the content and format of information in all hazardous weather text products so that key information can be extracted quickly and accurately, and (c) providing spatial information about hazardous weather threats in simple, understandable ways on the PnC webpage.

This work focused on current users of the PnC webpage, most of whom are long-term, frequent users. We did not attempt to evaluate why non-users do not use the webpage. The survey we conducted with the public may offer insight into this issue if it reveals differences between the general public and the PnC users. This analysis was beyond the scope of this report but will be part of future analysis.

In summary, this research project illustrates that broadly representative, rigorous data from hard-to-reach populations—in this case, NWS PnC webpage users—can be collected with a thoughtful research design. Doing so revealed a wealth of empirical data about PnC webpage users' uses of, perceptions of, and preferences for the information as well as ways to improve the webpage information to better serve its users. Such robust approaches are particularly essential when considering policy changes that affect people's lives and well-being, as the PnC forecast information—and particularly the provision of hazardous weather forecast information—does. Indeed improvements made to the PnC webpage based on the results from this project have the potential to translate to tremendous positive real-world impacts for its millions of users.

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APPENDICES

- A. Exploratory Focus Groups: Instruments**
- B. Sampling Frame Development for Data Collection with NWS PnC Users**
- C. Exploratory Usability Evaluation: Instrument and Results**
- D. Exploratory NWS PnC User Survey (Survey 1): Implementation, Instrument, and Codebook**
- E. Public Survey: Implementation, Instrument, and Codebook**
- F. 1st Survey on Communication of Hazardous Weather with NWS PnC Users (Survey 2): Implementation, Instrument with Experimental Designs, and Codebook**
- G. 2nd Survey on Communication of Hazardous Weather with NWS PnC Users (Survey 3): Implementation, Instrument with Experimental Designs, and Codebook**

Appendix A

Exploratory Focus Groups: Instruments

A.1. Forecast Provider Focus Group Instrument

Informed consent

[Ensure everyone has read the informed consent and that they orally agree.]

Topic Introduction

There is growing support for the social sciences in the NWS and in the broader Weather Enterprise, and NWS is starting to support research that includes social science theories, concepts, and methods. We have a research project that is jointly funded by NWS's Office of Science and Technology (OST) and the Office of Climate, Weather, and Water Services (OCWWS) to assess and improve the point-and-click webpage from the public's perspective.

In general, we intend to assess people's cognition, attitudes, and behaviors for this forecast information. This research is focused on the NWS web information, so many of the questions are framed accordingly. However, most of what we intend to examine will provide information for the broader Weather Enterprise, including broadcasters and other private sector companies.

We're at the very beginning of planning our research scope and data collection. We'll primarily be collecting data from members of the public, first through a few focus groups and then most likely through a web-based survey that we'll develop and implement over the next 6-9 months.

But, before we even start with the public, we know that you have a LOT of knowledge and opinions based on your everyday experiences forecasting and based on your interactions with members of the public (via email, in person, etc.). Our focus group today is for us to learn about what thoughts and opinions you have and want to share.

Questions

[Show example of NWS point-and-click web forecast] This is an example of forecast information that the NWS provides on its point-and-click webpage.

1. (*professional roles*) What are your roles relating to generating and using this information?
 - a. Do you look at it (either after issuing a forecast; when issuing a forecast)?
 - b. For the NWS folks, to what extent can you modify this information?
2. (*attitude – thoughts*) What do you think about the forecast information being provided here? What do you like about the information? What don't you like?
3. (*audience perception*) In your experience, who do you think the users of this webpage are? Who gives you feedback?

Assessing and Improving the NWS Point-and-Click Webpage

- a. What information do they look at?
 - b. What do they think about the forecast information being provided? What do they like? What don't they like?
 - c. How do they use the information?
4. **(information preferences – content)** Is there any information that is not provided that you think should be *(based on own opinion or experience of public feedback)*?
 - a. Is there any information provided that you don't think should be?
 - b. Is there any information that you think should be provided differently?
5. **(information preferences – format)** Right now, the forecast is provided for 12-hour periods. What do you think about this?
 - a. Would providing the forecast at greater temporal resolution be better?
 - b. Is that possible?
 - c. Could the temporal resolution vary by lead-time?
6. **(operational constraints)** Do you have any concerns about changes to the point-and-click webpage?
 - a. Operational forecasting constraints?
 - b. Technical constraints?
 - c. Concerns about others' ingesting or using the data?
7. As possible, show additional examples in PowerPoint and have them discuss them
8. Do you have any final thoughts or opinions about this research project that you would like share?

A.2. Public Focus Group Instrument

Informed consent

[Ensure everyone has read and signed the informed consent document]

Topic Introduction

The National Weather Service provides several types of forecast information via its webpage. Getting feedback from people like you is important to ensure that the NWS is providing information that is important and useful to you. Today, we want your thoughts and opinions about some of the web-based forecast information the NWS provides. There are no right or wrong answers! We just want your input.

Questions

1. **(behavior/use)** Where do get weather information?

[Hand out hard copy example of NWS point-and-click web forecast] This is an example of forecast information that the NWS provides on its webpage. We want you to spend a few minutes writing down whatever thoughts and opinions you have about this information.

2. *(attitude/thoughts)* What do you think about the forecast information being provided here? What do you like about the information? What don't you like?
3. *(behavior/attention)* What part do you look at first? Do you look at anything else?
4. *(behavior/use)* Do any of you use this website? Why? Why not?
5. *(cognition/comprehension)* How do you interpret this information? What do you think the forecast means?
6. *(cognition/comprehension)* Is any of the information confusing?
7. *(behavior/use)* How would you use this information?
 - a. How would you use this information to make a decision?
8. *(attitude/preferences)* Is there any information you would like to have that is not provided? Is there any information provided that you don't ever want?
9. *(attitude/preferences)* Right now, the forecast is provided roughly for every 12 hours. There's a forecast for today, another forecast for tonight, etc. Does this meet your needs?
10. *(uncertainty)* Most of the information is what we call deterministic, which means the forecast is only for a single value with no uncertainty provided. For instance, the high temperature forecast of [\[read off high temp forecast\]](#) is an example of what we mean by a deterministic, or single-value forecast.
 - a. *(attitude/thoughts)* What do you think about the forecast information provided in this way?
11. Do you have any final thoughts or opinions about this information that you would like share?

Appendix B

Sampling Frame Development for Data Collection with NWS PnC Users

The target population for this study is all users of all NWS PnC pages. Because no complete list of this population of PnC users exists, we first developed a sampling frame—that is, a list of PnC users with contact information from which we could randomly select a subset to invite as participants for this study. The recruitment text (Figure B-1) was posted under the “Forecast at a Glance” icons on every PnC webpage in the country from July 28, 2010, to September 14, 2010. We recruited from the PnC webpage to ensure that our sampling frame consisted of people who use this webpage. We recruited over this multi-week period to offer people who were semi-regular users of the PnC webpage an opportunity to volunteer. From the PnC page, people were redirected via a landing webpage (Figure B-2) to an NCAR Societal Impacts Program webpage (Figure B-3) where they provided their contact information. Over 88,000 people submitted unique contact information.

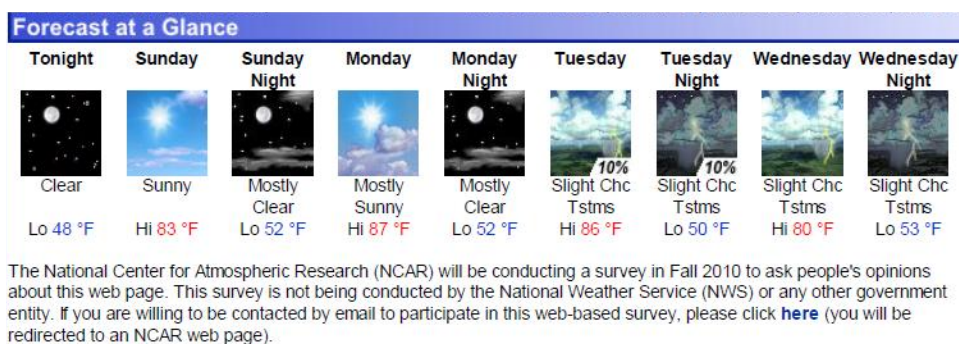


Figure B-1. Example screen shot showing the sample recruitment text on the NWS point-and-click webpage



We hope your visit was informative and enjoyable.

Figure B-2. Example screen shot showing the landing webpage

Assessing and Improving the NWS Point-and-Click Webpage

The screenshot shows the NCAR Societal Impacts Program (SIP) webpage. The header features the NCAR logo and the title "Societal Impacts Program" against a background of a lightning storm. A navigation bar includes links for "UCAR Home", "NCAR", "SIP Home", "About SIP", "Research", "Resources", and "Publications". Below this, a secondary navigation bar highlights "SIP Home", "Newsletter", "Contact", "Research", "Resources", and "Publications". The main content area is titled "Contact Information for NCAR Survey of NWS Point-and-Click Forecast Information". It contains a paragraph explaining the survey, followed by a form with fields for "Email Address:", "First Name:", "Last Name:", "City:", "State/Province:", "Country:", and "ZIP/Postal Code:". A "Submit" button is at the bottom of the form. On the left side of the page, there is a sidebar with links for "About SIP", "Our Research", "Community Resources", "WAS*IS", and "For SIP Staff".

NCAR

Societal Impacts Program

UCAR Home | NCAR

SIP Home About SIP Research Resources Publications

Newsletter Contact

NCAR > SIP > AGG Sampling Page

Contact Information for NCAR Survey of NWS Point-and-Click Forecast Information

The National Center for Atmospheric Research (NCAR) will be conducting a web-based survey in Fall 2010 about the National Weather Service's (NWS) point-and-click forecast web page. The survey will ask your thoughts and opinions about the forecast information provided on the NWS web page. If you are interested in participating in this survey, please submit your contact information below. Note that you **must** fill out all fields. We will keep all your personal information confidential, and we will securely store it on password-protected computers. **We will not share your contact information with anyone else.**

In Fall 2010, we will randomly select from the list of people who complete the form below. If you are selected, we will contact you by email to invite you to fill out a short web-based survey about the NWS point-and-click forecast web page.

If you have any questions about this survey, please contact us at foraag_survey@rap.ucar.edu.

Email Address:

First Name: Last Name:

City: State/Province:

Country:

ZIP/Postal Code:

About SIP

- Mission & Goals
- People
- Sponsors
- What's New
- Contact Us

Our Research

- Current Projects
- Publications
- Presentations

Community Resources

- ESRL-SIP Seminar Series
- Weather & Society Watch
- Discussion Board
- Extreme Weather Sourcebook
- Economics Primer
- Societal Aspects of Weather
- WeatherZine 1996-2002
- Digital Library
- Use & Value Bibliography

WAS*IS

- Mission & Objectives
- Resources
- Support
- Contact

For SIP Staff

- Hurricane WG
- NA THORPEX SERA
- Internal

Figure B-3. Example screen shot showing the NCAR SIP webpage where people provided their contact information

Appendix C

Exploratory Usability Evaluation: Instrument and Results

In November 2010, we conducted usability evaluations of the NWS PnC webpage. This research was conducted in partnership with Dr. Donald Zimmerman of Colorado State University's (CSU) Department of Journalism and Technical Communication (JTC) as well as Shaikhah Alghaith, Ashley Blickenstaff, Maryam Dadkhah, David Fry, Kristen Hemphill, Peggy Roberts, and Bevin Song from the JTC-661 Information Design class. The findings presented below are extracted from the full usability evaluation report.⁹

C.1. Usability Task Instrument for Verbal Protocol Analysis

The National Weather Service websites provide diverse information for different users.

Today, we need your help in evaluating the National Weather Service website to assess its usability.

We will ask you to review the website, use selected features, and then find information about specific topics.

Afterwards, we'll ask you to complete a survey about your experience.

Please keep in mind that some features of the website may not work and others are still being developed.

As you work, please talk aloud telling us what you're thinking. We'll be taking notes and videotaping you.

Remember we are not testing you, but are trying to learn what changes we may need to make so that the website is easy to use

Log onto this website:

<http://forecast.weather.gov/MapClick.php?CityName=Fort+Collins&state=CO&site=BOU&textField1=40.5555&textField2=-105.068&e=0>

1. What is tomorrow night's forecast?

KEY: to observe whether participants use the icons or the text.

2. Translate website to Spanish, then back to English.

KEY: Click on translator button.

3. What was yesterday's high temperature in Denver, CO?

⁹ The full usability evaluation report is available from Julie Demuth (jdemuth@ucar.edu) or Dr. Donald Zimmerman (don.zimmerman@colostate.edu).

KEY: Navigate to Denver forecast page. Then either (a) click on “Yesterday’s weather” up near the “Current conditions”, or (b) scroll down to “Additional Forecasts & Information” and click on “Denver Climate Weather Information” and then click on “Denver’s Climate Summary for Yesterday” and read the high temperature for yesterday.

4. What is the forecast temperature for Fort Collins for this Saturday at 3 pm.

KEY: (a) Click on the Hourly Weather Graph; scroll to the appropriate day; determine temperature by time, or (b) click on the “Hourly Weather Graph” and select the date and time from the drop-down menu, or (c) click on the “Quick Forecast” and get the forecast for Saturday at 3:00 p.m.

5. Using the Quick Forecast, what is the wind direction and speed at noon tomorrow for Fort Collins?

KEY: Click on Quick Forecast and look at wind direction and speed.

6. Are there any watches, warnings, advisories, or other non-typical forecast message currently in effect anywhere in the forecast area?

KEY: (a) there is a red link, the answer is “yes,” if there is no red link, the answer is “no.”, or (b) Can also scroll down to “Additional Forecasts & Information” and click on “Hazardous Weather”, and then “Current Colorado Severe Watches and Warnings”

7. Find the radar map and set it into motion.

KEY: Click on radar map and click “loop” from the left hand bar.

8. What is the forecast tomorrow for I-25 at the Colorado/Wyoming state border?

KEY: Click on map, scroll to the border following I-25.

9. Email the Fort Collins forecast to yourself.

KEY: Click on bookmark link, select “email” and send.

10. Are there any weather-related road condition alerts in Colorado?

KEY: Click on road conditions link, click on Colorado road report, find weather-related alerts.

11. What is the latitude, longitude, and elevation for Estes Park, CO.

KEY: (a) Type in Estes Park in the search box or use the map to locate Estes Park.

12. Navigate to the National Weather Service’s home page and find the email address to submit comments.

KEY: Use website link at bottom of the page or click on the logo at top of page to return to the home page, then find Contact Us and click on comments.

C.2. Verbal Protocol Analysis Results

Participants generally did well completing the usability tasks on the PnC webpage (see Table C-1). The percentage of successful completion by task ranged from 63-100% of participants, and average completion times by task ranged from 30 seconds to 1 minute 21 seconds. The three most problematic tasks (i.e., Tasks 4, 5, and 10) for the participants all required them to use one of the links found in the “Additional Forecasts & Information” section in the lower right-hand part of the page. Many of the participants indicated they do not regularly look at those links. Some participants were able to locate the information after some time searching, but others were unsuccessful.

Task 3, finding yesterday’s high temperature in Denver, also caused some problems. Some participants searched and used the “Denver Climate Weather Information” link under the “Additional Forecasts & Information” section. Others tried navigating to the NWS homepage and searching climate information from there. All participants overlooked the option to “View Yesterday’s Weather” under the “Current Conditions” section. Task 7, finding the radar map and setting it into motion, was primarily problematic to people who did not know to use the “Loop” link on the radar page. Some participants commented that animating the radar is more intuitive on other weather websites.

Table C-1. Completion of usability website tasks (N=8)

Tasks	Mean Time to Complete the Task (Min:Sec)	Percent of Respondents Completing the Task
1. What is tomorrow night’s forecast?	00:33	100%
2. Translate the website to Spanish, then back to English.	00:18	88%
3. What was yesterday’s high temperature in Denver, CO?	01:05	75%
4. What is the forecast temperature for Fort Collins for this Saturday at 3 p.m.?	01:01	63%
5. Using the Quick Forecast, what is the wind direction and speed at noon tomorrow for Fort Collins?	01:00	63%
6. Are there any watches, warnings, advisories, or other non-typical forecast message currently in effect anywhere in the forecast area?	00:35	100%
7. Find the radar map and set it into motion.	00:50	75%
8. What is the forecast tomorrow for I-25 at the Colorado/Wyoming state border?	00:43	100%
9. Email the Fort Collins forecast to yourself.	00:56	94%
10. Are there any weather-related road condition alerts in Colorado?	01:21	63%
11. What is the latitude, longitude, and elevation for Estes Park, CO?	00:30	94%
12. Navigate to the National Weather Service’s home page and find the email address to submit comments.	00:51	100%

C.3. Heuristic Evaluation Results

The evaluation of the PnC webpage included a heuristic analysis using the U.S. Department of Health and Human Service's research-based usability guidelines. Not all guidelines were applicable to the website and therefore were not analyzed. The following discussion summarizes the applicable guidelines and whether the PnC webpage was compliant with the guidelines.

The PnC webpage complied with the following select applicable usability guidelines:

Guideline 1.1 – Be easily found in the top 30.

The website can be found in the top 30 searches from several search engines.

Guideline 1.8 – Set usability goals.

The NWS website provides useful and relevant weather information for website users including, but not limited to local, regional, and nationwide forecasts, weather advisories and warnings, and historical and statistical weather information.

Guideline 2.6 – Minimize page download time.

No lengthy page download times were observed with the site.

Guideline 4.1 – Design for common browsers.

The Fort Collins website has been designed for most common browsers.

Guideline 5.1 – Enable access to the homepage.

The NWS website does a good job of making the homepage accessible from all pages within the website.

Guideline 6.1 – Place important items at top center.

The forecast-at-a-glance anchors the website and is located at the top and center of the page.

Guideline 6.7 – Align items on a page.

Information is organized on the site, horizontally with images and vertically with text.

Guideline 9.4 – Use unique and descriptive headings.

All of the page headings and subheadings clearly describe the content information displayed.

Guideline 14.5 – Include logos.

The NOAA and NWS logos are prominently located at the top of the Fort Collins webpage as well as all pages throughout the website.

Guideline 14.14 – Use thumbnail images to preview large images.

Thumbnail images are efficiently used on the Fort Collins page. For example, thumbnails are used on the page for the radar, satellite maps, and the National Digital Forecast Database.

The PnC webpage was non-compliant with the following guidelines:

Guideline 1.3 - Understands and meets user expectations.

The Fort Collins website could use improvement in understanding the site's users and ensuring that all users' expectations and information needs are met.

Guideline 6.2 – Place important items consistently.

Important information resides at the bottom of the Fort Collins page below the scroll line. For example, the links in the “Additional Forecasts & Information” box have important information. Most users do not know the information is there unless they scroll down. Links should be placed higher on the page.

Guideline 6.7 – Use fluid layouts.

The page does not automatically adjust to fit the entire monitor screen. A user can enlarge the page, but image resolution is compromised.

Guideline 7.4 – Provide feedback on user's location.

The website contains lot of information that is accessed through links and thumbnail images. However, a user cannot easily navigate back to original or previous pages without using the back button.

Guideline 9.5 – Highlight critical data.

In some cases, important information is not easy to distinguish. For example, forecasts, watches, warnings, and advisories are presented in the same way on the Fort Collins page with no easy distinction between the levels of severity (e.g., a Hazardous Weather Outlook is presented the same way as a Tornado Warning).

Guideline 9.8 – Provide users with a good way to reduce options

Currently, the site has no option for users to remove information from the page they are not interested in viewing.

Guideline 11.3 – Use mixed-case for prose text.

Warnings and watches are displayed in all capital letters which make reading difficult.

Guideline 15.2 – Avoid jargon.

The site could do a better job of clarifying terminology and associated images. For example, there is no explanation for the differences between “mostly cloudy” and “partly sunny.”

Guideline 17.4 – Provide a search option on each page.

The Fort Collins page does not offer a search option to search the entire NWS website; the search option currently provided is to search for a forecast for an area. Users must go to the NWS homepage in order to conduct a site search.

Appendix D

Exploratory NWS PnC User Survey (Survey 1): Implementation, Instrument, and Codebook

D.1. Survey Implementation Information

Survey fielding

- December 3, 2010, pretested with 5% of sample (n=500), to test for functionality, data quality, incompletes, etc
- December 6-17, 2010, fully fielded

Sample

- From the sampling frame of NWS PnC users, we randomly sampled and sent out n=9995 invitations. There were 212 email bounces, so the final number of invitees was n=9783. We received n=5153 total completed surveys for a response rate of 52.7%.
- The median time to complete the survey was 32 minutes, 15 seconds.

Subject line

- Request to respond to survey about the National Weather Service

Email text

- The National Center for Atmospheric Research (NCAR) in Boulder is conducting a survey to collect people's thoughts and opinions about weather forecast information, with an emphasis on the National Weather Service's (NWS) forecast webpage. This past summer, you (or someone who shares this email address) provided your contact information via a link from the NWS forecast webpage, indicating you would be interested in contributing to our survey. We appreciate your interest and willingness to respond.

Reminder email text to people who had not responded or had responded but had not completed

- We recently sent you an invitation to participate in a survey to collect people's thoughts and opinions about weather forecast information, with an emphasis on the National Weather Service's (NWS) forecast webpage. This past summer, you (or someone who shares this email address) provided your contact information via a link from the NWS forecast webpage, indicating you would be interested in contributing to our survey. This survey will only remain open until December 20, so we ask that you complete it as soon as possible. We greatly appreciate your help. It is only by asking people like you to share your feedback that we can better understand people's views about weather forecast information.

D.2. Survey Instrument and Codebook^{10,11}

Evaluating Weather Forecast Information provided by the National Weather Service

Important information about this survey – please read!

The purpose of this survey is to understand your thoughts about weather and weather forecast information with a focus on forecasts provided by the National Weather Service. You do not need any special knowledge about weather or weather forecasts to answer the questions.

We will use your responses to improve the communication of weather forecast information and to guide future weather-related research, so your responses are very important to us. All your responses will remain anonymous.

The survey should take you about 30 minutes to complete. Completing this survey is voluntary. The information you provide us that can be identified with you will remain confidential. We will analyze your responses together with all other respondents, so please respond as honestly as you can.

Thank you for taking the time to complete this survey!

Are you 18 years of age or older?

☐ Yes

☐ No → if “No”, then display this message: “Thank you for your interest in our study. Unfortunately, you must be at least 18 years of age to participate in this survey.” Do not let respondent answer any further questions.

Yes	No	n
1	2	
5153	0	5153

¹⁰ Open-ended responses not included due to space considerations.

¹¹ All statistics summarizing the central tendency (mean, median) and distribution (standard deviation) of response distributions are calculated omitting responses of “Don’t know”, “Not familiar with this”, “Not applicable”

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The questions below ask about your thoughts about weather forecast information in general.

1. How often do you get weather forecasts from the sources listed below? Sub-items randomized.

Sub-question	Never	Rarely	Once or more a month	Once a week	Two or more times a week	Once a day	Two or more times a day	Mean	Median	SD	n
	1	2	3	4	5	6	7				
Local TV station	916 17.8%	983 19.1%	442 8.6%	422 8.2%	812 15.8%	1014 19.7%	564 10.9%	3.88	4.00	2.09	5153
Cable TV station (e.g., CNN, The Weather Channel)	1517 29.4%	1253 24.3%	576 11.2%	422 8.2%	572 11.1%	448 8.7%	365 7.1%	3.02	2.00	1.97	5153
Newspaper	2060 40.0%	1562 30.3%	327 6.3%	334 6.5%	328 6.4%	515 10.0%	27 0.5%	2.41	2.00	1.69	5153
Telephone dial-in weather information source	4423 85.8%	545 10.6%	98 1.9%	34 0.7%	23 0.4%	22 0.4%	8 0.2%	1.21	1.00	.66	5153
Commercial or public radio station	835 16.2%	992 19.3%	409 7.9%	435 8.4%	887 17.2%	906 17.6%	689 13.4%	3.97	4.00	2.09	5153
NOAA Weather Radio	2119 41.1%	1258 24.4%	629 12.2%	271 5.3%	358 6.9%	245 4.8%	273 5.3%	2.48	2.00	1.80	5153
Friend, family, co-worker, etc.	1195 23.2%	1605 31.1%	642 12.5%	677 13.1%	683 13.3%	242 4.7%	109 2.1%	2.85	2.00	1.62	5153
Website	118 2.3%	65 1.3%	55 1.1%	90 1.7%	556 10.8%	1404 27.2%	2865 55.6%	6.22	7.00	1.25	5153
Social media (e.g., Facebook, Twitter)	4459 86.5%	455 8.8%	72 1.4%	49 1.0%	48 0.9%	35 0.7%	35 0.7%	1.26	1.00	.85	5153
Non-internet enabled mobile device (e.g., cell phone, personal desk assistant [PDA], pager)	4356 84.5%	422 8.2%	82 1.6%	79 1.5%	71 1.4%	71 1.4%	72 1.4%	1.37	1.00	1.10	5153
Internet-enabled smart phone (e.g., iPhone, Droid, Blackberry) or other mobile device (e.g., iPad)	2953 57.3%	360 7.0%	181 3.5%	182 3.5%	382 7.4%	453 8.8%	642 12.5%	2.73	1.00	2.33	5153

➔ If response to “website” is more frequent than “never”, go to Part a

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➔ If response to “Internet-enabled smart phone or other mobile device” is more frequent than “never”, go to Parts b and c

a. How often do you get weather forecasts from the websites listed below? Sub-items randomized.

Sub-question	Never	Rarely	Once or more a month	Once a week	Two or more times a week	Once a day	Two or more times a day	I am not familiar with this	Mean	Median	SD	n
	1	2	3	4	5	6	7	8				
National Weather Service website example NWS web addresses are www.weather.gov and www.nws.gov	135 2.7%	69 1.4%	87 1.7%	89 1.8%	543 10.8%	1153 22.9%	2687 53.4%	272 5.4%	6.16	7.00	1.35	5035
The Weather Channel website www.weather.com	1769 35.1%	1347 26.8%	625 12.4%	336 6.7%	385 7.6%	258 5.1%	271 5.4%	44 0.9%	2.62	2.00	1.80	5035
AccuWeather website www.accuweather.com	2544 50.5%	1153 22.9%	411 8.2%	225 4.5%	233 4.6%	148 2.9%	152 3.0%	169 3.4%	2.08	1.00	1.58	5035
WeatherBug website www.weatherbug.com	3499 69.5%	654 13.0%	146 2.9%	86 1.7%	105 2.1%	95 1.9%	109 2.2%	341 6.8%	1.59	1.00	1.34	5035
Weather Underground website www.wunderground.com	2433 48.3%	1073 21.3%	482 9.6%	205 4.1%	268 5.3%	144 2.9%	170 3.4%	260 5.2%	2.14	1.00	1.63	5035
Intellicast www.intellicast.com	3248 64.5%	634 12.6%	227 4.5%	112 2.2%	133 2.6%	91 1.8%	109 2.2%	481 9.6%	1.67	1.00	1.39	5035
Local TV station's website	2405 47.8%	1202 23.9%	512 10.2%	268 5.3%	309 6.1%	199 4.0%	106 2.1%	34 0.7%	2.18	2.00	1.58	5035
Cable TV station's website	3631 72.1%	834 16.6%	162 3.2%	90 1.8%	105 2.1%	99 2.0%	61 1.2%	53 1.1%	1.54	1.00	1.20	5035
Online newspaper website	3145 62.5%	1148 22.8%	264 5.2%	141 2.8%	136 2.7%	125 2.5%	45 0.9%	31 0.6%	1.71	1.00	1.26	5035

Assessing and Improving the NWS Point-and-Click Webpage

- b. Do you ever use a weather app application on your smart phone or other Internet-enabled mobile device to get weather forecasts?

___ Yes → If yes, which weather app do you primarily use? _____

___ No

No	Yes	n
1	2	
1075 48.9%	1125 51.1%	2200

- c. Do you ever use the mobile web browser on your smart phone or other Internet-enabled mobile device to get weather forecasts from a website?

___ Yes → If yes, which website do you primarily use? _____

___ No

No	Yes	n
1	2	
755 34.3%	1445 65.7%	2200

Assessing and Improving the NWS Point-and-Click Webpage

There are 4 alternate sets of Question 2 below. One-fourth of the sample (randomly selected) got each version.

*** Alt 1 ***

2. How useful do you find the weather forecast information provided by each of the sources listed below? Sub-items randomized.

Sub-question	Not at all useful	A little useful	Somewhat useful	Very useful	Extremely useful	I don't know/NA	Mean	Median	SD	n
	1	2	3	4	5	6				
Local TV station	103 6.8%	191 12.7%	399 26.5%	430 28.6%	206 13.7%	176 11.7%	3.33	3.00	1.13	1505
Cable TV station (e.g., CNN, The Weather Channel)	182 12.1%	224 14.9%	366 24.3%	266 17.7%	127 8.4%	340 22.6%	2.94	3.00	1.22	1505
Newspaper	350 23.3%	392 26.0%	361 24.0%	96 6.4%	23 1.5%	283 18.8%	2.22	2.00	1.01	1505
Telephone dial-in weather information source	462 30.7%	108 7.2%	68 4.5%	39 2.6%	15 1.0%	813 54.0%	1.61	1.00	1.02	1505
Commercial or public radio station	128 8.5%	272 18.1%	498 33.1%	315 20.9%	116 7.7%	176 11.7%	3.01	3.00	1.08	1505
NOAA Weather Radio	126 8.4%	81 5.4%	163 10.8%	253 16.8%	366 24.3%	516 34.3%	3.66	4.00	1.38	1505
Friend, family, co-worker, etc.	284 18.9%	508 33.8%	400 26.6%	121 8.0%	25 1.7%	167 11.1%	2.32	2.00	0.97	1505
Website	39 2.6%	24 1.6%	82 5.4%	281 18.7%	1004 66.7%	75 5.0%	4.53	5.00	0.89	1505
Social media (e.g., Facebook, Twitter)	561 37.3%	80 5.3%	43 2.9%	16 1.1%	13 0.9%	792 52.6%	1.37	1.00	0.84	1505
Non-internet enabled mobile device (e.g., cell phone, personal desk assistant [PDA], pager)	446 29.6%	86 5.7%	53 3.5%	21 1.4%	20 1.3%	879 58.4%	1.54	1.00	1.00	1505
Internet-enabled smart phone (e.g., iPhone, Droid, Blackberry) or other mobile device (e.g., iPad)	233 15.5%	63 4.2%	102 6.8%	154 10.2%	251 16.7%	702 46.6%	3.16	4.00	1.63	1505

Assessing and Improving the NWS Point-and-Click Webpage

*** Alt 2 ***

2. How easy to understand do you find the weather forecast information provided by each of the sources listed below? Sub-items randomized.

Sub-question	Not at all easy to under-stand	A little easy to under-stand	Somewhat easy to under-stand	Very easy to under-stand	Extremely easy to under-stand	I don't know/NA	Mean	Median	SD	n
	1	2	3	4	5	6				
Local TV station	13 1.1%	17 1.4%	114 9.3%	431 35.0%	445 36.2%	210 17.1%	4.25	4.00	0.82	1230
Cable TV station (e.g., CNN, The Weather Channel)	15 1.2%	22 1.8%	101 8.2%	388 31.5%	343 27.9%	361 29.3%	4.18	4.00	0.86	1230
Newspaper	20 1.6%	33 2.7%	143 11.6%	391 31.8%	306 24.9%	337 27.4%	4.04	4.00	0.92	1230
Telephone dial-in weather information source	22 1.8%	13 1.1%	48 3.9%	66 5.4%	72 5.9%	1009 82.0%	3.69	4.00	1.26	1230
Commercial or public radio station	11 0.9%	23 1.9%	137 11.1%	452 36.7%	368 29.9%	239 19.4%	4.15	4.00	0.82	1230
NOAA Weather Radio	8 0.7%	18 1.5%	97 7.9%	279 22.7%	337 27.4%	491 39.9%	4.24	4.00	0.85	1230
Friend, family, co-worker, etc.	36 2.9%	77 6.3%	222 18.0%	277 22.5%	252 20.5%	366 29.8%	3.73	4.00	1.10	1230
Website	7 0.6%	13 1.1%	65 5.3%	367 29.8%	685 55.7%	93 7.6%	4.50	5.00	0.71	1230
Social media (e.g., Facebook, Twitter)	28 2.3%	19 1.5%	34 2.8%	48 3.9%	50 4.1%	1051 85.4%	3.41	4.00	1.40	1230
Non-internet enabled mobile device (e.g., cell phone, personal desk assistant [PDA], pager)	27 2.2%	18 1.5%	38 3.1%	44 3.6%	55 4.5%	1048 85.2%	3.45	4.00	1.40	1230
Internet-enabled smart phone (e.g., iPhone, Droid, Blackberry) or other mobile device (e.g., iPad)	11 0.9%	18 1.5%	64 5.2%	160 13.0%	230 18.7%	747 60.7%	4.20	4.00	0.96	1230

Assessing and Improving the NWS Point-and-Click Webpage

*** Alt 3 ***

2. How convenient do you find the sources of weather forecast information listed below? Sub-items randomized.

Sub-question	Not at all convenient	A little convenient	Somewhat convenient	Very convenient	Extremely convenient	I don't know/NA	Mean	Median	SD	n
	1	2	3	4	5	6				
Local TV station	221 18.2%	227 18.7%	346 28.5%	245 20.2%	95 7.8%	79 6.5%	2.79	3.00	1.22	1213
Cable TV station (e.g., CNN, The Weather Channel)	274 22.6%	226 18.6%	296 24.4%	191 15.7%	78 6.4%	148 12.2%	2.60	3.00	1.25	1213
Newspaper	460 37.9%	269 22.2%	235 19.4%	108 8.9%	30 2.5%	111 9.2%	2.07	2.00	1.12	1213
Telephone dial-in weather information source	587 48.4%	142 11.7%	74 6.1%	37 3.1%	16 1.3%	357 29.4%	1.54	1.00	0.95	1213
Commercial or public radio station	186 15.3%	237 19.5%	360 29.7%	227 18.7%	131 10.8%	72 5.9%	2.89	3.00	1.23	1213
NOAA Weather Radio	224 18.5%	133 11.0%	215 17.7%	165 13.6%	214 17.6%	262 21.6%	3.01	3.00	1.47	1213
Friend, family, co-worker, etc.	347 28.6%	311 25.6%	282 23.2%	118 9.7%	59 4.9%	96 7.9%	2.31	2.00	1.17	1213
Website	38 3.1%	19 1.6%	60 4.9%	254 20.9%	805 66.4%	37 3.1%	4.50	5.00	0.92	1213
Social media (e.g., Facebook, Twitter)	573 47.2%	86 7.1%	69 5.7%	33 2.7%	14 1.2%	438 36.1%	1.49	1.00	0.95	1213
Non-internet enabled mobile device (e.g., cell phone, personal desk assistant [PDA], pager)	534 44.0%	79 6.5%	54 4.5%	33 2.7%	23 1.9%	490 40.4%	1.52	1.00	1.03	1213
Internet-enabled smart phone (e.g., iPhone, Droid, Blackberry) or other mobile device (e.g., iPad)	267 22.0%	51 4.2%	68 5.6%	112 9.2%	304 25.1%	411 33.9%	3.17	4.00	1.74	1213

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*** Alt 4 ***

2. How well do the sources of weather forecast information listed below meet your needs? [Sub-items randomized.](#)

Sub-question	Not at all	A little	Somewhat	Very	Extremely	I don't know/NA	Mean	Median	SD	n
	1	2	3	4	5	6				
Local TV station	155 12.9%	209 17.3%	356 29.5%	283 23.5%	102 8.5%	100 8.3%	2.97	3.00	1.17	1205
Cable TV station (e.g., CNN, The Weather Channel)	263 21.8%	230 19.1%	312 25.9%	151 12.5%	76 6.3%	173 14.4%	2.56	3.00	1.22	1205
Newspaper	420 34.9%	311 25.8%	243 20.2%	67 5.6%	12 1.0%	152 12.6%	1.99	2.00	0.99	1205
Telephone dial-in weather information source	657 54.5%	60 5.0%	43 3.6%	23 1.9%	10 0.8%	412 34.2%	1.32	1.00	0.81	1205
Commercial or public radio station	194 16.1%	238 19.8%	400 33.2%	217 18.0%	64 5.3%	92 7.6%	2.75	3.00	1.13	1205
NOAA Weather Radio	248 20.6%	142 11.8%	155 12.9%	183 15.2%	222 18.4%	255 21.2%	2.99	3.00	1.52	1205
Friend, family, co-worker, etc.	324 26.9%	415 34.4%	288 23.9%	72 6.0%	20 1.7%	86 7.1%	2.15	2.00	0.97	1205
Website	50 4.1%	30 2.5%	57 4.7%	267 22.2%	772 64.1%	29 2.4%	4.43	5.00	1.00	1205
Social media (e.g., Facebook, Twitter)	722 59.9%	63 5.2%	27 2.2%	13 1.1%	5 0.4%	375 31.1%	1.21	1.00	0.63	1205
Non-internet enabled mobile device (e.g., cell phone, personal desk assistant [PDA], pager)	618 51.3%	69 5.7%	44 3.7%	28 2.3%	10 0.8%	436 36.2%	1.37	1.00	0.85	1205
Internet-enabled smart phone (e.g., iPhone, Droid, Blackberry) or other mobile device (e.g., iPad)	388 32.2%	42 3.5%	113 9.4%	127 10.5%	187 15.5%	348 28.9%	2.63	2.00	1.66	1205

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3. A weather forecast can provide several types of information about temperature, cloudiness, winds, and precipitation such as rain, snow, hail, or sleet. How important is it to you to have the information listed below as part of a forecast? [Sub-items randomized.](#)

Sub-question	Not at all important	A little important	Somewhat important	Very important	Extremely important	Mean	Median	SD	n
	1	2	3	4	5				
Information about hazardous weather	10 0.2%	80 1.6%	332 6.4%	1310 25.4%	3421 66.4%	4.56	5.00	0.70	5153
Chance of precipitation	12 0.2%	46 0.9%	496 9.6%	2229 43.3%	2370 46.0%	4.34	4.00	0.71	5153
Amount of precipitation	15 0.3%	113 2.2%	763 14.8%	2239 43.5%	2023 39.3%	4.19	4.00	0.79	5153
Type of precipitation	40 0.8%	110 2.1%	491 9.5%	2074 40.2%	2438 47.3%	4.31	4.00	0.79	5153
When precipitation will occur	17 0.3%	89 1.7%	590 11.4%	2182 42.3%	2275 44.1%	4.28	4.00	0.76	5153
Where precipitation will occur	19 0.4%	86 1.7%	527 10.2%	2143 41.6%	2378 46.1%	4.31	4.00	0.75	5153
Chance of different amounts of precipitation (e.g., greater than ½ inch, 1 inch, 6 inches)	25 0.5%	157 3.0%	865 16.8%	2158 41.9%	1948 37.8%	4.13	4.00	0.83	5153
Low temperature	42 0.8%	215 4.2%	971 18.8%	2152 41.8%	1773 34.4%	4.05	4.00	0.88	5153
High temperature	33 0.6%	139 2.7%	899 17.4%	2250 43.7%	1832 35.6%	4.11	4.00	0.83	5153
What time of day the high temperature will occur	356 6.9%	1055 20.5%	1851 35.9%	1242 24.1%	649 12.6%	3.15	3.00	1.10	5153
What time of day the low temperature will occur	412 8.0%	1173 22.8%	1752 34.0%	1149 22.3%	667 12.9%	3.09	3.00	1.13	5153
How cloudy it will be	173 3.4%	869 16.9%	2240 43.5%	1351 26.2%	520 10.1%	3.23	3.00	0.96	5153
Wind speed	41 0.8%	251 4.9%	1407 27.3%	2149 41.7%	1305 25.3%	3.86	4.00	0.88	5153
Wind direction	317 6.2%	815 15.8%	1648 32.0%	1466 28.4%	907 17.6%	3.36	3.00	1.13	5153
Humidity levels	188 3.6%	773 15.0%	1946 37.8%	1556 30.2%	690 13.4%	3.35	3.00	1.01	5153
Dewpoint	827 16.0%	1399 27.1%	1606 31.2%	884 17.2%	437 8.5%	2.75	3.00	1.17	5153

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Pollen count	1157 22.5%	1646 31.9%	1407 27.3%	610 11.8%	333 6.5%	2.48	2.00	1.15	5153
Air quality	651 12.6%	1473 28.6%	1770 34.3%	852 16.5%	407 7.9%	2.78	3.00	1.11	5153

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The questions below ask about your thoughts about the National Weather Service NWS in general.

The National Weather Service NWS is the primary source of weather forecasts, watches, warnings, and advisories for the United States. In addition to normal weather forecasts of precipitation, temperature, cloudiness, and winds, the NWS also provides forecasts, watches, and warnings for:

- severe weather such as thunderstorms and tornadoes,
- winter weather,
- hurricanes,
- fire weather, and
- forecasts used for aviation and marine commerce.

All of this information is also provided to media such as television, radio, and newspapers and to private weather services such as The Weather Channel and AccuWeather.

4. Have you heard of the National Weather Service?

☐ Yes

☐ No → if “No”, go to socio-demographic questions

Yes	No	n
1	2	
5141 99.8%	12 0.2%	5153

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Now, please think about your overall satisfaction with the National Weather Service.

5. First, please consider all of your experiences with the National Weather Service. Using a 10-point scale on which 1 means “Very Dissatisfied” and 10 means “Very Satisfied”, how satisfied are you with the National Weather Service?

Very Dissatisfied									Very Satisfied	Don't know	Mean	Median	SD	n
1	2	3	4	5	6	7	8	9	10	11				
15 0.3%	11 0.2%	12 0.2%	11 0.2%	35 0.7%	65 1.3%	251 4.9%	948 18.4%	1434 27.9%	2320 45.1%	39 0.8%	9.04	9.00	1.22	5141

6. Using a 10-point scale on which 1 now means “Falls Short of your Expectations” and 10 means “Exceeds your Expectations”, to what extent has the National Weather Service fallen short of, or exceeded your expectations?

Falls short of expectations									Exceeds expectations	Don't know	Mean	Median	SD	n
1	2	3	4	5	6	7	8	9	10	11				
8 0.2%	15 0.3%	42 0.8%	66 1.3%	203 3.9%	324 6.3%	644 12.5%	1310 25.5%	1589 30.9%	868 16.9%	72 1.4%	8.16	8.00	1.52	5141

7. Now, imagine what an ideal organization providing weather information would be like. How well do you think the National Weather Service compares with that ideal organization you just imagined? Please use a 10-point scale on which 1 means “Not Very Close to the Ideal” and 10 means “Very Close to the Ideal”.

Not very close to ideal									Very close to ideal	Don't know	Mean	Median	SD	n
1	2	3	4	5	6	7	8	9	10	11				
9 0.2%	11 0.2%	34 0.7%	51 1.0%	104 2.0%	202 3.9%	704 13.7%	1355 26.4%	1246 24.2%	1347 26.2%	78 1.5%	8.40	9.00	1.46	5141

Assessing and Improving the NWS Point-and-Click Webpage

8. People have a wide range of thoughts about the National Weather Service. Below are pairs of words that represent opposite ideas. Please select the box closest to the idea that best describes your feelings about the National Weather Service. [Sub-items randomized.](#)

Sub-question	Strongly agree	Agree	Neither	Agree	Strongly agree	I don't know	Mean	Median	SD	n
	1	2	3	4	5	6				
Can't/can be trusted	10 0.2%	32 0.6%	212 4.1%	1567 30.5%	3260 63.4%	60 1.2%	4.58	5.00	0.62	5141
Is inaccurate/accurate	15 0.3%	79 1.5%	310 6.0%	2333 45.4%	2372 45.1%	32 0.6%	4.36	4.00	0.69	5141
Is unfair/fair	12 0.2%	12 0.2%	317 6.2%	1534 29.8%	2852 55.5%	414 8.1%	4.52	5.00	0.66	5141
Doesn't/does tell the whole story	19 0.4%	89 1.7%	451 8.8%	1880 36.6%	2426 47.2%	276 5.4%	4.36	4.00	0.76	5141
Is biased/unbiased	18 0.4%	40 0.8%	290 5.6%	1339 26.0%	3107 60.4%	347 6.7%	4.56	5.00	0.68	5141
Doesn't/Does watch after your interests	14 0.3%	31 0.6%	611 11.9%	1706 33.2%	2348 45.7%	431 8.4%	4.35	4.00	0.75	5141
Is not/is concerned about the community's well-being	10 0.2%	21 0.4%	465 9.0%	1474 28.7%	2756 53.6%	415 8.1%	4.47	5.00	0.71	5141
Is concerned about making profits/public interest	10 0.2%	19 0.4%	305 5.9%	1429 27.8%	3068 59.7%	310 6.0%	4.56	5.00	0.65	5141
Has poorly/well trained forecasters	9 0.2%	23 0.4%	192 3.7%	1374 26.7%	3226 62.8%	317 6.2%	4.61	5.00	0.61	5141

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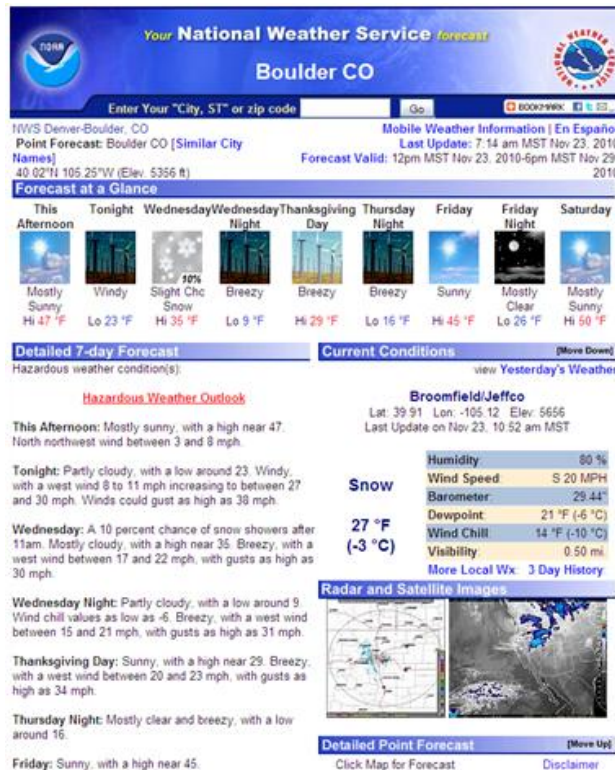
The questions below ask about your thoughts about the National Weather Service NWS point-and-click forecast webpage. An example of the point-and-click forecast webpage for the city of Boulder, Colorado, is shown in the figure below. As you respond to the next set of questions, please think about the NWS point-and-click forecast webpage for the city or cities you look at.

9. Have you used the NWS point-and-click forecast webpage for your area before?

☐ Yes

☐ No → if “No”, go to socio-demographic questions

Yes	No	n
1	2	
5078 98.8%	63 1.2%	5141



Assessing and Improving the NWS Point-and-Click Webpage

10. What do you like about the NWS point-and-click forecast webpage? [Open-ended](#)

11. What do you dislike about the NWS point-and-click forecast webpage? [Open-ended](#)

12. There are many ways to access the NWS point-and-click forecast webpage. Please indicate whether you typically access the webpage in the ways listed below. [Sub-items randomized](#).

Sub-question	No	Yes	I am not familiar with this	n
	1	2	3	
I have it bookmarked for the forecast location I want	610 12.0%	4414 86.9%	54 1.1%	5078
I go to the NWS homepage and get the forecast for my desired location	2233 44.0%	2794 55.0%	51 1.0%	5078
I go the homepage of my local Weather Forecast Office and get the forecast for my desired location	3159 62.2%	1530 30.1%	389 7.7%	5078
I type in the webpage address	4003 78.8%	1034 20.4%	41 0.8%	5078
Other	3319 65.4%	540 10.6%	1219 24.0%	5078

a. What other ways do you access the National Weather Service point-and-click forecast webpage? [Open-ended](#)

Assessing and Improving the NWS Point-and-Click Webpage

13. How knowledgeable are you about the NWS point-and-click forecast webpage overall?

Not at all knowledgeable	A little knowledgeable	Somewhat knowledgeable	Very knowledgeable	Extremely knowledgeable	Mean	Median	SD	n
1	2	3	4	5				
17 0.3%	227 4.5%	1497 29.5%	2414 47.5%	923 18.2%	3.79	4.00	0.80	5078

14. For approximately how long have you been using the NWS point-and-click forecast webpage?

Less than 6 months	6 months to less than 1 year	1 year to less than 3 years	3 years to less than 5 years	5 years or longer	Mean	Median	SD	n
1	2	3	4	5				
47 0.9%	93 1.8%	762 15.0%	1500 29.5%	2676 52.7%	4.31	5.00	0.86	5078

15. How often do you typically visit the NWS point-and-click forecast webpage?

Never	Rarely	Once or more a month	Once a week	Two or more times a week	Once a day	Two or more times a day	Mean	Median	SD	n
1	2	3	4	5	6	7				
6 0.1%	30 0.6%	76 1.5%	96 1.9%	654 12.9%	1330 26.2%	2886 56.8%	6.33	7.00	0.96	5078

16. During a typical visit to the NWS point-and-click forecast webpage, approximately how much time do you spend on the webpage?

Less than 15 seconds	15 seconds to less than 30 seconds	30 seconds to less than 1 minute	1 minute to less than 3 minutes	3 minutes to less than 5 minutes	5 minutes to less than 10 minutes	10 minutes or longer	Mean	Median	SD	n
1	2	3	4	5	6	7				
58 1.1%	373 7.3%	891 17.5%	1914 37.7%	1133 22.3%	549 10.8%	160 3.2%	4.18	4.00	1.22	5078

Assessing and Improving the NWS Point-and-Click Webpage

17. On average, how often do you seek weather forecast information for the following time periods from the NWS point-and-click forecast webpage?

Sub-items NOT randomized.

Sub-question	Rarely or never	Less than half of the time	About half the time	More than half the time	Usually or always	Not applicable to me	Mean	Median	SD	n
	1	2	3	4	5	6				
up to the next 6 hours	412 8.1%	889 17.5%	611 12.0%	560 11.0%	2557 50.4%	49 1.0%	3.79	5.00	1.42	5078
6-12 hours from now	227 4.5%	679 13.4%	693 13.6%	719 14.2%	2711 53.4%	49 1.0%	4.00	5.00	1.27	5078
12-24 hours from now	76 1.5%	357 7.0%	591 11.6%	874 17.2%	3148 62.0%	32 0.6%	4.32	5.00	1.03	5078
1-2 days from now	104 2.0%	423 8.3%	616 12.1%	1022 20.1%	2863 56.4%	50 1.0%	4.22	5.00	1.08	5078
2-3 days from now	174 3.4%	612 12.1%	739 14.6%	1022 20.1%	2474 48.7%	57 1.1%	4.00	4.00	1.20	5078
3-5 days from now	277 5.5%	887 17.5%	811 16.0%	895 17.6%	2151 42.4%	57 1.1%	3.75	4.00	1.32	5078
5-7 days from now	423 8.3%	1094 21.5%	793 15.6%	723 14.2%	1980 39.0%	65 1.3%	3.55	4.00	1.41	5078
the upcoming weekend	388 7.6%	895 17.6%	803 15.8%	803 15.8%	1998 39.3%	191 3.8%	3.64	4.00	1.38	5078
the upcoming work week	542 10.7%	942 18.6%	748 14.7%	707 13.9%	1872 36.9%	267 5.3%	3.50	4.00	1.45	5078

Assessing and Improving the NWS Point-and-Click Webpage

18. Below is a list of reasons for getting weather forecast information from the NWS point-and-click forecast webpage. Please indicate the extent to which you agree or disagree with each item. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Median	SD	n
	1	2	3	4	5				
To learn about things to discuss with other people	1162 22.9%	1312 25.8%	1578 31.1%	871 17.2%	155 3.1%	2.52	3.00	1.11	5078
To belong to a group	2412 47.5%	1644 32.4%	917 18.1%	70 1.4%	35 0.7%	1.75	2.00	.84	5078
Because I enjoy talking about the weather to others	777 15.3%	1013 19.9%	1537 30.3%	1379 27.2%	372 7.3%	2.91	3.00	1.17	5078
Because it passes the time, particularly when I'm bored	1968 38.8%	1590 31.3%	1071 21.1%	368 7.2%	81 1.6%	2.02	2.00	1.02	5078
Because it relaxes me	1378 27.1%	1389 27.4%	1732 34.1%	473 9.3%	106 2.1%	2.32	2.00	1.04	5078
So I can forget about school, work, and other things	2315 45.6%	1649 32.5%	845 16.6%	194 3.8%	75 1.5%	1.83	2.00	.94	5078
To find out about interesting weather	401 7.9%	577 11.4%	1327 26.1%	1982 39.0%	791 15.6%	3.43	4.00	1.12	5078
Because it is entertaining	939 18.5%	1068 21.0%	1690 33.3%	1129 22.2%	252 5.0%	2.74	3.00	1.14	5078
Because it is exciting	922 18.2%	1056 20.8%	1872 36.9%	913 18.0%	315 6.2%	2.73	3.00	1.14	5078
To keep up with what is going on with the weather	83 1.6%	79 1.6%	394 7.8%	2574 50.7%	1948 38.4%	4.23	4.00	.79	5078
As a way to get to other links on that webpage	1336 26.3%	1283 25.3%	1156 22.8%	1052 20.7%	251 4.9%	2.53	2.00	1.22	5078
To be aware of potential changes in the weather	14 0.3%	18 0.4%	119 2.3%	2174 42.8%	2753 54.2%	4.50	5.00	.59	5078
To learn about the major weather events of the day	174 3.4%	280 5.5%	785 15.5%	2326 45.8%	1513 29.8%	3.93	4.00	.99	5078
To go directly to important weather information	36 0.7%	48 0.9%	238 4.7%	2101 41.4%	2655 52.3%	4.44	5.00	.69	5078
To find out about important weather information	30 0.6%	20 0.4%	135 2.7%	2173 42.8%	2720 53.6%	4.48	5.00	.63	5078
To seek weather information for a specific task I need to do	68 1.3%	103 2.0%	400 7.9%	2301 45.3%	2206 43.4%	4.27	4.00	.80	5078

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To seek weather information for a specific decision I need to make	33 0.6%	71 1.4%	338 6.7%	2283 45.0%	2353 46.3%	4.35	4.00	.72	5078
To avoid advertisements	730 14.4%	529 10.4%	934 18.4%	1302 25.6%	1583 31.2%	3.49	4.00	1.39	5078

19. On average, how often do you use forecasts from the NWS point-and-click forecast webpage for the planning activities listed below? [Sub-items randomized.](#)

Sub-question	Rarely or never	Less than half of the time	About half the time	More than half the time	Usually or always	Not applicable to me	Mean	Median	SD	n
	1	2	3	4	5	6				
Planning how to dress yourself	433 8.5%	624 12.3%	697 13.7%	972 19.1%	2294 45.2%	58 1.1%	3.81	4.00	1.35	5078
Planning how to dress your children or other family members	1486 29.3%	487 8.5%	350 6.9%	488 9.6%	1086 21.4%	1181 23.3%	2.79	2.00	1.69	5078
Planning how to get to work or school	1309 25.8%	960 18.9%	490 9.6%	563 11.1%	1269 25.0%	487 9.6%	2.90	3.00	1.60	5078
Planning to do yard work or outdoor house work	473 9.3%	871 17.2%	679 13.4%	871 17.2%	2028 39.9%	156 3.1%	3.63	4.00	1.41	5078
Planning job activities	1195 23.5%	905 17.8%	484 9.5%	510 10.0%	1465 28.8%	519 10.2%	3.03	3.00	1.63	5078
Planning social activities	688 13.5%	1182 23.3%	836 16.5%	831 16.4%	1442 28.4%	99 1.9%	3.23	3.00	1.44	5078
Planning weekend activities	242 4.8%	703 13.8%	784 15.4%	992 19.5%	2266 44.6%	91 1.8%	3.87	4.00	1.26	5078
Planning leisure activities	231 4.5%	692 13.6%	793 15.6%	1018 20.0%	2294 45.2%	50 1.0%	3.89	4.00	1.25	5078
Planning work- or school-related travel i.e., to a different city	863 17.0%	956 18.8%	460 9.1%	534 10.5%	1855 36.5%	410 8.1%	3.33	4.00	1.59	5078
Planning travel for leisure	463 9.1%	1074 21.2%	635 12.5%	699 13.8%	2125 41.8%	82 1.6%	3.59	4.00	1.44	5078
Planning for outdoor work/school activities	454 8.9%	587 11.6%	543 10.7%	786 15.5%	2461 48.5%	247 4.9%	3.87	5.00	1.39	5078

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For the next set of questions, please refer to the Parts A-L labeled in the figure below.

The screenshot shows the National Weather Service website for Aspen, CO. The page is organized into several sections, with labels A through L pointing to specific areas:

- A** points to the NWS logo and header.
- B** points to the location and forecast validity information.
- C** points to the "Forecast at a Glance" section, which includes a table of weather conditions for the next seven days.
- D** points to the "Detailed 7-day Forecast" section, which provides more detailed weather information for each day.
- E** points to the "Current Conditions" section, which shows real-time weather data for Aspen/Sardy Field.
- F** points to the "National Digital Forecast Database" section, which provides access to historical forecast data.
- G** points to the "A Few Clouds" section, which displays current cloud cover and other atmospheric data.
- H** points to the "Radar and Satellite Images" section, which provides visual data on weather patterns.
- I** points to the "Detailed Point Forecast" section, which provides a more detailed forecast for a specific location.
- J** points to the "Map" section, which shows a map of the area around Aspen.
- K** points to the "XML" link, which provides access to weather data in XML format.
- L** points to the "Additional Forecasts & Information" section, which provides links to various other weather-related resources.

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20. On average, how often do you use the different parts of the NWS point-and-click forecast webpage listed below? Sub-items NOT randomized.

Sub-question	Rarely or never	Less than half of the time	About half the time	More than half the time	Usually or always	I am not familiar with this	Mean	Median	SD	n
	1	2	3	4	5	6				
Part A – Top banner with NOAA and NWS logos, forecast location, search box, bookmark links	1626 32.0%	1442 28.4%	504 9.9%	410 8.1%	1076 21.1%	20 0.4%	2.58	2.00	1.53	5078
Part B – Forecast reference information i.e., latitude, longitude, elevation, forecast update date/time, forecast valid date/time	1208 23.8%	1406 27.7%	683 13.5%	534 10.5%	1229 24.2%	18 0.4%	2.84	2.00	1.51	5078
Part C – Forecast-at-a-glance pictures	44 0.9%	119 2.3%	231 4.5%	403 7.9%	4265 84.0%	16 0.3%	4.72	5.00	0.73	5078
Part D – Hazardous weather conditions	115 2.3%	443 8.7%	444 8.7%	716 14.1%	3342 65.8%	18 0.4%	4.33	5.00	1.09	5078
Part E – Detailed 7-day text forecast	43 0.8%	159 3.1%	384 7.6%	886 17.4%	3579 70.5%	27 0.5%	4.54	5.00	0.83	5078
Part F – National Digital Forecast Database	1641 32.3%	1469 28.9%	683 13.5%	489 9.6%	607 12.0%	189 3.7%	2.38	2.00	1.36	5078
Part G – Current conditions	127 2.5%	378 7.4%	515 10.1%	703 13.8%	3324 65.5%	31 0.6%	4.33	5.00	1.08	5078
Part H – Radar	496 9.8%	739 14.6%	651 12.8%	948 18.7%	2201 43.3%	43 0.8%	3.72	4.00	1.40	5078
Part I – Satellite	715 14.1%	1212 23.9%	881 17.3%	874 17.2%	1349 26.6%	47 0.9%	3.18	3.00	1.42	5078
Part J – Detailed point forecast map	908 17.9%	1038 20.4%	691 13.6%	708 13.9%	1651 32.5%	82 1.6%	3.23	3.00	1.53	5078
Part K – KML and XML links	3233 63.7%	677 13.3%	195 3.8%	115 2.3%	133 2.6%	725 14.3%	1.45	1.00	0.93	5078
Part L – Any of the “Additional Forecasts & Information” links.	1569 30.9%	1307 25.7%	600 11.8%	569 11.2%	870 17.1%	163 3.2%	2.57	2.00	1.48	5078

➔ If response to “Additional Forecasts & Information” is greater than “rarely or never”, go to Part a

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- a. On average, how often do you look at the following links under “Part L – Additional Forecasts & Information” on the NWS point-and-click webpage? Sub-items NOT randomized.

Sub-question	Rarely or never	Less than half of the time	About half the time	More than half the time	Usually or always	I am not familiar with this	Mean	Median	SD	n
	1	2	3	4	5	6				
Zone area forecast	1054 30.0%	927 26.4%	449 12.8%	333 8.5%	500 14.2%	246 7.0%	2.48	2.00	1.42	3509
Forecast discussion	987 28.1%	795 22.7%	403 11.5%	379 10.8%	757 21.6%	188 5.4%	2.74	2.00	1.54	3509
Printable forecast	2059 58.7%	753 21.5%	219 6.2%	112 3.2%	163 4.6%	203 5.8%	1.66	1.00	1.07	3509
Text only forecast	1988 56.7%	735 20.9%	274 7.8%	155 4.4%	167 4.8%	190 5.4%	1.73	1.00	1.12	3509
Hourly weather graph	839 23.9%	964 27.5%	484 13.8%	405 11.5%	610 17.4%	207 5.9%	2.69	2.00	1.44	3509
Tabular forecast	1571 44.8%	902 25.7%	310 8.8%	208 5.9%	214 6.1%	304 8.7%	1.94	2.00	1.20	3509
Quick forecast	1338 38.1%	755 21.5%	381 10.9%	291 8.3%	429 12.2%	315 9.0%	2.29	2.00	1.42	3509

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21. How important to you are the different parts of the NWS point-and-click forecast webpage listed below? Sub-items NOT randomized.

Sub-question	Not at all important	A little important	Somewhat important	Very important	Extremely important	I am not familiar with this	Mean	Median	SD	n
	1	2	3	4	5	6				
Part A – Top banner with NOAA and NWS logos, forecast location, search box, bookmark links	637 12.5%	1130 22.3%	1300 25.6%	1112 21.9%	879 17.3%	20 0.4%	3.09	3.00	1.28	5078
Part B – Forecast reference information i.e., latitude, longitude, elevation, forecast update date/time, forecast valid date/time	359 7.1%	1128 22.2%	1457 28.7%	1196 23.6%	924 18.2%	14 0.3%	3.24	3.00	1.19	5078
Part C – Forecast-at-a-glance pictures	41 0.8%	109 2.1%	457 9.0%	1404 27.6%	3053 60.1%	14 0.3%	4.45	5.00	0.81	5078
Part D – Hazardous weather conditions	20 0.4%	118 2.3%	366 7.2%	1130 22.3%	3418 67.3%	26 0.5%	4.55	5.00	0.76	5078
Part E – Detailed 7-day text forecast	27 0.5%	58 1.1%	349 6.9%	1497 29.5%	3125 61.5%	22 0.4%	4.51	5.00	0.72	5078
Part F – National Digital Forecast Database	860 16.9%	1192 23.5%	1400 27.6%	779 15.3%	599 11.8%	248 4.9%	2.81	3.00	1.26	5078
Part G – Current conditions	51 1.0%	201 4.0%	590 11.6%	1413 27.8%	2802 55.2%	21 0.4%	4.33	5.00	0.90	5078
Part H – Radar	228 4.5%	389 7.7%	683 13.5%	1219 24.0%	2497 49.2%	62 1.2%	4.07	4.00	1.16	5078
Part I – Satellite	335 6.6%	674 13.3%	1229 24.2%	1317 25.9%	1465 28.8%	58 1.1%	3.58	4.00	1.22	5078
Part J – Detailed point forecast map	531 10.5%	809 15.9%	1102 21.7%	1072 21.1%	1444 28.4%	120 2.4%	3.42	4.00	1.34	5078
Part K – KML and XML links	2311 45.5%	1036 20.4%	526 10.4%	173 3.4%	120 2.4%	912 18.0%	1.74	1.00	1.02	5078
Part L – Any of the “Additional Forecasts & Information” links.	1012 19.9%	1147 22.6%	1022 20.1%	680 13.4%	904 17.8%	313 6.2%	2.86	3.00	1.40	5078

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22. How easy to understand are the different parts of the NWS point-and-click forecast webpage listed below. Sub-items NOT randomized.

Sub-question	Not at all easy to under-stand	A little easy to under-stand	Somewhat easy to under-stand	Very easy to under-stand	Extremely easy to under-stand	I am not familiar with this	Mean	Median	SD	n
	1	2	3	4	5	6				
Part A – Top banner with NOAA and NWS logos, forecast location, search box, bookmark links	18 0.4%	74 1.5%	239 4.7%	1652 32.5%	3037 59.8%	58 1.1%	4.52	5.00	0.69	5078
Part B – Forecast reference information i.e., latitude, longitude, elevation, forecast update date/time, forecast valid date/time	27 0.5%	115 2.3%	468 9.2%	1816 35.8%	2601 51.2%	51 1.0%	4.36	5.00	0.79	5078
Part C – Forecast-at-a-glance pictures	6 0.1%	19 0.4%	114 2.2%	1060 20.9%	3864 76.1%	15 0.3%	4.73	5.00	0.53	5078
Part D – Hazardous weather conditions	19 0.4%	80 1.6%	391 7.7%	1530 30.1%	3033 59.7%	25 0.5%	4.48	5.00	0.74	5078
Part E – Detailed 7-day text forecast	3 0.1%	21 0.4%	149 2.9%	1390 27.4%	3482 68.6%	33 0.6%	4.65	5.00	0.56	5078
Part F – National Digital Forecast Database	238 4.7%	528 10.4%	996 19.6%	1287 25.3%	1299 25.6%	730 14.4%	3.66	4.00	1.18	5078
Part G – Current conditions	8 0.2%	29 0.6%	175 3.4%	1313 25.9%	3521 69.3%	32 0.6%	4.65	5.00	0.59	5078
Part H – Radar	115 2.3%	240 4.7%	611 12.0%	1471 29.0%	2483 48.9%	158 3.1%	4.21	5.00	0.99	5078
Part I – Satellite	135 2.7%	309 6.1%	773 15.2%	1510 29.7%	2169 42.7%	182 3.6%	4.08	4.00	1.05	5078
Part J – Detailed point forecast map	144 2.8%	322 6.3%	638 12.6%	1473 29.0%	2200 43.3%	301 5.9%	4.10	4.00	1.06	5078
Part K – KML and XML links	687 13.5%	592 11.7%	574 11.3%	616 12.1%	607 12.0%	2002 39.4%	2.96	3.00	1.44	5078
Part L – Any of the “Additional Forecasts & Information” links.	276 5.4%	543 10.7%	946 18.6%	1322 26.0%	1232 24.3%	759 14.9%	3.62	4.00	1.20	5078

23. Is there any information NOT currently available on the NWS point-and-click forecast webpage that you would like to have? Open-ended

24. Is there any information currently available on the NWS point-and-click forecast webpage that you would like removed? Open-ended

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25. Please indicate the extent to which you agree or disagree with the following statements about the NWS point-and-click forecast webpage. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I am not familiar with this	Mean	Median	SD	n
	1	2	3	4	5	6				
I would like to be able to personalize the webpage with the types of forecast information that I want	208 4.1%	629 12.4%	1607 31.6%	1471 29.0%	1087 21.4%	76 1.5%	3.52	4.00	1.09	5078
I think the webpage is too cluttered	843 16.6%	2312 45.5%	1236 24.3%	496 9.8%	175 3.4%	16 0.3%	2.38	2.00	0.99	5078
I would like to have links to tutorials, definitions, or help pages so that I can better understand the information provided on the webpage	211 4.2%	699 13.8%	1716 33.8%	1655 32.6%	753 14.8%	44 0.9%	3.41	3.00	1.03	5078
I can easily tell the location that the forecast applies to	15 0.3%	85 1.7%	298 5.9%	2031 40.0%	2636 51.9%	13 0.3%	4.42	5.00	0.71	5078
I would like to have the ability to select the size of the area that a forecast represents	95 1.9%	452 8.9%	1749 34.4%	1792 35.3%	909 17.9%	81 1.6%	3.59	4.00	0.95	5078
I would like more information about the uncertainty associated with a forecast	97 1.9%	477 9.4%	1482 29.2%	2002 39.4%	976 19.2%	44 0.9%	3.65	4.00	0.96	5078
I can easily find the information I'm looking for	24 0.5%	80 1.6%	290 5.7%	2229 43.9%	2440 48.1%	15 0.3%	4.38	4.00	0.71	5078
I think the forecast pictures communicate the weather effectively	21 0.4%	144 2.8%	535 10.5%	2340 46.1%	2017 39.7%	21 0.4%	4.22	4.00	0.78	5078
I think the forecast pictures make the forecast seem worse than the weather will be	888 17.5%	2552 50.3%	1128 22.2%	325 6.4%	131 2.6%	54 1.1%	2.26	2.00	0.91	5078
I think the information provided in the forecast pictures and text is consistent	18 0.4%	107 2.1%	382 7.5%	2584 50.9%	1943 38.3%	44 0.9%	4.26	4.00	0.72	5078
I think the webpage is easy to navigate	20 0.4%	122 2.4%	354 7.0%	2284 45.0%	2283 45.0%	15 0.3%	4.32	4.00	0.74	5078
I like the overall layout of the webpage	45 0.9%	163 3.2%	587 11.6%	2323 45.7%	1945 38.3%	15 0.3%	4.18	4.00	0.82	5078

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26. The NWS issues watches, warnings, advisories, and other forecast products for different types of hazardous weather (e.g., severe thunderstorms, tornadoes, winter storms, blizzards, floods, hurricanes, fire weather). Please think about how this information is provided on the NWS point-and-click forecast webpage, and indicate the extent to which you agree or disagree with the following statements. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I am not familiar with this	Mean	Median	SD	n
	1	2	3	4	5	6				
I can easily tell the area for which hazardous weather is forecast	61 1.2%	658 13.0%	986 19.4%	2222 43.8%	1060 20.9%	91 1.8%	3.71	4.00	0.98	5078
I can easily tell for what time period hazardous weather is forecast	66 1.3%	669 13.2%	985 19.4%	2261 44.5%	997 19.6%	100 2.0%	3.69	4.00	0.98	5078
I would like to have a map on the point-and-click page showing me the area that is under a hazardous weather threat	28 0.6%	154 3.0%	939 18.5%	2442 48.1%	1448 28.5%	67 1.3%	4.02	4.00	0.81	5078
I like the way hazardous weather information is currently conveyed	56 1.1%	478 9.4%	1339 26.4%	2180 42.9%	955 18.8%	70 1.4%	3.70	4.00	0.92	5078
I don't want any changes to how hazardous weather information is conveyed	154 3.0%	928 18.3%	2120 41.7%	1111 21.9%	608 12.0%	157 3.1%	3.22	3.00	0.99	5078
It's easy to tell if there is a potential for hazardous weather	34 0.7%	311 6.1%	731 14.4%	2544 50.1%	1396 27.5%	62 1.2%	3.99	4.00	0.86	5078
When there are multiple hazards being forecast, it's easy to tell which ones are most important	98 1.9%	1036 20.4%	1318 26.0%	1675 33.0%	722 14.2%	229 4.5%	3.39	3.00	1.04	5078
I think that, when it occurs, hazardous weather should be presented more prominently than it is now	109 2.1%	927 18.3%	1942 38.2%	1398 27.5%	629 12.4%	73 1.4%	3.30	3.00	0.98	5078

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27. Currently, the NWS point-and-click forecast webpage provides forecast information for every 12 hours of a time period. For instance, there is a forecast for today, tonight, tomorrow, tomorrow night, and so on for the time period up to 7 days from now. Please indicate the level of forecast detail you want for each of the forecast time periods listed below. Sub-items NOT randomized.

Sub-question	Forecast information provided for every <u>hour</u> of that time period	Forecast information provided for every <u>3 hours</u> of that time period	Forecast information provided for every <u>6 hours</u> of that time period	Forecast information provided for every <u>12 hours</u> of that time period	Forecast information provided for every <u>24 hours</u> of that time period	Mean	Median	SD	n
	1	2	3	4	5				
the next day 24 hours	1348 26.5%	1430 28.2%	1364 26.9%	862 17.0%	74 1.5%	2.39	2.00	1.09	5078
1-2 days from now	253 5.0%	739 14.6%	1522 30.0%	2349 46.3%	215 4.2%	3.30	4.00	0.94	5078
2-3 days from now	94 1.9%	254 5.0%	856 16.9%	3066 60.4%	808 15.9%	3.83	4.00	0.82	5078
3-5 days from now	64 1.3%	105 2.1%	417 8.2%	2812 55.4%	1680 33.1%	4.17	4.00	0.76	5078
5-7 days from now	51 1.0%	66 1.3%	233 4.6%	2113 41.6%	2615 51.5%	4.41	5.00	0.73	5078
7-10 days from now	51 1.0%	58 1.1%	170 3.3%	1583 31.2%	3216 63.3%	4.55	5.00	0.71	5078

About You and Your Household

The remaining survey questions are about you and your household. This information will be used to help group your responses with responses of others. You do not have to answer any question you are uncomfortable answering. All of your responses will remain anonymous, and your responses will not be reported in a way that can be linked to you.

28. How often do the statements below apply to you? [Sub-items randomized.](#)

Sub-question	Never	Seldom	Sometimes	Usually	Always	Mean	Median	SD	n	# missing
	1	2	3	4	5					
I take notice of changes that occur in the weather	13 0.3%	12 0.2%	151 3.0%	1745 34.1%	3196 62.5%	4.58	5.00	0.59	5117	36
I notice how the clouds look during various kinds of weather	27 0.5%	134 2.6%	647 12.6%	1964 38.3%	2358 46.0%	4.27	4.00	0.82	5130	23
I plan my daily routine around what the weather may bring	78 1.5%	506 9.9%	2075 40.5%	1653 32.2%	814 15.9%	3.51	3.00	0.93	5126	27
The weather or changes in the weather really do not matter to me	2473 48.4%	1483 29.0%	602 11.8%	301 5.9%	246 4.8%	1.90	2.00	1.12	5105	48
In the past I have wished for weather that would result in a weather-related holiday	1119 21.9%	1212 23.7%	1601 31.4%	512 10.0%	661 12.9%	2.68	3.00	1.28	5105	48

29. To what extent do you agree with the statements below? [Sub-items randomized.](#)

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	Mean	Median	SD	n	# missing
	1	2	3	4	5					
I am attached to the weather and climate of my hometown or the place of where my family of origin lives or lived	209 4.1%	527 10.3%	1201 23.6%	1921 37.7%	1240 24.3%	3.68	4.00	1.08	5098	55
It is important to me to live in a place that offers a variety of different weather conditions throughout the year	150 2.9%	385 7.5%	1244 24.3%	2015 39.3%	1328 25.9%	3.78	4.00	1.01	5122	31

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30. Please indicate the extent to which you agree or disagree with the following statements. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	Mean	Median	SD	n	# missing
	1	2	3	4	5					
I like to have the responsibility for handling a situation that requires a lot of thinking	95 1.9%	163 3.2%	1008 19.7%	2689 52.5%	1168 22.8%	3.91	4.00	0.84	5123	30
I would rather do something that requires little thought than something that is sure to challenge my thinking abilities	1947 38.0%	2260 44.1%	618 12.1%	227 4.4%	72 1.4%	1.87	2.00	0.89	5124	29
Thinking is not my idea of fun	2601 51.0%	1956 38.4%	407 8.0%	95 1.9%	41 0.8%	1.63	1.00	0.78	5100	53
I prefer complex to simple problems	98 1.9%	426 8.3%	1711 33.5%	2108 41.3%	762 14.9%	3.59	4.00	0.91	5105	48
I try to anticipate and avoid situations where it is likely that I will have to think in depth about something	2072 40.5%	2247 43.9%	528 10.3%	196 3.8%	70 1.4%	1.82	2.00	0.87	5113	40

31. What is your age in years?

Mean	Median	SD	n
51.4	53.0	13.1	5153

32. What is your sex? Select ONE box.

____ Male
____ Female

Male	Female	n	# missing
1	2		
3644 71.8%	1433 28.2%	5077	76

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33. What is your home 5-digit zip code?

34. How long in years have you lived within 50 miles of your current residence?

Mean	Median	SD	n	# missing
24.4	22.0	17.4	5153	0

35. How many people are there in your household, including yourself?

Mean	Median	SD	n	# missing
2.52	2.0	1.2	5153	0

36. Which of the following best describes the highest level of education you have completed? *Select ONE box.*

Did not complete high school	High school diploma or equivalent	Some college, technical school, or associate's degree	Bachelor's degree	Master's degree	Professional degree or doctorate	Mean (yrs)	Median (yrs)	SD (yrs)	n
1	2	3	4	5	6				
14 0.3%	202 3.9%	1407 27.3%	1754 34.0%	1201 23.3%	575 11.2%	16.4	16.0	2.6	5153

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37. What is your present employment status? *Select ALL that apply to you.*

Sub-question	No	Yes	Mean	Median	SD	n	# missing
	0	1					
Employed full time	2032 39.7%	3091 60.3%	.60	1.00	.49	5123	30
Employed part time	4458 87.0%	665 13.0%	.13	.00	.34	5123	30
Retired	3917 76.5%	1206 23.5%	.24	.00	.42	5123	30
Homemaker	4828 94.2%	295 5.8%	.06	.00	.23	5123	30
Student	4869 95.0%	254 5.0%	.05	.00	.22	5123	30
Unemployed	4875 95.2%	248 4.8%	.05	.00	.21	5123	30
In Armed Forces	5097 99.5%	26 0.5%	.01	.00	.07	5123	30

➔ If selected either “full time” or “part time”, go to sub-questions a-e

a. In your job, are you: *Select ALL that apply to you.*

Sub-question	No	Yes	Mean	Median	SD	n	# missing
	0	1					
An employee for a private, for-profit business	1972 53.7%	1697 46.3%	.46	.00	.50	3669	23
An employee of a private, not-for-profit organization	3170 86.4%	499 13.6%	.14	.00	.34	3669	23
A local government employee city, county, etc.	3303 90.0%	366 10.0%	.10	.00	.30	3669	23
A state government employee	3299 89.9%	370 10.1%	.10	.00	.30	3669	23
A federal government employee	3470 94.6%	199 5.4%	.05	.00	.23	3669	23
Self-employed in your own business	2876 78.4%	793 21.6%	.22	.00	.41	3669	23
Other please specify	3454 94.1%	215 5.9%	.06	.00	.24	3669	23

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b. What kind of business or industry is your employer for example: hospital, school, bank, trucking company? [Open-ended](#)

c. What economic sector is your employer?

Agriculture, forestry, fishing and hunting	1	190 5.2%
Construction	2	160 4.4%
Manufacturing	3	311 8.6%
Wholesale trade	4	33 0.9%
Retail trade	5	185 5.1%
Transportation, warehousing, and utilities	6	161 4.4%
Information telecommunications, publishing, broadcasting	7	306 8.4%
Finance and insurance	8	162 4.5%
Real estate, rental, and leasing	9	50 1.4%
Professional and scientific; management of companies; administrative and waste management services	10	394 10.8%
Educational services; health care and social assistance	11	802 22.1%
Arts, entertainment, and recreation; accommodation and food services	12	138 3.8%
Public administration	13	164 4.5%
Mining, quarrying, and oil and gas extraction	14	39 1.1%
Other please specify	15	538 14.8%
n		3633
# missing		59

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d. To what extent does weather affect your work or the economic sector that you indicated above?

Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	n	# missing
1	2	3	4	5					
563 15.3%	900 24.4%	909 24.7%	673 18.3%	639 17.3%	2.98	3.00	1.32	3684	8

e. To what extent are weather forecasts important in your work or the economic sector that you indicated above?

Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	n	# missing
1	2	3	4	5					
573 15.5%	866 23.5%	807 21.9%	729 19.8%	710 19.3%	3.04	3.00	1.35	3685	7

38. Which of the following best describes your race? *Select ALL that apply to you.*

Sub-question	No	Yes	n	# missing
	0	1		
White	170 3.4%	4845 96.6%	5015	138
Black or African American	4996 99.6%	19 0.4%	5015	138
American Indian or Alaska Native	4916 98.0%	99 2.0%	5015	138
Asian	4979 99.3%	36 0.7%	5015	138
Native Hawaiian or other Pacific Islander	5005 99.8%	10 0.2%	5015	138
Other	4879 97.3%	136 2.7%	5015	138

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39. Are you of Hispanic, Latino, or Spanish origin? *Select ONE box.*

No, not of Hispanic, Latino, or Spanish origin	Yes, Mexican, Mexican American, Chicano	Yes, Puerto Rican	Yes, Cuban	Yes, another Hispanic, Latino, or Spanish origin please specify	n	# missing
1	2	3	4	5		
4829 97.9%	28 0.6%	16 0.3%	11 0.2%	49 1.0%	4933	220

40. What is your primary language? [Open-ended](#)

41. What was your total household income for 2009 before taxes? *Select ONE box.*

Under \$15,000	1	\$7500	169 (3.3%)
\$15,000 to \$24,999	2	\$22500	197 (3.8%)
\$25,000 to \$34,999	3	\$30000	264 (5.1%)
\$35,000 to \$49,999	4	\$42500	576 (11.2%)
\$50,000 to \$74,999	5	\$62500	984 (19.1%)
\$75,000 to \$99,999	6	\$87500	840 (16.3%)
\$100,000 to \$124,999	7	\$112500	612 (11.9%)
\$125,000 to \$149,999	8	\$137500	371 (7.2%)
\$150,000 to \$199,999	9	\$175000	267 (5.2%)
\$200,000 or more	10	\$200000	270 (5.2%)
n			5153
# missing			603

42. If you have any further comments, please write them below. [Open-ended](#)

We greatly appreciate the time you took to complete this survey. Thank you!

Appendix E

Public Survey: Implementation, Instrument, and Codebook

E.1. Survey Implementation Information

Survey fielding

- December 3-10, 2010, fully fielded

Sample

- Survey Sampling International (SSI) provided the sample. The sample was drawn from SSI's Dynamix platform, which is a regularly screened and maintained database of people recruited from multiple sources (SSI's proprietary panels, online communities, social media, partners, etc.) who have actively indicated their willingness to respond to Internet surveys on a variety of topics. SSI balanced their invitations by gender, age, race/ethnicity, income, and geographic region to achieve a sample that was closely reflective of the U.S. population. The only people permitted to access the survey were those invited by SSI via an e-mail containing a specific link to the survey Website. We targeted 2000 completed survey responses and closed the survey after reaching that goal. We ultimately received n=2059 completed surveys.
- The median time to complete the survey was 10 minutes, 39 seconds.

Subject line

- Request to respond to a weather-related survey

E.2. Survey Instrument and Codebook^{12,13}

Evaluating Weather Forecast Information

Important information about this survey – please read!

The purpose of this survey is to understand your thoughts and opinions about weather and weather forecast information. You do not need any special knowledge about weather or weather forecasts to answer the questions.

We will use your responses to improve the communication of weather forecast information and to guide future weather-related research, so your responses are very important to us. All your responses will remain anonymous.

The survey should take you about 10 minutes to complete. Completing this survey is voluntary. The information you provide us that can be identified with you will remain confidential. We will analyze your responses together with all other respondents, so please respond as honestly as you can.

Thank you for taking the time to complete this survey!

Are you 18 years of age or older?

☐ Yes

☐ No → if “No”, then display this message: “Thank you for your interest in our study. Unfortunately, you must be at least 18 years of age to participate in this survey.” Do not let respondent answer any further questions.

Yes	No	n
1	2	
2059	0	2059

¹² Open-ended responses not included due to space considerations.

¹³ All statistics summarizing the central tendency (mean, median) and distribution (standard deviation) of response distributions are calculated omitting responses of “Don’t know”, “Not familiar with this”, “Not applicable”

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The questions below ask about your thoughts about weather forecast information in general.

1. How often do you get weather forecasts from the sources listed below? [Sub-items randomized.](#)

Sub-question	Never	Rarely	Once or more a month	Once a week	Two or more times a week	Once a day	Two or more times a day	Mean	Median	SD	n
	1	2	3	4	5	6	7				
Local TV station	191 9.28%	161 7.82%	105 5.1%	131 6.36%	301 14.62%	584 28.36%	586 28.46%	5.08	6	1.96	2059
Cable TV station e.g., CNN, The Weather Channel	449 21.81%	283 13.74%	203 9.86%	184 8.94%	297 14.42%	334 16.22%	309 15.01%	3.89	4	2.18	2059
Newspaper	708 34.39%	434 21.08%	116 5.63%	176 8.55%	181 8.79%	393 19.09%	51 2.48%	3.03	2	2.03	2059
Telephone (dial-in) weather information source	1596 77.51%	211 10.25%	47 2.28%	55 2.67%	53 2.57%	61 2.96%	36 1.75%	1.58	1	1.37	2059
Commercial or public radio station	633 30.74%	344 16.71%	122 5.92%	175 8.5%	257 12.48%	301 14.62%	227 11.02%	3.43	3	2.21	2059
NOAA Weather Radio	1421 69.01%	270 13.11%	101 4.9%	70 3.4%	71 3.45%	74 3.59%	52 2.52%	1.80	1	1.53	2059
Friend, family, co-worker, etc.	520 25.26%	412 20.01%	210 10.2%	253 12.29%	342 16.61%	221 10.73%	101 4.9%	3.27	3	1.92	2059
Website	483 23.46%	243 11.8%	177 8.6%	188 9.13%	299 14.52%	401 19.48%	268 13.02%	3.90	1	2.18	2059
Social media e.g., Facebook, Twitter	1506 73.14%	196 9.52%	55 2.67%	76 3.69%	72 3.5%	84 4.08%	70 3.4%	1.81	4	1.64	2059
Non-internet enabled mobile device e.g., cell phone, personal desk assistant [PDA], pager	1581 76.78%	172 8.35%	54 2.62%	58 2.82%	61 2.96%	88 4.27%	45 2.19%	1.68	1	1.52	2059
Internet-enabled smart phone e.g., iPhone, Droid, BlackBerry or other mobile device e.g., iPad	1407 68.33%	136 6.6%	68 3.3%	83 4.03%	107 5.2%	148 7.19%	110 5.34%	2.14	1	1.95	2059

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- ➔ If response to “website” is more frequent than “never”, go to Part a
- ➔ If response to “Internet-enabled smart phone or other mobile device” is more frequent than “never”, go to Parts b and c

a. How often do you get weather forecasts from the websites listed below? Sub-items will be randomized, except for “Other”.

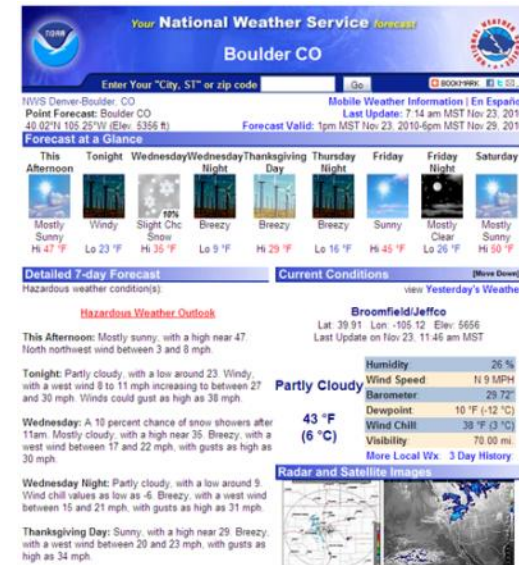
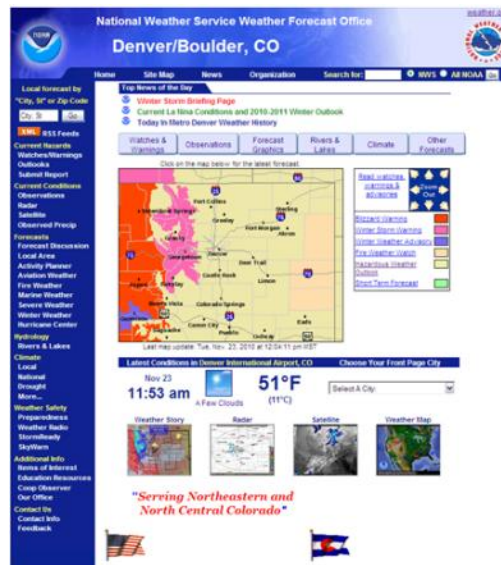
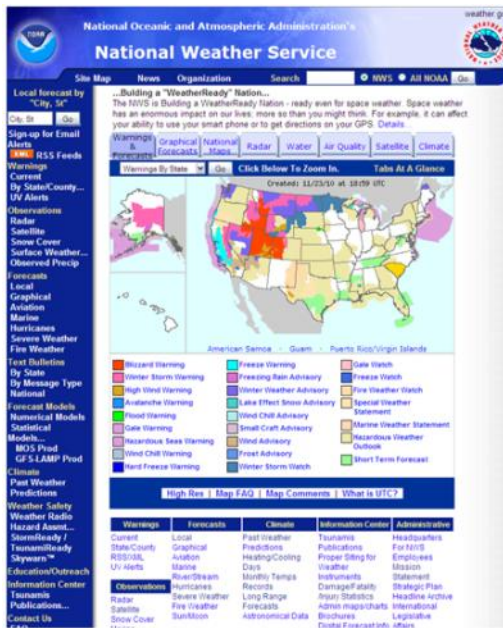
Sub-question	Never	Rarely	Once or more a month	Once a week	Two or more times a week	Once a day	Two or more times a day	I am not familiar with this	Mean	Median	SD	n
	1	2	3	4	5	6	7	8				
National Weather Service website (example NWS web addresses are www.weather.gov and www.nws.gov)	839 53.24%	230 14.59%	107 6.79%	90 5.71%	82 5.2%	103 6.54%	80 5.08%	45 2.86%	2.33	1	1.90	1576
The Weather Channel website (www.weather.com)	412 26.14%	195 12.37%	161 10.22%	156 9.9%	230 14.59%	221 14.02%	160 10.15%	41 2.6%	3.59	3	2.13	1576
AccuWeather website (www.accuweather.com)	902 57.23%	183 11.61%	89 5.65%	93 5.9%	82 5.2%	99 6.28%	64 4.06%	64 4.06%	2.22	1	1.86	1576
WeatherBug website (www.weatherbug.com)	937 59.45%	163 10.34%	61 3.87%	82 5.2%	62 3.93%	100 6.34%	98 6.22%	73 4.63%	2.24	1	1.97	1576
Weather Underground website (www.wunderground.com)	1063 67.45%	153 9.71%	44 2.79%	53 3.36%	57 3.62%	63 4%	44 2.79%	99 6.28%	1.82	1	1.62	1576
Intellicast (www.intellicast.com)	1096 69.54%	132 8.38%	36 2.28%	60 3.81%	46 2.92%	61 3.87%	38 2.41%	107 6.79%	1.75	1	1.57	1576
Local TV station’s website	603 38.26%	262 16.62%	131 8.31%	108 6.85%	161 10.22%	185 11.74%	87 5.52%	39 2.48%	2.91	2	2.05	1576
Cable TV station’s website	895 56.79%	200 12.69%	67 4.25%	82 5.2%	97 6.16%	127 8.06%	64 4.06%	44 2.79%	2.30	1	1.92	1576
Online newspaper website	861 54.63%	241 15.29%	82 5.2%	88 5.58%	97 6.16%	123 7.8%	49 3.11%	35 2.22%	2.28	1	1.85	1576

- ➔ If response to “National Weather Service website” is more frequent than “Never”, go to Part i

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- i. Below are three sample images of different parts of the National Weather Service website. Please tell us how often you get weather forecasts from a NWS website.

Never	Rarely	Once or more a month	Once a week	Two or more times a week	Once a day	Two or more times a day	Mean	Median	SD	n
1	2	3	4	5	6	7				
106 14.38%	230 31.21%	127 17.23%	88 11.94%	91 12.35%	65 8.82%	30 4.07%	3.19	3	1.71	737



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b. Do you ever use a weather app (application) on your smart phone or other Internet-enabled mobile device to get weather forecasts?

___ Yes → If yes, which weather app do you primarily use? _____

___ No

No	Yes	n
1	2	
421 64.57%	231 35.43%	652

c. Do you ever use the mobile web browser on your smart phone and/or other Internet-enabled mobile device to get a weather forecast from a website?

___ Yes → If yes, which website do you primarily use? _____

___ No

No	Yes	n
1	2	
455 69.78%	197 30.22%	652

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There are 4 alternate sets of Question 2 below. One-fourth of the sample (randomly selected) got each version.

*** Alt 1 ***

2. How useful do you find the weather forecast information provided by each of the sources listed below? [Sub-items randomized.](#)

Sub-question	Not at all useful	A little useful	Somewhat useful	Very useful	Extremely useful	I don't know/NA	Mean	Median	SD	n
	1	2	3	4	5	6				
Local TV station	25 4.72%	26 4.91%	93 17.55%	169 31.89%	179 33.77%	38 7.17%	3.92	4	1.10	531
Cable TV station e.g., CNN, The Weather Channel	52 9.81%	33 6.23%	119 22.45%	136 25.66%	128 24.15%	62 11.7%	3.54	4	1.27	531
Newspaper	86 16.23%	78 14.72%	137 25.85%	110 20.76%	47 8.87%	72 13.58%	2.90	3	1.25	531
Telephone (dial-in) weather information source	151 28.49%	41 7.74%	63 11.89%	44 8.3%	24 4.53%	207 39.06%	2.22	2	1.35	531
Commercial or public radio station	69 13.02%	61 11.51%	144 27.17%	106 20%	69 13.02%	81 15.28%	3.10	3	1.26	531
NOAA Weather Radio	108 20.38%	36 6.79%	69 13.02%	69 13.02%	46 8.68%	202 38.11%	2.72	3	1.46	531
Friend, family, co-worker, etc.	75 14.15%	89 16.79%	147 27.74%	102 19.24%	45 8.49%	72 13.58%	2.90	3	1.21	531
Website	77 14.53%	41 7.74%	94 17.74%	111 20.94%	115 21.7%	92 17.36%	3.33	4	1.41	531
Social media e.g., Facebook, Twitter	175 33.02%	37 6.98%	56 10.57%	38 7.17%	21 3.96%	203 38.3%	2.06	1	1.32	531
Non-internet enabled mobile device e.g., cell phone, personal desk assistant [PDA], pager	155 29.24%	30 5.66%	49 9.24%	42 7.92%	26 4.91%	228 43.02%	2.19	1	1.41	531
Internet-enabled smart phone e.g., iPhone, Droid, Blackberry or other mobile device e.g., iPad	136 25.66%	21 3.96%	55 10.38%	46 8.68%	49 9.24%	223 42.08%	2.51	2	1.55	531

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*** Alt 2 ***

2. How easy to understand do you find the weather forecast information provided by each of the sources listed below? [Sub-items randomized.](#)

Sub-question	Not at all easy to understand	A little easy to understand	Somewhat easy to understand	Very easy to understand	Extremely easy to understand	I don't know/NA	Mean	Median	SD	n
	1	2	3	4	5	6				
Local TV station	20 3.91%	8 1.57%	54 10.57%	133 26.03%	254 49.71%	42 8.22%	4.26	5	1.02	511
Cable TV station e.g., CNN, The Weather Channel	17 3.33%	18 3.52%	55 10.76%	122 23.88%	211 41.29%	88 17.22%	4.16	4	1.07	511
Newspaper	22 4.3%	18 3.52%	59 11.55%	142 27.79%	186 36.4%	84 16.44%	4.06	4	1.10	511
Telephone (dial-in) weather information source	24 4.7%	15 2.94%	52 10.18%	58 11.35%	82 16.05%	280 54.8%	3.69	4	1.30	511
Commercial or public radio station	23 4.5%	18 3.52%	56 10.96%	140 27.4%	166 32.48%	108 21.14%	4.01	4	1.12	511
NOAA Weather Radio	34 6.65%	17 3.33%	50 9.78%	75 14.68%	55 10.76%	280 54.8%	3.43	4	1.33	511
Friend, family, co-worker, etc.	20 3.91%	20 3.91%	78 15.26%	131 25.64%	186 36.4%	76 14.87%	4.02	4	1.10	511
Website	23 4.5%	18 3.52%	57 11.16%	133 26.03%	163 31.9%	117 22.9%	4.00	4	1.13	511
Social media e.g., Facebook, Twitter	34 6.65%	15 2.94%	54 10.57%	58 11.35%	57 11.16%	293 57.34%	3.41	4	1.36	511
Non-internet enabled mobile device e.g., cell phone, personal desk assistant [PDA], pager	29 5.68%	22 4.3%	45 8.81%	52 10.18%	57 11.16%	306 59.88%	3.42	4	1.37	511
Internet-enabled smart phone e.g., iPhone, Droid, Blackberry or other mobile device e.g., iPad	29 5.68%	18 3.52%	49 9.59%	58 11.35%	69 13.5%	288 56.36%	3.54	4	1.35	511

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*** Alt 3 ***

2. How convenient do you find the sources of weather forecast information listed below? Sub-items randomized.

Sub-question	Not at all convenient	A little convenient	Somewhat convenient	Very convenient	Extremely convenient	I don't know/NA	Mean	Median	SD	n
	1	2	3	4	5	6				
Local TV station	28 5.53%	39 7.71%	98 19.37%	151 29.84%	172 33.99%	18 3.56%	3.82	4	1.17	507
Cable TV station e.g., CNN, The Weather Channel	66 13.04%	50 9.88%	113 22.33%	122 24.11%	120 23.72%	35 6.92%	3.38	4	1.34	507
Newspaper	124 24.51%	79 15.61%	107 21.15%	86 17%	68 13.44%	42 8.3%	2.77	3	1.40	507
Telephone (dial-in) weather information source	218 43.08%	72 14.23%	58 11.46%	40 7.9%	19 3.76%	99 19.57%	1.94	1	1.22	507
Commercial or public radio station	86 17%	77 15.22%	104 20.55%	112 22.13%	84 16.6%	43 8.5%	3.07	3	1.37	507
NOAA Weather Radio	180 35.57%	66 13.04%	56 11.07%	58 11.46%	35 6.92%	111 21.94%	2.25	2	1.39	507
Friend, family, co-worker, etc.	88 17.39%	88 17.39%	125 24.7%	105 20.75%	61 12.06%	39 7.71%	2.92	3	1.30	507
Website	68 13.44%	61 12.06%	84 16.6%	126 24.9%	128 25.3%	39 7.71%	3.40	4	1.39	507
Social media e.g., Facebook, Twitter	201 39.72%	67 13.24%	61 12.06%	44 8.7%	22 4.35%	111 21.94%	2.04	1	1.27	507
Non-internet enabled mobile device e.g., cell phone, personal desk assistant [PDA], pager	210 41.5%	52 10.28%	52 10.28%	40 7.9%	19 3.76%	133 26.28%	1.94	1	1.26	507
Internet-enabled smart phone e.g., iPhone, Droid, Blackberry or other mobile device e.g., iPad	171 33.79%	32 6.32%	48 9.49%	67 13.24%	60 11.86%	128 25.3%	2.51	2	1.57	507

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*** Alt 4 ***

2. How well do the sources of weather forecast information listed below meet your needs? Sub-items will be randomized, except for “Other”.

Sub-question	Not at all	A little	Somewhat	Very	Extremely	I don't know/NA	Mean	Median	SD	n
	1	2	3	4	5	6				
Local TV station	35 6.84%	34 6.64%	77 15.04%	164 32.03%	164 32.03%	27 5.27%	3.85	4	1.20	513
Cable TV station e.g., CNN, The Weather Channel	78 15.23%	48 9.38%	105 20.51%	121 23.63%	96 18.75%	64 12.5%	3.24	3	1.37	513
Newspaper	112 21.88%	74 14.45%	120 23.44%	84 16.41%	52 10.16%	70 13.67%	2.75	3	1.34	513
Telephone (dial-in) weather information source	225 43.94%	35 6.84%	38 7.42%	31 6.06%	20 3.91%	163 31.84%	1.81	1	1.26	513
Commercial or public radio station	110 21.48%	55 10.74%	110 21.48%	87 16.99%	75 14.65%	75 14.65%	2.91	3	1.42	513
NOAA Weather Radio	186 36.33%	38 7.42%	44 8.59%	38 7.42%	38 7.42%	168 32.81%	2.14	1	1.44	513
Friend, family, co-worker, etc.	97 18.94%	94 18.36%	136 26.56%	96 18.75%	41 8.01%	48 9.38%	2.76	3	1.24	513
Website	94 18.36%	51 9.96%	80 15.62%	124 24.22%	103 20.12%	60 11.72%	3.20	4	1.45	513
Social media e.g., Facebook, Twitter	232 45.31%	40 7.81%	38 7.42%	24 4.69%	15 2.93%	163 31.84%	1.71	1	1.16	513
Non-internet enabled mobile device e.g., cell phone, personal desk assistant [PDA], pager	230 44.92%	31 6.06%	39 7.62%	20 3.91%	22 4.3%	170 33.2%	1.75	1	1.24	513
Internet-enabled smart phone e.g., iPhone, Droid, Blackberry or other mobile device e.g., iPad	212 41.41%	24 4.69%	33 6.44%	39 7.62%	44 8.59%	160 31.25%	2.09	1	1.50	513

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3. A weather forecast can provide several types of information about temperature, cloudiness, winds, and precipitation such as rain, snow, hail, or sleet. How important is it to you to have the information listed below as part of a forecast? [Sub-items randomized.](#)

Sub-question	Not at all important	A little important	Somewhat important	Very important	Extremely important	Mean	Median	SD	n
	1	2	3	4	5				
Information about hazardous weather	89 4.32%	108 5.24%	331 16.08%	615 29.87%	916 44.49%	4.01	4	1.10	2059
Chance of precipitation	99 4.81%	154 7.48%	534 25.94%	749 36.38%	523 25.4%	3.70	4	1.08	2059
Amount of precipitation	120 5.83%	196 9.52%	563 27.34%	705 34.24%	475 23.07%	3.59	4	1.12	2059
Type of precipitation	143 6.94%	165 8.01%	470 22.83%	718 34.87%	563 27.34%	3.67	4	1.16	2059
When precipitation will occur	103 5%	157 7.62%	504 24.48%	739 35.89%	556 27%	3.72	4	1.09	2059
Where precipitation will occur	119 5.78%	165 8.01%	479 23.26%	765 37.15%	531 25.79%	3.69	4	1.11	2059
Chance of different amounts of precipitation (e.g., greater than ½ inch, 1 inch, 6 inches)	143 6.94%	193 9.37%	554 26.91%	688 33.41%	481 23.36%	3.57	4	1.15	2059
Low temperature	102 4.95%	197 9.57%	566 27.49%	710 34.48%	484 23.51%	3.62	4	1.09	2059
High temperature	95 4.61%	158 7.67%	518 25.16%	793 38.51%	495 24.04%	3.70	4	1.06	2059
What time of day the high temperature will occur	261 12.68%	341 16.56%	635 30.84%	526 25.55%	296 14.38%	3.12	3	1.22	2059
What time of day the low temperature will occur	260 12.63%	396 19.23%	635 30.84%	465 22.58%	303 14.72%	3.07	3	1.23	2059
How cloudy it will be	273 13.26%	465 22.58%	727 35.31%	410 19.91%	184 8.94%	2.89	3	1.14	2059
Wind speed	164 7.96%	278 13.5%	697 33.85%	585 28.41%	335 16.27%	3.31	3	1.14	2059
Wind direction	398 19.33%	446 21.66%	620 30.11%	386 18.75%	209 10.15%	2.79	3	1.24	2059
Humidity levels	224 10.88%	321 15.59%	710 34.48%	528 25.64%	276 13.4%	3.15	3	1.17	2059
Dewpoint	603 29.29%	496 24.09%	533 25.89%	292 14.18%	135 6.56%	2.45	2	1.23	2059

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Pollen count	513 24.92%	409 19.86%	540 26.23%	369 17.92%	228 11.07%	2.70	3	1.32	2059
Air quality	335 16.27%	406 19.72%	618 30.02%	451 21.9%	249 12.09%	2.94	3	1.24	2059

4. On average, how often do you seek weather forecast information for the following time periods? [Sub-items NOT randomized.](#)

Sub-question	Rarely or never	Less than half of the time	About half the time	More than half the time	Usually or always	Not applicable to me	Mean	Median	SD	n
	1	2	3	4	5	6				
up to the next 6 hours	345 16.76%	343 16.66%	377 18.31%	328 15.93%	591 28.7%	75 3.64%	3.24	3	1.47	2059
6-12 hours from now	265 12.87%	313 15.2%	414 20.11%	367 17.82%	627 30.45%	73 3.54%	3.39	4	1.41	2059
12-24 hours from now	191 9.28%	255 12.38%	410 19.91%	399 19.38%	736 35.75%	68 3.3%	3.62	4	1.34	2059
1-2 days from now	193 9.37%	304 14.76%	437 21.22%	423 20.54%	634 30.79%	68 3.3%	3.50	4	1.33	2059
2-3 days from now	251 12.19%	361 17.53%	425 20.64%	365 17.73%	581 28.22%	76 3.69%	3.33	3	1.39	2059
3-5 days from now	304 14.76%	426 20.69%	413 20.06%	321 15.59%	516 25.06%	79 3.84%	3.16	3	1.42	2059
5-7 days from now	344 16.71%	424 20.59%	381 18.5%	293 14.23%	544 26.42%	73 3.54%	3.14	3	1.46	2059
the upcoming weekend	231 11.22%	337 16.37%	410 19.91%	334 16.22%	678 32.93%	69 3.35%	3.45	4	1.40	2059

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5. Below is a list of reasons for getting weather forecast information. Please indicate the extent to which you agree or disagree with each item. [Sub-items randomized.](#)

Sub-question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Median	SD	n
	1	2	3	4	5				
To learn about things to discuss with other people	575 27.93%	435 21.13%	643 31.23%	310 15.06%	96 4.66%	2.47	3	1.18	2059
To belong to a group	886 43.03%	479 23.26%	478 23.22%	148 7.19%	68 3.3%	2.04	2	1.12	2059
Because I enjoy talking about the weather to others	509 24.72%	440 21.37%	667 32.39%	328 15.93%	115 5.58%	2.56	3	1.18	2059
Because it passes the time, particularly when I'm bored	676 32.83%	453 22%	595 28.9%	250 12.14%	85 4.13%	2.32	2	1.17	2059
Because it relaxes me	621 30.16%	458 22.24%	661 32.1%	216 10.49%	103 5%	2.38	2	1.16	2059
So I can forget about school, work, and other things	750 36.42%	468 22.73%	535 25.98%	220 10.68%	86 4.18%	2.23	2	1.17	2059
To find out about interesting weather	325 15.78%	290 14.08%	720 34.97%	544 26.42%	180 8.74%	2.98	3	1.18	2059
Because it is entertaining	529 25.69%	448 21.76%	675 32.78%	304 14.76%	103 5%	2.52	3	1.17	2059
Because it is exciting	549 26.66%	405 19.67%	714 34.68%	276 13.4%	115 5.58%	2.52	3	1.18	2059
To keep up with what is going on with the weather	114 5.54%	114 5.54%	498 24.19%	905 43.95%	428 20.79%	3.69	4	1.04	2059
To be aware of potential changes in the weather	66 3.2%	67 3.25%	368 17.87%	956 46.43%	602 29.24%	3.95	4	.94	2059
To learn about the major weather events of the day	148 7.19%	133 6.46%	566 27.49%	851 41.33%	361 17.53%	3.56	4	1.08	2059
To find out about important weather information	85 4.13%	80 3.88%	420 20.4%	886 43.03%	588 28.56%	3.88	4	1.00	2059
To seek weather information for a specific task I need to do	101 4.9%	84 4.08%	455 22.1%	895 43.47%	524 25.45%	3.80	4	1.02	2059
To seek weather information for a specific decision I need to make	105 5.1%	73 3.54%	452 21.95%	935 45.41%	494 23.99%	3.80	4	1.01	2059

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6. On average, how often do you use forecasts for planning the activities listed below? Sub-items randomized.

Sub-question	Rarely or never	Less than half of the time	About half the time	More than half the time	Usually or always	Not applicable to me	Mean	Median	SD	n
	1	2	3	4	5	6				
Planning how to dress yourself	167 8.11%	180 8.74%	307 14.91%	400 19.43%	932 45.26%	73 3.54%	3.88	4	1.32	2059
Planning how to dress your children or other family members	466 22.63%	143 6.94%	199 9.66%	253 12.29%	507 24.62%	491 23.85%	3.12	3	1.65	2059
Planning how to get to work or school	503 24.43%	232 11.27%	267 12.97%	270 13.11%	428 20.79%	359 17.44%	2.93	3	1.58	2059
Planning to do yard work or outdoor house work	319 15.49%	218 10.59%	338 16.42%	355 17.24%	646 31.37%	183 8.89%	3.42	4	1.48	2059
Planning job activities	564 27.39%	216 10.49%	251 12.19%	259 12.58%	395 19.18%	374 18.16%	2.82	3	1.59	2059
Planning social activities	296 14.38%	326 15.83%	335 16.27%	434 21.08%	558 27.1%	110 5.34%	3.32	4	1.43	2059
Planning weekend activities	197 9.57%	250 12.14%	335 16.27%	429 20.84%	769 37.35%	79 3.84%	3.67	4	1.36	2059
Planning leisure activities	205 9.96%	251 12.19%	368 17.87%	441 21.42%	718 34.87%	76 3.69%	3.61	4	1.35	2059
Planning work- or school-related travel (i.e., to a different city)	487 23.65%	226 10.98%	242 11.75%	282 13.7%	487 23.65%	335 16.27%	3.03	3	1.60	2059
Planning travel for leisure	292 14.18%	304 14.76%	330 16.03%	366 17.78%	627 30.45%	140 6.8%	3.38	4	1.46	2059
Planning for outdoor work/school activities	302 14.67%	196 9.52%	305 14.81%	359 17.44%	664 32.25%	233 11.32%	3.49	4	1.48	2059

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The questions below ask about your thoughts about the National Weather Service (NWS) in general.

The National Weather Service (NWS) is the primary source of weather forecasts, watches, warnings, and advisories for the United States. In addition to normal weather forecasts of precipitation, temperature, cloudiness, and winds, the NWS also provides forecasts, watches, and warnings for:

- severe weather (such as thunderstorms and tornadoes),
- winter weather,
- hurricanes,
- fire weather, and
- forecasts used for aviation and marine commerce.

All of this information is also provided to media (such as television, radio, and newspapers) and to private weather services (such as The Weather Channel and AccuWeather).

7. Have you heard of the National Weather Service?

☐ Yes

☐ No → if “No”, go to socio-demographic questions

Yes	No	n
1	2	
1896 92.08%	163 7.92%	2059

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Now, please think about your overall satisfaction with the National Weather Service.

8. First, please consider all of your experiences with the National Weather Service. Using a 10-point scale on which 1 means “Very Dissatisfied” and 10 means “Very Satisfied”, how satisfied are you with the National Weather Service?

Very Dissatisfied									Very Satisfied	Don't know	Mean	Median	SD	n
1	2	3	4	5	6	7	8	9	10	11				
15 0.79%	13 0.69%	16 0.84%	12 0.63%	136 7.17%	144 7.6%	221 11.66%	421 22.2%	291 15.35%	483 25.48%	144 7.6%	8.02	8	1.86	1896

9. Using a 10-point scale on which 1 now means “Falls Short of your Expectations” and 10 means “Exceeds your Expectations”, to what extent has the National Weather Service fallen short of, or exceeded your expectations?

Falls short of expectations									Exceeds expectations	Don't know	Mean	Median	SD	n
1	2	3	4	5	6	7	8	9	10	11				
19 1%	15 0.79%	35 1.85%	38 2%	190 10.02%	233 12.29%	278 14.66%	410 21.62%	275 14.5%	228 12.02%	175 9.23%	7.34	8	1.92	1896

10. Now, imagine what an ideal organization providing weather information would be like. How well do you think the National Weather Service compares with that ideal organization you just imagined? Please use a 10-point scale on which 1 means “Not Very Close to the Ideal” and 10 means “Very Close to the Ideal”.

Not very close to ideal									Very close to ideal	Don't know	Mean	Median	SD	n
1	2	3	4	5	6	7	8	9	10	11				
19 1%	15 0.79%	29 1.53%	44 2.32%	144 7.6%	195 10.28%	287 15.14%	399 21.04%	287 15.14%	317 16.72%	160 8.44%	7.58	8	1.94	1896

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11. People have a wide range of thoughts about the National Weather Service. Below are pairs of words that represent opposite ideas. Please select the box closest to the idea that best describes your feelings about the National Weather Service. Sub-items randomized.

Sub-question	Strongly agree	Agree	Neither	Agree	Strongly agree	I don't know	Mean	Median	SD	n
	1	2	3	4	5	6				
Can't/can be trusted	27 1.42%	41 2.16%	332 17.51%	789 41.61%	616 32.49%	91 4.8%	4.07	4	0.86	1896
Is inaccurate/accurate	25 1.32%	60 3.16%	421 22.2%	844 44.52%	453 23.89%	93 4.9%	3.91	4	0.86	1896
Is unfair/fair	18 0.95%	18 0.95%	380 20.04%	793 41.82%	559 29.48%	128 6.75%	4.05	4	0.81	1896
Doesn't/does tell the whole story	29 1.53%	61 3.22%	462 24.37%	716 37.76%	510 26.9%	118 6.22%	3.91	4	0.91	1896
Is biased/unbiased	30 1.58%	33 1.74%	421 22.2%	672 35.44%	596 31.44%	144 7.6%	4.01	4	0.90	1896
Doesn't/Does watch after your interests	32 1.69%	59 3.11%	454 23.94%	699 36.87%	520 27.43%	132 6.96%	3.92	4	0.92	1896
Is not/is concerned about the community's well-being	19 1%	55 2.9%	380 20.04%	715 37.71%	595 31.38%	132 6.96%	4.03	4	0.88	1896
Is concerned about making profits/public interest	18 0.95%	41 2.16%	345 18.2%	713 37.6%	655 34.55%	124 6.54%	4.10	4	0.86	1896
Has poorly/well trained forecasters	18 0.95%	32 1.69%	296 15.61%	736 38.82%	698 36.81%	116 6.12%	4.16	4	0.83	1896

About You and Your Household

The remaining survey questions are about you and your household. This information will be used to help group your responses with responses of others. You do not have to answer any question you are uncomfortable answering. All of your responses will remain anonymous, and your responses will not be reported in a way that can be linked to you.

12. How often do you do the activities listed below? [Sub-items randomized.](#)

Sub-question	Never	Seldom	Sometimes	Usually	Always	Mean	Median	SD	n	# missing
	1	2	3	4	5					
I take notice of changes that occur in the weather	67 3.3%	110 5.4%	532 25.9%	865 42.1%	479 23.3%	3.77	4.0	0.97	2053	6
I notice how the clouds look during various kinds of weather	114 5.5%	210 10.2%	652 21.7%	717 34.9%	362 17.6%	3.49	4.0	1.07	2055	4
I plan my daily routine around what the weather may bring	135 6.6%	363 17.6%	799 38.8%	515 25.0%	240 11.7%	3.18	3.0	1.06	2052	7
The weather or changes in the weather really do not matter to me	452 22.0%	503 24.4%	639 31.0%	332 16.1%	125 6.1%	2.60	3.0	1.17	2051	8
In the past I have wished for weather that would result in a weather-related holiday	322 15.6%	395 19.2%	765 37.2%	365 17.7%	207 10.1%	2.87	3.0	1.18	2057	5

13. To what extent do you agree with the statements below? [Sub-items randomized.](#)

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	Mean	Median	SD	n	# missing
	1	2	3	4	5					
I am attached to the weather and climate of my hometown (or the place of where my family of origin lives or lived)	149 7.4%	242 12.0%	698 34.7%	677 33.6%	246 12.2%	3.31	3.0	1.07	2012	47
It is important to me to live in a place that offers a variety of different weather conditions throughout the year	148 7.4%	270 13.3%	735 36.3%	645 31.9%	227 11.2%	3.26	3.0	1.06	2025	34

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14. Please indicate the extent to which you agree or disagree with the following statements. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	Mean	Median	SD	n	# missing
	1	2	3	4	5					
I like to have the responsibility for handling a situation that requires a lot of thinking	76 3.7%	192 9.3%	786 38.2%	793 38.6%	208 10.1%	3.42	3.00	0.93	2055	4
I would rather do something that requires little thought than something that is sure to challenge my thinking abilities	330 16.1%	644 31.5%	645 31.6%	336 16.4%	89 4.4%	2.61	3.00	1.07	2044	15
Thinking is not my idea of fun	469 23.0%	652 31.9%	613 30.0%	226 11.1%	82 4.0%	2.41	2.00	1.08	2042	17
I prefer complex to simple problems	117 5.7%	298 14.6%	892 43.7%	560 27.5%	173 8.5%	3.18	3.00	0.98	2040	19
I try to anticipate and avoid situations where it is likely that I will have to think in depth about something	325 15.9%	600 29.4%	664 32.5%	353 17.3%	102 5.0%	2.66	3.00	1.09	2044	15

15. What is your age (in years)?

Mean	Median	SD	n	# missing
45.8	47	17.6	2059	0

16. What is your sex? Select ONE box.

☐ Male
☐ Female

Male	Female	n	# missing
1	2		
1018 (49.7%)	1029 (50.3%)	2047	12

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17. What is your home 5-digit zip code?

18. How long (in years) have you lived within 50 miles of your current residence?

Mean	Median	SD	n	# missing
22.0	20.0	17.9	2059	0

19. How many people are there in your household, including yourself?

Mean	Median	SD	n	# missing
2.3	2.0	1.8	2059	0

20. Which of the following best describes the highest level of education you have completed? *Select ONE box.*

Did not complete high school	High school diploma or equivalent	Some college, technical school, or associate's degree	Bachelor's degree	Master's degree	Professional degree or doctorate	Mean (yrs)	Median (yrs)	SD (yrs)	n	# missing
1	2	3	4	5	6					
57 2.8%	477 23.2%	862 41.9%	464 22.5%	142 6.9%	57 2.8%	14.7	14.0	2.24	2059	0

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21. What is your present employment status? *Select ALL that apply to you.*

Sub-question	No	Yes	n	# missing
	0	1		
Employed full time	1430 69.8%	620 30.2%	2050	9
Employed part time	1770 86.3%	280 13.7%	2050	9
Retired	1567 76.4%	483 23.6%	2050	9
Homemaker	1790 87.3%	260 12.7%	2050	9
Student	1886 92.0%	164 8.0%	2050	9
Unemployed	1694 82.6%	356 17.4%	2050	9
In Armed Forces	2047 99.9%	3 0.1%	2050	9

→if select either “full time” or “part time” or both, go to sub-questions a-e

a. In your job, are you: *Select ALL that apply to you.*

Sub-question	No	Yes	n	# missing
	0	1		
An employee for a private, for-profit business	352 39.7%	534 60.3%	886	6
An employee of a private, not-for-profit organization	796 89.8%	90 10.2%	886	6
A local government employee city, county, etc.	837 94.5%	49 5.5%	886	6
A state government employee	845 95.4%	41 4.6%	886	6
A federal government employee	865 97.6%	21 2.4%	886	6
Self-employed in your own business	766 86.5%	120 13.5%	886	6
Other (please specify)	831 93.8%	55 6.2%	886	6

b. What kind of business or industry is your employer (for example: hospital, school, bank, trucking company)? [Open-ended](#)

c. What economic sector is your employer?

Agriculture, forestry, fishing and hunting	1	14 1.6%
Construction	2	47 5.3%
Manufacturing	3	79 8.9%
Wholesale trade	4	16 1.8%
Retail trade	5	119 13.5%
Transportation, warehousing, and utilities	6	42 4.8%
Information telecommunications, publishing, broadcasting	7	34 3.8%
Finance and insurance	8	47 5.3%
Real estate, rental, and leasing	9	17 1.9%
Professional and scientific; management of companies; administrative and waste management services	10	66 7.5%
Educational services; health care and social assistance	11	131 14.8%
Arts, entertainment, and recreation; accommodation and food services	12	55 6.2%
Public administration	13	33 3.7%
Mining, quarrying, and oil and gas extraction	14	4 0.5%
Other please specify	15	180 20.4%
n		884
# missing		8

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d. To what extent does weather affect your work or the economic sector that you indicated above?

Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	n	# missing
1	2	3	4	5					
242 27.2%	239 26.9%	225 25.3%	106 11.9%	78 8.8%	2.48	2.00	1.25	890	2

e. To what extent are weather forecasts important in your work or the economic sector that you indicated above?

Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	n	# missing
1	2	3	4	5					
244 27.4%	231 26.0%	201 22.6%	137 15.4%	77 8.7%	2.52	2.00	1.28	890	2

22. Which of the following best describes your race? *Select ALL that apply to you.*

Sub-question	No	Yes	n	# missing
	0	1		
White	357 17.4%	1689 82.6%	2046	13
Black or African American	1839 89.9%	207 10.1%	2046	13
American Indian or Alaska Native	2009 98.2%	37 1.8%	2046	13
Asian	1948 95.2%	98 4.8%	2046	13
Native Hawaiian or other Pacific Islander	2036 99.5%	10 0.5%	2046	13
Other	1998 97.7%	48 2.3%	2046	13

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23. Are you of Hispanic, Latino, or Spanish origin? *Select ONE box.*

No, not of Hispanic, Latino, or Spanish origin	Yes, Mexican, Mexican American, Chicano	Yes, Puerto Rican	Yes, Cuban	Yes, another Hispanic, Latino, or Spanish origin please specify	n	# missing
1	2	3	4	5		
1920 94.1%	53 2.6%	30 1.5%	9 0.4%	28 1.4%	2040	19

24. What is your primary language? [Open-ended](#)

25. What was your total household income for 2009 before taxes? *Select ONE box.*

Under \$15,000	1	\$7500	279 (13.6%)
\$15,000 to \$24,999	2	\$22500	292 (14.2%)
\$25,000 to \$34,999	3	\$30000	326 (15.8%)
\$35,000 to \$49,999	4	\$42500	347 (16.9%)
\$50,000 to \$74,999	5	\$62500	392 (19.0%)
\$75,000 to \$99,999	6	\$87500	220 (10.7)
\$100,000 to \$124,999	7	\$112500	92 (4.5%)
\$125,000 to \$149,999	8	\$137500	36 (1.2%)
\$150,000 to \$199,999	9	\$175000	31 (1.5%)
\$200,000 or more	10	\$200000	27 (1.3%)
n			2042
# missing			17

26. If you have any further comments, please write them below. [Open-ended](#)

We greatly appreciate the time you took to complete this survey. Thank you!

Appendix F

1st Survey on Communication of Hazardous Weather Survey with PnC Users: Implementation, Instrument with Experimental Designs, and Codebook

F.1. Survey Implementation Information

We designed and implemented in parallel two versions of this survey: one for short-fused hazardous weather (i.e., a severe thunderstorm warning), and one for long-fused hazardous weather (i.e., a flood watch). The short-fused (Section F.2) and long-fused (Section F.3) versions of the survey were identical excepting their respective experimental forecasts and corresponding necessary changes to survey question wording.

Survey fielding

- October 12, 2011, pretested with 5% of sample (n=500 for short-fused and 250 for long-fused) to test for functionality, data quality, incompletes, etc.
- October 13-28, 2011, fully fielded

Short-fused Survey Sample

- From the sampling frame of NWS PnC users, we randomly sampled¹⁴ and sent out n=10,000 invitations. There were 442 email bounces, so the final number of invitations was n=9558. We received n=4358 completed surveys for a response rate of 45.6%. We had to remove n=53 cases because of a data logging error, so the final n=4305.
- The median time to complete the survey was 24 minutes, 8 seconds.

Long-fused Survey Sample

- From the sampling frame of NWS PnC users, we randomly sampled¹ and sent out n=5,000 invitations. There were 223 email bounces, so the final number of invitations was n=4777. We received n=2118 completed surveys for a response rate of 44.3%. We had to remove n=19 cases because of a data logging error, so the final n=2099.
- The median time to complete the survey was 24 minutes, 15 seconds.

Subject line

- Request to respond to survey about the National Weather Service

Email text

- The National Center for Atmospheric Research (NCAR) in Boulder, Colorado, is conducting a survey to collect people's thoughts and opinions about weather forecast information, with a focus on the National Weather Service's (NWS) forecast webpage. Last summer, you (or someone who shares this email address) provided your contact information via a link from the National Weather Service's forecast webpage, indicating you would be interested in contributing to our research. We will use your responses to

¹⁴ The people who were invited to participate in Survey 1 were removed from the sampling frame before randomly sampling for this survey.

improve the communication of weather forecast information and to guide future weather-related research, so your responses are very important to us. We appreciate your interest and willingness to respond.

Reminder email text to people who had not responded or had responded but had not completed

- We recently sent you an invitation to participate in a survey being conducted by the National Center for Atmospheric Research to collect people's thoughts and opinions about weather forecast information, with a focus on the National Weather Service's (NWS) forecast webpage. Last summer, you (or someone who shares this email address) provided your contact information via a link from the National Weather Service's forecast webpage, indicating you would be interested in contributing to our research. This survey will only remain open until October 28, so we ask that you complete it as soon as possible. We will use your responses to improve the communication of weather forecast information and to guide future weather-related research, so your responses are very important to us. We greatly appreciate your help. It is only by asking people like you to share your feedback that we can better understand people's views about weather forecast information.

F.2. Short-Fused Survey Instrument with Experimental Designs and Codebook^{15,16}

Evaluating Weather Forecast Information provided by the National Weather Service

Important information about this survey – please read!

The purpose of this survey is to understand your thoughts about weather and weather forecast information with a focus on forecasts provided by the National Weather Service. You do not need any special knowledge about weather or weather forecasts to answer the questions.

We will use your responses to improve the communication of weather forecast information and to guide future weather-related research, so your responses are very important to us.

The survey should take you about 15-20 minutes to complete. Completing this survey is voluntary. The information you provide us that can be identified with you will remain confidential. We will analyze your responses together with all other respondents, so please respond as honestly as you can.

Thank you for taking the time to complete this survey!

Are you 18 years of age or older?

☐ Yes

☐ No → if “No”, then display this message: “Thank you for your interest in our study. Unfortunately, you must be at least 18 years of age to participate in this survey.” Do not let respondent answer any further questions.

Yes	No	n
1	2	
100.0%	0.0%	4305
4305	0	

¹⁵ Open-ended responses not included due to space considerations.

¹⁶ All statistics summarizing the central tendency (mean, median) and distribution (standard deviation, skewness, kurtosis) of response distributions are calculated omitting responses of “Don’t know”, “Not familiar with this”, “Not applicable”

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The questions below ask about your thoughts about weather forecast information in general.

1. How often do you get weather forecasts from the sources listed below? [Sub-items randomized.](#)

Sub-question	Never	Rarely	Once or more a month	Once a week	Two or more times a week	Once a day	Two or more times a day	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6	7						
Local TV station	18.8% 810	19.1% 822	8.4% 360	7.5% 325	16.2% 696	19.2% 826	10.8% 466	3.84	4.00	2.10	0.01	-1.48	4305
Cable TV station (e.g., CNN, The Weather Channel)	29.5% 1272	25.2% 1087	10.2% 439	8.1% 349	11.8% 508	8.4% 360	6.7% 290	2.99	2.00	1.95	0.68	-0.87	4305
Newspaper	41.7% 1794	30.1% 1297	5.5% 235	6.0% 257	5.6% 242	10.6% 455	0.6% 25	2.38	2.00	1.71	1.16	0.01	4305
Telephone (dial-in) weather information source	87.9% 3785	9.4% 403	1.3% 58	0.6% 26	0.3% 15	0.2% 10	0.2% 8	1.18	1.00	0.59	5.22	35.18	4305
Commercial or public radio station	17.3% 744	20.4% 878	7.8% 334	8.5% 367	16.0% 689	16.0% 689	14.0% 604	3.90	4.00	2.12	0.03	-1.46	4305
NOAA Weather Radio	42.7% 1839	25.7% 1106	11.2% 483	5.2% 222	6.2% 265	4.8% 206	4.3% 184	2.38	2.00	1.73	1.30	0.64	4305
Friend, family, co-worker, etc.	23.9% 1029	32.9% 1417	12.1% 522	11.8% 509	13.0% 561	4.4% 191	1.8% 76	2.78	2.00	1.60	0.73	-0.49	4305
Website	2.3% 98	1.7% 72	1.1% 47	2.3% 97	12.5% 538	28.3% 1220	51.9% 2233	6.14	7.00	1.28	-2.20	5.36	4305
Social media (e.g., Facebook, Twitter)	82.9% 3568	10.0% 430	1.6% 68	1.5% 65	1.5% 64	1.4% 62	1.1% 48	1.38	1.00	1.08	3.57	12.82	4305
Non-internet enabled mobile device (e.g., cell phone, personal desk assistant [PDA], pager)	85.4% 3675	7.4% 318	1.5% 64	1.1% 48	1.7% 72	1.5% 63	1.5% 65	1.37	1.00	1.13	3.61	12.70	4305
Internet-enabled smart	48.7%	5.4%	4.1%	3.6%	10.1%	10.5%	17.5%	3.23	2.00	2.48	0.44	-1.55	4305

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phone (e.g., iPhone, Droid, Blackberry) or other mobile device (e.g., iPad)	2095	234	178	157	434	454	753						
---	------	-----	-----	-----	-----	-----	-----	--	--	--	--	--	--

- ➔ If response to “website” is more frequent than “never”, go to Part a
- ➔ If response to “Internet-enabled smart phone or other mobile device” is more frequent than “never”, go to Parts b and c

Assessing and Improving the NWS Point-and-Click Webpage

a. How often do you get weather forecasts from the websites listed below? Sub-items randomized.

Sub-question	Never	Rarely	Once or more a month	Once a week	Two or more times a week	Once a day	Two or more times a day	I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6	7	8						
National Weather Service (example NWS web addresses are www.weather.gov and www.nws.gov)	2.0% 86	1.9% 80	1.9% 82	2.2% 92	12.3% 517	24.5% 1029	50.1% 2106	5.1% 215	6.10	7.00	1.34	-2.04	4.30	4207
The Weather Channel (www.weather.com)	32.7% 1377	28.2% 1186	13.3% 560	6.6% 276	8.5% 358	5.4% 228	4.4% 185	0.9% 37	2.63	2.00	1.76	1.03	-0.01	4207
AccuWeather (www.accuweather.com)	48.6% 2045	23.5% 990	9.3% 393	4.4% 185	4.9% 205	3.5% 146	3.1% 131	2.7% 112	2.14	2.00	1.61	1.57	1.60	4207
WeatherBug (www.weatherbug.com)	66.9% 2814	14.7% 620	3.8% 160	1.9% 78	2.5% 105	2.3% 97	2.4% 103	5.5% 230	1.68	1.00	1.41	2.47	5.36	4207
Weather Underground (www.wunderground.com)	45.9% 1929	21.1% 889	11.1% 465	4.3% 182	5.3% 221	3.6% 152	3.9% 166	4.8% 203	2.25	2.00	1.69	1.44	1.09	4207
Intellicast (www.intellicast.com)	65.0% 2733	12.3% 517	4.5% 191	1.9% 80	2.4% 99	2.0% 86	2.5% 106	9.4% 395	1.68	1.00	1.43	2.44	5.21	4207
Local TV station's website	49.2% 2071	25.3% 1065	9.4% 396	4.5% 188	5.2% 219	3.6% 152	2.4% 99	0.4% 17	2.11	2.00	1.55	1.58	1.67	4207
Cable TV station's website	72.1% 3032	17.2% 723	3.2% 136	2.0% 85	1.8% 77	1.3% 53	1.3% 53	1.1% 48	1.51	1.00	1.14	2.96	9.15	4207
Online newspaper	64.2% 2700	22.6% 949	5.4% 229	2.3% 97	2.5% 105	2.0% 84	0.5% 23	0.5% 20	1.64	1.00	1.16	2.40	5.85	4207

Assessing and Improving the NWS Point-and-Click Webpage

- b. Do you ever use a weather app application on your smart phone or other Internet-enabled mobile device to get weather forecasts?

___ Yes → If yes, which weather app do you primarily use? _____

___ No

No	Yes	n
1	2	
40.7%	59.3%	2210
899	1311	

- c. Do you ever use the mobile web browser on your smart phone or other Internet-enabled mobile device to get weather forecasts from a website?

___ Yes → If yes, which website do you primarily use? _____

___ No

No	Yes	n
1	2	
31.2%	68.8%	2210
690	1520	

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The National Weather Service (NWS) is the primary source of weather forecasts, watches, warnings, and advisories for the United States. In addition to normal weather forecasts of precipitation, temperature, cloudiness, and winds, the NWS also provides forecasts, watches, and warnings for:

- severe weather (such as thunderstorms and tornadoes),
- winter weather,
- hurricanes,
- fire weather, and
- forecasts used for aviation and marine commerce.

All of this information is also provided to media (such as television, radio, and newspapers) and to private weather services (such as The Weather Channel and AccuWeather).

2. Have you heard of the National Weather Service?

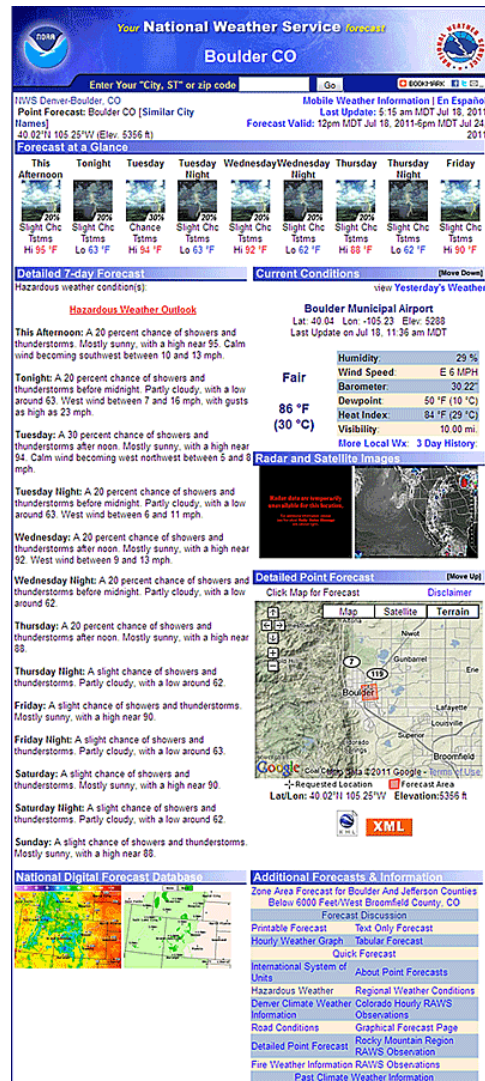
☐ Yes

☐ No → if “No”, go to socio-demographic questions

Yes	No	n
1	2	
99.6%	0.4%	4305
4286	19	

Assessing and Improving the NWS Point-and-Click Webpage

The next few questions ask about your thoughts about the National Weather Service (NWS) point-and-click forecast webpage. An example of the point-and-click forecast webpage for the city of Boulder, Colorado, is shown in the figure below. As you respond to the next set of questions, please think about the NWS point-and-click forecast webpage for the city or cities you look at.



Assessing and Improving the NWS Point-and-Click Webpage

3. Have you used the NWS point-and-click forecast webpage for your area before?

___ Yes

___ No → if “No”, go to socio-demographic questions

Yes	No	n
1	2	
98.9%	1.1%	4286
4239	47	

4. There are many ways to access the NWS point-and-click forecast webpage. Please indicate whether you typically access the webpage in the ways listed below. Sub-items randomized.

Sub-question	No	Yes	I am not familiar with this	n
	1	2	3	
I have it bookmarked for the forecast location I want	7.1% 299	92.5% 3920	0.5% 20	4239
I go to the NWS homepage and get the forecast for my desired location	40.4% 1714	58.9% 2498	0.6% 27	4239
I go the homepage of my local Weather Forecast Office and get the forecast for my desired location	60.5% 2565	34.0% 1443	5.4% 231	4239
I type in the webpage address	77.7% 3293	22.0% 931	0.4% 15	4239
I use another method to access the NWS point-and-click forecast webpage	87.3% 3700	7.9% 337	4.8% 202	4239

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5. How knowledgeable are you about the NWS point-and-click forecast webpage overall?

Not at all knowledgeable	A little knowledgeable	Somewhat knowledgeable	Very knowledgeable	Extremely knowledgeable	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5						
0.3%	3.1%	27.5%	46.7%	22.4%	3.88	4.00	0.80	-0.28	-0.27	4239
12	130	1167	1980	950						

6. For approximately how long have you been using the NWS point-and-click forecast webpage?

Less than 6 months	6 months to less than 1 year	1 year to less than 3 years	3 years to less than 5 years	5 years or longer	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5						
0.7%	0.9%	12.3%	29.9%	56.2%	4.40	5.00	0.79	-1.30	1.65	4239
31	38	520	1267	2383						

7. How often do you typically visit the NWS point-and-click forecast webpage?

Never	Rarely	Once or more a month	Once a week	Two or more times a week	Once a day	Two or more times a day	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5	6	7						
0.1%	0.6%	2.3%	2.8%	14.4%	27.9%	51.9%	6.22	7.00	1.03	-1.56	2.66	4239
4	25	98	119	609	1183	2201						

8. During a typical visit to the NWS point-and-click forecast webpage, approximately how much time do you spend on the webpage?

Less than 15 seconds	15 seconds to less than 30 seconds	30 seconds to less than 1 minute	1 minute to less than 3 minutes	3 minutes to less than 5 minutes	5 minutes to less than 10 minutes	10 minutes or longer	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5	6	7						
1.0%	7.9%	19.4%	38.5%	20.5%	10.2%	2.5%	4.10	4.00	1.19	0.09	-0.07	4235
43	335	823	1630	870	430	104						

Assessing and Improving the NWS Point-and-Click Webpage

Individual Experimental Forecasts

Please now consider the example point-and-click forecast shown below as you answer the next set of questions. Please answer the questions based on the location for which you most commonly get the forecast.

The following eight experimental designs were used in this part of the survey. Each survey respondent was randomly assigned to one of the eight designs and then responded to Questions 9-19 based on that image.



Figure F-1. Short-fused experimental forecast #1 with the bar and end-time text (fcst_v1_BU¹⁷).



Figure F-2. Short-fused experimental forecast #2 with the end-time text (fcst_v2_U).

¹⁷ The forecast image labels are abbreviated such that “B” indicates the bar, “U” indicates the end (or until) time, and “X” indicates the box. These letters and their combinations indicate which attributes are part of the experimental forecast image. The control image, which has none of these attributes, is labeled “C”.

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Figure F-3. Short-fused experimental forecast #3 with the bar, end-time text, and box (fcst_v3_BUX).



Figure F-4. Short-fused experimental forecast #4 with the end-time text and box (fcst_v4_UX).

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Figure F-5. Short-fused experimental forecast #5 with the bar (fcst_v5_B).



Figure F-6. Short-fused experimental forecast #6 with no modifications (the control) (fcst_v6_C).

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Figure F-7. Short-fused experimental forecast #7 with the bar and box (fcst_v7_BX).



Figure F-8. Short-fused experimental forecast #8 with the box (fcst_v8_X).

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Experimental Forecast	n
fcst_v1_BU	536
fcst_v2_U	528
fcst_v3_BUX	533
fcst_v4_UX	531
fcst_v5_B	522
fcst_v6_C	527
fcst_v7_BX	531
fcst_v8_X	531

9. The forecast high temperature for Thursday is 57°F. What do you think the actual high temperature will be?

Experimental Forecast	57°F	Between 56°F and 58°F	Between 55°F and 59°F	Between 52°F and 62°F	Between 47°F and 67°F	Other	n
	1	2	3	4	5	6	
fcst_v1_BU	8.6% 46	17.2% 92	58.8% 315	13.8% 74	0.6% 3	1.1% 6	536
fcst_v2_U	7.2% 38	26.3% 139	49.8% 263	14.4% 76	1.3% 7	0.9% 5	528
fcst_v3_BUX	5.3% 28	21.6% 115	54.0% 288	15.9% 85	0.9% 5	2.3% 12	533
fcst_v4_UX	5.3% 28	22.2% 118	54.6% 290	14.9% 79	0.4% 2	2.6% 14	531
fcst_v5_B	8.0% 42	24.7% 129	53.1% 277	12.5% 65	0.4% 2	1.3% 7	522
fcst_v6_C	7.0% 37	22.0% 116	53.9% 284	14.0% 74	0.6% 3	2.5% 13	527
fcst_v7_BX	5.8% 31	21.5% 114	55.0% 292	15.3% 81	1.1% 6	1.3% 7	531
fcst_v8_X	6.6% 35	23.7% 126	52.7% 280	14.9% 79	0.2% 1	1.9% 10	531

a. If other, please specify [Open-ended](#)

Assessing and Improving the NWS Point-and-Click Webpage

10. The forecast high temperature for Saturday is 63°F. What do you think the actual high temperature will be?

Experimental Forecast	63°F	Between 62°F and 64°F	Between 61°F and 65°F	Between 58°F and 68°F	Between 53°F and 73°F	Other	n
	1	2	3	4	5	6	
fcst_v1_BU	7.8% 42	16.0% 86	51.9% 278	20.9% 112	2.6% 14	0.7% 4	536
fcst_v2_U	6.1% 32	18.6% 98	49.1% 259	23.3% 123	2.5% 13	0.6% 3	528
fcst_v3_BUX	5.1% 27	14.3% 76	46.3% 247	27.4% 146	3.9% 21	3.0% 16	533
fcst_v4_UX	4.7% 25	17.5% 93	51.6% 274	20.9% 111	2.6% 14	2.6% 14	531
fcst_v5_B	7.7% 40	18.0% 94	49.2% 257	22.0% 115	2.1% 11	1.0% 5	522
fcst_v6_C	6.5% 34	15.0% 79	48.8% 257	24.1% 127	2.8% 15	2.8% 15	527
fcst_v7_BX	4.9% 26	16.2% 86	50.7% 269	23.5% 125	2.8% 15	1.9% 10	531
fcst_v8_X	6.0% 32	15.8% 84	47.3% 251	26.9% 143	1.9% 10	2.1% 11	531

a. If other, please specify [Open-ended](#)

11. The Detailed 7-day Forecast for Tonight indicates there is a “slight chance of showers and thunderstorms”. The icon for Tonight denotes "slight chance" as a 20% chance. What percent chance do you associate with the phrase "slight chance"?

Experimental Forecast	Less than 10% chance	10% chance	20% chance	30% chance	40% chance	50% chance	60% chance	70% chance	80% chance	90% chance	100% chance	Don't Know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6	7	8	9	10	11	12						
fcst_v1_BU	8.8% 47	22.4% 120	61.0% 327	4.9% 26	0.7% 4	0.4% 2	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.2% 1	1.7% 9	2.69	3	0.85	1.57	17.73	536
fcst_v2_U	9.1% 48	27.7% 146	55.5% 293	4.9% 26	0.6% 3	0.8% 4	0.0% 0	0.0% 0	0.0% 0	0.2% 1	0.0% 0	1.3% 7	2.63	3	0.87	1.26	10.80	528
fcst_v3_BU X	8.4% 45	23.6% 126	60.2% 321	5.6% 30	0.8% 4	0.4% 2	0.2% 1	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.8% 4	2.68	3	0.79	0.11	2.71	533
fcst_v4_UX	13.0% 69	21.8% 116	56.7% 301	5.3% 28	0.6% 3	0.9% 5	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.2% 1	1.5% 8	2.62	3	0.95	1.33	12.18	531
fcst_v5_B	12.3% 64	23.6% 123	59.0% 308	3.3% 17	0.6% 3	0.8% 4	0.2% 1	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.4% 2	2.59	3	0.85	0.22	2.70	522
fcst_v6_C	10.6% 56	24.1% 127	57.3% 302	5.3% 28	0.2% 1	0.2% 1	0.2% 1	0.4% 2	0.0% 0	0.0% 0	0.2% 1	1.5% 8	2.65	3	0.94	1.93	15.98	527
fcst_v7_BX	11.1% 59	24.5% 130	54.8% 291	6.0% 32	1.3% 7	0.6% 3	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1.7% 9	2.63	3	0.86	0.05	1.19	531
fcst_v8_X	8.1% 43	24.1% 128	61.4% 326	3.4% 18	0.6% 3	0.4% 2	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0.2% 1	1.9% 10	2.66	3	0.82	1.78	20.62	531

12. The Detailed 7-day Forecast for Saturday indicates there is a “showers likely”. The icon for Tonight denotes "likely" as a 70% chance. What percent chance do you associate with the phrase "likely"?

Experimental Forecast	Less than 10% chance	10% chance	20% chance	30% chance	40% chance	50% chance	60% chance	70% chance	80% chance	90% chance	100% chance	Don't Know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6	7	8	9	10	11	12						
fcst_v1_BU	0.0% 0	0.0% 0	0.0% 0	0.6% 3	1.1% 6	6.9% 37	11.6% 62	48.5% 260	22.9% 123	5.2% 28	1.5% 8	1.7% 9	8.07	8	1.08	-0.42	1.45	536
fcst_v2_U	0.4% 2	0.2% 1	0.6% 3	0.6% 3	0.4% 2	6.3% 33	13.1% 69	44.9% 237	24.1% 127	5.7% 30	3.2% 17	0.8% 4	8.10	8	1.29	-1.14	5.29	528
fcst_v3_BUX	0.4% 2	0.2% 1	0.2% 1	0.8% 4	0.8% 4	7.9% 42	14.1% 75	44.7% 238	23.6% 126	6.0% 32	0.6% 3	0.9% 5	7.98	8	1.22	-1.35	5.31	533
fcst_v4_UX	0.0% 0	0.0% 0	0.0% 0	0.8% 4	1.1% 6	9.2% 49	11.5% 61	45.4% 241	23.2% 123	5.3% 28	2.4% 13	1.1% 6	8.05	8	1.18	-0.33	1.03	531
fcst_v5_B	0.0% 0	0.0% 0	0.4% 2	0.6% 3	0.6% 3	8.6% 45	10.3% 54	53.3% 278	18.4% 96	5.0% 26	2.5% 13	0.4% 2	8.02	8	1.14	-0.43	2.30	522
fcst_v6_C	0.2% 1	0.2% 1	0.2% 1	0.9% 5	0.6% 3	5.3% 28	12.1% 64	48.6% 256	24.3% 128	4.4% 23	2.1% 11	1.1% 6	8.08	8	1.17	-1.12	5.36	527
fcst_v7_BX	0.0% 0	0.0% 0	0.0% 0	0.2% 1	0.4% 2	7.9% 42	13.6% 72	42.9% 228	26.2% 139	6.8% 36	0.4% 2	1.7% 9	8.10	8	1.05	-0.36	0.37	531
fcst_v8_X	0.2% 1	0.0% 0	0.4% 2	1.1% 6	0.6% 3	6.8% 36	10.5% 56	48.8% 259	25.0% 133	3.4% 18	1.7% 9	1.5% 8	8.03	8	1.16	-1.16	4.73	531

13. How important is it to you to have the types of information listed below as part of the NWS point-and-click forecast webpage?

Sub-question	Experimental forecast	Not at all important	A little important	Somewhat important	Very important	Extremely important	Don't know/ not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
		1	2	3	4	5	6						
Satellite thumbnail image	fcst_v1_B U	3.5% 19	10.3% 55	28.7% 154	30.8% 165	25.6% 137	1.1% 6	3.65	4	1.08	-0.46	-0.45	536
	fcst_v2_U	3.8% 20	15.0% 79	26.7% 141	29.2% 154	24.6% 130	0.8% 4	3.56	4	1.13	-0.35	-0.75	528
	fcst_v3_B UX	4.5% 24	13.9% 74	29.5% 157	29.1% 155	23.1% 123	0.0% 0	3.52	4	1.12	-0.34	-0.66	533
	fcst_v4_U X	4.0% 21	10.0% 53	29.4% 156	30.9% 164	23.9% 127	1.9% 10	3.62	4	1.08	-0.45	-0.40	531
	fcst_v5_B	5.4% 28	11.1% 58	30.1% 157	28.4% 148	24.5% 128	0.6% 3	3.56	4	1.14	-0.42	-0.53	522
	fcst_v6_C	0.9% 5	13.3% 70	26.8% 141	31.9% 168	25.8% 136	1.3% 7	3.69	4	1.03	-0.31	-0.84	527
	fcst_v7_B X	3.4% 18	12.1% 64	26.6% 141	32.0% 170	25.2% 134	0.8% 4	3.64	4	1.09	-0.45	-0.53	531
	fcst_v8_X	4.0% 21	12.6% 67	28.2% 150	31.1% 165	22.8% 121	1.3% 7	3.57	4	1.10	-0.40	-0.56	531
“Hazardous Weather Outlook” product	fcst_v1_B U	0.4% 2	2.1% 11	10.1% 54	32.8% 176	53.9% 289	0.7% 4	4.39	5	0.78	-1.25	1.41	536
	fcst_v2_U	0.4% 2	2.8% 15	9.8% 52	29.7% 157	55.3% 292	1.9% 10	4.39	5	0.81	-1.33	1.45	528
	fcst_v3_B UX	0.6% 3	2.3% 12	10.7% 57	31.1% 166	55.0% 293	0.4% 2	4.38	5	0.81	-1.32	1.57	533
	fcst_v4_U X	0.8% 4	2.4% 13	11.5% 61	29.9% 159	54.2% 288	1.1% 6	4.36	5	0.84	-1.32	1.55	531
	fcst_v5_B	0.8% 4	2.5% 13	13.2% 61	27.4% 132	55.4% 288	0.8% 4	4.35	5	0.86	-1.28	1.23	522

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		4	13	69	143	289	4						
	fcst_v6_C	1.3%	1.7%	14.4%	29.2%	52.8%	0.6%	4.31	5	0.88	-1.28	1.52	527
		7	9	76	154	278	3						
	fcst_v7_B X	0.4%	2.8%	10.5%	29.4%	56.3%	0.6%	4.39	5	0.82	-1.32	1.33	531
Forecast high temperature		2	15	56	156	299	3						
	fcst_v8_X	0.4%	2.8%	12.4%	28.8%	54.8%	0.8%	4.36	5	0.84	-1.21	0.91	531
		2	15	66	153	291	4						
	fcst_v1_B U	0.0%	1.1%	9.9%	39.7%	49.1%	0.2%	4.37	4	0.71	-0.86	0.18	536
		0	6	53	213	263	1						
	fcst_v2_U	0.0%	0.4%	7.6%	37.7%	53.8%	0.6%	4.46	5	0.65	-0.88	0.06	528
		0	2	40	199	284	3						
	fcst_v3_B UX	0.2%	0.6%	6.9%	40.9%	51.4%	0.0%	4.43	5	0.66	-1.01	1.22	533
Detailed point forecast map		1	3	37	218	274	0						
	fcst_v4_U X	0.0%	1.1%	9.6%	41.2%	47.5%	0.6%	4.36	4	0.70	-0.83	0.19	531
		0	6	51	219	252	3						
	fcst_v5_B	0.4%	0.8%	10.3%	42.1%	46.0%	0.4%	4.33	4	0.72	-0.96	1.16	522
		2	4	54	220	240	2						
	fcst_v6_C	0.2%	0.2%	7.6%	42.3%	49.3%	0.4%	4.41	4	0.66	-0.87	0.80	527
		1	1	40	223	260	2						
	fcst_v7_B X	0.2%	0.2%	9.6%	41.6%	48.2%	0.2%	4.38	4	0.68	-0.82	0.46	531
		1	1	51	221	256	1						
	fcst_v8_X	0.0%	0.6%	9.4%	39.7%	50.3%	0.0%	4.40	5	0.68	-0.80	-0.07	531
		0	3	50	211	267	0						
	fcst_v1_B U	3.5%	6.3%	20.0%	35.1%	33.0%	2.1%	3.90	4	1.06	-0.86	0.24	536
Detailed point forecast map		19	34	107	188	177	11						
	fcst_v2_U	2.3%	5.5%	19.1%	33.1%	38.1%	1.9%	4.01	4	1.01	-0.90	0.31	528
		12	29	101	175	201	10						
	fcst_v3_B UX	3.0%	8.1%	19.9%	31.1%	36.4%	1.5%	3.91	4	1.08	-0.80	-0.09	533
		16	43	106	166	194	8						
	fcst_v4_U	3.0%	7.0%	21.8%	31.1%	35.4%	1.7%	3.90	4	1.07	-0.77	-0.04	531

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	X	16	37	116	165	188	9						
	fcst_v5_B	3.3% 17	6.7% 35	21.5% 112	35.2% 184	32.4% 169	1.0% 5	3.88	4	1.05	-0.80	0.13	522
	fcst_v6_C	2.1% 11	6.5% 34	22.2% 117	35.1% 185	32.6% 172	1.5% 8	3.91	4	1.00	-0.72	0.02	527
	fcst_v7_B X	2.8% 15	6.6% 35	20.3% 108	33.5% 178	35.6% 189	1.1% 6	3.94	4	1.04	-0.83	0.13	531
	fcst_v8_X	4.1% 22	7.9% 42	19.4% 103	32.4% 172	34.5% 183	1.7% 9	3.87	4	1.11	-0.83	-0.01	531
Forecast reference information (latitude, longitude, elevation, etc.)	fcst_v1_B U	10.1% 54	24.6% 132	31.5% 169	18.8% 101	14.0% 75	0.9% 5	3.02	3	1.19	0.10	-0.83	536
	fcst_v2_U	10.0% 53	25.4% 134	30.9% 163	22.0% 116	11.4% 60	0.4% 2	2.99	3	1.16	0.07	-0.80	528
	fcst_v3_B UX	10.5% 56	19.9% 106	33.2% 177	21.0% 112	14.4% 77	0.9% 5	3.09	3	1.19	-0.03	-0.79	533
	fcst_v4_U X	10.4% 55	21.8% 116	34.3% 182	20.0% 106	12.6% 67	0.9% 5	3.03	3	1.16	0.04	-0.73	531
	fcst_v5_B	11.9% 62	21.6% 113	32.6% 170	19.5% 102	13.6% 71	0.8% 4	3.01	3	1.20	0.03	-0.82	522
	fcst_v6_C	11.4% 60	26.0% 137	27.1% 143	19.7% 104	15.6% 82	0.2% 1	3.02	3	1.24	0.09	-0.99	527
	fcst_v7_B X	13.9% 74	25.0% 133	28.1% 149	19.4% 103	13.0% 69	0.6% 3	2.92	3	1.24	0.11	-0.94	531
	fcst_v8_X	10.7% 57	20.9% 111	31.6% 168	21.5% 114	14.5% 77	0.8% 4	3.08	3	1.20	-0.03	-0.84	531
Forecast chance of precipitation	fcst_v1_B U	0.2% 1	0.0% 0	5.6% 30	38.1% 204	56.2% 301	0.0% 0	4.50	5	0.62	-1.04	1.24	536
	fcst_v2_U	0.0% 0	0.6% 3	5.1% 27	36.4% 192	57.8% 305	0.2% 1	4.52	5	0.62	-1.06	0.75	528
	fcst_v3_B	0.0%	0.2%	6.4%	36.0%	56.8%	0.6%	4.50	5	0.62	-0.92	0.04	533

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	UX	0	1	34	192	303	3						
	fcst_v4_U X	0.4% 2	0.2% 1	7.5% 40	37.7% 200	53.9% 286	0.4% 2	4.45	5	0.68	-1.17	1.86	531
	fcst_v5_B	0.4% 2	0.4% 2	7.3% 38	38.5% 201	53.1% 277	0.4% 2	4.44	5	0.68	-1.18	1.98	522
	fcst_v6_C	0.0% 0	0.6% 3	5.9% 31	35.9% 189	57.1% 301	0.6% 3	4.50	5	0.64	-1.05	0.63	527
	fcst_v7_B X	0.4% 2	0.4% 2	6.2% 33	38.6% 205	54.2% 288	0.2% 1	4.46	5	0.66	-1.24	2.32	531
	fcst_v8_X	0.0% 0	0.0% 0	5.1% 27	37.5% 199	57.1% 303	0.4% 2	4.52	5	0.59	-0.82	-0.31	531
Forecast of how cloudy it will be	fcst_v1_B U	1.5% 8	9.1% 49	33.4% 179	39.2% 210	16.8% 90	0.0% 0	3.61	4	0.92	-0.31	-0.22	536
	fcst_v2_U	0.6% 3	10.4% 55	34.7% 183	35.6% 188	18.8% 99	0.0% 0	3.62	4	0.93	-0.13	-0.63	528
	fcst_v3_B UX	1.3% 7	8.4% 45	32.1% 171	39.6% 211	18.6% 99	0.0% 0	3.66	4	0.92	-0.33	-0.24	533
	fcst_v4_U X	1.5% 8	7.3% 39	37.3% 198	36.3% 193	17.1% 91	0.4% 2	3.60	4	0.91	-0.22	-0.18	531
	fcst_v5_B	0.8% 4	9.6% 50	39.3% 205	32.4% 169	18.0% 94	0.0% 0	3.57	4	0.92	-0.04	-0.57	522
	fcst_v6_C	1.9% 10	8.5% 45	36.1% 190	36.4% 192	16.7% 88	0.4% 2	3.58	4	0.93	-0.28	-0.17	527
	fcst_v7_B X	0.9% 5	9.4% 50	36.7% 195	37.1% 197	15.6% 83	0.2% 1	3.57	4	0.90	-0.15	-0.37	531
	fcst_v8_X	0.4% 2	7.0% 37	36.3% 193	38.2% 203	18.1% 96	0.0% 0	3.67	4	0.86	-0.09	-0.52	531
Current conditions (temperature,	fcst_v1_B U	0.6% 3	2.1% 11	12.1% 65	36.8% 197	48.3% 259	0.2% 1	4.30	4	0.80	-1.11	1.14	536
	fcst_v2_U	0.4%	2.5%	13.4%	30.7%	52.7%	0.4%	4.33	5	0.83	-1.11	0.71	528

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humidity, dew point, visibility, etc.)		2	13	71	162	278	2						
	fcst_v3_B UX	0.2% 1	1.5% 8	11.3% 60	36.0% 192	50.8% 271	0.2% 1	4.36	5	0.76	-1.02	0.68	533
	fcst_v4_U X	0.2% 1	2.6% 14	14.5% 77	34.8% 185	47.6% 253	0.2% 1	4.27	4	0.82	-0.92	0.22	531
	fcst_v5_B	1.3% 7	1.7% 9	14.0% 73	37.4% 195	44.8% 234	0.8% 4	4.24	4	0.85	-1.16	1.55	522
	fcst_v6_C	0.4% 2	3.8% 20	11.4% 60	34.3% 181	49.9% 263	0.2% 1	4.30	5	0.84	-1.14	0.89	527
	fcst_v7_B X	0.8% 4	2.6% 14	12.6% 67	35.6% 189	48.2% 256	0.2% 1	4.28	4	0.84	-1.15	1.18	531
	fcst_v8_X	0.0% 0	3.0% 16	10.5% 56	35.2% 187	51.0% 271	0.2% 1	4.35	5	0.79	-1.07	0.57	531
KML and/or XML links	fcst_v1_B U	23.3% 125	23.5% 126	15.1% 81	7.1% 38	3.4% 18	27.6% 148	2.22	2	1.14	0.72	-0.27	536
	fcst_v2_U	20.8% 110	21.4% 113	18.2% 96	8.1% 43	3.0% 16	28.4% 150	2.32	2	1.13	0.53	-0.53	528
	fcst_v3_B UX	21.4% 114	19.1% 102	17.8% 95	8.3% 44	3.0% 16	30.4% 162	2.32	2	1.15	0.51	-0.62	533
	fcst_v4_U X	24.9% 132	19.4% 103	14.3% 76	8.5% 45	4.0% 21	29.0% 154	2.26	2	1.21	0.66	-0.57	531
	fcst_v5_B	24.3% 127	21.5% 112	16.1% 84	7.3% 38	3.1% 16	27.8% 145	2.21	2	1.14	0.67	-0.38	522
	fcst_v6_C	25.8% 136	20.1% 106	14.0% 74	6.6% 35	3.4% 18	30.0% 158	2.17	2	1.17	0.77	-0.29	527
	fcst_v7_B X	27.9% 148	16.6% 88	16.6% 88	6.4% 34	3.2% 17	29.4% 156	2.16	2	1.17	0.71	-0.43	531
	fcst_v8_X	23.0% 122	21.1% 112	17.5% 93	5.8% 31	4.9% 26	27.7% 147	2.29	2	1.19	0.69	-0.32	531
Forecast icons	fcst_v1_B	1.5%	6.7%	23.9%	35.6%	31.9%	0.4%	3.90	4	0.98	-0.62	-0.17	536

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(i.e., images across the top)	U	8	36	128	191	171	2						
	fcst_v2_U	2.3% 12	6.8% 36	21.4% 113	38.8% 205	30.5% 161	0.2% 1	3.89	4	0.99	-0.75	0.15	528
	fcst_v3_B UX	3.0% 16	6.6% 35	23.6% 126	35.8% 191	31.0% 165	0.0% 0	3.85	4	1.03	-0.73	0.07	533
	fcst_v4_U X	1.7% 9	6.4% 34	27.7% 147	33.1% 176	30.7% 163	0.4% 2	3.85	4	0.99	-0.53	-0.29	531
	fcst_v5_B	2.5% 13	5.7% 30	24.5% 128	36.0% 188	30.7% 160	0.6% 3	3.87	4	1.00	-0.70	0.10	522
	fcst_v6_C	2.7% 14	8.0% 42	24.1% 127	35.9% 189	28.8% 152	0.6% 3	3.81	4	1.03	-0.64	-0.12	527
	fcst_v7_B X	3.0% 16	7.0% 37	23.2% 123	37.5% 199	28.4% 151	0.9% 5	3.82	4	1.02	-0.72	0.10	531
	fcst_v8_X	1.5% 8	5.6% 30	24.9% 132	34.1% 181	33.9% 180	0.0% 0	3.93	4	0.97	-0.63	-0.15	531
Forecast wind speed	fcst_v1_B U	0.4% 2	4.9% 26	21.5% 115	43.3% 232	30.0% 161	0.0% 0	3.98	4	0.86	-0.55	-0.16	536
	fcst_v2_U	1.1% 6	4.2% 22	19.5% 103	40.7% 215	34.5% 182	0.0% 0	4.03	4	0.90	-0.79	0.38	528
	fcst_v3_B UX	0.4% 2	4.7% 25	16.1% 86	43.9% 234	34.9% 186	0.0% 0	4.08	4	0.85	-0.76	0.23	533
	fcst_v4_U X	0.9% 5	5.5% 29	18.3% 97	42.9% 228	32.0% 170	0.4% 2	4.00	4	0.90	-0.77	0.29	531
	fcst_v5_B	0.6% 3	5.2% 27	21.6% 113	41.6% 217	31.0% 162	0.0% 0	3.97	4	0.89	-0.59	-0.11	522
	fcst_v6_C	0.6% 3	4.4% 23	22.2% 117	39.7% 209	32.6% 172	0.6% 3	4.00	4	0.88	-0.58	-0.16	527
	fcst_v7_B X	0.6% 3	5.3% 28	22.4% 119	40.1% 213	31.5% 167	0.2% 1	3.97	4	0.90	-0.57	-0.21	531
	fcst_v8_X	0.6% 3	3.6% 20	20.2% 101	42.4% 212	33.0% 166	0.4% 1	4.04	4	0.85	-0.65	0.09	531

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		3	19	107	225	175	2						
Radar thumbnail image	fcst_v1_B U	3.0% 16	5.4% 29	20.3% 109	30.2% 162	40.3% 216	0.7% 4	4.00	4	1.05	-0.92	0.26	536
	fcst_v2_U	2.8% 15	8.7% 46	17.4% 92	28.8% 152	41.7% 220	0.6% 3	3.98	4	1.10	-0.89	-0.06	528
	fcst_v3_B UX	3.4% 18	6.8% 36	20.1% 107	29.5% 157	39.6% 211	0.8% 4	3.96	4	1.09	-0.88	0.07	533
	fcst_v4_U X	2.4% 13	6.2% 33	18.3% 97	29.2% 155	42.6% 226	1.3% 7	4.05	4	1.04	-0.95	0.23	531
	fcst_v5_B	3.1% 16	8.4% 44	19.9% 104	27.2% 142	40.4% 211	1.0% 5	3.94	4	1.11	-0.82	-0.19	522
	fcst_v6_C	0.8% 4	8.5% 45	15.9% 84	30.4% 160	43.5% 229	0.9% 5	4.08	4	1.00	-0.86	-0.18	527
	fcst_v7_B X	2.1% 11	7.3% 39	18.1% 96	31.5% 167	40.7% 216	0.4% 2	4.02	4	1.04	-0.89	0.08	531
	fcst_v8_X	1.9% 10	6.2% 33	20.7% 110	29.6% 157	40.3% 214	1.3% 7	4.02	4	1.02	-0.82	-0.02	531
Severe Thunderstorm Warning Information	fcst_v1_B U	0.0% 0	1.1% 6	6.5% 35	21.6% 116	70.5% 378	0.2% 1	4.62	5	0.66	-1.72	2.47	536
	fcst_v2_U	0.4% 2	0.6% 3	6.3% 33	22.2% 117	69.9% 369	0.8% 4	4.62	5	0.67	-1.92	4.23	528
	fcst_v3_B UX	0.2% 1	1.1% 6	5.6% 30	22.7% 121	70.2% 374	0.2% 1	4.62	5	0.66	-1.88	3.73	533
	fcst_v4_U X	0.2% 1	1.1% 6	5.8% 31	21.7% 115	70.2% 373	0.9% 5	4.62	5	0.67	-1.90	3.74	531
	fcst_v5_B	0.2% 1	1.3% 7	8.0% 42	18.6% 97	71.5% 373	0.4% 2	4.60	5	0.71	-1.84	3.01	522
	fcst_v6_C	0.2% 1	1.1% 6	6.6% 35	22.6% 119	68.7% 362	0.8% 4	4.60	5	0.68	-1.78	3.13	527
	fcst_v7_B	0.4%	0.9%	7.9%	21.7%	68.5%	0.6%	4.58	5	0.71	-1.79	3.25	531

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	X	2	5	42	115	364	3						
	fcst_v8_X	0.6%	1.3%	4.3%	24.3%	68.4%	1.1%	4.60	5	0.69	-2.13	5.54	531
Forecast low temperature		3	7	23	129	363	6						
	fcst_v1_B U	0.2%	1.1%	9.1%	42.9%	46.3%	0.4%	4.34	4	0.71	-0.92	0.89	536
		1	6	49	230	248	2						528
	fcst_v2_U	0.0%	0.9%	8.9%	36.6%	53.4%	0.2%	4.43	5	0.69	-0.97	0.35	533
		0	5	47	193	282	1						
	fcst_v3_B UX	0.2%	1.1%	9.8%	39.0%	49.7%	0.2%	4.37	4	0.72	-1.00	0.84	531
		1	6	52	208	265	1						
	fcst_v4_U X	0.0%	0.4%	11.7%	39.0%	48.4%	0.6%	4.36	4	0.70	-0.70	-0.44	522
		0	2	62	207	257	3						
Forecast wind direction	fcst_v5_B	0.0%	0.8%	11.1%	38.7%	49.0%	0.4%	4.37	4	0.71	-0.79	-0.14	527
		0	4	58	202	256	2						
	fcst_v6_C	0.0%	1.5%	8.3%	40.4%	49.1%	0.6%	4.38	4	0.70	-0.95	0.59	531
		0	8	44	213	259	3						
	fcst_v7_B X	0.2%	1.5%	9.4%	39.4%	49.2%	0.4%	4.36	4	0.73	-1.03	0.98	531
		1	8	50	209	261	2						
	fcst_v8_X	0.0%	2.1%	11.1%	39.7%	47.1%	0.0%	4.32	4	0.75	-0.89	0.29	528
		0	11	59	211	250	0						
Forecast wind direction	fcst_v1_B U	3.0%	11.0%	28.9%	34.9%	22.2%	0.0%	3.62	4	1.04	-0.43	-0.39	536
		16	59	155	187	119	0						
	fcst_v2_U	3.6%	14.0%	25.4%	33.9%	22.9%	0.2%	3.59	4	1.10	-0.43	-0.59	528
		19	74	134	179	121	1						
	fcst_v3_B UX	3.8%	12.6%	25.1%	33.0%	25.5%	0.0%	3.64	4	1.10	-0.49	-0.53	533
		20	67	134	176	136	0						
Forecast wind direction	fcst_v4_U X	4.0%	10.9%	26.4%	32.4%	26.0%	0.4%	3.66	4	1.10	-0.51	-0.43	531
		21	58	140	172	138	2						
	fcst_v5_B	3.4%	12.6%	28.2%	31.8%	23.9%	0.0%	3.60	4	1.09	-0.40	-0.57	522
		18	66	147	166	125	0						
	fcst_v6_C	3.0%	12.5%	29.0%	32.8%	22.2%	0.4%	3.59	4	1.06	-0.37	-0.53	527

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		16	66	153	173	117	2						
	fcst_v7_B X	3.8% 20	12.2% 65	31.1% 165	30.1% 160	22.8% 121	0.0% 0	3.56	4	1.08	-0.35	-0.55	531
	fcst_v8_X	3.2% 17	13.4% 71	27.1% 144	33.0% 175	23.4% 124	0.0% 0	3.60	4	1.08	-0.40	-0.59	531
Last update time of the forecast	fcst_v1_B U	0.2% 1	2.8% 15	14.4% 77	37.1% 199	45.3% 243	0.2% 1	4.25	4	0.82	-0.88	0.22	536
	fcst_v2_U	0.4% 2	2.3% 12	13.4% 71	37.3% 197	46.2% 244	0.4% 2	4.27	4	0.81	-0.97	0.63	528
	fcst_v3_B UX	0.2% 1	1.7% 9	10.5% 56	34.3% 183	53.1% 283	0.2% 1	4.39	5	0.76	-1.12	0.90	533
	fcst_v4_U X	0.6% 3	3.2% 17	10.7% 57	39.0% 207	45.8% 243	0.8% 4	4.27	4	0.82	-1.14	1.24	531
	fcst_v5_B	1.0% 5	2.9% 15	14.8% 77	33.0% 172	48.3% 252	0.2% 1	4.25	4	0.88	-1.11	0.93	522
	fcst_v6_C	0.0% 0	1.7% 9	14.6% 77	36.1% 190	47.1% 248	0.6% 3	4.29	4	0.78	-0.78	-0.23	527
	fcst_v7_B X	1.7% 9	3.4% 18	11.1% 59	35.8% 190	47.8% 254	0.2% 1	4.25	4	0.90	-1.34	1.80	531
	fcst_v8_X	0.2% 1	2.6% 14	12.4% 66	38.6% 205	45.4% 241	0.8% 4	4.27	4	0.80	-0.94	0.49	531

14. Which of the following types of hazardous weather appears in the forecast?

Experimental forecast	Severe Thunderstorm Warning	Flood Watch	Tornado Warning	Fire Weather Watch	I don't know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	6						
fcst_v1_BU	96.6% 518	1.1% 6	0.6% 3	0.6% 3	1.1% 6	1.10	1	0.60	7.14	52.79	536
fcst_v2_U	96.2% 508	1.9% 10	1.1% 6	0.2% 1	0.6% 3	1.08	1	0.47	8.11	74.68	528
fcst_v3_BUX	95.9% 511	1.5% 8	0.9% 5	1.1% 6	0.6% 3	1.10	1	0.53	6.67	48.92	533
fcst_v4_UX	97.7% 519	0.8% 4	0.6% 3	0.2% 1	0.8% 4	1.06	1	0.48	9.02	85.56	531
fcst_v5_B	95.2% 497	2.1% 11	1.7% 9	0.2% 1	0.8% 4	1.10	1	0.54	6.98	54.96	522
fcst_v6_C	94.9% 500	1.9% 10	0.6% 3	0.8% 4	1.9% 10	1.15	1	0.75	5.68	32.38	527
fcst_v7_BX	97.2% 516	0.9% 5	0.8% 4	0.4% 2	0.8% 4	1.07	1	0.51	8.16	71.08	531
fcst_v8_X	95.1% 505	0.6% 3	1.9% 10	0.6% 3	1.9% 10	1.15	1	0.76	5.45	30.05	531

15. Please consider the Severe Thunderstorm Warning shown in the forecast. In your opinion, how well does the forecast convey the information listed below?

Sub-question	Experimental forecast	Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	Skewness	Kurtosis	n
		1	2	3	4	5						
When the Severe Thunderstorm Warning <u>ends</u>	fcst_v1_B U	2.4% 13	1.5% 8	9.0% 48	45.7% 245	41.4% 222	4.22	4	0.86	-1.52	3.25	536
	fcst_v2_U	4.5% 24	2.5% 13	9.1% 48	41.9% 221	42.0% 222	4.14	4	1.00	-1.54	2.40	528
	fcst_v3_B UX	2.4% 13	2.8% 15	9.8% 52	43.5% 232	41.5% 221	4.19	4	0.90	-1.42	2.44	533
	fcst_v4_U X	9.2% 49	4.0% 21	14.5% 77	37.9% 201	34.5% 183	3.84	4	1.21	-1.10	0.41	531
	fcst_v5_B	46.6% 243	11.3% 59	19.7% 103	15.5% 81	6.9% 36	2.25	2	1.36	0.58	-1.05	522
	fcst_v6_C	47.1% 248	13.1% 69	18.2% 96	16.9% 89	4.7% 25	2.19	2	1.31	0.60	-1.04	527
	fcst_v7_B X	44.1% 234	12.8% 68	20.3% 108	17.1% 91	5.6% 30	2.27	2	1.33	0.51	-1.11	531
	fcst_v8_X	38.8% 206	13.4% 71	25.8% 137	15.4% 82	6.6% 35	2.38	2	1.31	0.40	-1.09	531
That a <u>threat</u> of a Severe Thunderstorm exists	fcst_v1_B U	1.1% 6	0.9% 5	8.6% 46	49.1% 263	40.3% 216	4.26	4	0.75	-1.26	3.03	536
	fcst_v2_U	0.4% 2	0.9% 5	9.5% 50	50.9% 269	38.3% 202	4.26	4	0.70	-0.84	1.43	528
	fcst_v3_B UX	0.4% 2	0.8% 4	6.2% 33	40.9% 218	51.8% 276	4.43	5	0.68	-1.21	2.29	533
	fcst_v4_U X	0.4% 2	1.3% 7	8.3% 44	46.7% 248	43.3% 230	4.31	4	0.71	-1.01	1.65	531
	fcst_v5_B	2.1% 11	2.5% 13	9.0% 47	47.3% 247	39.1% 204	4.19	4	0.86	-1.41	2.77	522

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	fcst_v6_C	3.0% 16	2.8% 15	13.3% 70	51.8% 273	29.0% 153	4.01	4	0.90	-1.26	2.17	527
	fcst_v7_B X	1.1% 6	1.5% 8	4.7% 25	45.6% 242	47.1% 250	4.36	4	0.74	-1.58	4.16	531
	fcst_v8_X	1.7% 9	1.7% 9	10.0% 53	43.1% 229	43.5% 231	4.25	4	0.83	-1.38	2.69	531
Whether the Severe Thunderstorm is <u>imminent</u> or not	fcst_v1_B U	11.8% 63	11.9% 64	27.6% 148	32.1% 172	16.6% 89	3.30	3	1.22	-0.43	-0.69	536
	fcst_v2_U	13.3% 70	10.8% 57	30.1% 159	28.0% 148	17.8% 94	3.26	3	1.25	-0.37	-0.76	528
	fcst_v3_B UX	5.6% 30	8.8% 47	22.0% 117	34.5% 184	29.1% 155	3.73	4	1.14	-0.73	-0.17	533
	fcst_v4_U X	7.2% 38	7.7% 41	23.5% 125	37.3% 198	24.3% 129	3.64	4	1.14	-0.73	-0.09	531
	fcst_v5_B	25.7% 134	14.4% 75	22.2% 116	23.4% 122	14.4% 75	2.86	3	1.40	0.00	-1.29	522
	fcst_v6_C	25.6% 135	12.9% 68	30.4% 160	23.5% 124	7.6% 40	2.75	3	1.28	-0.04	-1.13	527
	fcst_v7_B X	10.9% 58	7.0% 37	22.0% 117	35.8% 190	24.3% 129	3.56	4	1.24	-0.72	-0.35	531
	fcst_v8_X	8.7% 46	11.1% 59	23.9% 127	33.7% 179	22.6% 120	3.50	4	1.20	-0.56	-0.53	531
How to get <u>additional details</u> about the Severe Thunderstorm Warning	fcst_v1_B U	5.2% 28	6.0% 32	24.4% 131	42.7% 229	21.6% 116	3.70	4	1.04	-0.81	0.41	536
	fcst_v2_U	5.9% 31	5.9% 31	22.0% 116	44.1% 233	22.2% 117	3.71	4	1.06	-0.89	0.47	528
	fcst_v3_B UX	3.9% 21	5.6% 30	15.9% 85	43.9% 234	30.6% 163	3.92	4	1.02	-1.05	0.86	533
	fcst_v4_U X	2.4% 13	6.2% 33	22.6% 120	43.3% 230	25.4% 135	3.83	4	0.96	-0.75	0.38	531

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	fcst_v5_B	7.5% 39	8.8% 46	22.4% 117	39.1% 204	22.2% 116	3.60	4	1.15	-0.72	-0.15	522
	fcst_v6_C	6.6% 35	6.8% 36	23.9% 126	41.4% 218	21.3% 112	3.64	4	1.09	-0.79	0.17	527
	fcst_v7_B X	3.4% 18	6.8% 36	18.1% 96	48.4% 257	23.4% 124	3.82	4	0.98	-0.93	0.74	531
	fcst_v8_X	5.6% 30	6.2% 33	20.2% 107	45.4% 241	22.6% 120	3.73	4	1.06	-0.92	0.53	531
The <u>location</u> of the Severe Thunderstorm Warning	fcst_v1_B U	11.2% 60	11.6% 62	24.6% 132	35.8% 192	16.8% 90	3.35	4	1.21	-0.52	-0.61	536
	fcst_v2_U	11.9% 63	12.9% 68	24.8% 131	31.3% 165	19.1% 101	3.33	4	1.26	-0.42	-0.80	528
	fcst_v3_B UX	6.4% 34	11.6% 62	28.5% 152	33.4% 178	20.1% 107	3.49	4	1.13	-0.47	-0.43	533
	fcst_v4_U X	6.8% 36	12.6% 67	26.2% 139	34.1% 181	20.3% 108	3.49	4	1.15	-0.49	-0.50	531
	fcst_v5_B	16.3% 85	13.0% 68	23.4% 122	27.0% 141	20.3% 106	3.22	3	1.35	-0.31	-1.06	522
	fcst_v6_C	21.6% 114	11.0% 58	23.5% 124	32.3% 170	11.6% 61	3.01	3	1.33	-0.28	-1.14	527
	fcst_v7_B X	10.2% 54	12.1% 64	21.5% 114	39.0% 207	17.3% 92	3.41	4	1.20	-0.59	-0.55	531
	fcst_v8_X	10.5% 56	13.0% 69	26.0% 138	31.6% 168	18.8% 100	3.35	4	1.22	-0.42	-0.72	531
When the Severe Thunderstorm Warning <u>starts</u>	fcst_v1_B U	32.5% 174	14.6% 78	21.6% 116	20.0% 107	11.4% 61	2.63	3	1.40	0.21	-1.29	536
	fcst_v2_U	33.9% 179	11.4% 60	22.5% 119	19.5% 103	12.7% 67	2.66	3	1.43	0.18	-1.33	528
	fcst_v3_B UX	23.6% 126	9.4% 50	20.3% 108	27.8% 148	18.9% 101	3.09	3	1.44	-0.25	-1.28	533

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	fcst_v4_U X	20.5% 109	12.4% 66	21.8% 116	27.9% 148	17.3% 92	3.09	3	1.38	-0.24	-1.19	531
	fcst_v5_B	40.6% 212	11.9% 62	19.7% 103	19.3% 101	8.4% 44	2.43	2	1.40	0.37	-1.27	522
	fcst_v6_C	42.1% 222	12.9% 68	19.4% 102	19.7% 104	5.9% 31	2.34	2	1.35	0.42	-1.23	527
	fcst_v7_B X	32.4% 172	9.6% 51	18.3% 97	25.4% 135	14.3% 76	2.80	3	1.48	0.02	-1.46	531
	fcst_v8_X	29.2% 155	14.3% 76	18.5% 98	25.2% 134	12.8% 68	2.78	3	1.43	0.05	-1.38	531

16. Again, please consider the Severe Thunderstorm Warning shown in the forecast. Please indicate the extent to which each of the following statements is true for you.

Sub-question	Experimental forecast	Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	Skewness	Kurtosis	n
		1	2	3	4	5						
This information would prompt me to take action to protect myself and/or my family	fcst_v1_B U	2.8% 15	5.2% 28	26.1% 140	42.4% 227	23.5% 126	3.79	4	0.96	-0.70	0.42	536
	fcst_v2_U	3.0% 16	10.6% 56	25.2% 133	34.5% 182	26.7% 141	3.71	4	1.07	-0.54	-0.38	528
	fcst_v3_B UX	3.6% 19	6.9% 37	19.5% 104	42.4% 226	27.6% 147	3.83	4	1.02	-0.86	0.42	533
	fcst_v4_U X	1.9% 10	8.5% 45	17.5% 93	37.7% 200	34.5% 183	3.94	4	1.01	-0.81	0.05	531
	fcst_v5_B	7.7% 40	11.5% 60	22.8% 119	36.2% 189	21.8% 114	3.53	4	1.17	-0.60	-0.44	522
	fcst_v6_C	8.0% 42	12.1% 64	28.1% 148	33.8% 178	18.0% 95	3.42	4	1.15	-0.47	-0.49	527
	fcst_v7_B X	2.1% 11	8.1% 43	24.1% 128	38.8% 206	26.9% 143	3.80	4	0.99	-0.61	-0.10	531
	fcst_v8_X	4.1% 22	8.3% 44	24.9% 132	33.0% 175	29.8% 158	3.76	4	1.09	-0.66	-0.19	531
This information meets my needs	fcst_v1_B U	0.9% 5	4.5% 24	20.5% 110	48.9% 262	25.2% 135	3.93	4	0.85	-0.68	0.52	536
	fcst_v2_U	0.9% 5	4.9% 26	19.3% 102	46.8% 247	28.0% 148	3.96	4	0.87	-0.72	0.44	528
	fcst_v3_B UX	0.2% 1	2.1% 11	16.7% 89	51.2% 273	29.8% 159	4.08	4	0.75	-0.54	0.23	533
	fcst_v4_U X	0.2% 1	3.6% 19	15.6% 83	49.7% 264	30.9% 164	4.08	4	0.79	-0.67	0.31	531
	fcst_v5_B	4.6% 24	8.6% 45	21.8% 114	43.1% 225	21.8% 114	3.69	4	1.05	-0.76	0.16	522

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	fcst_v6_C	3.0% 16	12.3% 65	23.5% 124	43.1% 227	18.0% 95	3.61	4	1.01	-0.57	-0.20	527
	fcst_v7_B X	0.9% 5	5.8% 31	20.9% 111	49.2% 261	23.2% 123	3.88	4	0.86	-0.66	0.38	531
	fcst_v8_X	1.3% 7	6.0% 32	22.8% 121	44.3% 235	25.6% 136	3.87	4	0.91	-0.64	0.20	531
This information would prompt me to seek additional information	fcst_v1_B U	0.6% 3	3.7% 20	15.7% 84	46.5% 249	33.6% 180	4.09	4	0.83	-0.80	0.58	536
	fcst_v2_U	2.1% 11	4.4% 23	14.4% 76	41.9% 221	37.3% 197	4.08	4	0.93	-1.10	1.16	528
	fcst_v3_B UX	1.7% 9	4.5% 24	15.8% 84	40.7% 217	37.3% 199	4.08	4	0.93	-1.00	0.87	533
	fcst_v4_U X	0.9% 5	4.5% 24	11.9% 63	42.9% 228	39.7% 211	4.16	4	0.87	-1.07	1.11	531
	fcst_v5_B	3.1% 16	3.4% 18	15.7% 82	45.8% 239	32.0% 167	4.00	4	0.94	-1.13	1.46	522
	fcst_v6_C	1.3% 7	6.1% 32	16.1% 85	43.6% 230	32.8% 173	4.01	4	0.92	-0.88	0.53	527
	fcst_v7_B X	0.8% 4	3.2% 17	13.4% 71	44.4% 236	38.2% 203	4.16	4	0.83	-0.97	1.03	531
	fcst_v8_X	0.8% 4	4.5% 24	14.9% 79	39.9% 212	39.9% 212	4.14	4	0.88	-0.93	0.56	531
This information is easy to understand	fcst_v1_B U	0.6% 3	2.6% 14	18.5% 99	53.4% 286	25.0% 134	4.00	4	0.77	-0.64	0.76	536
	fcst_v2_U	0.6% 3	2.8% 15	16.3% 86	51.1% 270	29.2% 154	4.05	4	0.79	-0.73	0.80	528
	fcst_v3_B UX	0.6% 3	2.1% 11	11.3% 60	52.9% 282	33.2% 177	4.16	4	0.74	-0.90	1.56	533
	fcst_v4_U X	0.6% 3	1.3% 7	14.5% 77	48.6% 258	35.0% 186	4.16	4	0.76	-0.78	0.95	531

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	fcst_v5_B	3.1% 16	8.4% 44	22.4% 117	44.4% 232	21.6% 113	3.73	4	0.99	-0.72	0.22	522
	fcst_v6_C	1.9% 10	7.2% 38	24.5% 129	47.6% 251	18.8% 99	3.74	4	0.91	-0.66	0.37	527
	fcst_v7_B X	0.9% 5	3.2% 17	17.9% 95	52.0% 276	26.0% 138	3.99	4	0.81	-0.78	1.01	531
	fcst_v8_X	0.4% 2	5.1% 27	21.8% 116	44.6% 237	28.1% 149	3.95	4	0.86	-0.53	-0.13	531
This information gets my attention	fcst_v1_B U	0.7% 4	1.9% 10	14.2% 76	52.2% 280	31.0% 166	4.11	4	0.76	-0.84	1.38	536
	fcst_v2_U	0.9% 5	3.4% 18	14.8% 78	48.7% 257	32.2% 170	4.08	4	0.83	-0.91	1.10	528
	fcst_v3_B UX	0.4% 2	0.4% 2	7.1% 38	49.0% 261	43.2% 230	4.34	4	0.66	-0.90	1.78	533
	fcst_v4_U X	0.4% 2	1.7% 9	9.2% 49	47.8% 254	40.9% 217	4.27	4	0.73	-0.97	1.46	531
	fcst_v5_B	1.5% 8	5.7% 30	13.8% 72	48.5% 253	30.5% 159	4.01	4	0.90	-0.99	1.01	522
	fcst_v6_C	0.8% 4	7.2% 38	20.1% 106	46.9% 247	25.0% 132	3.88	4	0.89	-0.64	0.09	527
	fcst_v7_B X	0.2% 1	1.7% 9	7.5% 40	49.5% 263	41.1% 218	4.30	4	0.70	-0.91	1.35	531
	fcst_v8_X	0.4% 2	2.6% 14	12.8% 68	44.3% 235	39.9% 212	4.21	4	0.79	-0.89	0.76	531
This information is useful to me	fcst_v1_B U	0.0% 0	1.7% 9	10.3% 55	52.4% 281	35.6% 191	4.22	4	0.69	-0.63	0.38	536
	fcst_v2_U	0.2% 1	2.1% 11	9.7% 51	46.4% 245	41.7% 220	4.27	4	0.74	-0.91	0.96	528
	fcst_v3_B UX	0.4% 2	0.6% 3	7.5% 40	51.4% 274	40.2% 214	4.30	4	0.66	-0.86	1.78	533

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	fcst_v4_U X	0.2% 1	1.1% 6	7.5% 40	47.5% 252	43.7% 232	4.33	4	0.68	-0.89	1.21	531
	fcst_v5_B	1.3% 7	5.7% 30	13.2% 69	48.3% 252	31.4% 164	4.03	4	0.89	-0.99	1.00	522
	fcst_v6_C	0.6% 3	5.7% 30	15.2% 80	49.5% 261	29.0% 153	4.01	4	0.85	-0.80	0.53	527
	fcst_v7_B X	0.2% 1	2.3% 12	10.9% 58	50.3% 267	36.3% 193	4.20	4	0.73	-0.80	0.84	531
	fcst_v8_X	0.6% 3	2.8% 15	13.7% 73	43.9% 233	39.0% 207	4.18	4	0.81	-0.91	0.83	531
This information is visually appealing	fcst_v1_B U	3.7% 20	8.8% 47	31.0% 166	38.6% 207	17.9% 96	3.58	4	1.00	-0.51	-0.01	536
	fcst_v2_U	3.2% 17	9.1% 48	28.6% 151	39.8% 210	19.3% 102	3.63	4	1.00	-0.54	-0.05	528
	fcst_v3_B UX	1.9% 10	3.6% 19	24.4% 130	44.8% 239	25.3% 135	3.88	4	0.89	-0.71	0.63	533
	fcst_v4_U X	1.7% 9	5.1% 27	23.2% 123	42.7% 227	27.3% 145	3.89	4	0.92	-0.69	0.33	531
	fcst_v5_B	5.2% 27	10.3% 54	29.9% 156	37.7% 197	16.9% 88	3.51	4	1.05	-0.52	-0.15	522
	fcst_v6_C	5.3% 28	13.3% 70	38.3% 202	32.3% 170	10.8% 57	3.30	3	1.01	-0.30	-0.20	527
	fcst_v7_B X	0.8% 4	5.5% 29	24.7% 131	46.3% 246	22.8% 121	3.85	4	0.86	-0.51	0.06	531
	fcst_v8_X	2.4% 13	8.3% 44	24.5% 130	41.6% 221	23.2% 123	3.75	4	0.98	-0.63	0.04	531
This information is convenient	fcst_v1_B U	1.3% 7	1.9% 10	16.0% 86	53.7% 288	27.1% 145	4.03	4	0.79	-0.93	1.79	536
	fcst_v2_U	0.4% 2	3.2% 17	12.3% 65	55.3% 292	28.8% 152	4.09	4	0.75	-0.82	1.17	528

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	fcst_v3_B UX	0.8% 4	0.8% 4	13.3% 71	50.8% 271	34.3% 183	4.17	4	0.74	-0.85	1.55	533
	fcst_v4_U X	0.6% 3	2.3% 12	11.7% 62	50.8% 270	34.7% 184	4.17	4	0.76	-0.91	1.39	531
	fcst_v5_B	1.9% 10	6.1% 32	18.8% 98	49.6% 259	23.6% 123	3.87	4	0.91	-0.85	0.76	522
	fcst_v6_C	2.3% 12	8.2% 43	19.5% 103	50.5% 266	19.5% 103	3.77	4	0.93	-0.81	0.54	527
	fcst_v7_B X	0.6% 3	3.0% 16	15.8% 84	52.7% 280	27.9% 148	4.04	4	0.78	-0.75	0.91	531
	fcst_v8_X	1.3% 7	2.8% 15	20.0% 106	44.1% 234	31.8% 169	4.02	4	0.87	-0.80	0.73	531

17. When does the Severe Thunderstorm Warning start?

Experimental forecast	It has already started	6 PM on Wednesday	Sometime Tonight	I cannot tell	Other	n
	1	2	3	4	5	
fcst_v1_BU	80.2% 430	0.6% 3	1.7% 9	15.3% 82	2.2% 12	536
fcst_v2_U	81.8% 432	1.9% 10	1.3% 7	13.4% 71	1.5% 8	528
fcst_v3_BUX	88.9% 474	0.8% 4	0.4% 2	8.8% 47	1.1% 6	533
fcst_v4_UX	87.6% 465	1.5% 8	0.6% 3	8.7% 46	1.7% 9	531
fcst_v5_B	45.0% 235	3.3% 17	7.7% 40	40.6% 212	3.4% 18	522
fcst_v6_C	34.3% 181	4.0% 21	9.3% 49	48.0% 253	4.4% 23	527
fcst_v7_BX	82.9% 440	1.1% 6	1.1% 6	13.4% 71	1.5% 8	531
fcst_v8_X	81.9% 435	1.5% 8	2.1% 11	12.6% 67	1.9% 10	531

a. If other, please specify [Open-ended](#)

18. When does the Severe Thunderstorm Warning end?

Experimental forecast	It has already ended	6 PM on Wednesday	Sometime Tonight	I cannot tell	Other	n
	1	2	3	4	5	
fcst_v1_BU	0.4%	96.8%	0.7%	1.1%	0.9%	536
	2	519	4	6	5	
fcst_v2_U	0.2%	94.3%	1.9%	2.3%	1.3%	528
	1	498	10	12	7	
fcst_v3_BUX	0.0%	94.9%	1.1%	3.6%	0.4%	533
	0	506	6	19	2	
fcst_v4_UX	0.4%	81.4%	7.7%	9.8%	0.8%	531
	2	432	41	52	4	
fcst_v5_B	0.6%	3.1%	18.0%	71.8%	6.5%	522
	3	16	94	375	34	
fcst_v6_C	0.4%	2.5%	13.3%	78.7%	5.1%	527
	2	13	70	415	27	
fcst_v7_BX	0.2%	7.2%	30.7%	59.9%	2.1%	531
	1	38	163	318	11	
fcst_v8_X	0.4%	7.3%	30.5%	60.1%	1.7%	531
	2	39	162	319	9	

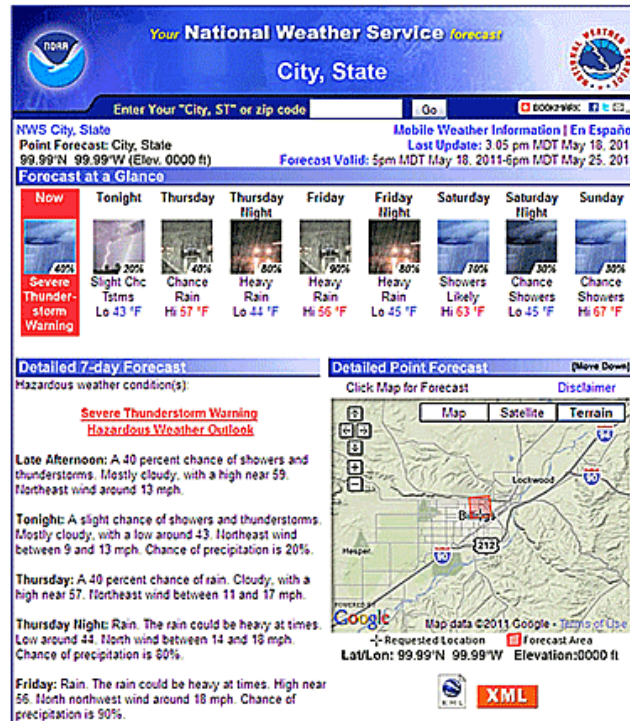
a. If other, please specify [Open-ended](#)

19. If you received this forecast with the Severe Thunderstorm Warning for your location, what would you do? [Open-ended](#)

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Preferences for Single Experimental Attributes and when there are Multiple Hazards

The next set of questions will show two example point-and-click forecasts for when a Severe Thunderstorm Warning is in effect. For each question, please indicate which way you prefer the information be provided.



FORECAST - A



FORECAST - B

20. Forecast "A" shows a red box around the first forecast picture denoting the Severe Thunderstorm Warning. Forecast "B" does not have the box. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the red box	Forecast B – <u>without</u> the red box	No opinion/No preference	n
1	2	3	
90.9%	5.5%	3.6%	4239
3852	235	152	

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Forecast A

Severe Thunderstorm Warning (until 6 PM Wed)
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

FORECAST - A

Forecast B

Severe Thunderstorm Warning
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

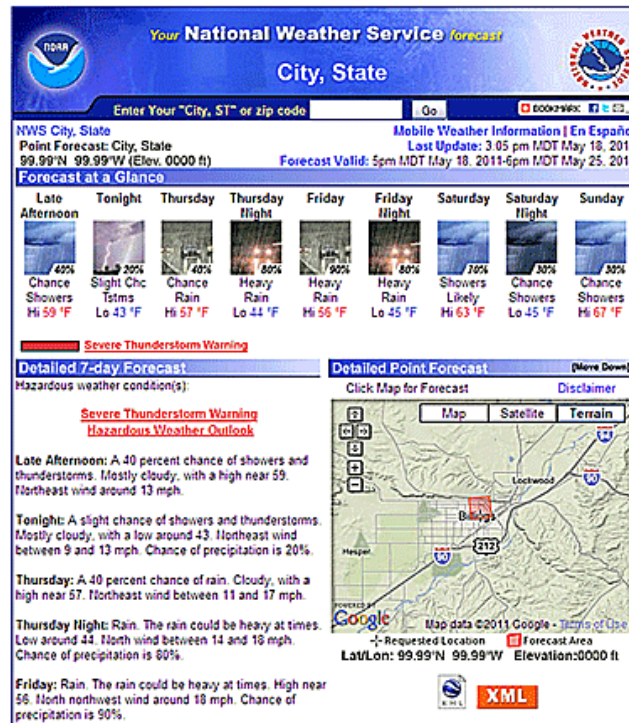
Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

FORECAST - B

21. Forecast "A" indicates how long the Severe Thunderstorm Warning is in effect (i.e., "until 6 PM Wed"). Forecast "B" does not have the "until" information. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the “until 6 PM Wed” info	Forecast B – <u>without</u> the “until 6 PM Wed” info	No opinion/No preference	n
1	2	3	
95.1%	1.8%	3.1%	4239
4033	75	131	

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FORECAST - A

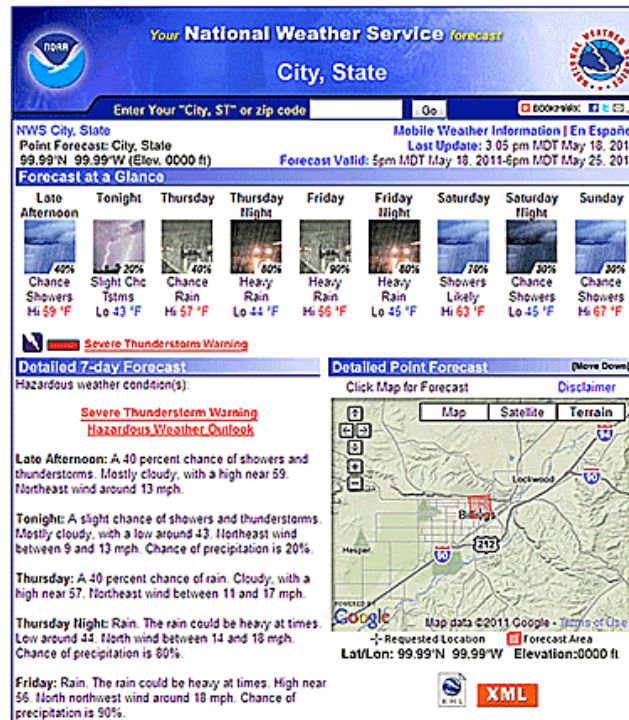


FORECAST - B

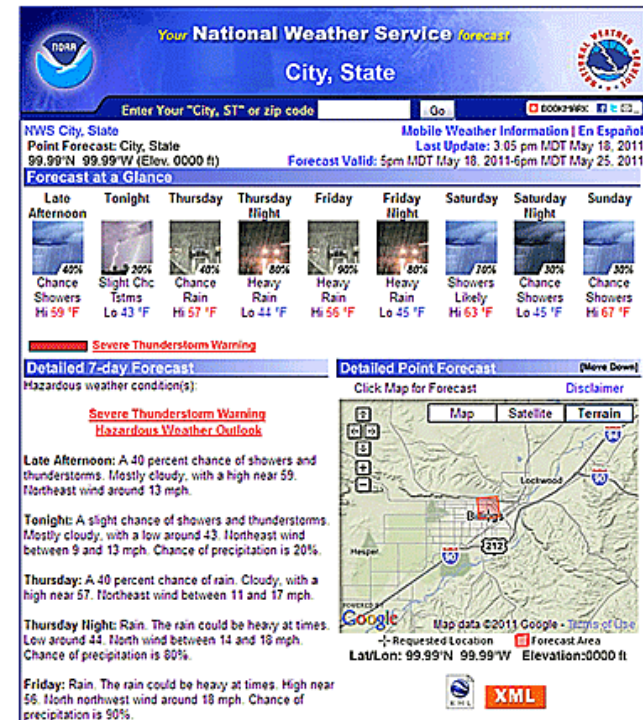
22. Forecast "A" shows a bar with text underneath the first forecast picture denoting the Severe Thunderstorm Warning. Forecast "B" does not have the bar with text. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the bar and text	Forecast B – <u>without</u> the bar and text	No opinion/No preference	n
1	2	3	
66.3%	18.0%	15.8%	4239
2810	761	668	

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FORECAST - A



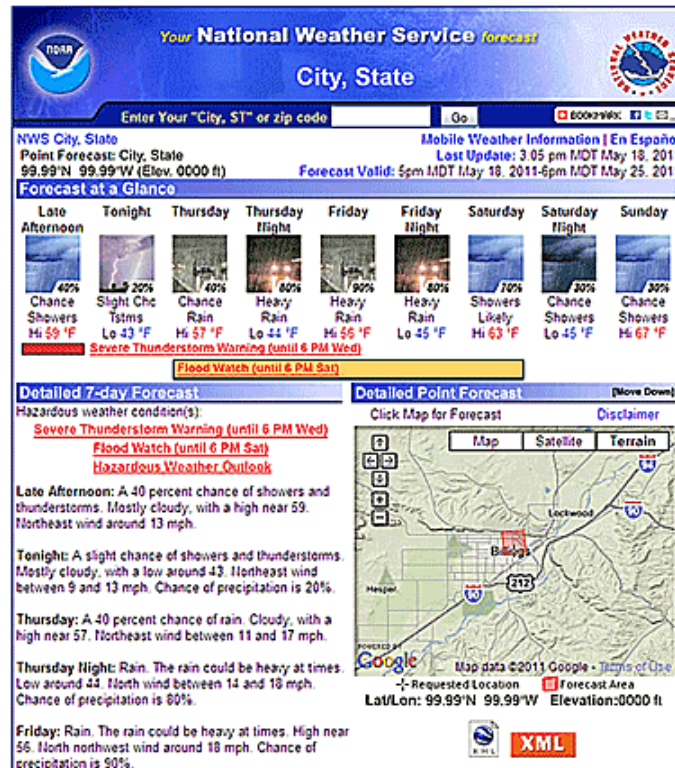
FORECAST - B

23. Forecast "A" shows a bar with text underneath the first forecast picture denoting the Severe Thunderstorm Warning with a purple icon of a lightning bolt. Forecast "B" shows the bar with text only. Which way do you prefer the information be provided?

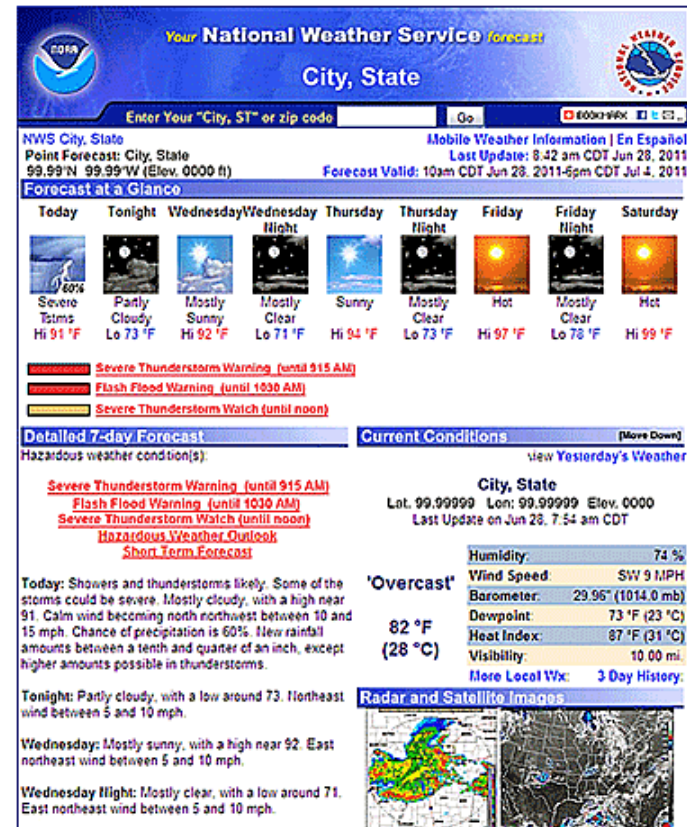
Forecast A – <u>with</u> the purple icon next to the bar and text	Forecast B – <u>without</u> the purple icon next to the bar and text	No opinion/No preference	n
1	2	3	
37.0%	35.1%	28.0%	4239
1568	1486	1185	

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Multiple weather hazards can occur at the same time and/or in the same multi-day forecast. Two example forecasts are shown below. The first forecast shows what it would look like if there were a Severe Thunderstorm Warning and a Flood Watch in the same multi-day forecast but not occurring at the same time. The second forecast shows what it would look like if there were multiple hazards at the same time.



FORECAST - A



FORECAST - B

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24. Please consider how the information is presented in these forecasts and indicate the extent to which you agree or disagree with the statements below. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
I want the start time to be included in the bar for weather threats that begin in the future (like for the Flood Watch in the first forecast)	1.6% 68	6.9% 291	10.7% 455	46.3% 1961	33.3% 1411	1.3% 53	4.04	4.00	0.93	-1.08	0.99	4239
I think there should only be 1 bar at a time showing the most serious weather threat	24.9% 1055	52.7% 2234	10.0% 424	7.3% 310	3.9% 164	1.2% 52	2.11	2.00	0.99	1.18	1.20	4239
Having the bars helps me better understand the time when the different weather hazards are in effect	2.5% 104	9.3% 393	11.6% 491	43.8% 1855	31.7% 1345	1.2% 51	3.94	4.00	1.02	-0.99	0.45	4239
I do not want the bar information duplicated as a hyperlink under the “hazardous weather conditions”. For instance, if there is a “Severe Thunderstorm Warning” bar, I do not want the “Severe Thunderstorm Warning” hyperlink.	14.0% 592	31.6% 1340	16.7% 706	23.2% 985	11.9% 503	2.7% 113	2.87	3.00	1.27	0.18	-1.13	4239
I want to be able to click on each bar to immediately get information about that weather threat	1.3% 53	3.1% 131	5.9% 248	37.0% 1570	51.4% 2180	1.3% 57	4.36	5.00	0.83	-1.62	3.08	4239
I do not want to have a	7.7% 326	21.3% 893	10.7% 445	33.5% 1391	24.7% 1014	2.1% 87	3.47	4.00	1.29	-0.44	-1.05	4239

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"watch" bar if there is a "warning" bar for the same type of weather threat at the same time. For instance, I do not want the "Severe Thunderstorm Watch" bar in the second forecast because there is a "Severe Thunderstorm Warning" bar.	326	901	453	1419	1049	91						
I like that there are different colored bars for a "watch" versus a "warning"	1.4% 58	3.6% 152	6.7% 285	41.6% 1765	45.6% 1935	1.0% 44	4.28	4.00	0.85	-1.46	2.56	4239
I want to be able to "mouse over" each bar and have a pop-up window appear that gives the key information about that weather threat	5.0% 210	12.4% 527	11.7% 495	35.1% 1488	34.3% 1455	1.5% 64	3.83	4.00	1.18	-0.85	-0.26	4239
I think the bar provides useful information	2.1% 87	4.7% 198	7.5% 319	49.8% 2111	34.8% 1476	1.1% 48	4.12	4.00	0.89	-1.35	2.21	4239
I would like to have different colored bars for the different types of weather threat (one color for the Severe Thunderstorm, a different color for the Flash Flood, etc.)	3.3% 138	11.6% 490	11.7% 498	36.5% 1546	35.8% 1516	1.2% 51	3.91	4.00	1.11	-0.91	-0.05	4239

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25. The most number of bars I would like to have appear in a multi-day forecast at any given time is:

0	1	2	3	4	5	The number of bars necessary to show all the hazardous weather threats	Other	n
1	2	3	4	5	6	7	8	
4.1%	2.5%	5.9%	21.2%	3.5%	1.3%	58.4%	3.1%	4239
172	104	249	899	150	56	2477	132	

a. If other, please specify. [Open-ended](#)

26. If you have any additional comments about the forecast images we have shown or about how about the National Weather Service can better communicate hazardous weather threats on its website, please share them below. [Open-ended](#)

Socio-demographic Characteristics

About You and Your Household

The remaining survey questions are about you and your household. This information will be used to help group your responses with responses of others. You do not have to answer any question you are uncomfortable answering. All of your responses will remain anonymous, and your responses will not be reported in a way that can be linked to you.

27. What is your age in years?

Mean	Median	SD	n	# missing
52.67	54.00	13.20	4257	48

28. What is your sex? *Select ONE box.*

Male	Female	n	# missing
1	2		
72.3% 3054	27.7% 1168	4222	83

29. What is your home 5-digit zip code? [Open-ended](#)

30. How long in years have you lived within 50 miles of your current residence?

Mean	Median	SD	n	# missing
24.48	21.00	17.62	4240	65

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31. How many people are there in your household, including yourself?

Mean	Median	SD	n	# missing
2.54	2.0	1.30	4227	78

32. Which of the following best describes the highest level of education you have completed? *Select ONE box.*

Did not complete high school	High school diploma or equivalent	Some college, technical school, or associate's degree	Bachelor's degree	Master's degree	Professional degree or doctorate	Mean (yrs)	Median (yrs)	SD (yrs)	n	# missing
1	2	3	4	5	6					
0.2% 7	4.1% 175	26.4% 1130	34.4% 1474	23.0% 987	11.9% 509	16.47	16.00	2.60	4282	23

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33. What is your present employment status? *Select ALL that apply to you.*

Sub-question	No	Yes
	0	1
Employed full time	41.5% 1785	58.5% 2520
Employed part time	89.1% 3835	10.9% 470
Retired	73.9% 3182	26.1% 1123
Homemaker	95.4% 4105	4.6% 200
Student	96.0% 4131	4.0% 174
Unemployed	96.4% 4148	3.6% 157
In Armed Forces	99.4% 4279	0.6% 26

If employed full time or part time check, go to Parts a -e

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a. **In your job, are you:** *Select ALL that apply to you.*

Sub-question	No	Yes	n	# missing
	0	1		
An employee for a private, for-profit business	54.1% 1598	45.9% 1357	2955	1350
An employee of a private, not-for-profit organization	86.6% 2560	13.4% 395	2955	1350
A local government employee city, county, etc.	91.0% 2689	9.0% 266	2955	1350
A state government employee	90.1% 2662	9.9% 293	2955	1350
A federal government employee	94.0% 2777	6.0% 178	2955	1350
Self-employed in your own business	80.1% 2367	19.9% 588	2955	1350
Other please specify	94.8% 2801	5.2% 154	2955	1350

b. **What kind of business or industry is your employer for example: hospital, school, bank, trucking company?** [Open-ended](#)

c. What economic sector is your employer?

Agriculture, forestry, fishing and hunting	1	5.1% 146
Construction	2	4.1% 116
Manufacturing	3	8.5% 244
Wholesale trade	4	1.0% 28
Retail trade	5	5.4% 154
Transportation, warehousing, and utilities	6	5.1% 146
Information telecommunications, publishing, broadcasting	7	7.1% 202
Finance and insurance	8	4.7% 134
Real estate, rental, and leasing	9	1.1% 31
Professional and scientific; management of companies; administrative and waste management services	10	11.5% 330
Educational services; health care and social assistance	11	21.6% 617
Arts, entertainment, and recreation; accommodation and food services	12	3.4% 96
Public administration	13	4.1% 118
Mining, quarrying, and oil and gas extraction	14	0.7% 20
Other please specify	15	16.8% 481
n		2863
# missing		1442

d. To what extent does weather affect your work or the economic sector that you indicated above?

Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	n	# missing
1	2	3	4	5					
11.2% 329	22.1% 651	26.9% 793	19.7% 581	20.1% 594	3.15	3.00	1.29	2948	1357

e. To what extent are weather forecasts important in your work or the economic sector that you indicated above?

Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	N	# missing
1	2	3	4	5					
12.8% 376	19.6% 577	22.3% 656	22.6% 667	22.8% 671	3.22	3.00	1.35	2947	1358

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34. Which of the following best describes your race? *Select ALL that apply to you.*

Sub-question	No	Yes
	0	1
White	7.3% 313	92.7% 3992
Black or African American	99.6% 4286	0.4% 19
American Indian or Alaska Native	98.8% 4254	1.2% 51
Asian	99.2% 4269	0.8% 36
Native Hawaiian or other Pacific Islander	99.7% 4293	0.3% 12
Other	97.6% 4201	2.4% 104

35. Are you of Hispanic, Latino, or Spanish origin? *Select ONE box.*

No, not of Hispanic, Latino, or Spanish origin	Yes, Mexican, Mexican American, Chicano	Yes, Puerto Rican	Yes, Cuban	Yes, another Hispanic, Latino, or Spanish origin please specify	n	# missing
1	2	3	4	5		
97.7% 3958	0.8% 34	0.3% 11	0.1% 6	1.0% 41	4050	255

36. What is your primary language?

English	Spanish	Other	n	# missing
1	2	3		
99.4% 4014	0.2% 8	0.4% 18	4040	265

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37. What was your total household income for 2009 before taxes? *Select ONE box.*

Under \$15,000	1	\$7500	3.8% 141
\$15,000 to \$24,999	2	\$22500	4.6% 173
\$25,000 to \$34,999	3	\$30000	5.8% 216
\$35,000 to \$49,999	4	\$42500	12.0% 445
\$50,000 to \$74,999	5	\$62500	20.8% 776
\$75,000 to \$99,999	6	\$87500	17.9% 668
\$100,000 to \$124,999	7	\$112500	14.7% 548
\$125,000 to \$149,999	8	\$137500	7.0% 262
\$150,000 to \$199,999	9	\$175000	7.2% 269
\$200,000 or more	10	\$200000	6.0% 225
N			3723
# missing			582

38. If you have any further comments, please write them below. [Open-ended](#)

We greatly appreciate the time you took to complete this survey. Thank you!

F.3. Long-Fused Survey Instrument with Experimental Designs and Codebook^{18,19}

Evaluating Weather Forecast Information Provided by the National Weather Service

Important information about this survey – please read!

The purpose of this survey is to understand your thoughts about weather and weather forecast information with a focus on forecasts provided by the National Weather Service. You do not need any special knowledge about weather or weather forecasts to answer the questions.

We will use your responses to improve the communication of weather forecast information and to guide future weather-related research, so your responses are very important to us.

The survey should take you about 15-20 minutes to complete. Completing this survey is voluntary. The information you provide us that can be identified with you will remain confidential. We will analyze your responses together with all other respondents, so please respond as honestly as you can.

Thank you for taking the time to complete this survey!

Are you 18 years of age or older?

☐ Yes

☐ No → if “No”, then display this message: “Thank you for your interest in our study. Unfortunately, you must be at least 18 years of age to participate in this survey.” Do not let respondent answer any further questions.

Yes	No	n
1	2	
100.0%	0.0%	2099
2099	0	

¹⁸ Open-ended responses not included due to space considerations.

¹⁹ All statistics summarizing the central tendency (mean, median) and distribution (standard deviation, skewness, kurtosis) of response distributions are calculated omitting responses of “Don’t know”, “Not familiar with this”, “Not applicable”

Assessing and Improving the NWS Point-and-Click Webpage

The questions below ask about your thoughts about weather forecast information in general.

1. How often do you get weather forecasts from the sources listed below? [Sub-items randomized.](#)

Sub-question	Never	Rarely	Once or more a month	Once a week	Two or more times a week	Once a day	Two or more times a day	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6	7						
Local TV station	21.0% 441	17.6% 369	8.4% 177	8.5% 178	15.5% 325	19.2% 404	9.8% 205	3.77	4.00	2.10	0.03	-1.48	2099
Cable TV station (e.g., CNN, The Weather Channel)	30.7% 644	26.3% 552	10.8% 226	7.6% 159	10.1% 212	8.2% 173	6.3% 133	2.90	2.00	1.93	0.77	-0.70	2099
Newspaper	42.5% 892	28.6% 600	6.3% 132	5.8% 122	55% 115	10.6% 223	0.7% 15	2.38	2.00	1.72	1.16	0.00	2099
Telephone (dial-in) weather information source	88.7% 1862	8.1% 169	1.3% 27	0.6% 12	0.7% 14	0.4% 9	0.3% 6	1.19	1.00	0.68	5.21	31.80	2099
Commercial or public radio station	17.4% 366	19.4% 407	9.1% 191	8.0% 168	16.8% 353	15.8% 332	13.4% 282	3.89	4.00	2.11	0.02	-1.44	2099
NOAA Weather Radio	42.4% 891	25.3% 531	12.4% 260	4.8% 101	6.7% 140	4.2% 89	4.1% 87	2.37	2.00	1.71	1.30	0.69	2099
Friend, family, co-worker, etc.	25.6% 537	31.3% 656	12.2% 256	12.6% 265	11.7% 246	4.5% 95	2.1% 44	2.76	2.00	1.62	0.76	-0.42	2099
Website	2.5% 52	1.3% 28	0.9% 18	2.5% 53	11.7% 245	28.8% 604	52.4% 1099	6.15	7.00	1.28	-2.28	5.81	2099
Social media (e.g., Facebook, Twitter)	84.0% 1764	9.5% 200	1.5% 32	1.4% 29	1.1% 23	1.1% 23	1.3% 28	1.35	1.00	1.04	3.84	15.17	2099
Non-internet enabled mobile device (e.g., cell phone, personal desk assistant [PDA], pager)	84.7% 1777	7.7% 161	1.7% 35	1.1% 24	2.0% 41	1.7% 35	1.2% 26	1.38	1.00	1.13	3.48	11.74	2099
Internet-enabled smart	50.3%	5.4%	5.1%	3.5%	9.3%	9.2%	17.2%	3.13	1.00	2.46	0.53	-1.45	2099

Assessing and Improving the NWS Point-and-Click Webpage

phone (e.g., iPhone, Droid, Blackberry) or other mobile device (e.g., iPad)	1055	113	106	74	195	194	362						
---	------	-----	-----	----	-----	-----	-----	--	--	--	--	--	--

- ➔ If response to “website” is more frequent than “never”, go to Part a
- ➔ If response to “Internet-enabled smart phone or other mobile device” is more frequent than “never”, go to Parts b and c

Assessing and Improving the NWS Point-and-Click Webpage

a. How often do you get weather forecasts from the websites listed below? Sub-items randomized.

Sub-question	Never	Rarely	Once or more a month	Once a week	Two or more times a week	Once a day	Two or more times a day	I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6	7	8						
National Weather Service (example NWS web addresses are www.weather.gov and www.nws.gov)	2.1% 44	1.4% 29	1.5% 30	1.7% 35	11.8% 242	24.4% 499	52.5% 1075	4.5% 93	6.17	7.00	1.29	-2.24	5.44	2047
The Weather Channel (www.weather.com)	35.7% 731	26.5% 542	13.1% 268	6.0% 122	7.8% 159	5.8% 118	4.4% 91	0.8% 16	2.58	2.00	1.77	1.07	0.05	2047
AccuWeather (www.accuweather.com)	48.6% 995	23.6% 484	8.4% 171	4.9% 100	4.9% 100	3.5% 72	3.3% 68	2.8% 57	2.15	1.50	1.63	1.56	1.51	2047
WeatherBug (www.weatherbug.com)	69.1% 1414	13.8% 283	2.8% 58	1.4% 28	2.2% 45	2.0% 41	2.8% 58	5.9% 120	1.63	1.00	1.41	2.65	6.23	2047
Weather Underground (www.wunderground.com)	44.9% 920	21.1% 432	10.6% 216	4.6% 95	6.1% 125	3.2% 65	5.0% 102	4.5% 92	2.32	2.00	1.76	1.37	0.81	2047
Intellicast (www.intellicast.com)	65.4% 1339	12.0% 245	3.6% 73	2.5% 52	3.2% 65	2.0% 41	2.6% 54	8.7% 178	1.71	1.00	1.47	2.31	4.45	2047
Local TV station's website	48.7% 996	25.6% 524	10.2% 209	4.3% 89	5.3% 108	3.4% 69	2.1% 42	0.5% 10	2.10	2.00	1.51	1.58	1.74	2047
Cable TV station's website	74.1% 1517	15.9% 325	2.9% 60	2.1% 43	1.5% 30	1.5% 30	1.4% 28	0.7% 14	1.50	1.00	1.15	3.05	9.59	2047
Online newspaper	64.5% 1321	22.4% 459	5.7% 116	2.8% 57	2.4% 49	1.5% 31	0.4% 8	0.3% 6	1.62	1.00	1.11	2.36	5.81	2047

Assessing and Improving the NWS Point-and-Click Webpage

- b. Do you ever use a weather app application on your smart phone or other Internet-enabled mobile device to get weather forecasts?

___ Yes → If yes, which weather app do you primarily use? _____

___ No

No	Yes	n
1	2	
41.3%	58.7%	1044
431	613	

- c. Do you ever use the mobile web browser on your smart phone or other Internet-enabled mobile device to get weather forecasts from a website?

___ Yes → If yes, which website do you primarily use? _____

___ No

No	Yes	n
1	2	
29.7%	70.3%	1044
310	734	

Assessing and Improving the NWS Point-and-Click Webpage

The National Weather Service NWS is the primary source of weather forecasts, watches, warnings, and advisories for the United States. In addition to normal weather forecasts of precipitation, temperature, cloudiness, and winds, the NWS also provides forecasts, watches, and warnings for:

- severe weather (such as thunderstorms and tornadoes),
- winter weather,
- hurricanes,
- fire weather, and
- forecasts used for aviation and marine commerce.

All of this information is also provided to media (such as television, radio, and newspapers) and to private weather services (such as The Weather Channel and AccuWeather).

2. Have you heard of the National Weather Service?

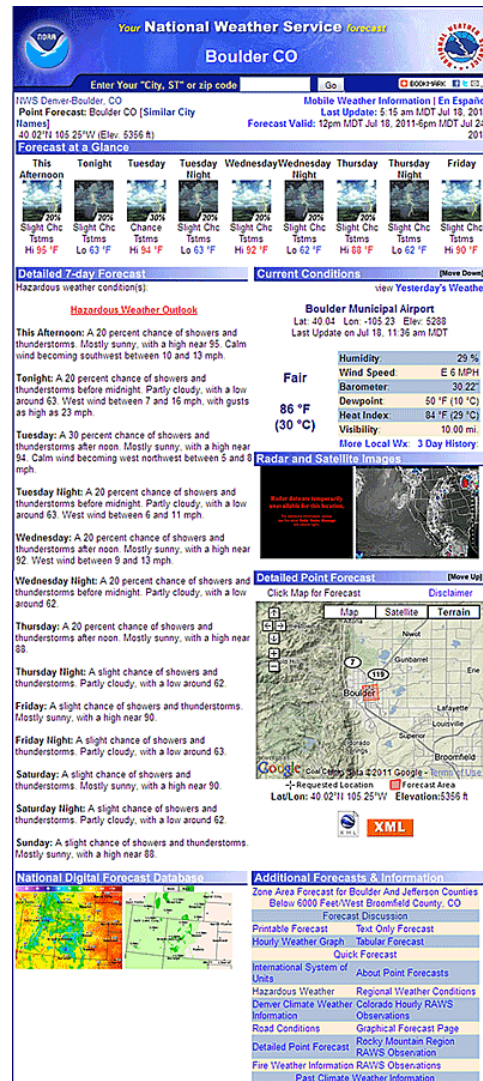
☐ Yes

☐ No → if “No”, go to socio-demographic questions

Yes	No	n
1	2	
99.8% 2094	0.2% 5	2099

Assessing and Improving the NWS Point-and-Click Webpage

The questions below ask about your thoughts about the National Weather Service NWS point-and-click forecast webpage. An example of the point-and-click forecast webpage for the city of Boulder, Colorado, is shown in the figure below. As you respond to the next set of questions, please think about the NWS point-and-click forecast webpage for the city or cities you look at.



Assessing and Improving the NWS Point-and-Click Webpage

3. Have you used the NWS point-and-click forecast webpage (for your area) before?

___ Yes

___ No → if “No”, go to socio-demographic questions

Yes	No	n
1	2	
99.4%	0.6%	2094
2081	13	

4. There are many ways to access the NWS point-and-click forecast webpage. Please indicate whether you typically access the webpage in the ways listed below. Sub-items will be randomized, except for “Other”.

Sub-question	No	Yes	I am not familiar with this	n
	1	2	3	
I have it bookmarked for the forecast location I want	7.9% 165	91.5% 1905	0.5% 11	2081
I go to the NWS homepage and get the forecast for my desired location	40.7% 846	58.8% 1224	0.5% 11	2081
I go the homepage of my local Weather Forecast Office and get the forecast for my desired location	61.2% 1273	33.8% 703	5.0% 105	2081
I type in the webpage address	76.1% 1583	23.3% 485	0.6% 13	2081
Other	87.6% 1822	8.8% 184	3.6% 75	2081

a. What other ways do you access the National Weather Service point-and-click forecast webpage? Open-ended

Assessing and Improving the NWS Point-and-Click Webpage

5. How knowledgeable are you about the NWS point-and-click forecast webpage overall?

Not at all knowledgeable	A little knowledgeable	Somewhat knowledgeable	Very knowledgeable	Extremely knowledgeable	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5						
0.1%	3.4%	25.5%	47.4%	23.5%	3.91	4.00	0.79	-0.31	-0.33	2081
3	71	531	986	490						

6. For approximately how long have you been using the NWS point-and-click forecast webpage?

Less than 6 months	6 months to less than 1 year	1 year to less than 3 years	3 years to less than 5 years	5 years or longer	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5						
0.9%	0.7%	11.5%	26.3%	60.6%	4.45	5.00	0.79	-1.49	2.31	2081
18	14	239	548	1262						

7. How often do you typically visit the NWS point-and-click forecast webpage?

Never	Rarely	Once or more a month	Once a week	Two or more times a week	Once a day	Two or more times a day	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5	6	7						
0.1%	0.6%	2.1%	2.4%	14.3%	27.7%	52.8%	6.24	7.00	1.01	-1.61	2.98	2081
2	13	44	49	298	577	1098						

8. During a typical visit to the NWS point-and-click forecast webpage, approximately how much time do you spend on the webpage?

Less than 15 seconds	15 seconds to less than 30 seconds	30 seconds to less than 1 minute	1 minute to less than 3 minutes	3 minutes to less than 5 minutes	5 minutes to less than 10 minutes	10 minutes or longer	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5	6	7						
1.2%	7.6%	21.4%	40.0%	19.1%	8.5%	2.4%	4.03	4.00	1.17	0.15	0.13	2079
25	157	444	831	397	176	49						

Assessing and Improving the NWS Point-and-Click Webpage

Individual Experimental Forecasts

Please now consider the example point-and-click forecast shown below as you answer the next set of questions. Please answer the questions based on the location for which you most commonly get the forecast.

The following four experimental designs were used in this part of the survey. Each survey respondent was randomly assigned to one of the four designs and then responded to Questions 9-19 based on that image.



Figure F-9. Long-fused experimental forecast #9 with the bar and end-time text (fcst_v9_BU).



Figure F-10. Long-fused experimental forecast #10 with the end-time text (fcst_v10_U).

Assessing and Improving the NWS Point-and-Click Webpage



Figure F-11. Short-fused experimental forecast #11 with the bar (fcst_v11_B).



Figure F-12. Short-fused experimental forecast #12 with no modifications (fcst_v12_C).

Assessing and Improving the NWS Point-and-Click Webpage

Experimental forecast	n
fcst_v9_BU	522
fcst_v10_U	524
fcst_v11_B	512
fcst_v12_C	523

9. The forecast high temperature for Thursday is 57°F. What do you think the actual high temperature will be? [Response options NOT randomized.](#)

Experimental forecast	57°F	Between 56°F and 58°F	Between 55°F and 59°F	Between 52°F and 62°F	Between 47°F and 67°F	Other	n
	1	2	3	4	5	6	
fcst_v9_BU	6.7% 35	25.1% 131	54.6% 285	11.1% 58	0.8% 4	1.7% 9	522
fcst_v10_U	9.2% 48	21.4% 112	51.7% 271	15.3% 80	1.1% 6	1.3% 7	524
fcst_v11_B	8.0% 41	23.8% 122	53.3% 273	11.5% 59	1.0% 5	2.3% 12	512
fcst_v12_C	5.7% 30	24.9% 130	51.6% 270	14.3% 75	1.3% 7	2.1% 11	523

a. If other, please specify [Open-ended](#)

Assessing and Improving the NWS Point-and-Click Webpage

10. The forecast high temperature for Saturday is 63°F. What do you think the actual high temperature will be? [Response options NOT randomized.](#)

Experimental forecast	63°F	Between 62°F and 64°F	Between 61°F and 65°F	Between 58°F and 68°F	Between 53°F and 73°F	Other	n
	1	2	3	4	5	6	
fcst_v9_BU	6.3% 33	17.8% 93	48.3% 252	23.0% 120	2.9% 15	1.7% 9	522
fcst_v10_U	8.2% 43	16.0% 84	46.9% 246	24.0% 126	3.2% 17	1.5% 8	524
fcst_v11_B	6.8% 35	17.8% 91	50.2% 257	20.3% 104	2.5% 13	2.3% 12	512
fcst_v12_C	5.0% 26	18.4% 96	48.6% 254	22.6% 118	2.7% 14	2.9% 15	523

b. If other, please specify [Open-ended](#)

11. The Detailed 7-day Forecast for Tonight indicates there is a “slight chance of showers and thunderstorms”. The icon for Tonight denotes "slight chance" as a 20% chance. What percent chance do you associate with the phrase "slight chance"?

Experimental forecast	Less than 10% chance	10% chance	20% chance	30% chance	40% chance	50% chance	60% chance	70% chance	80% chance	90% chance	100% chance	Don't Know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6	7	8	9	10	11	12						
fcst_v9_B U	8.8% 46	27.2% 142	57.1% 298	5.0% 26	0.4% 2	0.2% 1	0.2% 1	0.0% 0	0.0% 0	0.0% 0	0.0% 0	6 1.1%	2.62	3	0.78	0.03	2.42	522
fcst_v10_U	12.0% 63	27.5% 144	53.8% 282	4.0% 21	0.6% 3	1.0% 5	0.0% 0	0.0% 0	0.0% 0	0.2% 1	0.0% 0	1.0% 5	2.57	3	0.91	1.19	9.32	524
fcst_v11_B	10.0% 51	26.6% 136	58.2% 298	3.1% 16	1.0% 5	0.2% 1	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	1.0% 5	2.59	3	0.77	-0.24	1.10	512
fcst_v12_C	11.3% 59	27.3% 143	53.0% 277	5.2% 27	0.6% 3	0.8% 4	0.2% 1	0.4% 2	0.2% 1	0.0% 0	0.0% 0	1.1% 6	2.62	3	0.97	1.40	7.89	523

12. The Detailed 7-day Forecast for Saturday indicates there is a “showers likely”. The icon for Tonight denotes "likely" as a 70% chance. What percent chance do you associate with the phrase "likely"?

Experimental forecast	Less than 10% chance	10% chance	20% chance	30% chance	40% chance	50% chance	60% chance	70% chance	80% chance	90% chance	100% chance	Don't Know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6	7	8	9	10	11	12						
fcst_v9_B U	0.2% 1	0.0% 0	0.2% 1	0.4% 2	0.2% 1	7.5% 39	10.5% 55	48.3% 252	22.4% 117	7.3% 38	2.1% 11	1.0% 5	8.14	8	1.15	-0.70	3.82	522
fcst_v10_U	0.4% 2	0.0% 0	0.4% 2	0.6% 3	1.9% 10	8.8% 46	10.3% 54	46.9% 246	21.8% 114	6.1% 32	1.5% 8	1.3% 7	7.98	8	1.27	-1.11	4.12	524
fcst_v11_B	0.2% 1	0.6% 3	0.0% 0	0.2% 1	0.2% 1	7.6% 39	9.6% 49	50.2% 257	23.6% 121	4.9% 25	2.0% 10	1.0% 5	8.08	8	1.17	-1.26	6.47	512
fcst_v12_C	0.2% 1	0.0% 0	0.2% 1	0.2% 1	1.0% 5	7.3% 38	12.2% 64	50.5% 264	20.5% 107	5.7% 30	1.1% 6	1.1% 6	8.03	8	1.11	-0.83	4.17	523

Assessing and Improving the NWS Point-and-Click Webpage

13. How important is it to you to have the types of information listed below as part of the NWS point-and-click forecast webpage? [Sub-items randomized.](#)

Sub-question		Not at all important	A little important	Somewhat important	Very important	Extremely important	Don't know/I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
		1	2	3	4	5	6						
Satellite thumbnail image	fcst_v9_B U	4.6% 24	16.9% 88	26.1% 136	27.4% 143	23.8% 124	1.3% 7	3.50	4	1.16	-0.30	-0.85	522
	fcst_v10_U	3.8% 20	11.1% 58	25.8% 135	31.1% 163	27.9% 146	0.4% 2	3.68	4	1.11	-0.52	-0.48	524
	fcst_v11_B	3.7% 19	11.7% 60	25.6% 131	28.3% 145	29.7% 152	1.0% 5	3.69	4	1.13	-0.50	-0.61	512
	fcst_v12_C	3.6% 19	12.2% 64	27.7% 145	34.4% 180	21.6% 113	0.4% 2	3.58	4	1.07	-0.44	-0.45	523
“Hazardous Weather Outlook” product	fcst_v9_B U	0.8% 4	3.3% 17	10.2% 53	33.1% 173	51.9% 271	0.8% 4	4.33	5	0.85	-1.32	1.62	522
	fcst_v10_U	1.1% 6	2.3% 12	10.5% 55	26.9% 141	58.2% 305	1.0% 5	4.40	5	0.85	-1.54	2.30	524
	fcst_v11_B	0.8% 4	1.4% 7	10.4% 53	29.7% 152	56.4% 289	1.4% 7	4.42	5	0.80	-1.43	2.18	512
	fcst_v12_C	0.6% 3	2.5% 13	13.8% 72	29.4% 154	53.2% 278	0.6% 3	4.33	5	0.85	-1.16	0.89	523
Forecast high temperature	fcst_v9_B U	0.4% 2	0.2% 1	6.1% 32	42.0% 219	50.4% 263	1.0% 5	4.43	5	0.65	-1.10	2.14	522
	fcst_v10_U	0.0% 0	0.8% 4	9.2% 48	39.9% 209	49.4% 259	0.8% 4	4.39	4	0.69	-0.83	0.08	524
	fcst_v11_B	0.0% 0	0.6% 3	6.8% 35	38.3% 196	53.9% 276	0.4% 2	4.46	5	0.65	-0.93	0.35	512
	fcst_v12_C	0.0% 0	0.6% 3	6.3% 33	44.6% 233	48.6% 254	0.0% 0	4.41	4	0.64	-0.74	0.19	523
Detailed point	fcst_v9_B	3.8%	8.2%	18.6%	31.8%	35.2%	2.3%	3.88	4	1.11	-0.84	-0.04	522

Assessing and Improving the NWS Point-and-Click Webpage

forecast map	U	20	43	97	166	184	12						
	fcst_v10_U	3.2% 17	5.5% 29	17.9% 94	34.2% 179	38.4% 201	0.8% 4	4.00	4	1.04	-0.99	0.49	524
	fcst_v11_B	2.1% 11	5.5% 28	18.6% 95	31.1% 159	41.2% 211	1.6% 8	4.05	4	1.01	-0.94	0.32	512
	fcst_v12_C	2.1% 11	5.4% 28	23.1% 121	35.6% 186	31.9% 167	1.9% 10	3.92	4	0.98	-0.72	0.12	523
Forecast reference information (latitude, longitude, elevation, etc.)	fcst_v9_B U	11.1% 58	26.1% 136	28.4% 148	21.3% 111	12.5% 65	0.8% 4	2.98	3	1.20	0.09	-0.89	522
	fcst_v10_U	11.1% 58	21.4% 112	28.6% 150	21.2% 111	16.0% 84	1.7% 9	3.10	3	1.24	-0.03	-0.95	524
	fcst_v11_B	10.7% 55	23.8% 122	31.6% 162	18.9% 97	14.5% 74	0.4% 2	3.03	3	1.20	0.08	-0.85	512
	fcst_v12_C	11.3% 59	24.7% 129	29.3% 153	20.5% 107	13.6% 71	0.8% 4	3.00	3	1.21	0.07	-0.89	523
Forecast chance of precipitation	fcst_v9_B U	0.0% 0	0.2% 1	3.8% 20	36.8% 192	58.4% 305	0.8% 4	4.55	5	0.58	-0.92	0.19	522
	fcst_v10_U	0.2% 1	0.4% 2	4.8% 25	32.8% 172	61.5% 322	0.4% 2	4.56	5	0.62	-1.38	2.37	524
	fcst_v11_B	0.0% 0	0.4% 2	4.1% 21	35.7% 183	59.8% 306	0.0% 0	4.55	5	0.59	-1.06	0.69	512
	fcst_v12_C	0.0% 0	0.6% 3	5.7% 30	40.0% 209	53.5% 280	0.2% 1	4.47	5	0.63	-0.91	0.43	523
Forecast of how cloudy it will be	fcst_v9_B U	0.6% 3	6.7% 35	35.4% 185	39.5% 206	17.6% 92	0.2% 1	3.67	4	0.86	-0.16	-0.38	522
	fcst_v10_U	1.7% 9	7.8% 41	31.9% 167	38.5% 202	19.8% 104	0.2% 1	3.67	4	0.94	-0.38	-0.17	524
	fcst_v11_B	0.8% 4	6.8% 35	35.7% 183	35.7% 183	20.9% 107	0.0% 0	3.69	4	0.90	-0.17	-0.48	512
	fcst_v12_C	1.1% 6	9.2% 48	38.8% 203	33.5% 175	17.4% 91	0.0% 0	3.57	4	0.92	-0.10	-0.42	523

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Current conditions (temperature, humidity, dew point, visibility, etc.)	fcst_v9_B U	0.6% 3	3.1% 16	11.9% 62	34.1% 178	49.6% 259	0.8% 4	4.30	5	0.84	-1.16	1.09	522
	fcst_v10_U	0.2% 1	2.5% 13	12.4% 65	33.2% 174	51.1% 268	0.6% 3	4.33	5	0.80	-1.06	0.57	524
	fcst_v11_B	0.4% 2	1.4% 7	11.5% 59	34.8% 178	51.8% 265	0.2% 1	4.36	5	0.77	-1.12	1.08	512
	fcst_v12_C	0.6% 3	2.7% 14	14.5% 76	36.9% 193	45.1% 236	0.2% 1	4.24	4	0.84	-0.98	0.67	523
KML and/or XML links	fcst_v9_B U	27.4% 143	20.1% 105	14.2% 74	6.3% 33	3.1% 16	28.9% 151	2.12	2	1.15	0.81	-0.21	522
	fcst_v10_U	24.4% 128	19.5% 102	15.8% 83	8.0% 42	3.6% 19	28.6% 150	2.26	2	1.19	0.63	-0.54	524
	fcst_v11_B	24.6% 126	19.3% 99	15.4% 79	7.4% 38	4.3% 22	28.9% 148	2.26	2	1.21	0.67	-0.49	512
	fcst_v12_C	26.6% 139	19.9% 104	16.1% 84	7.6% 40	2.9% 15	27.0% 141	2.18	2	1.15	0.67	-0.46	523
Forecast icons (i.e., images across the top)	fcst_v9_B U	1.7% 9	7.1% 37	24.1% 126	37.4% 195	29.3% 153	0.4% 2	3.86	4	0.98	-0.61	-0.11	522
	fcst_v10_U	3.2% 17	6.1% 32	23.3% 122	33.8% 177	32.8% 172	0.8% 4	3.88	4	1.05	-0.76	0.09	524
	fcst_v11_B	1.8% 9	6.4% 33	25.2% 129	29.9% 153	35.9% 184	0.8% 4	3.93	4	1.02	-0.63	-0.30	512
	fcst_v12_C	2.1% 11	8.6% 45	24.1% 126	38.6% 202	26.4% 138	0.2% 1	3.79	4	1.00	-0.60	-0.14	523
Forecast wind speed	fcst_v9_B U	1.1% 6	5.0% 26	20.9% 109	41.8% 218	31.0% 162	0.2% 1	3.97	4	0.91	-0.71	0.23	522
	fcst_v10_U	0.6% 3	4.0% 21	18.5% 97	39.5% 207	37.0% 194	0.4% 2	4.09	4	0.87	-0.74	0.12	524
	fcst_v11_B	0.0% 0	3.7% 19	20.1% 103	39.3% 201	36.7% 188	0.2% 1	4.09	4	0.84	-0.55	-0.51	512
	fcst_v12_C	0.4% 3	4.8% 21	18.9% 97	44.6% 223	31.4% 162	0.0% 0	4.02	4	0.85	-0.64	0.04	523

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	C	2	25	99	233	164	0						
Radar thumbnail image	fcst_v9_B U	3.6% 19	8.0% 42	18.0% 94	29.5% 154	39.8% 208	1.0% 5	3.95	4	1.11	-0.89	0.01	522
	fcst_v10_U	2.5% 13	7.3% 38	16.4% 86	30.5% 160	42.7% 224	0.6% 3	4.04	4	1.05	-0.98	0.24	524
	fcst_v11_B	2.0% 10	9.0% 46	18.4% 94	24.8% 127	45.1% 231	0.8% 4	4.03	4	1.09	-0.86	-0.25	512
	fcst_v12_C	2.9% 15	7.3% 38	15.3% 80	35.8% 187	38.2% 200	0.6% 3	4.00	4	1.05	-0.99	0.41	523
Flood Watch Information	fcst_v9_B U	3.6% 19	10.0% 52	24.3% 127	29.7% 155	32.0% 167	0.4% 2	3.77	4	1.11	-0.60	-0.43	522
	fcst_v10_U	3.6% 19	7.6% 40	22.5% 118	28.6% 150	37.2% 195	0.4% 2	3.89	4	1.11	-0.76	-0.17	524
	fcst_v11_B	3.9% 20	10.0% 51	22.3% 114	28.1% 144	35.7% 183	0.0% 0	3.82	4	1.14	-0.68	-0.41	512
	fcst_v12_C	4.6% 24	11.9% 62	24.1% 126	29.4% 154	30.0% 157	0.0% 0	3.68	4	1.15	-0.55	-0.56	523
Forecast low temperature	fcst_v9_B U	0.2% 1	1.1% 6	9.0% 47	37.9% 198	51.0% 266	0.8% 4	4.39	5	0.72	-1.06	1.04	522
	fcst_v10_U	0.2% 1	0.6% 3	8.8% 46	35.5% 186	54.4% 285	0.6% 3	4.44	5	0.69	-1.09	1.01	524
	fcst_v11_B	0.2% 1	0.4% 2	8.0% 41	36.9% 189	54.1% 277	0.4% 2	4.45	5	0.68	-1.06	1.07	512
	fcst_v12_C	0.2% 1	1.0% 5	8.6% 45	40.2% 210	50.1% 262	0.0% 0	4.39	5	0.70	-1.01	1.03	523
Forecast wind direction	fcst_v9_B U	3.6% 19	11.9% 62	27.4% 143	32.6% 170	24.3% 127	0.2% 1	3.62	4	1.09	-0.45	-0.50	522
	fcst_v10_U	4.2% 22	10.5% 55	24.0% 126	32.1% 168	29.2% 153	4.2% 22	3.72	4	1.12	-0.60	-0.40	524
	fcst_v11_B	1.6% 8	12.7% 65	27.1% 139	30.5% 156	28.1% 144	0.0% 0	3.71	4	1.06	-0.36	-0.77	512

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	fcst_v12_C	2.9% 15	12.2% 64	27.0% 141	34.4% 180	23.5% 123	0.0% 0	3.63	4	1.06	-0.43	-0.50	523
Last update time of the forecast	fcst_v9_B U	0.6% 3	3.3% 17	10.9% 57	35.6% 186	49.2% 257	0.4% 2	4.30	4	0.83	-1.19	1.24	522
	fcst_v10_U	0.4% 2	1.3% 7	11.6% 61	36.5% 191	49.8% 261	0.4% 2	4.34	5	0.77	-1.06	0.99	524
	fcst_v11_B	0.4% 2	1.2% 6	9.0% 46	39.8% 204	49.2% 252	0.4% 2	4.37	4	0.73	-1.12	1.56	512
	fcst_v12_C	0.4% 2	1.5% 8	13.4% 70	38.6% 202	46.1% 241	0.0% 0	4.28	4	0.78	-0.93	0.66	523

14. Which of the following types of hazardous weather appears in the forecast? Response options randomized except for “I don’t know”

Experimental forecast	Severe Thunderstorm Warning	Flood Watch	Tornado Warning	Fire Weather Watch	I don’t know	n
	1	2	3	4	6	
fcst_v9_BU	5.0% 26	93.7% 489	1.1% 6	0.0% 0	1 0.2%	522
fcst_v10_U	8.4% 44	88.0% 461	1.0% 5	0.0% 0	2.7% 14	524
fcst_v11_B	6.6% 34	90.8% 465	0.8% 4	0.6% 3	1.2% 6	512
fcst_v12_C	6.3% 33	89.5% 468	0.6% 3	1.0% 5	2.7% 14	523

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15. Please consider the Flood Watch shown in the forecast. In your opinion, how well does the forecast convey the information listed below? [Sub-items randomized.](#)

Sub-question	Experimental forecast	Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	Skewness	Kurtosis	n
		1	2	3	4	5						
When the Flood Watch <u>ends</u>	fcst_v9_B U	2.7% 14	1.5% 8	7.7% 40	44.8% 234	43.3% 226	4.25	4	0.87	-1.63	3.57	522
	fcst_v10_ U	5.5% 29	3.2% 17	9.4% 49	41.0% 215	40.8% 214	4.08	4	1.06	-1.45	1.82	524
	fcst_v11_B	50.0% 256	12.3% 63	18.2% 93	14.5% 74	5.1% 26	2.12	2	1.31	0.71	-0.86	512
	fcst_v12_C	62.0% 324	11.3% 59	14.1% 74	10.3% 54	2.3% 12	1.80	1	1.16	1.16	0.02	523
That a <u>threat</u> of a Flood Watch exists	fcst_v9_B U	1.0% 5	3.1% 16	11.3% 59	49.8% 260	34.9% 182	4.15	4	0.81	-1.06	1.70	522
	fcst_v10_ U	1.9% 10	3.2% 17	15.3% 80	46.8% 245	32.8% 172	4.05	4	0.88	-1.06	1.45	524
	fcst_v11_B	3.3% 17	3.7% 19	14.1% 72	48.2% 247	30.7% 157	3.99	4	0.95	-1.19	1.65	512
	fcst_v12_C	5.5% 29	5.5% 29	18.5% 97	46.3% 242	24.1% 126	3.78	4	1.05	-1.00	0.72	523
Whether the Flood Watch is <u>imminent</u> or not	fcst_v9_B U	11.1% 58	12.6% 66	31.6% 165	31.0% 162	13.6% 71	3.23	3	1.17	-0.37	-0.60	522
	fcst_v10_ U	16.4% 86	11.8% 62	30.2% 158	28.2% 148	13.4% 70	3.10	3	1.26	-0.29	-0.88	524
	fcst_v11_B	23.4% 120	16.2% 83	27.9% 143	22.1% 113	10.4% 53	2.80	3	1.30	0.02	-1.11	512
	fcst_v12_C	36.5% 191	16.8% 88	26.2% 137	15.5% 81	5.0% 26	2.36	2	1.25	0.39	-1.03	523
How to get <u>additional details</u>	fcst_v9_B U	5.9% 31	7.5% 39	21.5% 112	42.9% 224	22.2% 116	3.68	4	1.08	-0.83	0.23	522

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about the Flood Watch	fcst_v10_U	7.8% 41	8.4% 44	21.2% 111	41.8% 219	20.8% 109	3.59	4	1.14	-0.78	-0.05	524
	fcst_v11_B	8.0% 41	9.4% 48	18.0% 92	45.1% 231	19.5% 100	3.59	4	1.14	-0.82	-0.03	512
	fcst_v12_C	11.9% 62	10.1% 53	21.6% 113	38.6% 202	17.8% 93	3.40	4	1.23	-0.61	-0.56	523
The <u>location</u> of the Flood Watch	fcst_v9_B U	14.8% 77	15.9% 83	25.1% 131	29.9% 156	14.4% 75	3.13	3	1.27	-0.26	-0.97	522
	fcst_v10_U	17.6% 92	13.9% 73	24.8% 130	30.0% 157	13.7% 72	3.08	3	1.30	-0.26	-1.03	524
	fcst_v11_B	23.8% 122	16.6% 85	22.9% 117	26.0% 133	10.7% 55	2.83	3	1.34	-0.02	-1.23	512
	fcst_v12_C	28.9% 151	16.1% 84	22.8% 119	23.9% 125	8.4% 44	2.67	3	1.34	0.10	-1.27	523
When the Flood Watch <u>starts</u>	fcst_v9_B U	35.4% 185	13.2% 69	20.3% 106	21.3% 111	9.8% 51	2.57	3	1.40	0.24	-1.32	522
	fcst_v10_U	35.9% 188	13.5% 71	20.8% 109	20.0% 105	9.7% 51	2.54	3	1.40	0.28	-1.29	524
	fcst_v11_B	44.3% 227	12.7% 65	19.7% 101	17.4% 89	5.9% 30	2.28	2	1.34	0.51	-1.12	512
	fcst_v12_C	56.6% 296	11.1% 58	15.9% 83	13.2% 69	3.3% 17	1.95	1	1.24	0.91	-0.57	523

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16. Again, please consider the Flood Watch shown in the forecast. Please indicate the extent to which each of the following statements is true for you.
Sub-items randomized.

Sub-question	Experimental forecast	Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	Skewness	Kurtosis	n
		1	2	3	4	5						
This information would prompt me to take action to protect myself and/or my family	fcst_v9_B U	4.6% 24	10.9% 57	25.7% 134	36.8% 192	22.0% 115	3.61	4	1.08	-0.56	-0.28	522
	fcst_v10_ U	6.3% 33	11.5% 60	25.6% 134	34.7% 182	21.9% 115	3.55	4	1.14	-0.54	-0.41	524
	fcst_v11_ B	8.4% 43	10.9% 56	27.7% 142	31.8% 163	21.1% 108	3.46	4	1.18	-0.49	-0.52	512
	fcst_v12_ C	12.6% 66	15.3% 80	26.0% 136	33.3% 174	12.8% 67	3.18	3	1.21	-0.35	-0.81	523
This information meets my needs	fcst_v9_B U	2.7% 14	5.9% 31	21.3% 111	48.7% 254	21.5% 112	3.80	4	0.93	-0.84	0.76	522
	fcst_v10_ U	2.7% 14	5.5% 29	22.7% 119	46.0% 241	23.1% 121	3.81	4	0.94	-0.79	0.63	524
	fcst_v11_ B	4.3% 22	8.2% 42	27.7% 142	41.6% 213	18.2% 93	3.61	4	1.01	-0.64	0.14	512
	fcst_v12_ C	7.3% 38	13.8% 72	26.4% 138	39.2% 205	13.4% 70	3.38	4	1.10	-0.51	-0.41	523
This information would prompt me to seek additional information	fcst_v9_B U	2.7% 14	4.0% 21	20.7% 108	41.8% 218	30.8% 161	3.94	4	0.96	-0.90	0.76	522
	fcst_v10_ U	3.4% 18	4.4% 23	18.3% 96	44.3% 232	29.6% 155	3.92	4	0.98	-1.01	0.98	524
	fcst_v11_ B	2.7% 14	4.5% 23	15.0% 77	45.1% 231	32.6% 167	4.00	4	0.95	-1.09	1.23	512
	fcst_v12_ C	3.8% 20	6.5% 34	18.4% 96	45.7% 239	25.6% 134	3.83	4	1.01	-0.93	0.65	523
This information is easy to understand	fcst_v9_B U	1.5% 8	2.3% 12	24.9% 130	47.7% 249	23.6% 123	3.89	4	0.84	-0.66	0.83	522

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	fcst_v10_U	3.1% 16	6.5% 34	22.5% 118	46.0% 241	21.9% 115	3.77	4	0.96	-0.79	0.53	524
	fcst_v11_B	3.1% 16	9.2% 47	27.1% 139	41.6% 213	18.9% 97	3.64	4	0.99	-0.58	0.01	512
	fcst_v12_C	6.5% 34	13.0% 68	24.7% 129	41.3% 216	14.5% 76	3.44	4	1.09	-0.58	-0.31	523
This information gets my attention	fcst_v9_B U	1.0% 5	3.6% 19	16.7% 87	49.6% 259	29.1% 152	4.02	4	0.83	-0.83	0.93	522
	fcst_v10_U	2.5% 13	6.1% 32	19.8% 104	45.0% 236	26.5% 139	3.87	4	0.96	-0.84	0.58	524
	fcst_v11_B	2.9% 15	6.4% 33	19.1% 98	45.1% 231	26.4% 135	3.86	4	0.98	-0.88	0.59	512
	fcst_v12_C	5.0% 26	11.3% 59	23.5% 123	41.7% 218	18.5% 97	3.58	4	1.07	-0.63	-0.15	523
This information is useful to me	fcst_v9_B U	1.7% 9	3.4% 18	20.9% 109	47.7% 249	26.2% 137	3.93	4	0.87	-0.81	0.93	522
	fcst_v10_U	2.3% 12	5.7% 30	19.1% 100	46.2% 242	26.7% 140	3.89	4	0.94	-0.87	0.70	524
	fcst_v11_B	2.5% 13	5.9% 30	24.8% 127	39.8% 204	27.0% 138	3.83	4	0.98	-0.69	0.23	512
	fcst_v12_C	5.5% 29	10.5% 55	21.0% 110	44.4% 232	18.5% 97	3.60	4	1.08	-0.73	-0.01	523
This information is visually appealing	fcst_v9_B U	5.6% 29	10.3% 54	33.3% 174	35.6% 186	15.1% 79	3.44	4	1.04	-0.46	-0.16	522
	fcst_v10_U	5.7% 30	13.4% 70	33.0% 173	31.7% 166	16.2% 85	3.39	3	1.08	-0.33	-0.44	524
	fcst_v11_B	6.4% 33	14.3% 73	33.2% 170	33.0% 169	13.1% 67	3.32	3	1.07	-0.34	-0.41	512
	fcst_v12_C	10.3% 54	16.4% 86	35.9% 188	28.7% 150	8.6% 45	3.09	3	1.10	-0.25	-0.54	523
This information is	fcst_v9_B	1.7%	2.9%	20.1%	52.1%	23.2%	3.92	4	0.84	-0.86	1.36	522

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convenient	U	9	15	105	272	121						
	fcst_v10_U	1.9%	4.0%	20.6%	49.4%	24.0%	3.90	4	0.88	-0.84	1.01	524
	U	10	21	108	259	126						
	fcst_v11_B	3.5%	5.1%	28.7%	40.2%	22.5%	3.73	4	0.98	-0.67	0.36	512
	B	18	26	147	206	115						
	fcst_v12_C	5.7%	9.8%	24.9%	45.3%	14.3%	3.53	4	1.04	-0.72	0.12	523
	C	30	51	130	237	75						

17. When does the Flood Watch start? Response options NOT randomized

Experimental forecast	It has already started	Sometime on Thursday	6 PM on Saturday	I cannot tell	Other	n
	1	2	3	4	5	
fcst_v9_BU	76.2% 398	8.2% 43	1.0% 5	14.0% 73	0.6% 3	522
fcst_v10_U	75.0% 393	4.8% 25	2.1% 11	17.2% 90	1.0% 5	524
fcst_v11_B	25.8% 132	33.8% 173	0.0% 0	38.5% 197	2.0% 10	512
fcst_v12_C	29.4% 154	13.0% 68	1.1% 6	53.3% 279	3.1% 16	523

b. If other, please specify [Open-ended](#)

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18. When does the Flood Watch end? [Response options NOT randomized](#)

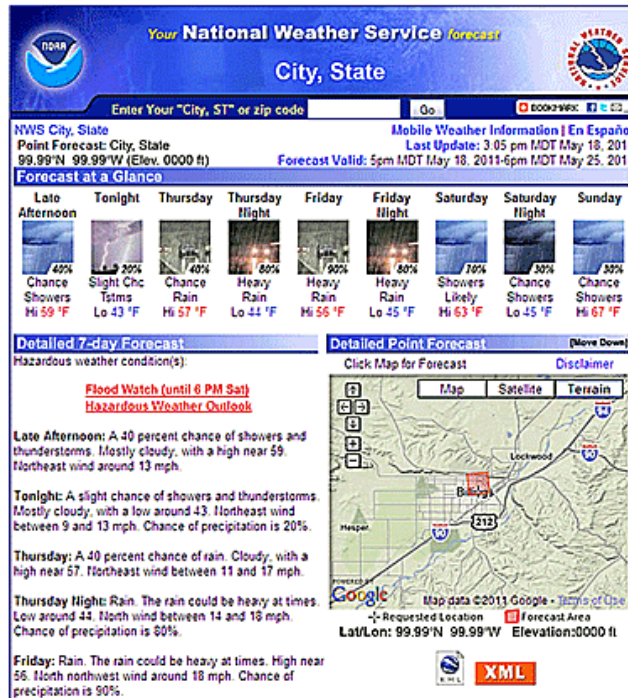
Experimental forecast	It has already ended	Sometime on Thursday	6 PM on Saturday	I cannot tell	Other	n
	1	2	3	4	5	
fcst_v9_BU	0.2% 1	0.2% 1	98.1% 512	1.1% 6	0.4% 2	522
fcst_v10_U	0.2% 1	0.2% 1	95.2% 499	3.8% 20	0.6% 3	524
fcst_v11_B	0.2% 1	1.2% 6	23.2% 119	68.0% 348	7.4% 38	512
fcst_v12_C	29.4% 154	13.0% 68	1.1% 6	53.3% 279	3.1% 16	523

b. If other, please specify [Open-ended](#)

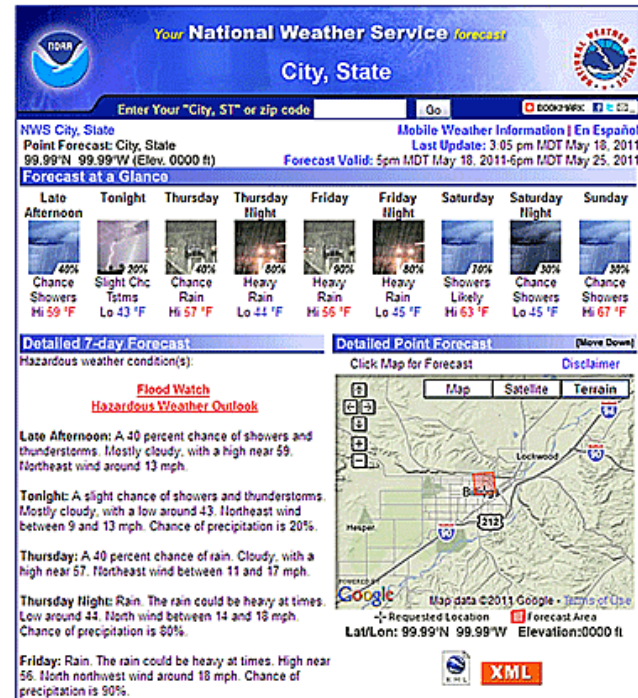
19. If you received this forecast with the Flood Watch for your location, what would you do? [Open-ended](#)

Preferences for Single Experimental Attributes and when there are Multiple Hazards

The next set of questions will show two example point-and-click forecasts for when a Flood Watch is in effect. For each question, please indicate which way you prefer the information be provided.



FORECAST - A

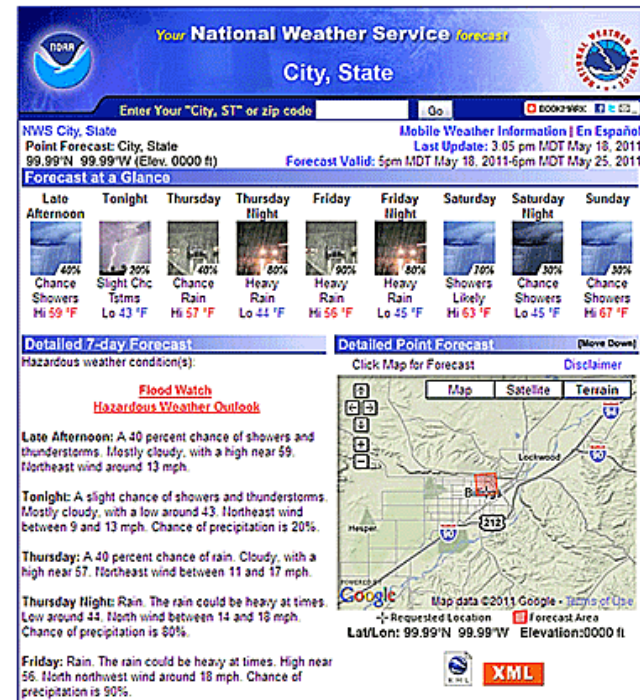
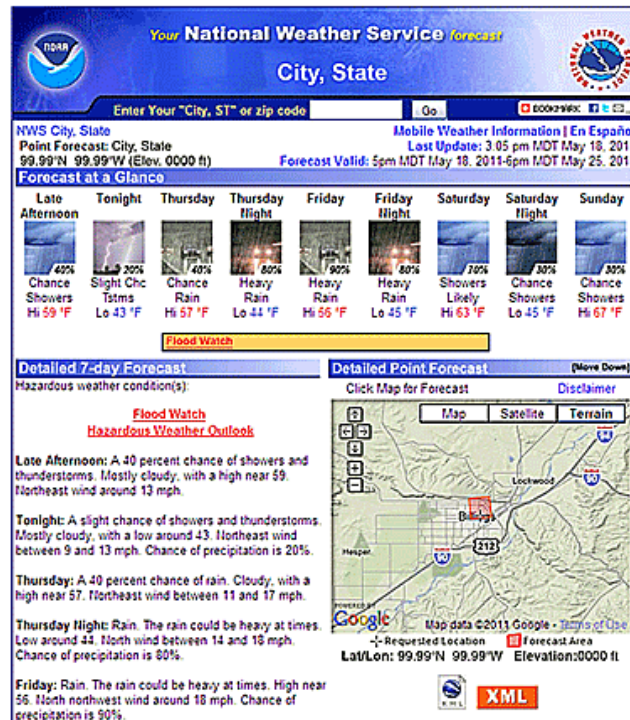


FORECAST - B

20. Forecast "A" indicates how long the Flood Watch is in effect (i.e., "until 6 PM Sat"). Forecast "B" does not have the "until" information. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the “until 6 PM Sat” info	Forecast B – <u>without</u> the “until 6 PM Sat” info	No opinion/No preference	n
1	2	3	
91.5%	3.6%	4.9%	2081
1905	75	101	

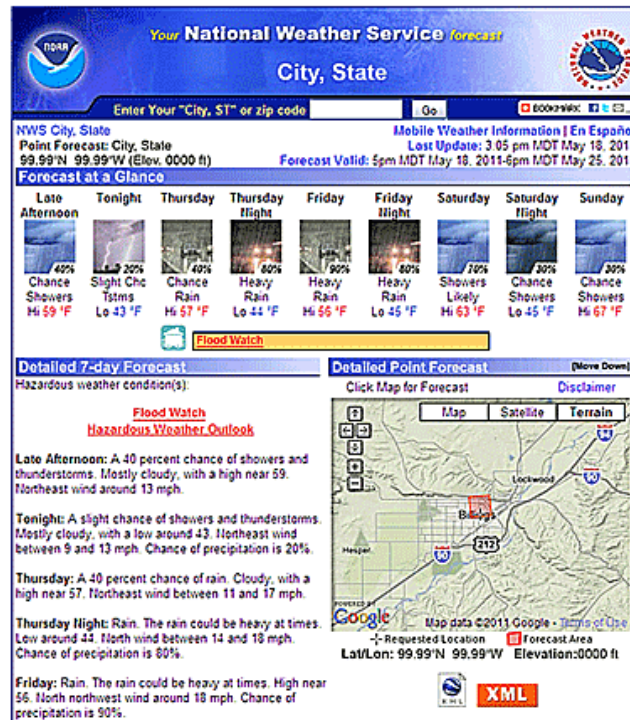
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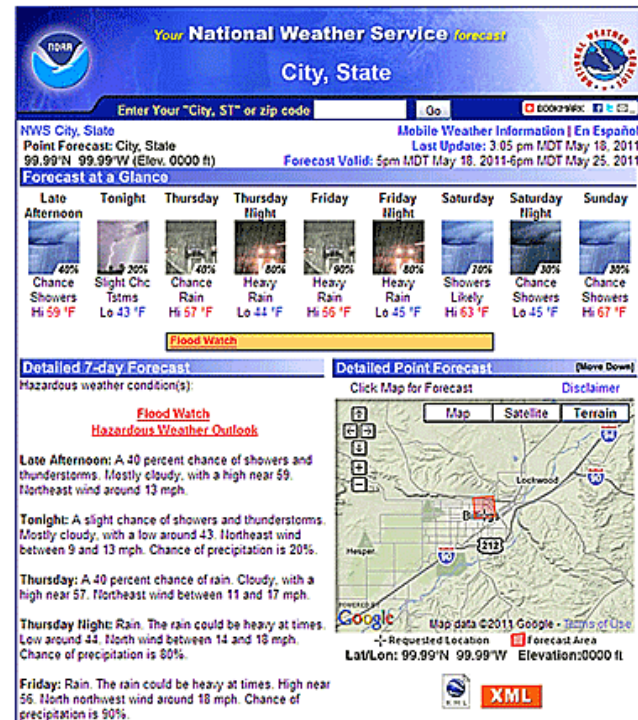
21. Forecast "A" shows a bar with text underneath the first forecast picture denoting the Flood Watch. Forecast "B" does not have the bar with text. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the bar and text	Forecast B – <u>without</u> the bar and text	No opinion/No preference	n
1	2	3	
68.8%	20.7%	10.5%	2081
1432	431	218	

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FORECAST - A



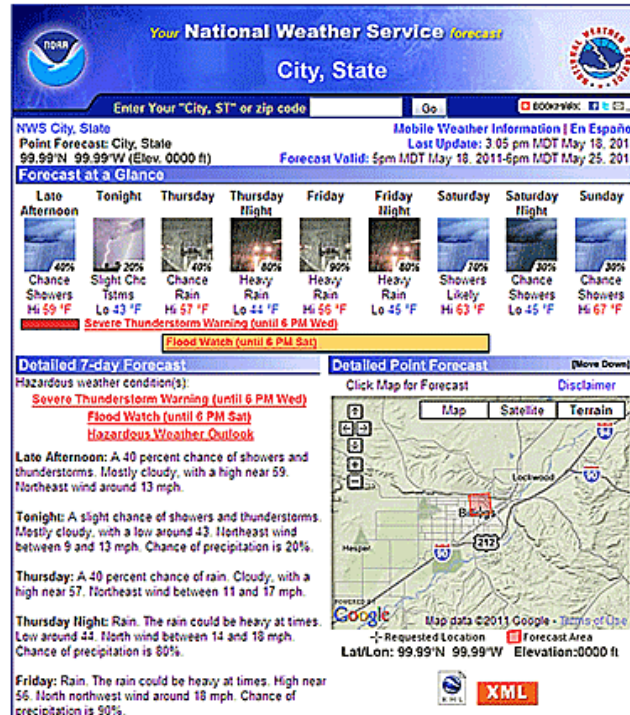
FORECAST - B

22. Forecast "A" shows a bar with text underneath the first forecast picture denoting the Flood Watch with a green icon of a house in flood waters. Forecast "B" shows the bar with text only. Which way do you prefer the information be provided?

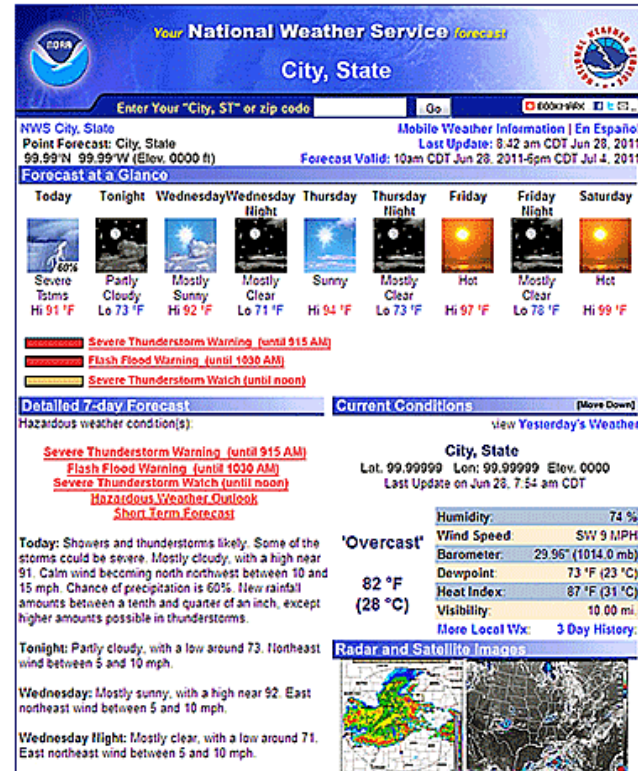
Forecast A – <u>with</u> the green icon next to the bar and text	Forecast B – <u>without</u> the green icon next to the bar and text	No opinion/No preference	n
1	2	3	
27.2%	46.0%	26.8%	2081
566	957	558	

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Multiple weather hazards can occur at the same time and/or in the same multi-day forecast. Two example forecasts are shown below. The first forecast shows what it would look like if there were a Severe Thunderstorm Warning and a Flood Watch in the same multi-day forecast but not occurring at the same time. The second forecast shows what it would look like if there were multiple hazards at the same time.



FORECAST - A



FORECAST - B

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23. Please consider how the information is presented in these forecasts and indicate the extent to which you agree or disagree with the statements below. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
I want the start time to be included in the bar for weather threats that begin in the future (like for the Flood Watch in the first forecast)	1.9% 40	7.9% 165	10.4% 216	42.4% 883	35.6% 740	1.8% 37	4.04	4.00	0.98	-1.08	0.74	2081
I think there should only be 1 bar at a time showing the most serious weather threat	30.2% 629	49.8% 1037	8.9% 185	5.9% 122	3.9% 82	1.2% 26	2.02	2.00	1.00	1.29	1.54	2081
Having the bars helps me better understand the time when the different weather hazards are in effect	3.7% 76	8.8% 183	11.5% 240	41.9% 872	32.5% 677	1.6% 33	3.92	4.00	1.06	-1.03	0.48	2081
I do not want the bar information duplicated as a hyperlink under the "hazardous weather conditions". For instance, if there is a "Severe Thunderstorm Warning" bar, I do not want the "Severe Thunderstorm Warning" hyperlink.	15.0% 313	29.4% 611	15.3% 319	23.1% 481	13.8% 287	3.4% 70	2.91	3.00	1.31	0.13	-1.21	2081
I want to be able to click on each bar to immediately get information about that weather threat	1.3% 27	2.3% 47	4.9% 101	33.2% 691	57.3% 1193	1.1% 22	4.45	5.00	0.80	-1.86	4.22	2081
I do not want to have a "watch" bar if there is a "warning" bar for the same type of weather threat at the same time. For instance, I do not want the "Severe Thunderstorm Watch" bar in the second forecast because there is a "Severe Thunderstorm Warning" bar.	9.2% 192	23.7% 493	9.9% 207	31.2% 650	23.1% 481	2.8% 58	3.36	4.00	1.33	-0.32	-1.21	2081
I like that there are different	1.7% 	4.2% 	5.5% 	39.1% 	48.1% 	1.3% 	4.29	4.00	0.89	-1.58	2.73	2081

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colored bars for a "watch" versus a "warning"	36	87	115	813	1002	28						
I want to be able to "mouse over" each bar and have a pop-up window appear that gives the key information about that weather threat	4.7%	12.7%	11.4%	35.8%	34.4%	1.1%	3.83	4.00	1.17	-0.86	-0.24	2081
	97	264	238	744	716	22						
I think the bar provides useful information	2.6%	5.5%	6.9%	46.2%	37.7%	1.2%	4.12	4.00	0.95	-1.39	1.96	2081
	54	114	143	962	784	24						
I would like to have different colored bars for the different types of weather threat (one color for the Severe Thunderstorm, a different color for the Flash Flood, etc.)	4.6%	12.9%	14.5%	34.3%	32.1%	1.6%	3.78	4.00	1.17	-0.75	-0.40	2081
	96	268	302	713	668	34						

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24. The most number of bars I would like to have appear in a multi-day forecast at any given time is.

0	1	2	3	4	5	The number of bars necessary to show all the hazardous weather threats	Other	n
1	2	3	4	5	6	7	8	
5.9%	2.0%	4.8%	19.4%	3.4%	1.1%	61.4%	2.2%	2081
122	42	99	404	70	22	1277	45	

a. If other, please specify [Open-ended](#)

25. If you have any additional comments about the forecast images we have shown or about how about the National Weather Service can better communicate hazardous weather threats on its website, please share them below. [Open-ended](#)

Socio-demographic Characteristics

About You and Your Household

The remaining survey questions are about you and your household. This information will be used to help group your responses with responses of others. You do not have to answer any question you are uncomfortable answering. All of your responses will remain anonymous, and your responses will not be reported in a way that can be linked to you.

26. What is your age in years?

Mean	Median	SD	n	# missing
53.15	54.00	13.28	2062	37

27. What is your sex? *Select ONE box.*

Male	Female	n	# missing
1	2		
72.3% 1477	27.7% 565	2042	57

28. What is your home 5-digit zip code? [Open-ended](#)

29. How long in years have you lived within 50 miles of your current residence?

Mean	Median	SD	n	# missing
25.42	22.00	17.55	2067	32

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30. How many people are there in your household, including yourself?

Mean	Median	SD	n	# missing
2.49	2.00	1.23	2057	425

31. Which of the following best describes the highest level of education you have completed? *Select ONE box.*

Did not complete high school	High school diploma or equivalent	Some college, technical school, or associate's degree	Bachelor's degree	Master's degree	Professional degree or doctorate	Mean (yrs)	Median (yrs)	SD (yrs)	n	# missing
1	2	3	4	5	6					
0.2% 5	3.9% 81	27.1% 564	35.1% 731	21.6% 449	12.1% 253	16.45	16.00	2.61	2083	16

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32. What is your present employment status? *Select ALL that apply to you.*

Sub-question	No	Yes
	0	1
Employed full time	42.5% 892	57.5% 1207
Employed part time	87.9% 1845	12.1% 254
Retired	73.7% 1548	26.3% 551
Homemaker	95.2% 1998	4.8% 101
Student	96.1% 2017	3.9% 82
Unemployed	96.0% 2016	4.0% 83
In Armed Forces	99.7% 2092	0.3% 7

If employed full time or part time check, go to Parts a -e

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a. In your job, are you: *Select ALL that apply to you.*

Sub-question	No	Yes	n	# missing
	0	1		
An employee for a private, for-profit business	54.2% 779	45.8% 659	661	1438
An employee of a private, not-for-profit organization	87.8% 1263	12.2% 175	661	1438
A local government employee city, county, etc.	91.4% 1315	8.6% 123	661	1438
A state government employee	88.8% 1277	11.2% 161	661	1438
A federal government employee	94.4% 1358	5.6% 80	661	1438
Self-employed in your own business	78.9% 1134	21.1% 304	661	1438
Other please specify	95.9% 1379	4.1% 59	661	1438

b. What kind of business or industry is your employer for example: hospital, school, bank, trucking company? [Open-ended](#)

c. What economic sector is your employer?

Agriculture, forestry, fishing and hunting	1	4.9% 69
Construction	2	4.0% 56
Manufacturing	3	8.5% 119
Wholesale trade	4	0.9% 12
Retail trade	5	6.0% 84
Transportation, warehousing, and utilities	6	4.6% 65
Information telecommunications, publishing, broadcasting	7	8.0% 112
Finance and insurance	8	4.4% 62
Real estate, rental, and leasing	9	1.4% 19
Professional and scientific; management of companies; administrative and waste management services	10	10.3% 145
Educational services; health care and social assistance	11	21.8% 306
Arts, entertainment, and recreation; accommodation and food services	12	4.3% 60
Public administration	13	4.3% 61
Mining, quarrying, and oil and gas extraction	14	0.9% 12
Other please specify	15	15.8% 221
n		1403
# missing		696

d. To what extent does weather affect your work or the economic sector that you indicated above?

Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	n	# missing
1	2	3	4	5					
10.9% 156	21.8% 313	27.5% 395	19.8% 284	20.1% 288	3.16	3.00	1.28	1436	663

e. To what extent are weather forecasts important in your work or the economic sector that you indicated above?

Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	n	# missing
1	2	3	4	5					
13.0% 187	18.7% 269	22.9% 329	22.8% 327	22.6% 324	3.23	3.00	1.34	1436	663

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33. Which of the following best describes your race? *Select ALL that apply to you.*

Sub-question	No	Yes
	0	1
White	7.6% 160	92.4% 1939
Black or African American	99.5% 2088	0.5% 11
American Indian or Alaska Native	98.2% 2062	1.8% 37
Asian	99.4% 2086	0.6% 13
Native Hawaiian or other Pacific Islander	99.9% 2097	0.1% 2
Other	97.4% 2045	2.6% 54

34. Are you of Hispanic, Latino, or Spanish origin? *Select ONE box.*

No, not of Hispanic, Latino, or Spanish origin	Yes, Mexican, Mexican American, Chicano	Yes, Puerto Rican	Yes, Cuban	Yes, another Hispanic, Latino, or Spanish origin please specify	n	# missing
1	2	3	4	5		
98.2% 1940	0.6% 12	0.2% 4	0.2% 4	0.8% 16	1976	123

35. What is your primary language?

English	Spanish	Other	n	# missing
1	2	3		
99.5% 1951	0.1% 1	0.4% 8	1960	139

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36. What was your total household income for 2009 before taxes? *Select ONE box.*

Under \$15,000	1	\$7500	3.1% 56
\$15,000 to \$24,999	2	\$22500	3.9% 71
\$25,000 to \$34,999	3	\$30000	6.0% 108
\$35,000 to \$49,999	4	\$42500	12.1% 217
\$50,000 to \$74,999	5	\$62500	20.4% 367
\$75,000 to \$99,999	6	\$87500	19.9% 357
\$100,000 to \$124,999	7	\$112500	13.8% 248
\$125,000 to \$149,999	8	\$137500	7.6% 136
\$150,000 to \$199,999	9	\$175000	7.1% 128
\$200,000 or more	10	\$200000	6.1% 110
N			1798
# missing			301

37. If you have any further comments, please write them below. [Open-ended](#)

We greatly appreciate the time you took to complete this survey. Thank you!

Appendix G

2nd Survey on Communication of Hazardous Weather with PnC Users (Survey 3): Implementation, Instrument with Experimental Designs, and Codebook

G.1. Survey Implementation Information

As in Survey 2, we designed and implemented in parallel two versions of this survey: one for short-fused hazardous weather (i.e., a severe thunderstorm warning), and one for long-fused hazardous weather (i.e., a flood watch). The short-fused (Section G.2) and long-fused (Section G.3) versions of the survey were identical except for their respective short-fused and long-fused experimental forecasts and any corresponding necessary changes to survey question wording.

Survey fielding

- March 13, 2012, pretested with 5% of sample (n=500 each for short-fused and long-fused) to test for functionality, data quality, incompletes, etc.
- March 15-24, 2012, fully fielded

Short-fused Survey Sample

- From the sampling frame of NWS PnC users, we randomly sampled²⁰ and sent out n=10,000 invitations. There were 578 email bounces, so the final number of invitations was n=9422. We received n=3766 completed surveys for a response rate of 40.0%.
- The median time to complete the survey was 22 minutes, 57 seconds.

Long-fused Survey Sample

- From the sampling frame of NWS PnC users, we randomly sampled² and sent out n=10,000 invitations. There were 579 email bounces, so the final number of invitations was n=9421. We received n=3795 completed surveys for a response rate of 40.3%.
- The median time to complete the survey was 23 minutes, 41 seconds.

Subject line

- Request to respond to survey about the National Weather Service

Email text

- The National Center for Atmospheric Research (NCAR) in Boulder, Colorado, is conducting a survey to collect people's thoughts about weather forecast information, with a focus on the National Weather Service's (NWS) forecast webpage. Several months ago, you (or someone who shares this email address) provided your contact information via a link from the National Weather Service's forecast webpage, indicating you would be interested in contributing to our research. The survey should take you about 10-15 minutes to complete. We will use your responses from this survey to improve the communication of weather forecast information and to guide future weather-related

²⁰ The people who were invited to participate in either Survey 1 or Survey 2 were removed from the sampling frame before randomly sampling for this survey.

research, so your responses are very important to us. Completing this survey is voluntary. The information you provide that can be identified with you will remain confidential. This survey will only remain open until Saturday, March 24. We appreciate your interest and willingness to respond. It is only by asking people like you to share your feedback that we can better understand people's views about weather forecast information.

Reminder email text to people who had not responded or had responded but had not completed

- We recently sent you an invitation to participate in a survey being conducted by the National Center for Atmospheric Research to collect people's thoughts about weather forecast information, with a focus on the National Weather Service's (NWS) forecast webpage. Several months ago, you (or someone who shares this email address) provided your contact information via a link from the National Weather Service's forecast webpage, indicating you would be interested in contributing to our research. This survey will only remain open until this Saturday, March 24, so we ask that you complete it as soon as possible. The survey should only take you about 10-15 minutes to complete. We will use your responses to improve the communication of weather forecast information and to guide future weather-related research, so your responses are very important to us. We greatly appreciate your help. It is only by asking people like you to share your feedback that we can better understand people's views about weather forecast information.

G.2. Short-Fused Survey Instrument with Experimental Designs and Codebook^{21,22}

Evaluating Weather Forecast Information Provided by the National Weather Service

Important information about this survey – please read!

The purpose of this survey is to understand your thoughts about weather forecast information with a focus on forecasts provided by the National Weather Service. You do not need any special knowledge about weather or weather forecasts to answer the questions.

We will use your responses to improve the communication of weather forecast information and to guide future weather-related research, so your responses are very important to us.

The survey should take you about 10-15 minutes to complete. Completing this survey is voluntary. The information you provide us that can be identified with you will remain confidential. We will analyze your responses together with all other respondents, so please respond as honestly as you can.

Thank you for taking the time to complete this survey!

Are you 18 years of age or older?

☐ Yes

☐ No → if “No”, then display this message: “Thank you for your interest in our study. Unfortunately, you must be at least 18 years of age to participate in this survey.” Do not let respondent answer any further questions.

Yes	No	n
1	2	
3766 100.0%	0 0.0%	3766

²¹ Open-ended responses not included due to space considerations.

²² All statistics summarizing the central tendency (mean, median) and distribution (standard deviation, skewness, kurtosis) of response distributions are calculated omitting responses of “Don’t know”, “Not familiar with this”, “Not applicable”

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The National Weather Service (NWS) is the primary source of weather forecasts, watches, warnings, and advisories for the United States. In addition to normal weather forecasts of precipitation, temperature, cloudiness, and winds, the NWS also provides forecasts, watches, and warnings for:

- severe weather (such as thunderstorms and tornadoes),
- winter weather,
- hurricanes,
- fire weather, and
- forecasts used for aviation and marine commerce.

All of this information is also provided to media (such as television, radio, and newspapers) and to private weather services (such as The Weather Channel and AccuWeather).

1. Have you heard of the National Weather Service?

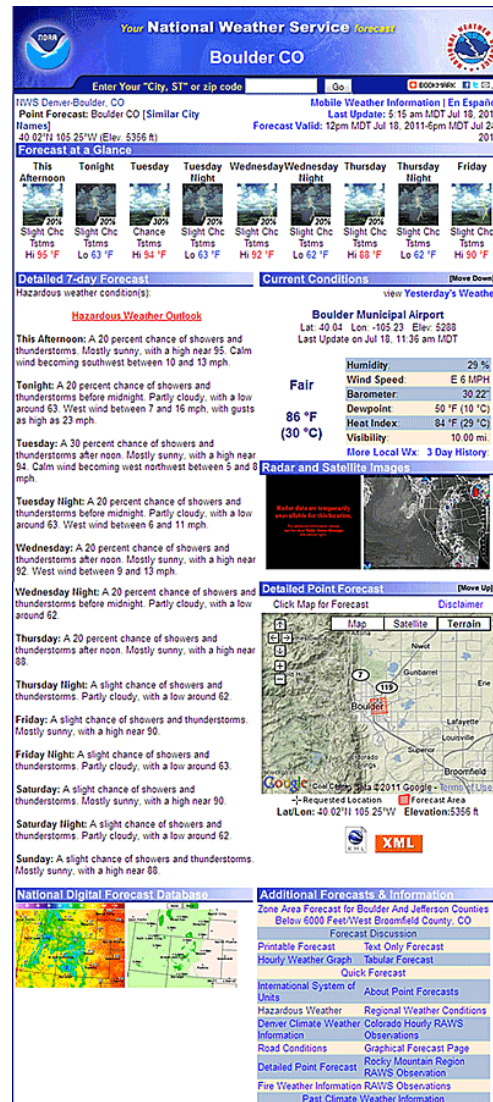
☐ Yes

☐ No → if “No”, go to socio-demographic questions

Yes	No	n
1	2	
3761 99.9%	5 0.1%	3766

Assessing and Improving the NWS Point-and-Click Webpage

The next few questions ask about your experiences with the National Weather Service (NWS) point-and-click forecast webpage. An example of the point-and-click forecast webpage for the city of Boulder, Colorado, is shown in the figure below. As you respond to the next set of questions, please think about the NWS point-and-click forecast webpage for the city or cities you look at.



Assessing and Improving the NWS Point-and-Click Webpage

2. Have you used the NWS point-and-click forecast webpage (for your area) before?

___ Yes

___ No → if “No”, go to socio-demographic questions

Yes	No	n
1	2	
3717	44	3761
98.8%	1.2%	

3. There are many ways to access the NWS point-and-click forecast webpage. Please indicate whether you typically access the webpage in the ways listed below. Sub-items randomized except for final item.

Sub-question	No	Yes	Not familiar with this	n
	1	2	3	
I have it bookmarked for the forecast location I want	285 7.7%	3416 91.9%	16 0.4%	3717
I go to the NWS homepage and get the forecast for my desired location	1673 45.0%	2020 54.3%	24 0.6%	3717
I go the homepage of my local Weather Forecast Office and get the forecast for my desired location	2276 61.2%	1203 32.4%	238 6.4%	3717
I type in the webpage address	2987 80.4%	707 19.0%	23 0.6%	3717
I use another method to access the webpage	3090 83.1%	424 11.4%	203 5.5%	3717

a. What other ways do you access the National Weather Service point-and-click forecast webpage? Open-ended

Assessing and Improving the NWS Point-and-Click Webpage

4. How knowledgeable are you about the NWS point-and-click forecast webpage overall?

Not at all knowledgeable	A little knowledgeable	Somewhat knowledgeable	Very knowledgeable	Extremely knowledgeable	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5						
16 0.4%	173 4.7%	1220 32.8%	1695 45.6%	613 16.5%	3.73	4	0.80	-0.21	-0.16	3717

5. For approximately how long have you been using the NWS point-and-click forecast webpage?

Less than 6 months	6 months to less than 1 year	1 year to less than 3 years	3 years to less than 5 years	5 years or longer	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5						
26 0.7%	18 0.5%	354 9.5%	1008 27.1%	2311 62.2%	4.50	5	0.74	-1.57	2.77	3717

6. How often do you typically visit the NWS point-and-click forecast webpage?

Never	Rarely	Once or more a month	Once a week	Two or more times a week	Once a day	Two or more times a day	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5	6	7						
4 0.1%	11 0.3%	92 2.5%	117 3.1%	653 17.6%	1034 27.8%	1806 48.6%	6.16	6	1.03	-1.31	1.75	3717

7. During a typical visit to the NWS point-and-click forecast webpage, approximately how much time do you spend on the webpage?

Less than 15 seconds	15 seconds to less than 30 seconds	30 seconds to less than 1 minute	1 minute to less than 3 minutes	3 minutes to less than 5 minutes	5 minutes to less than 10 minutes	10 minutes or longer	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5	6	7						
50 1.3%	256 6.9%	707 19.0%	1432 38.5%	801 21.5%	379 10.2%	92 2.5%	4.13	4	1.19	0.04	0.02	3717

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Individual Experimental Forecasts

Please now consider the example point-and-click forecast shown below as you answer the next set of questions. Please answer the questions based on the location for which you most commonly get the forecast.

The following eight experimental designs were used in this part of the survey. Each survey respondent was randomly assigned to one of the eight designs and then responded to Questions 8-12 based on that image.



Figure G-1. Short-fused experimental forecast #1 with the start- and end-time text (fcst_v1_SU²³).



Figure G-2. Short-fused experimental forecast #2 with the end-time text (fcst_v2_U).

²³ The forecast image labels are abbreviated such that "S" indicates start time, "U" indicates the end (or until) time, and "X" indicates the box. These letters and their combinations indicate which attributes are part of the experimental forecast image. The control image, which has none of these attributes, is labeled "C".

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Figure G-3. Short-fused experimental forecast #3 with the box, start-, and end-time text (fcst_v3_SUX).



Figure G-4. Short-fused experimental forecast #4 with the box and end-time text (fcst_v4_UX).

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Figure G-5. Short-fused experimental forecast #5 with the start-time text (fcst_v5_S).



Figure G-6. Short-fused experimental forecast #6 with no modifications (the control) (fcst_v6_C).

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Figure G-7. Short-fused experimental forecast #7 with the box and start-time text (fcst_v7_SX).



Figure G-8. Short-fused experimental forecast #8 with the box (fcst_v8_X).

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Experimental forecast	n
fcst_v1_SU	640
fcst_v2_U	413
fcst_v3_SUX	427
fcst_v4_UX	429
fcst_v5_S	282
fcst_v6_C	554
fcst_v7_SX	371
fcst_v8_X	601

8. Which of the following types of hazardous weather appears in the forecast? [Randomize first four response options.](#)

Experimental forecast	Severe Thunderstorm Warning	Flood Watch	Tornado Warning	Fire Weather Watch	None of the above	I don't know	n
	1	2	3	4	5	6	
fcst_v1_SU	621 97.0%	2 0.3%	2 0.3%	2 0.3%	11 1.7%	2 0.3%	640
fcst_v2_U	407 98.5%	0 0.0%	0 0.0%	0 0.0%	5 1.2%	1 0.2%	413
fcst_v3_SUX	423 99.1%	1 0.2%	1 0.2%	1 0.2%	0 0.0%	1 0.2%	427
fcst_v4_UX	423 98.6%	3 0.7%	0 0.0%	2 0.5%	1 0.2%	0 0.0%	429
fcst_v5_S	273 96.8%	4 1.4%	0 0.0%	0 0.0%	4 1.4%	1 0.4%	282
fcst_v6_C	526 94.9%	6 1.1%	2 0.4%	2 0.4%	16 2.9%	2 0.4%	554
fcst_v7_SX	366 98.7%	0 0.0%	1 0.3%	0 0.0%	2 0.5%	2 0.5%	371
fcst_v8_X	587 97.7%	5 0.8%	1 0.2%	2 0.3%	3 0.5%	3 0.5%	601

Assessing and Improving the NWS Point-and-Click Webpage

9. Please consider the Severe Thunderstorm Warning shown in the forecast. In your opinion, how well does the forecast convey the information listed below? Sub-items randomized.

Sub-question	Experimental forecast	Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	Skewness	Kurtosis	n
		1	2	3	4	5						
When the Severe Thunderstorm Warning <u>ends</u>	fcst_v1_SU	14 2.2%	7 1.1%	26 4.1%	224 35.0%	369 57.7%	4.45	5	0.81	-2.10	5.71	640
	fcst_v2_U	9 2.2%	4 1.0%	15 3.6%	113 27.4%	272 65.9%	4.54	5	0.80	-2.41	7.01	413
	fcst_v3_SUX	7 1.6%	4 0.9%	23 5.4%	141 33.0%	252 59.0%	4.47	5	0.78	-1.98	5.24	427
	fcst_v4_UX	5 1.2%	6 1.4%	19 4.4%	143 33.3%	256 59.7%	4.49	5	0.75	-1.94	5.12	429
	fcst_v5_S	163 57.8%	29 10.3%	45 16.0%	34 12.1%	11 3.9%	1.94	1	1.25	0.96	-0.44	282
	fcst_v6_C	332 59.9%	65 11.7%	78 14.1%	50 9.0%	29 5.2%	1.88	1	1.25	1.16	0.05	554
	fcst_v7_SX	163 43.9%	68 18.3%	66 17.8%	46 12.4%	28 7.5%	2.21	2	1.32	0.71	-0.75	371
	fcst_v8_X	184 30.6%	111 18.5%	172 28.6%	95 15.8%	39 6.5%	2.49	3	1.25	0.29	-0.99	601
That a <u>threat</u> of a Severe Thunderstorm exists	fcst_v1_SU	8 1.3%	11 1.7%	51 8.0%	255 39.8%	315 49.2%	4.34	4	0.80	-1.48	3.02	640
	fcst_v2_U	4 1.0%	11 2.7%	46 11.1%	146 35.4%	206 49.9%	4.31	4	0.84	-1.28	1.69	413
	fcst_v3_SUX	4 0.9%	4 0.9%	16 3.7%	148 34.7%	255 59.7%	4.51	5	0.70	-1.92	5.52	427
	fcst_v4_UX	3 0.7%	2 0.5%	23 5.4%	143 33.3%	258 60.1%	4.52	5	0.69	-1.70	4.34	429
	fcst_v5_S	10 3.5%	9 3.2%	25 8.9%	118 41.8%	120 42.6%	4.17	4	0.97	-1.50	2.39	282

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	fcst_v6_C	17 3.1%	30 5.4%	66 11.9%	216 39.0%	225 40.6%	4.09	4	1.01	-1.22	1.19	554
	fcst_v7_SX	11 3.0%	5 1.3%	24 6.5%	128 34.5%	203 54.7%	4.37	5	0.89	-1.90	4.22	371
	fcst_v8_X	4 0.7%	6 1.0%	33 5.5%	212 35.3%	346 57.6%	4.48	5	0.71	-1.62	3.78	601
Whether the Severe Thunderstorm is <u>imminent</u> or not	fcst_v1_SU	57 8.9%	55 8.6%	163 25.5%	201 31.4%	164 25.6%	3.56	4	1.21	-0.61	-0.44	640
	fcst_v2_U	55 13.3%	58 14.0%	119 28.8%	101 24.5%	80 19.4%	3.23	3	1.28	-0.25	-0.92	413
	fcst_v3_SUX	23 5.4%	25 5.9%	96 22.5%	151 35.4%	132 30.9%	3.81	4	1.10	-0.84	0.19	427
	fcst_v4_UX	32 7.5%	35 8.2%	119 27.7%	147 34.3%	96 22.4%	3.56	4	1.14	-0.61	-0.24	429
	fcst_v5_S	21 7.4%	22 7.8%	48 17.0%	98 34.8%	93 33.0%	3.78	4	1.20	-0.89	-0.05	282
	fcst_v6_C	132 23.8%	107 19.3%	141 25.5%	118 21.3%	56 10.1%	2.75	3	1.30	0.11	-1.12	554
	fcst_v7_SX	13 3.5%	18 4.9%	75 20.2%	131 35.3%	134 36.1%	3.96	4	1.04	-0.94	0.50	371
	fcst_v8_X	66 11.0%	70 11.6%	164 27.3%	194 32.3%	107 17.8%	3.34	4	1.21	-0.45	-0.65	601
How to get <u>additional details</u> about the Severe Thunderstorm Warning	fcst_v1_SU	35 5.5%	59 9.2%	133 20.8%	232 36.3%	181 28.3%	3.73	4	1.13	-0.74	-0.14	640
	fcst_v2_U	24 5.8%	25 6.1%	86 20.8%	150 36.3%	128 31.0%	3.81	4	1.12	-0.88	0.22	413
	fcst_v3_SUX	12 2.8%	29 6.8%	91 21.3%	170 39.8%	125 29.3%	3.86	4	1.01	-0.78	0.25	427
	fcst_v4_UX	25 5.8%	18 4.2%	103 24.0%	167 38.9%	116 27.0%	3.77	4	1.07	-0.88	0.46	429
	fcst_v5_S	20	22	55	106	79	3.72	4	1.16	-0.83	-0.02	282

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		7.1%	7.8%	19.5%	37.6%	28.0%						
	fcst_v6_C	46 8.3%	55 9.9%	108 19.5%	212 38.3%	133 24.0%	3.60	4	1.19	-0.72	-0.31	554
	fcst_v7_SX	20 5.4%	17 4.6%	77 20.8%	159 42.9%	98 26.4%	3.80	4	1.05	-0.96	0.69	371
	fcst_v8_X	35 5.8%	36 6.0%	132 22.0%	222 36.9%	176 29.3%	3.78	4	1.11	-0.85	0.20	601
The <u>location</u> of the Severe Thunderstorm Warning	fcst_v1_SU	59 9.2%	74 11.6%	177 27.7%	189 29.5%	141 22.0%	3.44	4	1.21	-0.45	-0.64	640
	fcst_v2_U	28 6.8%	49 11.9%	113 27.4%	119 28.8%	104 25.2%	3.54	4	1.18	-0.47	-0.60	413
	fcst_v3_SUX	18 4.2%	41 9.6%	106 24.8%	147 34.4%	115 26.9%	3.70	4	1.09	-0.61	-0.26	427
	fcst_v4_UX	25 5.8%	41 9.6%	93 21.7%	152 35.4%	118 27.5%	3.69	4	1.14	-0.71	-0.22	429
	fcst_v5_S	31 11.0%	38 13.5%	61 21.6%	95 33.7%	57 20.2%	3.39	4	1.26	-0.48	-0.77	282
	fcst_v6_C	91 16.4%	79 14.3%	142 25.6%	152 27.4%	90 16.2%	3.13	3	1.31	-0.24	-1.02	554
	fcst_v7_SX	27 7.3%	49 13.2%	80 21.6%	129 34.8%	86 23.2%	3.53	4	1.19	-0.55	-0.57	371
	fcst_v8_X	49 8.2%	71 11.8%	138 23.0%	208 34.6%	135 22.5%	3.51	4	1.19	-0.57	-0.53	601
When the Severe Thunderstorm Warning <u>starts</u>	fcst_v1_SU	79 12.3%	40 6.3%	86 13.4%	193 30.2%	242 37.8%	3.75	4	1.35	-0.91	-0.37	640
	fcst_v2_U	168 40.7%	56 13.6%	100 24.2%	56 13.6%	33 8.0%	2.35	2	1.34	0.49	-1.01	413
	fcst_v3_SUX	34 8.0%	27 6.3%	58 13.6%	134 31.4%	174 40.7%	3.91	4	1.23	-1.07	0.19	427
	fcst_v4_UX	98 22.8%	55 12.8%	111 25.9%	108 25.2%	57 13.3%	2.93	3	1.35	-0.11	-1.18	429

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	fcst_v5_S	78 27.7%	24 8.5%	58 20.6%	73 25.9%	49 17.4%	2.97	3	1.47	-0.14	-1.38	282
	fcst_v6_C	289 52.2%	65 11.7%	93 16.8%	74 13.4%	33 6.0%	2.09	1	1.32	0.80	-0.75	554
	fcst_v7_SX	84 22.6%	36 9.7%	59 15.9%	102 27.5%	90 24.3%	3.21	4	1.49	-0.34	-1.31	371
	fcst_v8_X	128 21.3%	90 15.0%	160 26.6%	159 26.5%	64 10.6%	2.90	3	1.30	-0.11	-1.12	601

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10. Again, please consider the Severe Thunderstorm Warning shown in the forecast. Please indicate the extent to which each of the following statements is true for you. Sub-items randomized.

Sub-question	Experimental forecast	Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	Skewness	Kurtosis	n
		1	2	3	4	5						
This information would prompt me to take action to protect myself and/or my family	fcst_v1_SU	22 3.4%	74 11.6%	159 24.8%	215 33.6%	170 26.6%	3.68	4	1.09	-0.53	-0.46	640
	fcst_v2_U	14 3.4%	47 11.4%	113 27.4%	129 31.2%	110 26.6%	3.66	4	1.09	-0.46	-0.52	413
	fcst_v3_SUX	6 1.4%	29 6.8%	90 21.1%	157 36.8%	145 34.0%	3.95	4	0.97	-0.71	-0.04	427
	fcst_v4_UX	16 3.7%	24 5.6%	99 23.1%	161 37.5%	129 30.1%	3.85	4	1.03	-0.81	0.31	429
	fcst_v5_S	15 5.3%	24 8.5%	73 25.9%	105 37.2%	65 23.0%	3.64	4	1.09	-0.65	-0.08	282
	fcst_v6_C	51 9.2%	76 13.7%	177 31.9%	152 27.4%	98 17.7%	3.31	3	1.18	-0.30	-0.66	554
	fcst_v7_SX	11 3.0%	28 7.5%	90 24.3%	128 34.5%	114 30.7%	3.82	4	1.04	-0.67	-0.09	371
	fcst_v8_X	23 3.8%	53 8.8%	139 23.1%	231 38.4%	155 25.8%	3.74	4	1.06	-0.69	-0.04	601
This information meets my needs	fcst_v1_SU	3 0.5%	28 4.4%	107 16.7%	298 46.6%	204 31.9%	4.05	4	0.84	-0.74	0.36	640
	fcst_v2_U	1 0.2%	14 3.4%	80 19.4%	181 43.8%	137 33.2%	4.06	4	0.82	-0.59	-0.10	413
	fcst_v3_SUX	1 0.2%	9 2.1%	51 11.9%	207 48.5%	159 37.2%	4.20	4	0.75	-0.79	0.73	427
	fcst_v4_UX	1 0.2%	9 2.1%	73 17.0%	189 44.1%	157 36.6%	4.15	4	0.79	-0.64	0.04	429
	fcst_v5_S	6 2.1%	11 3.9%	69 24.5%	119 42.2%	77 27.3%	3.89	4	0.92	-0.72	0.53	282

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	fcst_v6_C	9 1.6%	56 10.1%	147 26.5%	226 40.8%	116 20.9%	3.69	4	0.97	-0.47	-0.27	554
	fcst_v7_SX	4 1.1%	14 3.8%	75 20.2%	178 48.0%	100 27.0%	3.96	4	0.85	-0.72	0.65	371
	fcst_v8_X	4 0.7%	26 4.3%	136 22.6%	264 43.9%	171 28.5%	3.95	4	0.86	-0.57	0.03	601
This information would prompt me to seek additional information	fcst_v1_SU	11 1.7%	25 3.9%	98 15.3%	246 38.4%	260 40.6%	4.12	4	0.93	-1.07	1.00	640
	fcst_v2_U	3 0.7%	25 6.1%	68 16.5%	149 36.1%	168 40.7%	4.10	4	0.93	-0.86	0.13	413
	fcst_v3_SUX	2 0.5%	15 3.5%	69 16.2%	152 35.6%	189 44.3%	4.20	4	0.87	-0.89	0.27	427
	fcst_v4_UX	3 0.7%	13 3.0%	59 13.8%	178 41.5%	176 41.0%	4.19	4	0.83	-0.98	0.91	429
	fcst_v5_S	5 1.8%	11 3.9%	30 10.6%	124 44.0%	112 39.7%	4.16	4	0.89	-1.26	1.83	282
	fcst_v6_C	13 2.3%	28 5.1%	91 16.4%	229 41.3%	193 34.8%	4.01	4	0.96	-1.00	0.83	554
	fcst_v7_SX	1 0.3%	9 2.4%	46 12.4%	153 41.2%	162 43.7%	4.26	4	0.79	-0.92	0.65	371
	fcst_v8_X	2 0.3%	19 3.2%	82 13.6%	250 41.6%	248 41.3%	4.20	4	0.82	-0.89	0.52	601
This information is easy to understand	fcst_v1_SU	3 0.5%	14 2.2%	103 16.1%	290 45.3%	230 35.9%	4.14	4	0.79	-0.74	0.50	640
	fcst_v2_U	2 0.5%	8 1.9%	59 14.3%	204 49.4%	140 33.9%	4.14	4	0.76	-0.77	0.88	413
	fcst_v3_SUX	0 0.0%	4 0.9%	37 8.7%	208 48.7%	178 41.7%	4.31	4	0.67	-0.64	0.17	427
	fcst_v4_UX	1 0.2%	7 1.6%	40 9.3%	202 47.1%	179 41.7%	4.28	4	0.72	-0.90	1.09	429
	fcst_v5_S	3	5	51	140	83	4.05	4	0.80	-0.79	1.16	282

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		1.1%	1.8%	18.1%	49.6%	29.4%						
	fcst_v6_C	5 0.9%	37 6.7%	138 24.9%	242 43.7%	132 23.8%	3.83	4	0.90	-0.51	-0.08	554
	fcst_v7_SX	0 0.0%	7 1.9%	61 16.4%	183 49.3%	120 32.3%	4.12	4	0.74	-0.48	-0.21	371
	fcst_v8_X	5 0.8%	10 1.7%	101 16.8%	298 49.6%	187 31.1%	4.08	4	0.78	-0.77	1.05	601
This information gets my attention	fcst_v1_SU	9 1.4%	35 5.5%	103 16.1%	258 40.3%	235 36.7%	4.05	4	0.93	-0.93	0.57	640
	fcst_v2_U	5 1.2%	17 4.1%	74 17.9%	172 41.6%	145 35.1%	4.05	4	0.90	-0.86	0.58	413
	fcst_v3_SUX	0 0.0%	5 1.2%	27 6.3%	173 40.5%	222 52.0%	4.43	5	0.67	-1.00	0.83	427
	fcst_v4_UX	0 0.0%	5 1.2%	25 5.8%	175 40.8%	224 52.2%	4.44	5	0.66	-1.01	0.92	429
	fcst_v5_S	3 1.1%	10 3.5%	49 17.4%	130 46.1%	90 31.9%	4.04	4	0.86	-0.84	0.81	282
	fcst_v6_C	10 1.8%	51 9.2%	111 20.0%	229 41.3%	153 27.6%	3.84	4	0.99	-0.69	-0.06	554
	fcst_v7_SX	1 0.3%	6 1.6%	27 7.3%	159 42.9%	178 48.0%	4.37	4	0.71	-1.12	1.67	371
	fcst_v8_X	1 0.2%	8 1.3%	50 8.3%	268 44.6%	274 45.6%	4.34	4	0.70	-0.93	1.04	601
This information is useful to me	fcst_v1_SU	2 0.3%	6 0.9%	67 10.5%	276 43.1%	289 45.2%	4.32	4	0.72	-0.91	0.96	640
	fcst_v2_U	1 0.2%	3 0.7%	44 10.7%	187 45.3%	178 43.1%	4.30	4	0.71	-0.80	0.69	413
	fcst_v3_SUX	0 0.0%	2 0.5%	23 5.4%	197 46.1%	205 48.0%	4.42	4	0.62	-0.68	0.12	427
	fcst_v4_UX	0 0.0%	5 1.2%	31 7.2%	176 41.0%	217 50.6%	4.41	5	0.68	-0.95	0.63	429

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	fcst_v5_S	1 0.4%	5 1.8%	32 11.3%	136 48.2%	108 38.3%	4.22	4	0.74	-0.86	1.05	282
	fcst_v6_C	4 0.7%	27 4.9%	77 13.9%	261 47.1%	185 33.4%	4.08	4	0.85	-0.90	0.76	554
	fcst_v7_SX	0 0.0%	6 1.6%	39 10.5%	171 46.1%	155 41.8%	4.28	4	0.71	-0.74	0.24	371
	fcst_v8_X	2 0.3%	3 0.5%	65 10.8%	303 50.4%	228 37.9%	4.25	4	0.69	-0.71	0.96	601
This information is visually appealing	fcst_v1_SU	21 3.3%	54 8.4%	196 30.6%	218 34.1%	151 23.6%	3.66	4	1.03	-0.48	-0.23	640
	fcst_v2_U	13 3.1%	33 8.0%	136 32.9%	139 33.7%	92 22.3%	3.64	4	1.01	-0.43	-0.20	413
	fcst_v3_SUX	4 0.9%	12 2.8%	86 20.1%	185 43.3%	140 32.8%	4.04	4	0.85	-0.72	0.46	427
	fcst_v4_UX	5 1.2%	15 3.5%	100 23.3%	173 40.3%	136 31.7%	3.98	4	0.89	-0.65	0.21	429
	fcst_v5_S	9 3.2%	27 9.6%	91 32.3%	97 34.4%	58 20.6%	3.60	4	1.02	-0.40	-0.26	282
	fcst_v6_C	35 6.3%	61 11.0%	172 31.0%	200 36.1%	86 15.5%	3.44	4	1.08	-0.49	-0.25	554
	fcst_v7_SX	7 1.9%	16 4.3%	84 22.6%	167 45.0%	97 26.1%	3.89	4	0.91	-0.75	0.62	371
	fcst_v8_X	16 2.7%	25 4.2%	149 24.8%	242 40.3%	169 28.1%	3.87	4	0.96	-0.75	0.47	601
This information is convenient	fcst_v1_SU	2 0.3%	21 3.3%	83 13.0%	304 47.5%	230 35.9%	4.15	4	0.79	-0.83	0.68	640
	fcst_v2_U	1 0.2%	9 2.2%	66 16.0%	189 45.8%	148 35.8%	4.15	4	0.78	-0.67	0.20	413
	fcst_v3_SUX	1 0.2%	1 0.2%	39 9.1%	208 48.7%	178 41.7%	4.31	4	0.66	-0.69	0.73	427
	fcst_v4_UX	0	8	28	209	184	4.33	4	0.68	-0.87	0.97	429

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		0.0%	1.9%	6.5%	48.7%	42.9%						
	fcst_v5_S	2 0.7%	8 2.8%	46 16.3%	140 49.6%	86 30.5%	4.06	4	0.80	-0.78	0.89	282
	fcst_v6_C	5 0.9%	39 7.0%	106 19.1%	265 47.8%	139 25.1%	3.89	4	0.89	-0.69	0.24	554
	fcst_v7_SX	0 0.0%	9 2.4%	36 9.7%	208 56.1%	118 31.8%	4.17	4	0.70	-0.68	0.78	371
	fcst_v8_X	3 0.5%	14 2.3%	84 14.0%	297 49.4%	203 33.8%	4.14	4	0.77	-0.80	0.92	601

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11. When does the Severe Thunderstorm Warning start? [Response options NOT randomized.](#)

Experimental forecast	It has already started	6 PM today	Sometime tonight	I cannot tell	Other	n
	1	2	3	4	5	
fcst_v1_SU	599 93.6%	11 1.7%	3 0.5%	13 2.0%	14 2.2%	640
fcst_v2_U	348 84.3%	1 0.2%	6 1.5%	43 10.4%	15 3.6%	413
fcst_v3_SUX	418 97.9%	4 0.9%	0 0.0%	2 0.5%	3 0.7%	427
fcst_v4_UX	316 73.7%	8 1.9%	3 0.7%	57 13.3%	45 10.5%	429
fcst_v5_S	256 90.8%	1 0.4%	5 1.8%	16 5.7%	4 1.4%	282
fcst_v6_C	238 43.0%	18 3.2%	42 7.6%	226 40.8%	30 5.4%	554
fcst_v7_SX	337 90.8%	3 0.8%	2 0.5%	22 5.9%	7 1.9%	371
fcst_v8_X	331 55.1%	31 5.2%	22 3.7%	111 18.5%	106 17.6%	601

c. If other, please specify. [Open-ended](#)

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12. When does the Severe Thunderstorm Warning end? [Response options NOT randomized.](#)

Experimental forecast	It has already ended	6 PM today	Sometime tonight	I cannot tell	Other	n
	1	2	3	4	5	
fcst_v1_SU	0 0.0%	636 99.4%	3 0.5%	1 0.2%	0 0.0%	640
fcst_v2_U	0 0.0%	402 97.3%	3 0.7%	3 0.7%	5 1.2%	413
fcst_v3_SUX	0 0.0%	422 98.8%	1 0.2%	3 0.7%	1 0.2%	427
fcst_v4_UX	2 0.5%	419 97.7%	4 0.9%	3 0.7%	1 0.2%	429
fcst_v5_S	1 0.4%	14 5.0%	55 19.5%	200 70.9%	12 4.3%	282
fcst_v6_C	1 0.2%	27 4.9%	100 18.1%	394 71.1%	32 5.8%	554
fcst_v7_SX	1 0.3%	29 7.8%	140 37.7%	190 51.2%	11 3.0%	371
fcst_v8_X	2 0.3%	82 13.6%	246 40.9%	235 39.1%	36 6.0%	601

c. If other, please specify. [Open-ended](#)

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Preferences for Single Experimental Attributes

The National Weather Service is interested in finding ways to better communicate information about hazardous weather threats on the point-and-click forecast webpage. The next few questions have experimental images that show different ways of possibly highlighting hazardous weather.

Forecast A

Forecast B

Forecast A

Forecast B

13. Forecast "A" indicates that the Severe Thunderstorm Warning is in effect "Now". Forecast "B" does not have the "Now" information. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the "Now" info	Forecast B – <u>without</u> the "Now" info	No opinion/No preference	n
1	2	3	
2903	324	490	3717
78.1%	8.7%	13.2%	

Assessing and Improving the NWS Point-and-Click Webpage

Forecast A

Forecast B

14. Forecast "A" indicates how long the Severe Thunderstorm Warning is in effect (i.e., "until 6 PM"). Forecast "B" does not have the "until 6 PM" information. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the “until 6 PM” info	Forecast B – <u>without</u> the “until 6 PM” info	No opinion/No preference	n
1	2	3	
3501	102	114	3717
94.2%	2.7%	3.1%	

Assessing and Improving the NWS Point-and-Click Webpage

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code [Go] [BOOKMARK] [E] [S]

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Now	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
40% Severe Thunderstorm Warning	20% Slight Chc Tstms Lo 43 °F	40% Chance Rain Hi 57 °F	80% Heavy Rain Lo 44 °F	90% Heavy Rain Hi 56 °F	80% Heavy Rain Lo 45 °F	70% Showers Likely Hi 63 °F	30% Chance Showers Lo 45 °F	30% Chance Showers Hi 67 °F

Detailed 7-day Forecast [More Down]
 Hazardous weather condition(s):
Severe Thunderstorm Warning
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Detailed Point Forecast [More Down]
 Click Map for Forecast Disclaimer

Map Satellite Terrain

Map data ©2011 Google - Sample of Use
 --Requested Location Forecast Area
 Lat/Lon: 99.99°N 99.99°W Elevation: 0000 ft

[XML]

Forecast A

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code [Go] [BOOKMARK] [E] [S]

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Late Afternoon	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
40% Chance Showers Hi 59 °F	20% Slight Chc Tstms Lo 43 °F	40% Chance Rain Hi 57 °F	80% Heavy Rain Lo 44 °F	90% Heavy Rain Hi 56 °F	80% Heavy Rain Lo 45 °F	70% Showers Likely Hi 63 °F	30% Chance Showers Lo 45 °F	30% Chance Showers Hi 67 °F

Detailed 7-day Forecast [More Down]
 Hazardous weather condition(s):
Severe Thunderstorm Warning
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Detailed Point Forecast [More Down]
 Click Map for Forecast Disclaimer

Map Satellite Terrain

Map data ©2011 Google - Sample of Use
 --Requested Location Forecast Area
 Lat/Lon: 99.99°N 99.99°W Elevation: 0000 ft

[XML]

Forecast B

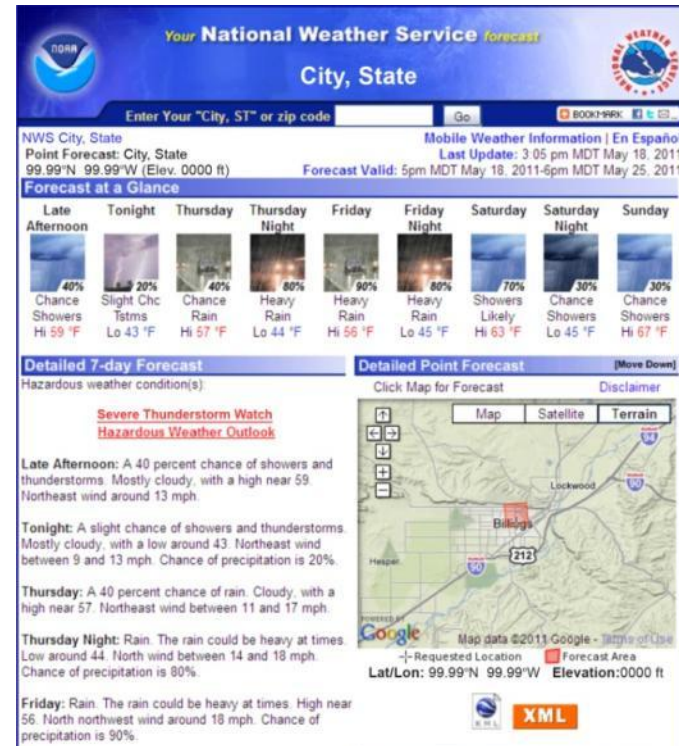
15. Forecast "A" shows a red box around the first forecast picture denoting the Severe Thunderstorm Warning. Forecast "B" does not have the red warning box. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the red warning box	Forecast B – <u>without</u> the red warning box	No opinion/No preference	n
1	2	3	
3362	244	111	3717
90.4%	6.6%	3.0%	

Assessing and Improving the NWS Point-and-Click Webpage



Forecast A



Forecast B

16. Forecast "A" shows an orange box around the first forecast picture denoting the Severe Thunderstorm Watch. Forecast "B" does not have the orange watch box. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the orange watch box	Forecast B – <u>without</u> the orange watch box	No opinion/No preference	n
1	2	3	
3214	322	181	3717
86.5%	8.7%	4.9%	

Assessing and Improving the NWS Point-and-Click Webpage

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code [] Go [BOOKMARK] [] []

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Now	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
40% Chance Showers Hi 59 °F	20% Slight Chc Tstms Lo 43 °F	40% Chance Rain Hi 57 °F	80% Heavy Rain Lo 44 °F	90% Heavy Rain Hi 56 °F	80% Heavy Rain Lo 45 °F	70% Showers Likely Hi 63 °F	30% Chance Showers Lo 45 °F	30% Chance Showers Hi 67 °F

Urban and Small Stream Flood Advisory

Detailed 7-day Forecast [Move Down]
 Hazardous weather condition(s):
 Urban and Small Stream Flood Advisory
 Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Click Map for Forecast [Map] [Satellite] [Terrain] [Disclaimer]

Map data ©2011 Google - Terms of Use
 - Requested Location [] Forecast Area []
 Lat/Lon: 99.99°N 99.99°W Elevation: 0000 ft
 XML

Forecast A

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code [] Go [BOOKMARK] [] []

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Late Afternoon	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
40% Chance Showers Hi 59 °F	20% Slight Chc Tstms Lo 43 °F	40% Chance Rain Hi 57 °F	80% Heavy Rain Lo 44 °F	90% Heavy Rain Hi 56 °F	80% Heavy Rain Lo 45 °F	70% Showers Likely Hi 63 °F	30% Chance Showers Lo 45 °F	30% Chance Showers Hi 67 °F

Detailed 7-day Forecast [Move Down]
 Hazardous weather condition(s):
 Urban and Small Stream Flood Advisory
 Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Click Map for Forecast [Map] [Satellite] [Terrain] [Disclaimer]

Map data ©2011 Google - Terms of Use
 - Requested Location [] Forecast Area []
 Lat/Lon: 99.99°N 99.99°W Elevation: 0000 ft
 XML

Forecast B

17. Forecast "A" shows a yellow box around the first forecast picture denoting the Urban and Small Stream Flood Advisory. Forecast "B" does not have the advisory box. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the yellow advisory box	Forecast B – <u>without</u> the yellow advisory box	No opinion/No preference	n
1	2	3	
2962	536	219	3717
79.7%	14.4%	5.9%	

Assessing and Improving the NWS Point-and-Click Webpage



Forecast A



Forecast B



Forecast C

18. The forecast images above show boxes highlighting a warning (Forecast A), a watch (Forecast B), and an advisory (Forecast C) (as shown in the previous 3 questions). For what type of weather hazards do you prefer to have the boxes?

Prefer to have a box for <u>warnings</u> only	Prefer to have a box for <u>warnings</u> and <u>watches</u> only	Prefer to have a box for <u>warnings</u> , <u>watches</u> , and <u>advisories</u>	Do not want the boxes at all	Other	n
1	2	3	4	5	
604	892	1977	179	65	3717
16.2%	24.0%	53.2%	4.8%	1.7%	

Assessing and Improving the NWS Point-and-Click Webpage

Preferences When There Are Multiple Hazards

There are 5 versions of Question 19 below, labeled as Ver1, Ver2, Ver3, Ver4, and Ver5. Approximately one-fifth of the sample (randomly selected) got each version.

*** Ver1 – Multiple hazards, not overlapping in time ***

The screenshot displays the NWS Point-and-Click Webpage interface. At the top, it says "Your National Weather Service forecast" and "City, State". Below this is a search bar with the text "Enter Your 'City, ST' or zip code" and a "Go" button. To the right of the search bar are links for "BOOKMARK", "RSS", and "Twitter".

The main content area shows the "Forecast at a Glance" section. It includes a table with columns for "Now (until 6 PM)", "Tonight", "Thursday", "Thursday Night", "Friday", "Friday Night", "Saturday", "Saturday Night", and "Sunday". Each column contains a weather icon, a percentage chance of precipitation, and a description of the weather. For example, "Now (until 6 PM)" shows a 40% chance of "Severe Thunderstorm Warning".

Below the "Forecast at a Glance" section is a "Detailed 7-day Forecast" section. It lists hazardous weather conditions: "Severe Thunderstorm Warning (Now until 6 PM)" and "Flood Watch (from 6 AM Thu, until 6 PM Sat)". It also provides detailed forecasts for each day, including temperature ranges and wind speeds. For example, "Late Afternoon" shows a 40 percent chance of showers and thunderstorms, with a high near 59 and a northeast wind around 13 mph.

To the right of the "Detailed 7-day Forecast" is a "Detailed Point Forecast" section. It includes a "Click Map for Forecast" button and a "Disclaimer" link. Below these is a map showing the requested location (Billings) and the forecast area. The map includes a legend for "Requested Location" and "Forecast Area", and displays the latitude and longitude coordinates (Lat/Lon: 99.99°N 99.99°W) and elevation (Elevation: 0000 ft).

Assessing and Improving the NWS Point-and-Click Webpage

19. Multiple weather hazards can occur in the same multi-day forecast. Please consider how the information is presented in the example forecast shown here, and indicate the extent to which you agree or disagree with the statements below. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	I don't know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
The “warning” and “watch” boxes help me better notice that there are different weather hazards.	4 0.5%	16 2.1%	10 1.3%	172 23.1%	542 72.7%	2 0.3%	4.66	5	0.67	-2.56	8.04	746
The “warning” and “watch” boxes help me better understand when the different weather hazards are in effect.	6 0.8%	12 1.6%	24 3.2%	195 26.1%	506 67.8%	3 0.4%	4.59	5	0.71	-2.25	6.38	746
Having more than one box is confusing.	282 37.8%	323 43.3%	66 8.8%	41 5.5%	33 4.4%	1 0.1%	1.95	2	1.04	1.33	1.45	746
I like that there are different colors for the “warning” and “watch” boxes.	5 0.7%	22 2.9%	21 2.8%	174 23.3%	512 68.6%	12 1.6%	4.59	5	0.75	-2.26	5.65	746
The boxes make the forecast look cluttered.	197 26.4%	315 42.2%	89 11.9%	89 11.9%	53 7.1%	3 0.4%	2.31	2	1.19	0.84	-0.21	
I would like to be able to click on each box to get information about that weather hazard.	2 0.3%	29 3.9%	66 8.8%	246 33.0%	380 50.9%	23 3.1%	4.35	5	0.83	-1.26	1.23	746
I would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. If “agree” or “strongly agree”, go to sub-questions (a) and (b)	65 8.7%	118 15.8%	94 12.6%	185 24.8%	259 34.7%	25 3.4%	3.63	4	1.35	-0.59	-0.95	746
I only want boxes for warnings and <u>not</u> for watches.(Ver 1-3 only)	188 25.2%	366 49.1%	90 12.1%	49 6.6%	42 5.6%	11 1.5%	2.17	2	1.06	1.13	0.89	746
I would prefer <u>not</u> to have	397	273	30	22	24	0	1.66	1	0.93	1.89	3.83	746

Assessing and Improving the NWS Point-and-Click Webpage

the boxes	53.2%	36.6%	4.0%	2.9%	3.2%	0.0%						
Having the start and end time information (e.g., “now until 6 PM”) for more than one weather hazard is confusing.	285	311	59	46	38	7	1.97	2	1.09	1.32	1.21	746
	38.2%	41.7%	7.9%	6.2%	5.1%	0.9%						
The start and end time information (e.g., “now until 6 PM”) makes the forecast look cluttered.	261	350	50	58	25	2	1.97	2	1.02	1.27	1.27	746
	35.0%	46.9%	6.7%	7.8%	3.4%	0.3%						
I would prefer <u>not</u> to have the start and end time information (e.g., “now until 6 PM”) in the boxes.	330	323	33	31	25	4	1.78	2	0.96	1.66	2.88	746
	44.2%	43.3%	4.4%	4.2%	3.4%	0.5%						
I would prefer <u>not</u> to have the start and end time information (e.g., “now until 6 PM”) in the red, underlined text/link.	344	312	37	32	18	3	1.75	2	0.92	1.62	2.86	746
	46.1%	41.8%	5.0%	4.3%	2.4%	0.4%						
With the boxes and the start and end time information written out, there is too much information in this forecast.	314	329	32	45	24	2	1.84	2	0.99	1.52	2.14	746
	42.1%	44.1%	4.3%	6.0%	3.2%	0.3%						

Assessing and Improving the NWS Point-and-Click Webpage

- a. You indicated you would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. Keeping in mind that there is limited space for information in a pop-up window, please indicate how important it would be to you to have each of the following types of information in a pop-up window. [Sub items randomized.](#)

Sub-question	Not at all important	A little important	Somewhat important	Very important	Extremely important	Don't know/I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
When the weather hazard <u>starts</u>	15 3.4%	38 8.6%	69 15.5%	158 35.6%	162 36.5%	2 0.5%	3.94	4	1.08	-0.93	0.18	444
When the weather hazard <u>ends</u>	13 2.9%	42 9.5%	92 20.7%	160 36.0%	136 30.6%	1 0.2%	3.82	4	1.06	-0.71	-0.16	444
Main <u>impacts</u> of the weather hazard	22 5.0%	45 10.1%	117 26.4%	137 30.9%	120 27.0%	3 0.7%	3.65	4	1.13	-0.55	-0.42	444
Amount of precipitation expected (if relevant)	23 5.2%	53 11.9%	124 27.9%	158 35.6%	84 18.9%	2 0.5%	3.51	4	1.09	-0.48	-0.36	444
Location of weather hazard (if relevant)	6 1.4%	15 3.4%	40 9.0%	151 34.0%	229 51.6%	3 0.7%	4.32	5	0.88	-1.46	2.19	444
Precautionary/preparedness actions to take in response to the weather hazard	92 20.7%	109 24.5%	114 25.7%	67 15.1%	59 13.3%	3 0.7%	2.76	3	1.31	0.26	-1.00	444

- b. If there is any other type of information about a weather hazard that you would like to have in a pop-up window, please tell us below. [Open-ended.](#)

Assessing and Improving the NWS Point-and-Click Webpage

*** Ver2 – Two hazards (same – severe thunderstorm), partially overlapping in time ***



Your **National Weather Service** forecast



City, State

Enter Your "City, ST" or zip code

Go

BOOKMARKS

Mobile Weather Information | En Español

NWS City, State

Point Forecast: City, State

99.99°N 99.99°W (Elev. 0000 ft)

Last Update: 3:05 pm MDT May 18, 2011

Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Now (until 6 PM)	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
 40% Severe Thunder- storm Warning	 20% Slight Chc Tstms Lo 43 °F	 40% Chance Rain Hi 57 °F	 80% Heavy Rain Lo 44 °F	 90% Heavy Rain Hi 56 °F	 80% Heavy Rain Lo 45 °F	 70% Showers Likely Hi 63 °F	 30% Chance Showers Lo 45 °F	 30% Chance Showers Hi 67 °F

Severe Thunderstorm Watch
(Now until 9 PM)

Detailed 7-day Forecast

Hazardous weather condition(s):

Severe Thunderstorm Warning (Now until 6 PM)
Severe Thunderstorm Watch (Now until 9 PM)

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Detailed Point Forecast

[Move Down]

Click Map for Forecast

Disclaimer

Map

Satellite

Terrain



Map data ©2011 Google - [Terms of Use](#)

Requested Location

Forecast Area

Lat/Lon: 99.99°N 99.99°W

Elevation:0000 ft





Assessing and Improving the NWS Point-and-Click Webpage

19. Multiple weather hazards can occur in the same multi-day forecast. Please consider how the information is presented in the example forecast shown here, and indicate the extent to which you agree or disagree with the statements below. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	I don't know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
The “warning” and “watch” boxes help me better notice that there are different weather hazards.	20 2.7%	38 5.1%	55 7.4%	235 31.5%	375 50.3%	23 3.1%	4.25	5	1.00	-1.52	1.94	746
The “warning” and “watch” boxes help me better understand when the different weather hazards are in effect.	19 2.5%	54 7.2%	53 7.1%	251 33.6%	352 47.2%	17 2.3%	4.18	4	1.03	-1.37	1.28	746
Having more than one box is confusing.	213 28.6%	335 44.9%	73 9.8%	74 9.9%	49 6.6%	2 0.3%	2.21	2	1.15	1.01	0.21	746
I like that there are different colors for the “warning” and “watch” boxes.	10 1.3%	37 5.0%	38 5.1%	207 27.7%	423 56.7%	31 4.2%	4.39	5	0.91	-1.72	2.69	746
The boxes make the forecast look cluttered.	199 26.7%	333 44.6%	93 12.5%	69 9.2%	48 6.4%	4 0.5%	2.24	2	1.14	0.97	0.21	746
I would like to be able to click on each box to get information about that weather hazard.	24 3.2%	62 8.3%	66 8.8%	252 33.8%	320 42.9%	22 2.9%	4.08	4	1.08	-1.20	0.70	746
I would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. If “agree” or “strongly agree”, go to sub-questions (a) and (b)	53 7.1%	91 12.2%	78 10.5%	233 31.2%	258 34.6%	33 4.4%	3.77	4	1.27	-0.83	-0.45	746
I only want boxes for warnings and <u>not</u> for watches. (Ver 1-3 only)	198 26.5%	331 44.4%	76 10.2%	74 9.9%	57 7.6%	10 1.3%	2.27	2	1.18	0.96	0.04	746
I would prefer <u>not</u> to have	355	295	31	25	36	4	1.78	2	1.02	1.75	2.86	746

Assessing and Improving the NWS Point-and-Click Webpage

the boxes	47.6%	39.5%	4.2%	3.4%	4.8%	0.5%						
Having the start and end time information (e.g., “now until 6 PM”) for more than one weather hazard is confusing.	228 30.6%	316 42.4%	68 9.1%	95 12.7%	37 5.0%	2 0.3%	2.19	2	1.15	0.92	-0.05	746
The start and end time information (e.g., “now until 6 PM”) makes the forecast look cluttered.	210 28.2%	357 47.9%	72 9.7%	79 10.6%	24 3.2%	4 0.5%	2.12	2	1.04	1.01	0.46	746
I would prefer <u>not</u> to have the start and end time information (e.g., “now until 6 PM”) in the boxes.	284 38.1%	331 44.4%	40 5.4%	55 7.4%	33 4.4%	3 0.4%	1.95	2	1.06	1.35	1.33	746
I would prefer <u>not</u> to have the start and end time information (e.g., “now until 6 PM”) in the red, underlined text/link.	316 42.4%	329 44.1%	43 5.8%	39 5.2%	16 2.1%	3 0.4%	1.80	2	0.92	1.47	2.27	746
With the boxes and the start and end time information written out, there is too much information in this forecast.	239 32.0%	329 44.1%	67 9.0%	71 9.5%	36 4.8%	4 0.5%	2.11	2	1.11	1.08	0.49	746
I do not want a “watch” box if it overlaps with a “warning” box. For instance, in this forecast, I do not want the “Severe Thunderstorm Watch” box since it overlaps with the “Severe Thunderstorm Warning” box. (Ver 2 only)	177 23.7%	250 33.5%	83 11.1%	137 18.4%	90 12.1%	9 1.2%	2.61	2	1.35	0.44	-1.09	746

Assessing and Improving the NWS Point-and-Click Webpage

- a. You indicated you would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. Keeping in mind that there is limited space for information in a pop-up window, please indicate how important it would be to you to have each of the following types of information in a pop-up window. [Sub items randomized.](#)

Sub-question	Not at all important	A little important	Somewhat important	Very important	Extremely important	Don't know/I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
When the weather hazard starts	20 4.1%	33 6.7%	78 15.9%	184 37.5%	176 35.8%	0 0.0%	3.94	4	1.07	-1.01	0.49	491
When the weather hazard ends	11 2.2%	37 7.5%	96 19.6%	208 42.4%	139 28.3%	0 0.0%	3.87	4	0.98	-0.78	0.25	491
Main impacts of the weather hazard	25 5.1%	52 10.6%	103 21.0%	158 32.2%	151 30.8%	2 0.3%	3.73	4	1.16	-0.68	-0.37	491
Amount of precipitation expected (if relevant)	20 4.1%	62 12.6%	143 29.1%	172 35.0%	94 19.1%	0 0.0%	3.53	4	1.06	-0.41	-0.42	491
Location of weather hazard (if relevant)	3 0.6%	15 3.1%	42 8.6%	173 35.2%	257 52.3%	1 0.2%	4.36	5	0.81	-1.37	1.90	491
Precautionary/preparedness actions to take in response to the weather hazard	78 15.9%	134 27.3%	121 24.6%	82 16.7%	74 15.1%	2 0.3%	2.88	3	1.29	0.21	-1.03	491

- b. If there is any other type of information about a weather hazard that you would like to have in a pop-up window, please tell us below. [Open-ended.](#)

Assessing and Improving the NWS Point-and-Click Webpage

*** Ver3 – Two hazards (different – severe thunderstorm and flood), partially overlapping in time ***



Your **National Weather Service** forecast



City, State

Enter Your "City, ST" or zip code

Go

BOOKMARK

NWS City, State

Point Forecast: City, State

99.99°N 99.99°W (Elev. 0000 ft)

Mobile Weather Information | En Español

Last Update: 3:05 pm MDT May 18, 2011

Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Now (until 6 PM)	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
 40% Severe Thunder- storm Warning	 20% Slight Chc Tstms Lo 43 °F	 40% Chance Rain Hi 57 °F	 80% Heavy Rain Lo 44 °F	 90% Heavy Rain Hi 56 °F	 80% Heavy Rain Lo 45 °F	 70% Showers Likely Hi 63 °F	 30% Chance Showers Lo 45 °F	 30% Chance Showers Hi 67 °F

Flood Watch (Now until 9 PM Fri)

Detailed 7-day Forecast

Hazardous weather condition(s):

Severe Thunderstorm Warning (Now until 6 PM)

Flood Watch (Now until 9 PM Fri)

Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Detailed Point Forecast

Click Map for Forecast

Disclaimer

Map

Satellite

Terrain



Map data ©2011 Google - [Terms of Use](#)

Requested Location

Forecast Area

Lat/Lon: 99.99°N 99.99°W

Elevation: 0000 ft





Assessing and Improving the NWS Point-and-Click Webpage

19. Multiple weather hazards can occur in the same multi-day forecast. Please consider how the information is presented in the example forecast shown here, and indicate the extent to which you agree or disagree with the statements below. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	I don't know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
The “warning” and “watch” boxes help me better notice that there are different weather hazards.	15 2.0%	23 3.1%	31 4.1%	245 32.7%	406 54.2%	29 3.9%	4.39	5	0.88	-1.89	3.95	749
The “warning” and “watch” boxes help me better understand when the different weather hazards are in effect.	13 1.7%	24 3.2%	39 5.2%	257 34.3%	390 52.1%	26 3.5%	4.37	5	0.87	-1.74	3.40	749
Having more than one box is confusing.	223 29.8%	354 47.3%	64 8.5%	55 7.3%	41 5.5%	12 1.6%	2.10	2	1.09	1.20	0.91	749
I like that there are different colors for the “warning” and “watch” boxes.	16 2.1%	18 2.4%	31 4.1%	190 25.4%	460 61.4%	34 4.5%	4.48	5	0.87	-2.15	4.95	749
The boxes make the forecast look cluttered.	227 30.3%	331 44.2%	84 11.2%	64 8.5%	38 5.1%	5 0.7%	2.13	2	1.10	1.06	0.50	749
I would like to be able to click on each box to get information about that weather hazard.	24 3.2%	47 6.3%	68 9.1%	257 34.3%	332 44.3%	21 2.8%	4.13	4	1.04	-1.31	1.20	749
I would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. If “agree” or “strongly agree”, go to sub-questions (a) and (b)	53 7.1%	93 12.4%	77 10.3%	237 31.6%	265 35.4%	24 3.2%	3.78	4	1.26	-0.84	-0.43	749
I only want boxes for warnings and <u>not</u> for watches. (Ver 1-3 only)	192 25.6%	360 48.1%	71 9.5%	63 8.4%	51 6.8%	12 1.6%	2.21	2	1.13	1.08	0.48	749
I would prefer <u>not</u> to have the	380	284	37	16	26	6	1.69	1	0.93	1.87	3.87	749

Assessing and Improving the NWS Point-and-Click Webpage

boxes	50.7%	37.9%	4.9%	2.1%	3.5%	0.8%						
Having the start and end time information (e.g., “now until 6 PM”) for more than one weather hazard is confusing.	216 28.8%	346 46.2%	67 8.9%	83 11.1%	31 4.1%	6 0.8%	2.15	2	1.09	1.01	0.33	749
The start and end time information (e.g., “now until 6 PM”) makes the forecast look cluttered.	219 29.2%	372 49.7%	70 9.3%	67 8.9%	20 2.7%	1 0.1%	2.06	2	0.99	1.09	0.86	749
I would prefer <u>not</u> to have the start and end time information (e.g., “now until 6 PM”) in the boxes.	317 42.3%	318 42.5%	48 6.4%	41 5.5%	19 2.5%	6 0.8%	1.83	2	0.96	1.44	2.02	749
I would prefer <u>not</u> to have the start and end time information (e.g., “now until 6 PM”) in the red, underlined text/link.	317 42.3%	312 41.7%	66 8.8%	40 5.3%	10 1.3%	4 0.5%	1.81	2	0.90	1.26	1.52	749
With the boxes and the start and end time information written out, there is too much information in this forecast.	252 33.6%	345 46.1%	54 7.2%	64 8.5%	31 4.1%	3 0.4%	2.03	2	1.06	1.21	0.93	749
I do not want a “watch” box if it overlaps with a “warning” box. For instance, in this forecast, I do not want the “Flood Watch” box since it overlaps with the “Severe Thunderstorm Warning” box. (Ver 3 only)	213 28.4%	303 40.5%	65 8.7%	72 9.6%	78 10.4%	18 2.4%	2.31	2	1.28	0.91	-0.29	749

Assessing and Improving the NWS Point-and-Click Webpage

- a. You indicated you would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. Keeping in mind that there is limited space for information in a pop-up window, please indicate how important it would be to you to have each of the following types of information in a pop-up window. [Sub items randomized.](#)

Sub-question	Not at all important	A little important	Somewhat important	Very important	Extremely important	Don't know/I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
When the weather hazard starts	11 2.2%	32 6.4%	75 14.9%	202 40.2%	180 35.9%	2 0.4%	4.02	4	0.98	-1.00	0.65	502
When the weather hazard ends	7 1.4%	35 7.0%	98 19.5%	215 42.8%	145 28.9%	2 0.4%	3.91	4	0.94	-0.74	0.19	502
Main impacts of the weather hazard	22 4.4%	62 12.4%	99 19.7%	174 34.7%	142 28.3%	3 0.6%	3.71	4	1.14	-0.64	-0.43	502
Amount of precipitation expected (if relevant)	19 3.8%	66 13.1%	146 29.1%	176 35.1%	94 18.7%	1 0.2%	3.52	4	1.06	-0.39	-0.45	502
Location of weather hazard (if relevant)	4 0.8%	12 2.4%	44 8.8%	188 37.5%	251 50.0%	3 0.6%	4.34	5	0.80	-1.35	2.15	502
Precautionary/preparedness actions to take in response to the weather hazard	83 16.5%	146 29.1%	113 22.5%	93 18.5%	64 12.7%	3 0.6%	2.82	3	1.28	0.23	-1.02	502

- b. If there is any other type of information about a weather hazard that you would like to have in a pop-up window, please tell us below. [Open-ended](#)

Assessing and Improving the NWS Point-and-Click Webpage

*** Ver4 – Multiple hazards (with a warning) at the same time ***



Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code

NWS City, State

Point Forecast: City, State
99.99°N 99.99°W (Elev. 0000 ft)

Mobile Weather Information | En Español
Last Update: 8:42 am CDT Jun 28, 2011

Forecast Valid: 10am CDT Jun 28, 2011-6pm CDT Jul 4, 2011

Forecast at a Glance

Now	Tonight	Wednesday	Wednesday Night	Thursday	Thursday Night	Friday	Friday Night	Saturday
								
Multiple Hazards in Effect (see below)	Partly Cloudy Lo 73 °F	Mostly Sunny Hi 92 °F	Mostly Clear Lo 71 °F	Sunny Hi 94 °F	Mostly Clear Lo 73 °F	Hot Hi 97 °F	Mostly Clear Lo 78 °F	Hot Hi 99 °F

Detailed 7-day Forecast

Hazardous weather condition(s):
[Severe Thunderstorm Warning \(Now until 915 AM\)](#)
[Flash Flood Warning \(Now until 1030 AM\)](#)
[Severe Thunderstorm Watch \(Now until noon\)](#)
[Hazardous Weather Outlook](#)
[Short Term Forecast](#)

Today: Showers and thunderstorms likely. Some of the storms could be severe. Mostly cloudy, with a high near 91. Calm wind becoming north northwest between 10 and 15 mph. Chance of precipitation is 60%. New rainfall amounts between a tenth and quarter of an inch, except higher amounts possible in thunderstorms.
Tonight: Partly cloudy, with a low around 73. Northeast wind between 5 and 10 mph.
Wednesday: Mostly sunny, with a high near 92. East northeast wind between 5 and 10 mph.
Wednesday Night: Mostly clear, with a low around 71. East northeast wind between 5 and 10 mph.
Thursday: Sunny, with a high near 94. East southeast wind around 5 mph.

Current Conditions [\[Move Down\]](#)

City, State
Lat. 99.99999 Lon: 99.99999 Elev. 0000
Last Update on Jun 28, 7:54 am CDT

'Overcast'
82 °F
(28 °C)

Humidity:	74 %
Wind Speed	SW 9 MPH
Barometer:	29.96" (1014.0 mb)
Dewpoint:	73 °F (23 °C)
Heat Index:	87 °F (31 °C)
Visibility:	10.00 mi.

[More Local Wx:](#) [3 Day History](#)

Radar and Satellite Images



Assessing and Improving the NWS Point-and-Click Webpage

19. Multiple weather hazards can occur in the same multi-day forecast. Please consider how the information is presented in the example forecast shown here, and indicate the extent to which you agree or disagree with the statements below. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	I don't know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
The box helps me better notice that there are different weather hazards.	15 2.0%	35 4.7%	49 6.6%	261 35.2%	360 48.6%	21 2.8%	4.27	5	0.94	-1.53	2.24	741
The box helps me better understand when the different weather hazards are in effect.	17 2.3%	51 6.9%	74 10.0%	291 39.3%	288 38.9%	20 2.7%	4.08	4	1.00	-1.18	0.99	741
Having only one box when there are multiple hazards is confusing.	187 25.2%	391 52.8%	79 10.7%	57 7.7%	26 3.5%	1 0.1%	2.11	2	0.99	1.14	1.12	741
I like that the box indicating there are multiple hazards in effect is red.	24 3.2%	40 5.4%	59 8.0%	264 35.6%	327 44.1%	27 3.6%	4.16	4	1.02	-1.41	1.60	741
The box makes the forecast look cluttered.	201 27.1%	353 47.6%	82 11.1%	73 9.9%	28 3.8%	4 0.5%	2.15	2	1.05	1.01	0.49	741
I would like to be able to click on the box to get information about all the weather hazards at once.	27 3.6%	78 10.5%	94 12.7%	282 38.1%	240 32.4%	20 2.7%	3.87	4	1.10	-0.90	0.05	741
I would like to be able to “mouse over” the box and have a pop-up window appear that gives key information about the weather hazards. <i>If “agree” or “strongly agree”, go to sub-questions (a) and (b)</i>	53 7.2%	121 16.3%	117 15.8%	201 27.1%	223 30.1%	26 3.5%	3.59	4	1.29	-0.52	-0.92	741
I would prefer <u>not</u> to have the boxes	361 48.7%	290 39.1%	39 5.3%	25 3.4%	24 3.2%	2 0.3%	1.73	2	0.95	1.72	3.13	741
Having the start and end time information (e.g., “now until 915 AM”) for more than one weather hazard is confusing.	196 26.5%	356 48.0%	68 9.2%	81 10.9%	39 5.3%	1 0.1%	2.20	2	1.11	1.01	0.30	741
The start and end time	183	348	82	103	24	1	2.24	2	1.07	0.82	-0.08	741

Assessing and Improving the NWS Point-and-Click Webpage

information (e.g., “now until 915 AM”) makes the forecast look cluttered.	24.7%	47.0%	11.1%	13.9%	3.2%	0.1%						
I would prefer <u>not</u> to have the start and end time information (e.g., “now until 9:15 AM”) in the red, underlined text/link.	284 38.3%	330 44.5%	49 6.6%	48 6.5%	26 3.5%	4 0.5%	1.92	2	1.01	1.36	1.58	741
With the box and the start and end time information written out, there is too much information in this forecast.	220 29.7%	336 45.3%	68 9.2%	84 11.3%	32 4.3%	1 0.1%	2.15	2	1.10	0.99	0.25	741
It’s hard to know which of the multiple hazards in this forecast is most serious. (Ver 4-5 only)	93 12.6%	241 32.5%	110 14.8%	220 29.7%	74 10.0%	3 0.4%	2.92	3	1.24	0.07	-1.18	741

Assessing and Improving the NWS Point-and-Click Webpage


- a. You indicated you would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. Keeping in mind that there is limited space for information in a pop-up window, please indicate how important it would be to you to have each of the following types of information in a pop-up window. [Sub items randomized.](#)

Sub-question	Not at all important	A little important	Somewhat important	Very important	Extremely important	Don't know/I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
When the weather hazard starts	9 2.1%	25 5.9%	70 16.5%	172 40.6%	147 34.7%	1 0.2%	4.00	4	0.97	-0.95	0.62	424
When the weather hazard ends	8 1.9%	24 5.7%	78 18.4%	178 42.0%	136 32.1%	0 0.0%	3.97	4	0.95	-0.87	0.52	424
Main impacts of the weather hazard	17 4.0%	37 8.7%	108 25.5%	145 34.2%	115 27.1%	2 0.5%	3.72	4	1.08	-0.62	-0.20	424
Amount of precipitation expected (if relevant)	22 5.2%	72 17.0%	131 30.9%	112 26.4%	87 20.5%	0 0.0%	3.40	3	1.14	-0.21	-0.77	424
Location of weather hazard (if relevant)	7 1.7%	13 3.1%	29 6.8%	156 36.8%	218 51.4%	1 0.2%	4.34	5	0.86	-1.62	3.00	424
Precautionary/preparedness actions to take in response to the weather hazard	66 15.6%	131 30.9%	119 28.1%	65 15.3%	43 10.1%	0 0.0%	2.74	3	1.19	0.33	-0.73	424

- b. If there is any other type of information about a weather hazard that you would like to have in a pop-up window, please tell us below. [Open-ended](#)

Assessing and Improving the NWS Point-and-Click Webpage

*** Ver5 – Multiple watches at the same time ***



Your **National Weather Service** forecast

City, State

Enter Your "City, ST" or zip code

BOOKMARK

NWS City, State

Point Forecast: City, State










99.99°N 99.99°W (Elev. 0000 ft)

Mobile Weather Information | En Español

Last Update: 8:42 am CDT Jun 28, 2011

Forecast Valid: 10am CDT Jun 28, 2011-6pm CDT Jul 4, 2011

Forecast at a Glance

Now	Tonight	Wednesday	Wednesday Night	Thursday	Thursday Night	Friday	Friday Night	Saturday
								
40% Chance Showers	Partly Cloudy	Mostly Sunny	Mostly Clear	Sunny	Mostly Clear	Hot	Mostly Clear	Hot
Hi 59 °F	Lo 73 °F	Hi 92 °F	Lo 71 °F	Hi 94 °F	Lo 73 °F	Hi 97 °F	Lo 78 °F	Hi 99 °F

Multiple
Watches
in Effect
(see below)

Detailed 7-day Forecast

Hazardous weather condition(s):

Severe Thunderstorm Watch (Now until noon)

Flash Flood Watch (Now until 1030 AM)

Hazardous Weather Outlook

Short Term Forecast

Today: Showers and thunderstorms likely. Some of the storms could be severe. Mostly cloudy, with a high near 91. Calm wind becoming north northwest between 10 and 15 mph. Chance of precipitation is 60%. New rainfall amounts between a tenth and quarter of an inch, except higher amounts possible in thunderstorms.

Tonight: Partly cloudy, with a low around 73. Northeast wind between 5 and 10 mph.

Wednesday: Mostly sunny, with a high near 92. East northeast wind between 5 and 10 mph.

Wednesday Night: Mostly clear, with a low around 71. East northeast wind between 5 and 10 mph.

Thursday: Sunny, with a high near 94. East southeast wind around 5 mph.

Current Conditions

[Move Down]

view Yesterday's Weather

City, State

Lat. 99.99999 Lon: 99.99999 Elev. 0000

Last Update on Jun 28, 7:54 am CDT

'Overcast'

82 °F
(28 °C)

Humidity: 74 %

Wind Speed: SW 9 MPH

Barometer: 29.96" (1014.0 mb)

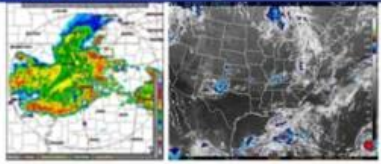
Dewpoint: 73 °F (23 °C)

Heat Index: 87 °F (31 °C)

Visibility: 10.00 mi.

More Local Wx: 3 Day History

Radar and Satellite Images



Detailed Point Forecast [Move Up]

NCAR Societal Impacts Program

G-46

Assessing and Improving the NWS Point-and-Click Webpage

19. Multiple weather hazards can occur in the same multi-day forecast. Please consider how the information is presented in the example forecast shown here, and indicate the extent to which you agree or disagree with the statements below. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	I don't know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
The box helps me better notice that there are multiple watches.	23 3.1%	45 6.1%	40 5.4%	273 37.1%	339 46.1%	15 2.0%	4.19	4	1.01	-1.50	1.85	735
The box helps me better understand when the multiple watches are in effect.	26 3.5%	65 8.8%	64 8.7%	278 37.8%	288 39.2%	14 1.9%	4.02	4	1.08	-1.15	0.63	735
Having only one box when there are multiple watches is confusing.	168 22.9%	383 52.1%	91 12.4%	65 8.8%	22 3.0%	6 0.8%	2.16	2	0.98	1.02	0.78	735
I like that the box indicating there are multiple watches in effect is orange.	31 4.2%	51 6.9%	148 20.1%	264 35.9%	216 29.4%	25 3.4%	3.82	4	1.08	-0.82	0.15	735
The box makes the forecast look cluttered.	204 27.8%	362 49.3%	81 11.0%	55 7.5%	27 3.7%	6 0.8%	2.09	2	1.01	1.12	0.99	735
I would like to be able to click on the box to get information about all the weather watches at once.	29 3.9%	67 9.1%	99 13.5%	272 37.0%	243 33.1%	25 3.4%	3.89	4	1.10	-0.94	0.17	735
I would like to be able to “mouse over” the box and have a pop-up window appear that gives key information about the weather watches. If “agree” or “strongly agree”, go to sub-questions (a) and (b)	64 8.7%	117 15.9%	94 12.8%	217 29.5%	216 29.4%	27 3.7%	3.57	4	1.32	-0.57	-0.90	735
I would prefer <u>not</u> to have the box.	362 49.3%	251 34.1%	51 6.9%	38 5.2%	25 3.4%	8 1.1%	1.78	2	1.02	1.53	1.95	735
Having the start and end time information (e.g., “now until noon”) for more than one watch is confusing.	216 29.4%	356 48.4%	72 9.8%	63 8.6%	24 3.3%	4 0.5%	2.07	2	1.01	1.10	0.85	735
The start and end time	202	370	67	64	28	4	2.11	2	1.03	1.13	0.89	735

Assessing and Improving the NWS Point-and-Click Webpage

information (e.g., “now until noon”) makes the forecast look cluttered.												
I would prefer <u>not</u> to have the start and end time information (e.g., “now until noon”) in the red, underlined text/link.	317 43.1%	317 43.1%	48 6.5%	27 3.7%	20 2.7%	6 0.8%	1.79	2	0.92	1.56	2.72	735
With the box and the start and end time information written out, there is too much information in this forecast.	232 31.6%	354 48.2%	58 7.9%	57 7.8%	31 4.2%	3 0.4%	2.05	2	1.04	1.22	1.09	735
It’s hard to know which of the multiple watches in this forecast is most serious. (Ver 4-5 only)	106 14.4%	241 32.8%	107 14.6%	214 29.1%	64 8.7%	3 0.4%	2.85	3	1.24	0.11	-1.18	735

Assessing and Improving the NWS Point-and-Click Webpage

- a. You indicated you would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. Keeping in mind that there is limited space for information in a pop-up window, please indicate how important it would be to you to have each of the following types of information in a pop-up window. [Sub items randomized.](#)

Sub-question	Not at all important	A little important	Somewhat important	Very important	Extremely important	Don't know/I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
	2	3	4	5	6	7						
When the weather hazard starts	12 2.8%	19 4.4%	59 13.6%	189 43.6%	153 35.3%	1 0.2%	4.05	4	0.96	-1.16	1.36	433
When the weather hazard ends	9 2.1%	28 6.5%	81 18.7%	194 44.8%	120 27.7%	1 0.2%	3.90	4	0.95	-0.84	0.52	433
Main impacts of the weather hazard	16 3.7%	47 10.9%	86 19.9%	152 35.1%	130 30.0%	2 0.5%	3.77	4	1.11	-0.69	-0.28	433
Amount of precipitation expected (if relevant)	22 5.1%	73 16.9%	120 27.7%	151 34.9%	67 15.5%	0 0.0%	3.39	4	1.09	-0.33	-0.60	433
Location of weather hazard (if relevant)	2 0.5%	7 1.6%	43 9.9%	152 35.1%	227 52.4%	2 0.5%	4.38	5	0.77	-1.23	1.58	433
Precautionary/preparedness actions to take in response to the weather hazard	72 16.6%	125 28.9%	103 23.8%	77 17.8%	55 12.7%	1 0.2%	2.81	3	1.27	0.24	-0.99	433

- b. If there is any other type of information about a weather hazard that you would like to have in a pop-up window, please tell us below. [Open-ended](#)

Assessing and Improving the NWS Point-and-Click Webpage

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Now (until 6 PM)	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
40% Severe Thunderstorm Warning	20% Slight Chc Tstms Lo 43 °F	40% Chance Rain Hi 57 °F	80% Heavy Rain Lo 44 °F	90% Heavy Rain Hi 56 °F	80% Heavy Rain Lo 45 °F	70% Showers Likely Hi 63 °F	30% Chance Showers Lo 45 °F	30% Chance Showers Hi 67 °F

Severe Thunderstorm Watch
(Now until 9 PM)

Detailed 7-day Forecast [More Down]

Hazardous weather condition(s):

Severe Thunderstorm Warning (Now until 6 PM)
Severe Thunderstorm Watch (Now until 9 PM)

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Detailed Point Forecast [More Down]

Click Map for Forecast Disclaimer

Map Satellite Terrain

Map data ©2011 Google - [Terms of Use](#)

Lat/Lon: 99.99°N 99.99°W Elevation: 0000 ft

Forecast A

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Now (until 6 PM)	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
40% Severe Thunderstorm Warning	20% Slight Chc Tstms Lo 43 °F	40% Chance Rain Hi 57 °F	80% Heavy Rain Lo 44 °F	90% Heavy Rain Hi 56 °F	80% Heavy Rain Lo 45 °F	70% Showers Likely Hi 63 °F	30% Chance Showers Lo 45 °F	30% Chance Showers Hi 67 °F

Flood Watch (Now until 9 PM Fri)

Detailed 7-day Forecast [More Down]

Hazardous weather condition(s):

Severe Thunderstorm Warning (Now until 6 PM)
Flood Watch (Now until 9 PM Fri)
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Detailed Point Forecast [More Down]

Click Map for Forecast Disclaimer

Map Satellite Terrain

Map data ©2011 Google - [Terms of Use](#)

Lat/Lon: 99.99°N 99.99°W Elevation: 0000 ft

Forecast B

Assessing and Improving the NWS Point-and-Click Webpage

20. Please consider both forecast images shown.

- Forecast A has overlapping watch and warning boxes for the same type of weather hazard (a severe thunderstorm).
- Forecast B has overlapping watch and warning boxes for different types of weather hazards (a severe thunderstorm and a flood).

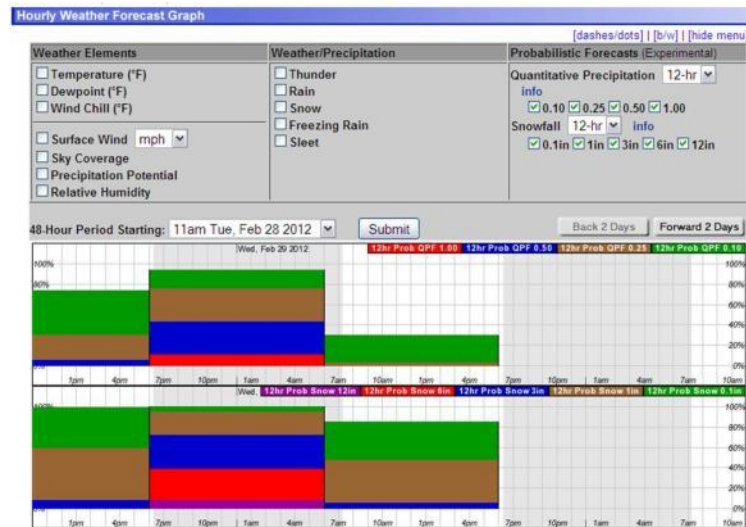
Which way do you prefer the information be provided? [Response options NOT randomized.](#)

Prefer overlapping watch and warning boxes in <u>both</u> cases	Prefer overlapping watch and warning boxes only in the case of Forecast A – for the <u>same</u> type of weather hazard	Prefer overlapping watch and warning boxes only in the case of Forecast B – for <u>different</u> types of weather hazards	I do not like the boxes in either forecast	I don't know/No opinion	Other	n
1	2	3	4	5	6	
2096	319	865	270	113	54	3717
56.4%	8.6%	23.3%	7.3%	3.0%	1.5%	

21. If you have any additional comments about the forecast images we have shown or about how the National Weather Service can better communicate hazardous weather threats on its website, please share them below. [Open-ended](#)

Assessing and Improving the NWS Point-and-Click Webpage

22. Below is a probabilistic forecast that shows the chances of different amounts of precipitation (top graph) and snowfall (bottom graph) over time.



- In your own words, please explain what you think the forecast information in each graph means. Please be as specific as you can. [Open-ended](#)
- According to the forecast, what is the chance there will be 1 inch of snow in the period from 6 pm Feb 28 to 6 am Feb 29? [Response options NOT randomized.](#)

10% chance	30% chance	60% chance	95% chance	I don't know	Other	n
1	2	3	4	5	6	
345	161	1736	209	868	398	3717
9.3%	4.3%	46.7%	5.6%	23.4%	10.7%	

Assessing and Improving the NWS Point-and-Click Webpage

c. Please indicate the extent to which you agree or disagree with the statements listed below about the probabilistic forecast information. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	I don't know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
Overall, this forecast information is useful to me.	479 12.9%	739 19.9%	811 21.8%	1056 28.4%	542 14.6%	90 2.4%	3.12	3	1.27	-0.18	-1.05	3717
I would like a link to a tutorial explaining what this forecast information means.	241 6.5%	523 14.1%	770 20.7%	1216 32.7%	866 23.3%	101 2.7%	3.54	4	1.19	-0.51	-0.66	3717
Overall, this forecast information is too confusing for me to use.	347 9.3%	890 23.9%	631 17.0%	894 24.1%	902 24.3%	53 1.4%	3.30	3	1.33	-0.18	-1.23	3717
The probabilistic forecast over the 12-hour time period is hard to understand.	211 5.7%	752 20.2%	623 16.8%	1108 29.8%	958 25.8%	65 1.7%	3.51	4	1.24	-0.38	-1.01	3717
Having the different probabilities of precipitation stacked on top of each other is confusing.	219 5.9%	648 17.4%	515 13.9%	1110 29.9%	1156 31.1%	69 1.9%	3.64	4	1.26	-0.56	-0.87	3717

Socio-Demographic Characteristics

About You and Your Household

The remaining survey questions are about you and your household. This information will be used to help group your responses with responses of others. You do not have to answer any question you are uncomfortable answering. All of your responses will remain anonymous, and your responses will not be reported in a way that can be linked to you.

23. What is your age in years?

Mean	Median	SD	n	# missing
53.47	55.00	12.99	3681	85

24. What is your gender? *Select ONE box.*

Male	Female	n	# missing
1	2		
72.9% 2718	27.1% 1009	3727	39

25. What is your home 5-digit zip code?

26. How long in years have you lived within 50 miles of your current residence? _____

Mean	Median	SD	n	# missing
24.81	22.00	17.16	3716	50

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27. How many people are there in your household, including yourself?

Mean	Median	SD	n	# missing
2.47	2.00	1.21	3682	84

28. Which of the following best describes the highest level of education you have completed? *Select ONE box.*

Did not complete high school	High school diploma or equivalent	Some college, technical school, or associate's degree	Bachelor's degree	Master's degree	Professional degree or doctorate	Mean (yrs)	Median (yrs)	SD (yrs)	n	# missing
1	2	3	4	5	6					
0.3% 9	3.8% 126	27.1% 900	34.4% 1144	23.6% 785	10.9% 363	16.42	16.00	2.55	3327	439

29. What is your present employment status? *Select ALL that apply to you.*

Sub-question	No	Yes
	0	1
Employed full time	42.6% 1606	57.4% 2160
Employed part time	89.5% 3372	10.5% 394
Retired	73.8% 2778	26.2% 988
Homemaker	96.2% 3623	3.8% 143
Student	97.0% 3652	3.0% 114
Unemployed	96.5% 3636	3.5% 130
In Armed Forces	99.8% 3758	0.2% 8

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30. Which of the following best describes your race? Select ALL that apply to you.

Sub-question	No	Yes
	0	1
White	7.8% 292	92.2% 3474
Black or African American	99.4% 3744	0.6% 22
American Indian or Alaska Native	98.9% 3724	1.1% 42
Asian	99.5% 3746	0.5% 20
Native Hawaiian or other Pacific Islander	99.8% 3760	0.2% 6
Other	97.7% 3681	2.3% 85

31. Are you of Hispanic, Latino, or Spanish origin? Select ONE box.

No, not of Hispanic, Latino, or Spanish origin	Yes, Mexican, Mexican American, Chicano	Yes, Puerto Rican	Yes, Cuban	Yes, another Hispanic, Latino, or Spanish origin please specify	n	# missing
1	2	3	4	5		
98.0% 3420	0.7% 26	0.3% 11	0.1% 4	0.9% 30	3491	275

32. What is your primary language?

English	Spanish	Other	n	# missing
1	2	3		
99.3% 3507	0.3% 12	0.3% 12	3531	235

Assessing and Improving the NWS Point-and-Click Webpage

33. What was your total household income for 2010 before taxes? *Select ONE box.*

Under \$15,000	1	\$7500	3.6% 114
\$15,000 to \$24,999	2	\$22500	4.3% 136
\$25,000 to \$34,999	3	\$30000	6.2% 197
\$35,000 to \$49,999	4	\$42500	12.1% 387
\$50,000 to \$74,999	5	\$62500	20.5% 655
\$75,000 to \$99,999	6	\$87500	18.7% 596
\$100,000 to \$124,999	7	\$112500	14.0% 446
\$125,000 to \$149,999	8	\$137500	7.1% 227
\$150,000 to \$199,999	9	\$175000	6.9% 219
\$200,000 or more	10	\$200000	6.7% 214
N			3191
# missing			575

34. If you have any further comments, please write them below. [Open-ended](#)

We greatly appreciate the time you took to complete this survey. Thank you!

G.3. Long-Fused Survey Instrument with Experimental Designs and Codebook^{24,25}

Evaluating Weather Forecast Information Provided by the National Weather Service

Important information about this survey – please read!

The purpose of this survey is to understand your thoughts about weather and weather forecast information with a focus on forecasts provided by the National Weather Service. You do not need any special knowledge about weather or weather forecasts to answer the questions.

We will use your responses to improve the communication of weather forecast information and to guide future weather-related research, so your responses are very important to us.

The survey should take you about 10-15 minutes to complete. Completing this survey is voluntary. The information you provide us that can be identified with you will remain confidential. We will analyze your responses together with all other respondents, so please respond as honestly as you can.

Thank you for taking the time to complete this survey!

Are you 18 years of age or older?

☐ Yes

☐ No → if “No”, then display this message: “Thank you for your interest in our study. Unfortunately, you must be at least 18 years of age to participate in this survey.” Do not let respondent answer any further questions.

Yes	No	n
1	2	
3795	0	3795
100.0%	0.0%	

²⁴ Open-ended responses not included due to space considerations.

²⁵ All statistics summarizing the central tendency (mean, median) and distribution (standard deviation, skewness, kurtosis) of response distributions are calculated omitting responses of “Don’t know”, “Not familiar with this”, “Not applicable”

Assessing and Improving the NWS Point-and-Click Webpage

The National Weather Service NWS is the primary source of weather forecasts, watches, warnings, and advisories for the United States. In addition to normal weather forecasts of precipitation, temperature, cloudiness, and winds, the NWS also provides forecasts, watches, and warnings for:

- severe weather (such as thunderstorms and tornadoes),
- winter weather,
- hurricanes,
- fire weather, and
- forecasts used for aviation and marine commerce

All of this information is also provided to media (such as television, radio, and newspapers) and to private weather services (such as The Weather Channel and AccuWeather).

1. Have you heard of the National Weather Service?

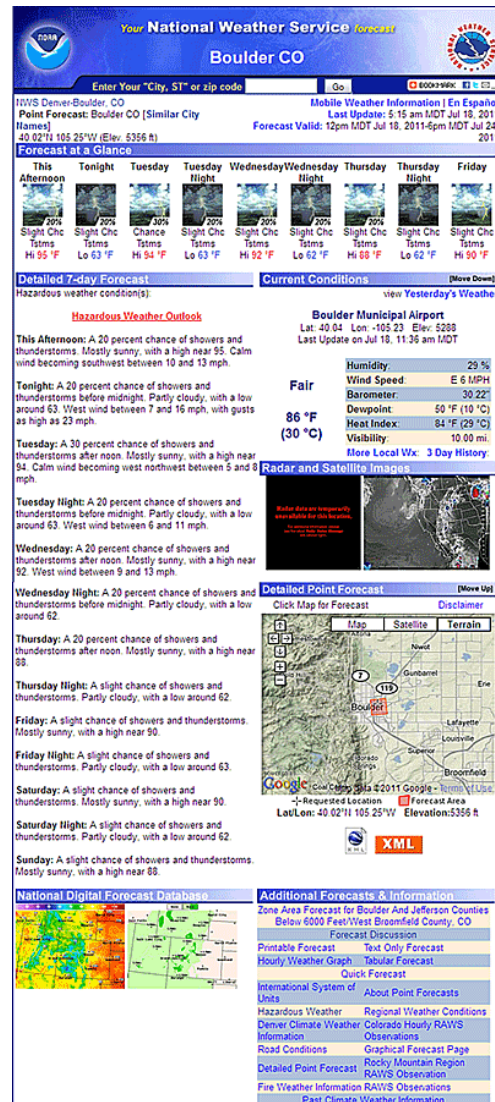
☐ Yes

☐ No → if “No”, go to socio-demographic questions

Yes	No	n
1	2	
3794 100.0%	1 0.0%	3795

Assessing and Improving the NWS Point-and-Click Webpage

The next few questions ask about your experiences with the National Weather Service (NWS) point-and-click forecast webpage. An example of the point-and-click forecast webpage for the city of Boulder, Colorado, is shown in the figure below. As you respond to the next set of questions, please think about the NWS point-and-click forecast webpage for the city or cities you look at.



Assessing and Improving the NWS Point-and-Click Webpage

2. Have you used the NWS point-and-click forecast webpage (for your area) before?

___ Yes

___ No → if “No”, go to socio-demographic questions

Yes	No	n
1	2	
3747	47	3794
98.8%	1.2%	

3. There are many ways to access the NWS point-and-click forecast webpage. Please indicate whether you typically access the webpage in the ways listed below. Sub-items randomized except for final item.

Sub-question	No	Yes	Not familiar with this	n
	1	2	3	
I have it bookmarked for the forecast location I want	276 7.4%	3460 92.3%	11 0.3%	3747
I go to the NWS homepage and get the forecast for my desired location	1688 45.0%	2035 54.3%	24 0.6%	3747
I go the homepage of my local Weather Forecast Office and get the forecast for my desired location	2383 63.6%	1136 30.3%	228 6.1%	3747
I type in the webpage address	3005 80.2%	716 19.1%	26 0.7%	3747
I use another method to access the webpage	3184 85.0%	390 10.4%	173 4.6%	3747

a. What other ways do you access the National Weather Service point-and-click forecast webpage? Open-ended²⁶

²⁶ Open-ended responses not included due to space considerations.

Assessing and Improving the NWS Point-and-Click Webpage

4. How knowledgeable are you about the NWS point-and-click forecast webpage overall?

Not at all knowledgeable	A little knowledgeable	Somewhat knowledgeable	Very knowledgeable	Extremely knowledgeable	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5						
3 0.1%	142 3.8%	1128 30.1%	1864 49.7%	610 16.3%	3.78	4	0.76	-0.18	-0.28	3747

5. For approximately how long have you been using the NWS point-and-click forecast webpage?

Less than 6 months	6 months to less than 1 year	1 year to less than 3 years	3 years to less than 5 years	5 years or longer	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5						
19 0.5%	20 0.5%	324 8.6%	1018 27.2%	2366 63.1%	4.52	5	0.72	-1.56	2.68	3747

6. How often do you typically visit the NWS point-and-click forecast webpage?

Never	Rarely	Once or more a month	Once a week	Two or more times a week	Once a day	Two or more times a day	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5	6	7						
2 0.1%	15 0.4%	70 1.9%	101 2.7%	637 17.0%	1077 28.7%	1845 49.2%	6.19	6	0.99	-1.34	1.97	3747

7. During a typical visit to the NWS point-and-click forecast webpage, approximately how much time do you spend on the webpage?

Less than 15 seconds	15 seconds to less than 30 seconds	30 seconds to less than 1 minute	1 minute to less than 3 minutes	3 minutes to less than 5 minutes	5 minutes to less than 10 minutes	10 minutes or longer	Mean	Median	SD	Skewness	Kurtosis	n
1	2	3	4	5	6	7						
30 0.8%	260 6.9%	731 19.5%	1435 38.3%	819 21.9%	376 10.0%	96 2.6%	4.14	4	1.17	0.11	-0.04	3747

Assessing and Improving the NWS Point-and-Click Webpage

Individual Experimental Forecasts

Please now consider the example point-and-click forecast shown below as you answer the next set of questions. Please answer the questions based on the location for which you most commonly get the forecast.

The following eight experimental designs were used in this part of the survey. Each survey respondent was randomly assigned to one of the eight designs and then responded to Questions 8-12 based on that image.



Figure G-9. Long-fused experimental forecast #9 with the start- and end-time text (fcst_v9_SU).



Figure G-10. Long-fused experimental forecast #10 with the end-time text (fcst_v10_U).

Assessing and Improving the NWS Point-and-Click Webpage



Figure G-11. Long-fused experimental forecast #11 with the start-time text (fcst_v11_S).



Figure G-12. Long-fused experimental forecast #12 with no modifications (the control) (fcst_v12_C).

Assessing and Improving the NWS Point-and-Click Webpage



Figure G-13. Long-fused experimental forecast #13 with the box, start-, and end-time text (fcst_v13_SUX).

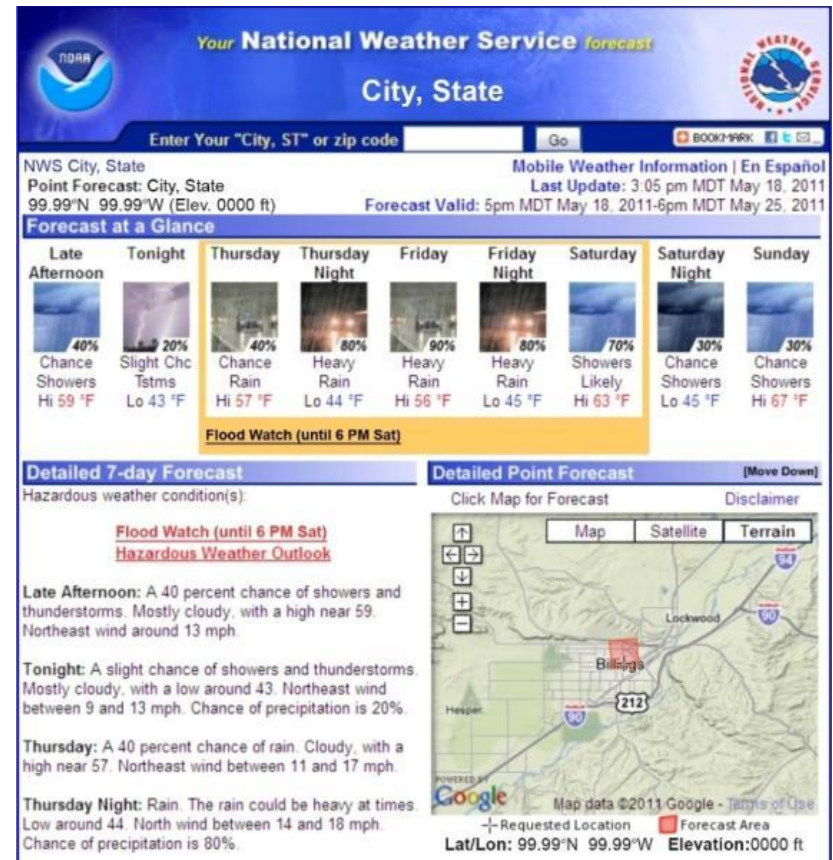


Figure G-14. Long-fused experimental forecast #14 with the box and end-time text (fcst_v14_UX).

Assessing and Improving the NWS Point-and-Click Webpage



Figure G-15. Long-fused experimental forecast #15 with the box and start-time text (fcst_v15_SX).



Figure G-16. Long-fused experimental forecast #16 with the box (fcst_v16_X).

Assessing and Improving the NWS Point-and-Click Webpage

Experimental forecast	n
fcst_v9_SU	655
fcst_v10_U	321
fcst_v11_S	442
fcst_v12_C	550
fcst_v13_SUX	414
fcst_v14_UX	366
fcst_v15_SX	417
fcst_v16_X	582

8. Which of the following types of hazardous weather appears in the forecast? [Randomize first four response options.](#)

Experimental forecast	Severe Thunderstorm Warning	Flood Watch	Tornado Warning	Fire Weather Watch	None of the above	I don't know	n
	1	2	3	4	5	6	
fcst_v9_SU	14 2.1%	616 94.0%	4 0.6%	2 0.3%	17 2.6%	2 0.3%	655
fcst_v10_U	10 3.1%	302 94.1%	0 0.0%	3 0.9%	5 1.6%	1 0.3%	321
fcst_v11_S	14 3.2%	413 93.4%	3 0.7%	0 0.0%	10 2.3%	2 0.5%	442
fcst_v12_C	26 4.7%	495 90.0%	3 0.5%	0 0.0%	25 4.5%	1 0.2%	550
fcst_v13_SUX	5 1.2%	405 97.8%	2 0.5%	0 0.0%	1 0.2%	1 0.2%	414
fcst_v14_UX	11 3.0%	348 95.1%	0 0.0%	0 0.0%	7 1.9%	0 0.0%	366
fcst_v15_SX	2 0.5%	408 97.8%	0 0.0%	0 0.0%	7 1.7%	0 0.0%	417
fcst_v16_X	11 1.9%	561 96.4%	0 0.0%	1 0.2%	7 1.2%	2 0.3%	582

Assessing and Improving the NWS Point-and-Click Webpage

9. Please consider the Flood Watch shown in the forecast. In your opinion, how well does the forecast convey the information listed below? [Sub-items randomized.](#)

Sub-question	Experimental forecast	Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	Skewness	Kurtosis	n
		1	2	3	4	5						
When the Flood Watch <u>ends</u>	fcst_v9_SU	6 0.9%	3 0.5%	14 2.1%	210 32.1%	422 64.4%	4.59	5	0.65	-2.21	7.77	655
	fcst_v10_U	6 1.9%	1 0.3%	8 2.5%	107 33.3%	199 62.0%	4.53	5	0.74	-2.40	8.16	321
	fcst_v11_S	311 70.4%	29 6.6%	34 7.7%	31 7.0%	37 8.4%	1.76	1	1.33	1.48	0.69	442
	fcst_v12_C	410 74.5%	47 8.5%	54 9.8%	23 4.2%	16 2.9%	1.52	1	1.02	1.95	2.84	550
	fcst_v13_SUX	1 0.2%	1 0.2%	6 1.4%	162 39.1%	244 58.9%	4.56	5	0.57	-1.26	3.37	414
	fcst_v14_UX	3 0.8%	5 1.4%	9 2.5%	116 31.7%	233 63.7%	4.56	5	0.69	-2.12	6.39	366
	fcst_v15_SX	56 13.4%	28 6.7%	96 23.0%	135 32.4%	102 24.5%	3.48	4	1.30	-0.63	-0.61	417
	fcst_v16_X	53 9.1%	28 4.8%	109 18.7%	247 42.4%	145 24.9%	3.69	4	1.16	-0.96	0.26	582
That a <u>threat</u> of a Flood Watch exists	fcst_v9_SU	7 1.1%	19 2.9%	68 10.4%	262 40.0%	299 45.6%	4.26	4	0.84	-1.26	1.81	655
	fcst_v10_U	9 2.8%	8 2.5%	42 13.1%	146 45.5%	116 36.1%	4.10	4	0.92	-1.28	2.06	321
	fcst_v11_S	9 2.0%	20 4.5%	54 12.2%	196 44.3%	163 36.9%	4.10	4	0.92	-1.17	1.45	442
	fcst_v12_C	18 3.3%	23 4.2%	90 16.4%	232 42.2%	187 34.0%	3.99	4	0.98	-1.08	1.10	550
	fcst_v13_SUX	2 0.5%	7 1.7%	30 7.2%	154 37.2%	221 53.4%	4.41	5	0.74	-1.37	2.37	414

Assessing and Improving the NWS Point-and-Click Webpage

	fcst_v14_UX	5 1.4%	5 1.4%	28 7.7%	127 34.7%	201 54.9%	4.40	5	0.80	-1.66	3.58	366
	fcst_v15_SX	3 0.7%	8 1.9%	33 7.9%	139 33.3%	234 56.1%	4.42	5	0.78	-1.51	2.65	417
	fcst_v16_X	9 1.5%	13 2.2%	50 8.6%	231 39.7%	279 47.9%	4.30	4	0.84	-1.48	2.77	582
Whether the Flood Watch is <u>imminent</u> or not	fcst_v9_SU	117 17.9%	81 12.4%	192 29.3%	160 24.4%	105 16.0%	3.08	3	1.31	-0.20	-1.01	655
	fcst_v10_U	90 28.0%	58 18.1%	90 28.0%	61 19.0%	22 6.9%	2.59	3	1.26	0.18	-1.07	321
	fcst_v11_S	103 23.3%	68 15.4%	124 28.1%	98 22.2%	49 11.1%	2.82	3	1.31	0.00	-1.12	442
	fcst_v12_C	212 38.5%	107 19.5%	136 24.7%	73 13.3%	22 4.0%	2.25	2	1.21	0.51	-0.86	550
	fcst_v13_SUX	73 17.6%	42 10.1%	119 28.7%	107 25.8%	73 17.6%	3.16	3	1.32	-0.29	-0.98	414
	fcst_v14_UX	55 15.0%	45 12.3%	123 33.6%	95 26.0%	48 13.1%	3.10	3	1.23	-0.25	-0.78	366
	fcst_v15_SX	67 16.1%	35 8.4%	122 29.3%	122 29.3%	71 17.0%	3.23	3	1.29	-0.40	-0.81	417
	fcst_v16_X	94 16.2%	84 14.4%	179 30.8%	154 26.5%	71 12.2%	3.04	3	1.24	-0.20	-0.90	582
How to get <u>additional details</u> about the Flood Watch	fcst_v9_SU	38 5.8%	44 6.7%	145 22.1%	246 37.6%	182 27.8%	3.75	4	1.11	-0.81	0.13	655
	fcst_v10_U	27 8.4%	27 8.4%	56 17.4%	133 41.4%	78 24.3%	3.65	4	1.18	-0.84	-0.07	321
	fcst_v11_S	36 8.1%	50 11.3%	77 17.4%	170 38.5%	109 24.7%	3.60	4	1.20	-0.71	-0.39	442
	fcst_v12_C	70 12.7%	45 8.2%	107 19.5%	194 35.3%	134 24.4%	3.50	4	1.29	-0.67	-0.59	550
	fcst_v13_SUX	32	26	87	167	102	3.68	4	1.14	-0.86	0.14	414

Assessing and Improving the NWS Point-and-Click Webpage

		7.7%	6.3%	21.0%	40.3%	24.6%						
	fcst_v14_UX	32 8.7%	17 4.6%	77 21.0%	147 40.2%	93 25.4%	3.69	4	1.16	-0.91	0.22	366
	fcst_v15_SX	26 6.2%	22 5.3%	92 22.1%	154 36.9%	123 29.5%	3.78	4	1.11	-0.88	0.27	417
	fcst_v16_X	31 5.3%	48 8.2%	135 23.2%	225 38.7%	143 24.6%	3.69	4	1.09	-0.73	0.00	582
The <u>location</u> of the Flood Watch	fcst_v9_SU	69 10.5%	94 14.4%	166 25.3%	179 27.3%	147 22.4%	3.37	3	1.27	-0.36	-0.87	655
	fcst_v10_U	42 13.1%	42 13.1%	96 29.9%	89 27.7%	52 16.2%	3.21	3	1.24	-0.30	-0.80	321
	fcst_v11_S	73 16.5%	71 16.1%	111 25.1%	111 25.1%	76 17.2%	3.10	3	1.32	-0.17	-1.08	442
	fcst_v12_C	118 21.5%	83 15.1%	149 27.1%	132 24.0%	68 12.4%	2.91	3	1.32	-0.07	-1.12	550
	fcst_v13_SUX	24 5.8%	43 10.4%	112 27.1%	136 32.9%	99 23.9%	3.59	4	1.13	-0.54	-0.38	414
	fcst_v14_UX	27 7.4%	50 13.7%	94 25.7%	115 31.4%	80 21.9%	3.47	4	1.19	-0.44	-0.65	366
	fcst_v15_SX	25 6.0%	35 8.4%	107 25.7%	148 35.5%	102 24.5%	3.64	4	1.12	-0.66	-0.15	417
	fcst_v16_X	54 9.3%	74 12.7%	152 26.1%	196 33.7%	106 18.2%	3.39	4	1.19	-0.47	-0.60	582
When the Flood Watch <u>starts</u>	fcst_v9_SU	5 0.8%	4 0.6%	10 1.5%	214 32.7%	422 64.4%	4.59	5	0.63	-2.17	7.74	655
	fcst_v10_U	170 53.0%	38 11.8%	52 16.2%	44 13.7%	17 5.3%	2.07	1	1.31	0.82	-0.72	321
	fcst_v11_S	17 3.8%	5 1.1%	30 6.8%	165 37.3%	225 50.9%	4.30	5	0.94	-1.85	3.85	442
	fcst_v12_C	356 64.7%	60 10.9%	76 13.8%	36 6.5%	22 4.0%	1.74	1	1.16	1.39	0.78	550

Assessing and Improving the NWS Point-and-Click Webpage

	fcst_v13_SUX	1 0.2%	2 0.5%	7 1.7%	155 37.4%	249 60.1%	4.57	5	0.58	-1.42	3.77	414
	fcst_v14_UX	48 13.1%	27 7.4%	83 22.7%	120 32.8%	88 24.0%	3.47	4	1.29	-0.63	-0.61	366
	fcst_v15_SX	4 1.0%	1 0.2%	23 5.5%	150 36.0%	239 57.3%	4.48	5	0.70	-1.71	4.72	417
	fcst_v16_X	46 7.9%	27 4.6%	112 19.2%	247 42.4%	150 25.8%	3.74	4	1.13	-0.98	0.43	582

Assessing and Improving the NWS Point-and-Click Webpage

10. Again, please consider the Flood Watch shown in the forecast. Please indicate the extent to which each of the following statements is true for you.
Sub-items randomized.

Sub-question	Experimental Forecast	Not at all	A little	Somewhat	Very	Extremely	Mean	Median	SD	Skewness	Kurtosis	n
		1	2	3	4	5						
This information would prompt me to take action to protect myself and/or my family	fcst_v9_SU	17 2.6%	60 9.2%	153 23.4%	234 35.7%	191 29.2%	3.80	4	1.04	-0.63	-0.23	655
	fcst_v10_U	15 4.7%	45 14.0%	87 27.1%	118 36.8%	56 17.4%	3.48	4	1.08	-0.44	-0.44	321
	fcst_v11_S	26 5.9%	59 13.3%	125 28.3%	133 30.1%	99 22.4%	3.50	4	1.15	-0.40	-0.61	442
	fcst_v12_C	45 8.2%	91 16.5%	172 31.3%	163 29.6%	79 14.4%	3.25	3	1.14	-0.26	-0.65	550
	fcst_v13_SUX	7 1.7%	44 10.6%	89 21.5%	144 34.8%	130 31.4%	3.84	4	1.04	-0.60	-0.43	414
	fcst_v14_UX	11 3.0%	19 5.2%	86 23.9%	149 40.7%	101 27.6%	3.85	4	0.98	-0.78	0.44	366
	fcst_v15_SX	10 2.4%	18 4.3%	89 21.3%	161 38.6%	139 33.3%	3.96	4	0.97	-0.85	0.52	417
	fcst_v16_X	16 2.7%	48 8.2%	144 24.7%	233 40.0%	141 24.2%	3.75	4	1.00	-0.63	0.00	582
This information meets my needs	fcst_v9_SU	3 0.5%	25 3.8%	114 17.4%	302 46.1%	211 32.2%	4.06	4	0.83	-0.71	0.31	655
	fcst_v10_U	2 0.6%	20 6.2%	73 22.7%	151 47.0%	75 23.4%	3.86	4	0.87	-0.54	0.04	321
	fcst_v11_S	4 0.9%	20 4.5%	114 25.8%	195 44.1%	109 24.7%	3.87	4	0.87	-0.50	0.07	442
	fcst_v12_C	14 2.5%	63 11.5%	136 24.7%	220 40.0%	117 21.3%	3.66	4	1.02	-0.52	-0.28	550
	fcst_v13_SUX	0 0.0%	11 2.7%	53 12.8%	203 49.0%	147 35.5%	4.17	4	0.75	-0.68	0.22	414

Assessing and Improving the NWS Point-and-Click Webpage

	fcst_v14_UX	3 0.8%	7 1.9%	51 13.9%	186 50.8%	119 32.5%	4.12	4	0.78	-0.89	1.44	366
	fcst_v15_SX	2 0.5%	10 2.4%	63 15.1%	201 48.2%	141 33.8%	4.12	4	0.78	-0.76	0.72	417
	fcst_v16_X	4 0.7%	24 4.1%	104 17.9%	294 50.5%	156 26.8%	3.99	4	0.82	-0.72	0.63	582
This information would prompt me to seek additional information	fcst_v9_SU	10 1.5%	18 2.7%	78 11.9%	268 40.9%	281 42.9%	4.21	4	0.87	-1.23	1.80	655
	fcst_v10_U	7 2.2%	12 3.7%	51 15.9%	141 43.9%	110 34.3%	4.04	4	0.92	-1.05	1.23	321
	fcst_v11_S	10 2.3%	26 5.9%	57 12.9%	184 41.6%	165 37.3%	4.06	4	0.97	-1.11	1.00	442
	fcst_v12_C	8 1.5%	33 6.0%	80 14.5%	240 43.6%	189 34.4%	4.03	4	0.93	-0.96	0.71	550
	fcst_v13_SUX	3 0.7%	12 2.9%	66 15.9%	160 38.6%	173 41.8%	4.18	4	0.85	-0.91	0.60	414
	fcst_v14_UX	5 1.4%	9 2.5%	45 12.3%	163 44.5%	144 39.3%	4.18	4	0.84	-1.16	1.81	366
	fcst_v15_SX	2 0.5%	13 3.1%	72 17.3%	166 39.8%	164 39.3%	4.14	4	0.85	-0.78	0.23	417
	fcst_v16_X	5 0.9%	20 3.4%	70 12.0%	258 44.3%	229 39.3%	4.18	4	0.84	-1.06	1.27	582
This information is easy to understand	fcst_v9_SU	2 0.3%	12 1.8%	91 13.9%	307 46.9%	243 37.1%	4.19	4	0.76	-0.75	0.54	655
	fcst_v10_U	2 0.6%	13 4.0%	61 19.0%	169 52.6%	76 23.7%	3.95	4	0.80	-0.67	0.66	321
	fcst_v11_S	3 0.7%	17 3.8%	102 23.1%	209 47.3%	111 25.1%	3.92	4	0.83	-0.54	0.21	442
	fcst_v12_C	14 2.5%	49 8.9%	151 27.5%	205 37.3%	131 23.8%	3.71	4	1.01	-0.52	-0.20	550
	fcst_v13_SUX	0	6	44	203	161	4.25	4	0.70	-0.65	0.19	414

Assessing and Improving the NWS Point-and-Click Webpage

		0.0%	1.4%	10.6%	49.0%	38.9%						
	fcst_v14_UX	1 0.5%	7 1.1%	28 9.8%	213 46.7%	117 41.8%	4.20	4	0.68	-0.85	1.90	366
	fcst_v15_SX	2 0.5%	4 1.0%	57 13.7%	197 47.2%	157 37.6%	4.21	4	0.74	-0.77	0.87	417
This information gets my attention	fcst_v16_X	2 0.3%	10 1.7%	92 15.8%	300 51.5%	178 30.6%	4.10	4	0.74	-0.62	0.57	582
	fcst_v9_SU	4 0.6%	20 3.1%	111 16.9%	284 43.4%	236 36.0%	4.11	4	0.83	-0.78	0.46	655
	fcst_v10_U	3 0.9%	18 5.6%	54 16.8%	154 48.0%	92 28.7%	3.98	4	0.87	-0.80	0.57	321
	fcst_v11_S	5 1.1%	24 5.4%	97 21.9%	201 45.5%	115 26.0%	3.90	4	0.89	-0.66	0.28	442
	fcst_v12_C	13 2.4%	49 8.9%	130 23.6%	237 43.1%	121 22.0%	3.73	4	0.98	-0.63	0.04	550
	fcst_v13_SUX	1 0.2%	3 0.7%	37 8.9%	193 46.6%	180 43.5%	4.32	4	0.69	-0.84	0.99	414
	fcst_v14_UX	1 0.3%	7 1.9%	34 9.3%	157 42.9%	167 45.6%	4.32	4	0.74	-1.03	1.22	366
	fcst_v15_SX	2 0.5%	11 2.6%	29 7.0%	188 45.1%	187 44.8%	4.31	4	0.76	-1.22	2.10	417
This information is useful to me	fcst_v16_X	3 0.5%	13 2.2%	57 9.8%	282 48.5%	227 39.0%	4.23	4	0.76	-1.01	1.58	582
	fcst_v9_SU	0 0.0%	12 1.8%	68 10.4%	306 46.7%	269 41.1%	4.27	4	0.72	-0.75	0.32	655
	fcst_v10_U	1 0.3%	9 2.8%	51 15.9%	157 48.9%	103 32.1%	4.10	4	0.78	-0.68	0.44	321
	fcst_v11_S	4 0.9%	14 3.2%	77 17.4%	205 46.4%	142 32.1%	4.06	4	0.84	-0.80	0.75	442
	fcst_v12_C	7 1.3%	38 6.9%	85 15.5%	267 48.5%	153 27.8%	3.95	4	0.91	-0.87	0.61	550

Assessing and Improving the NWS Point-and-Click Webpage

	fcst_v13_SUX	0 0.0%	8 1.9%	30 7.2%	191 46.1%	185 44.7%	4.34	4	0.70	-0.91	0.86	414
	fcst_v14_UX	2 0.5%	4 1.1%	36 9.8%	171 46.7%	153 41.8%	4.28	4	0.73	-1.00	1.70	366
	fcst_v15_SX	1 0.2%	6 1.4%	38 9.1%	193 46.3%	179 42.9%	4.30	4	0.71	-0.91	1.12	417
	fcst_v16_X	3 0.5%	10 1.7%	60 10.3%	297 51.0%	212 36.4%	4.21	4	0.73	-0.93	1.60	582
This information is visually appealing	fcst_v9_SU	19 2.9%	47 7.2%	195 29.8%	233 35.6%	161 24.6%	3.72	4	1.01	-0.52	-0.11	655
	fcst_v10_U	10 3.1%	35 10.9%	97 30.2%	128 39.9%	51 15.9%	3.55	4	0.99	-0.46	-0.13	321
	fcst_v11_S	16 3.6%	45 10.2%	162 36.7%	151 34.2%	68 15.4%	3.48	3	0.99	-0.33	-0.15	442
	fcst_v12_C	34 6.2%	79 14.4%	170 30.9%	184 33.5%	83 15.1%	3.37	3	1.09	-0.36	-0.48	550
	fcst_v13_SUX	3 0.7%	17 4.1%	86 20.8%	181 43.7%	127 30.7%	4.00	4	0.86	-0.65	0.18	414
	fcst_v14_UX	5 1.4%	17 4.6%	74 20.2%	171 46.7%	99 27.0%	3.93	4	0.88	-0.76	0.61	366
	fcst_v15_SX	8 1.9%	17 4.1%	85 20.4%	173 41.5%	134 32.1%	3.98	4	0.93	-0.84	0.63	417
	fcst_v16_X	4 0.7%	38 6.5%	136 23.4%	247 42.4%	157 27.0%	3.88	4	0.90	-0.53	-0.18	582
This information is convenient	fcst_v9_SU	3 0.5%	14 2.1%	79 12.1%	317 48.4%	242 36.9%	4.19	4	0.76	-0.88	1.10	655
	fcst_v10_U	0 0.0%	11 3.4%	67 20.9%	163 50.8%	80 24.9%	3.97	4	0.77	-0.40	-0.20	321
	fcst_v11_S	3 0.7%	12 2.7%	89 20.1%	210 47.5%	128 29.0%	4.01	4	0.81	-0.63	0.44	442
	fcst_v12_C	12	44	109	244	141	3.83	4	0.97	-0.76	0.25	550

Assessing and Improving the NWS Point-and-Click Webpage

		2.2%	8.0%	19.8%	44.4%	25.6%						
	fcst_v13_SUX	0 0.0%	7 1.7%	41 9.9%	196 47.3%	170 41.1%	4.28	4	0.71	-0.74	0.35	414
	fcst_v14_UX	2 0.5%	5 1.4%	27 7.4%	187 51.1%	145 39.6%	4.28	4	0.71	-1.07	2.36	366
	fcst_v15_SX	1 0.2%	7 1.7%	48 11.5%	191 45.8%	170 40.8%	4.25	4	0.74	-0.83	0.72	417
	fcst_v16_X	3 0.5%	7 1.2%	69 11.9%	305 52.4%	198 34.0%	4.18	4	0.72	-0.81	1.41	582

Assessing and Improving the NWS Point-and-Click Webpage

11. When does the Flood Watch start? Response options NOT randomized.

Experimental forecast	It has already started	Sometime on Thursday	6 PM on Saturday	I cannot tell	Other	n
	1	2	3	4	5	
fcst_v9_SU	23 3.5%	619 94.5%	6 0.9%	5 0.8%	2 0.3%	655
fcst_v10_U	252 78.5%	2 0.6%	4 1.2%	57 17.8%	6 1.9%	321
fcst_v11_S	8 1.8%	419 94.8%	1 0.2%	12 2.7%	2 0.5%	442
fcst_v12_C	174 31.6%	11 2.0%	3 0.5%	316 57.5%	46 8.4%	550
fcst_v13_SUX	3 0.7%	403 97.3%	2 0.5%	5 1.2%	1 0.2%	414
fcst_v14_UX	71 19.4%	130 35.5%	2 0.5%	94 25.7%	69 18.9%	366
fcst_v15_SX	5 1.2%	409 98.1%	0 0.0%	1 0.2%	2 0.5%	417
fcst_v16_X	29 5.0%	304 52.2%	5 0.9%	126 21.6%	118 20.3%	582

a. If other, please specify. Open-ended

Assessing and Improving the NWS Point-and-Click Webpage

12. When does the Flood Watch end? Response options NOT randomized.

Experimental forecast	It has already ended	Sometime on Thursday	6 PM on Saturday	I cannot tell	Other	n
	1	2	3	4	5	
fcst_v9_SU	0 0.0%	0 0.0%	652 99.5%	2 0.3%	1 0.2%	655
fcst_v10_U	0 0.0%	0 0.0%	320 99.7%	1 0.3%	0 0.0%	321
fcst_v11_S	1 0.2%	9 2.0%	12 2.7%	404 91.4%	16 3.6%	442
fcst_v12_C	1 0.2%	0 0.0%	23 4.2%	504 91.6%	22 4.0%	550
fcst_v13_SUX	0 0.0%	1 0.2%	412 99.5%	1 0.2%	0 0.0%	414
fcst_v14_UX	0 0.0%	1 0.3%	361 98.6%	3 0.8%	1 0.3%	366
fcst_v15_SX	1 0.2%	6 1.4%	192 46.0%	128 30.7%	90 21.6%	417
fcst_v16_X	0 0.0%	5 0.9%	340 58.4%	124 21.3%	113 19.4%	582

d. If other, please specify [Open-ended](#)

Assessing and Improving the NWS Point-and-Click Webpage

Preferences for Single Experimental Attributes

The National Weather Service is interested in finding ways to better communicate information about hazardous weather threats on the point-and-click forecast webpage. The next few questions have experimental images that show different ways of possibly highlighting hazardous weather.



Forecast A

Forecast B

13. Forecast "A" indicates when the Flood Watch goes into effect (i.e., "from 6 AM Thu"). Forecast "B" does not have the "from 6 AM Thu" information. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the “from 6 AM Thu” info	Forecast B – <u>without</u> the “from 6 AM Thu” info	No opinion/No preference	n
1	2	3	
3325	234	188	3747
88.7%	6.2%	5.0%	

Assessing and Improving the NWS Point-and-Click Webpage

Forecast A

Forecast B

14. Forecast "A" indicates how long the Flood Watch is in effect (i.e., "until 6 PM Sat"). Forecast "B" does not have the "until 6 PM Sat" information. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the “until 6 PM Sat” info	Forecast B – <u>without</u> the “until 6 PM Sat” info	No opinion/No preference	n
1	2	3	
3374	228	145	3747
90.0%	6.1%	3.9%	

Assessing and Improving the NWS Point-and-Click Webpage

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code [Go] [BOOKMARK] [E] [G]

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Late Afternoon	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
40% Chance Showers Hi 59 °F	20% Slight Chc Tstms Lo 43 °F	40% Chance Rain Hi 57 °F	80% Heavy Rain Lo 44 °F	90% Heavy Rain Hi 56 °F	80% Heavy Rain Lo 45 °F	70% Showers Likely Hi 63 °F	30% Chance Showers Lo 45 °F	30% Chance Showers Hi 67 °F

Flood Watch

Detailed 7-day Forecast [More Down]
 Hazardous weather condition(s):
Flood Watch
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Detailed Point Forecast [More Down]
 Click Map for Forecast Disclaimer

Map Satellite Terrain

Map data ©2011 Google - Terms of Use
 - Requested Location Forecast Area
 Lat/Lon: 99.99°N 99.99°W Elevation: 0000 ft

XML

Forecast A

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code [Go] [BOOKMARK] [E] [G]

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Late Afternoon	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
40% Chance Showers Hi 59 °F	20% Slight Chc Tstms Lo 43 °F	40% Chance Rain Hi 57 °F	80% Heavy Rain Lo 44 °F	90% Heavy Rain Hi 56 °F	80% Heavy Rain Lo 45 °F	70% Showers Likely Hi 63 °F	30% Chance Showers Lo 45 °F	30% Chance Showers Hi 67 °F

Detailed 7-day Forecast [More Down]
 Hazardous weather condition(s):

Detailed Point Forecast [More Down]
 Click Map for Forecast Disclaimer

Map Satellite Terrain

Map data ©2011 Google - Terms of Use
 - Requested Location Forecast Area
 Lat/Lon: 99.99°N 99.99°W Elevation: 0000 ft

XML

Forecast B

15. Forecast "A" shows an orange box around several of the forecast pictures denoting the Flood Watch. Forecast "B" does not have the orange watch box. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the orange watch box	Forecast B – <u>without</u> the orange watch box	No opinion/No preference	n
1	2	3	
3506	169	72	3747
93.6%	4.5%	1.9%	

Assessing and Improving the NWS Point-and-Click Webpage



Forecast A



Forecast B

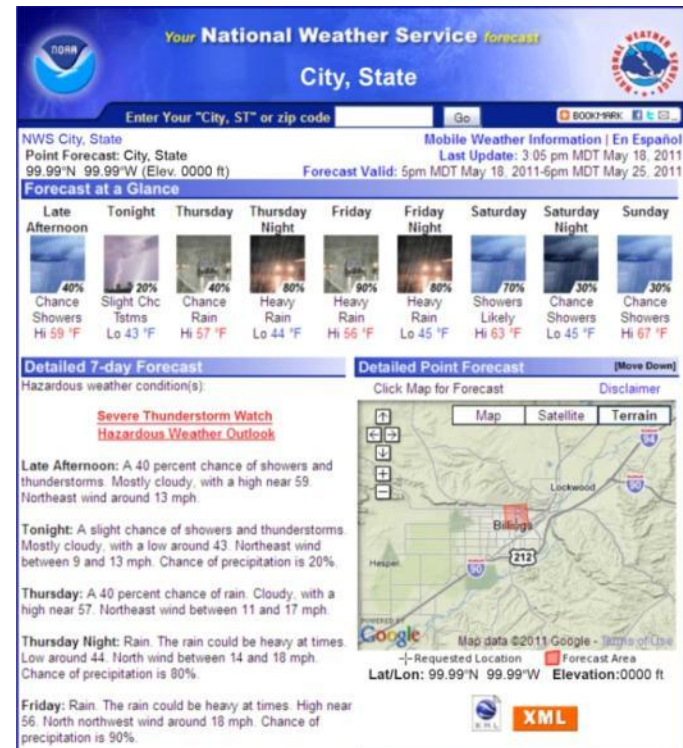
16. Forecast "A" shows a red box around the first forecast picture denoting the Severe Thunderstorm Warning. Forecast "B" does not have the red warning box. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the red warning box	Forecast B – <u>without</u> the red warning box	No opinion/No preference	n
1	2	3	
3510	169	68	3747
93.7%	4.5%	1.8%	

Assessing and Improving the NWS Point-and-Click Webpage



Forecast A



Forecast B

17. Forecast "A" shows an orange box around the first forecast picture denoting the Severe Thunderstorm Watch. Forecast "B" does not have the watch box. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the orange watch box	Forecast B – <u>without</u> the orange watch box	No opinion/No preference	n
1	2	3	
3469	197	81	3747
92.6%	5.3%	2.2%	

Assessing and Improving the NWS Point-and-Click Webpage

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code [] Go [BOOKMARK] [] []

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Now	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
40% Chance Showers Hi 59 °F Lo 43 °F	20% Slight Chc Tstms Lo 43 °F	40% Chance Rain Hi 57 °F	80% Heavy Rain Lo 44 °F	90% Heavy Rain Hi 56 °F	80% Heavy Rain Lo 45 °F	70% Showers Likely Hi 63 °F	30% Chance Showers Lo 45 °F	30% Chance Showers Hi 67 °F

Urban and Small Stream Flood Advisory

Detailed 7-day Forecast [Move Down]
 Hazardous weather condition(s):
 Urban and Small Stream Flood Advisory
 Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Map data ©2011 Google - Terms of Use
 - Requested Location - Forecast Area
 Lat/Lon: 99.99°N 99.99°W Elevation: 0000 ft
 XML

Forecast A

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code [] Go [BOOKMARK] [] []

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Late Afternoon	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
40% Chance Showers Hi 59 °F Lo 43 °F	20% Slight Chc Tstms Lo 43 °F	40% Chance Rain Hi 57 °F	80% Heavy Rain Lo 44 °F	90% Heavy Rain Hi 56 °F	80% Heavy Rain Lo 45 °F	70% Showers Likely Hi 63 °F	30% Chance Showers Lo 45 °F	30% Chance Showers Hi 67 °F

Urban and Small Stream Flood Advisory

Detailed 7-day Forecast [Move Down]
 Hazardous weather condition(s):
 Urban and Small Stream Flood Advisory
 Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Map data ©2011 Google - Terms of Use
 - Requested Location - Forecast Area
 Lat/Lon: 99.99°N 99.99°W Elevation: 0000 ft
 XML

Forecast B

18. Forecast "A" shows a yellow box around the first forecast picture denoting the Urban and Small Stream Flood Advisory. Forecast "B" does not have the advisory box. Which way do you prefer the information be provided?

Forecast A – <u>with</u> the yellow advisory box	Forecast B – <u>without</u> the yellow advisory box	No opinion/No preference	n
1	2	3	
3207	433	107	3747
85.6%	11.6%	2.9%	

Assessing and Improving the NWS Point-and-Click Webpage



Forecast A



Forecast B



Forecast C

19. The forecast images above show boxes highlighting a warning (Forecast A), a watch (Forecast B), and an advisory (Forecast C) (as shown in the previous 3 questions). For what type of weather hazards do you prefer to have the boxes?

Prefer to have a box for <u>warnings</u> only	Prefer to have a box for <u>warnings</u> and <u>watches</u> only	Prefer to have a box for <u>warnings</u> , <u>watches</u> , and <u>advisories</u>	Do not want the boxes at all	Other	n
1	2	3	4	5	
473	1099	2045	89	41	3747
12.6%	29.3%	54.6%	2.4%	1.1%	

Assessing and Improving the NWS Point-and-Click Webpage

Preferences When There Are Multiple Hazards

There are 5 versions of Question 20 below, labeled as Ver1, Ver2, Ver3, Ver4, and Ver5. Approximately one-fifth of the sample (randomly selected) got each version.

*** Ver1 – Multiple hazards, not overlapping in time ***

The screenshot displays the NWS Point-and-Click Webpage interface. At the top, it says "Your National Weather Service forecast" and "City, State". Below this is a search bar with the text "Enter Your 'City, ST' or zip code" and a "Go" button. To the right of the search bar are links for "BOOKMARK", "RSS", and "Twitter".

The main content area shows the "Forecast at a Glance" section. It includes a table with columns for "Now (until 6 PM)", "Tonight", "Thursday", "Thursday Night", "Friday", "Friday Night", "Saturday", "Saturday Night", and "Sunday". Each column contains a weather icon, a percentage chance of precipitation, and a description of the weather. For example, "Now (until 6 PM)" shows a 40% chance of "Severe Thunderstorm Warning".

Below the "Forecast at a Glance" section is a "Detailed 7-day Forecast" section. It lists hazardous weather conditions: "Severe Thunderstorm Warning (Now until 6 PM)" and "Flood Watch (from 6 AM Thu, until 6 PM Sat)". It also provides a detailed description of the weather for each day, including temperature ranges and wind speeds.

To the right of the "Detailed 7-day Forecast" is a "Detailed Point Forecast" section. It includes a "Click Map for Forecast" button and a "Disclaimer" link. Below these is a map showing the location of the requested location (Billings, MT) and the forecast area. The map includes a legend for "Requested Location" and "Forecast Area".

At the bottom of the page, there are links for "XML" and "RSS".

Assessing and Improving the NWS Point-and-Click Webpage

20. Multiple weather hazards can occur in the same multi-day forecast. Please consider how the information is presented in the example forecast shown here, and indicate the extent to which you agree or disagree with the statements below. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	I don't know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
The “warning” and “watch” boxes help me better notice that there are different weather hazards.	7 0.9%	6 0.8%	13 1.7%	147 19.5%	579 76.7%	3 0.4%	4.71	5	0.63	-3.04	12.00	755
The “warning” and “watch” boxes help me better understand when the different weather hazards are in effect.	7 0.9%	6 0.8%	21 2.8%	173 22.9%	543 71.9%	5 0.7%	4.65	5	0.67	-2.60	8.88	755
Having more than one box is confusing.	251 33.2%	352 46.6%	75 9.9%	40 5.3%	32 4.2%	5 0.7%	2.00	2	1.02	1.28	1.47	755
I like that there are different colors for the “warning” and “watch” boxes.	8 1.1%	13 1.7%	26 3.4%	158 20.9%	537 71.1%	13 1.7%	4.62	5	0.74	-2.50	7.25	755
The boxes make the forecast look cluttered.	207 27.4%	321 42.5%	105 13.9%	86 11.4%	32 4.2%	4 0.5%	2.22	2	1.10	0.84	-0.01	755
I would like to be able to click on each box to get information about that weather hazard.	9 1.2%	23 3.0%	60 7.9%	243 32.2%	400 53.0%	20 2.6%	4.36	5	0.85	-1.55	2.52	755
I would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. If “agree” or “strongly agree”, go to sub-questions (a) and (b)	59 7.8%	152 20.1%	77 10.2%	201 26.6%	250 33.1%	16 2.1%	3.58	4	1.35	-0.51	-1.10	755
I only want boxes for warnings and <u>not</u> for watches.	188 24.9%	395 52.3%	83 11.0%	52 6.9%	27 3.6%	10 1.3%	2.11	2	0.98	1.16	1.25	755
I would prefer <u>not</u> to have the boxes	428 56.7%	258 34.2%	38 5.0%	7 0.9%	20 2.6%	4 0.5%	1.58	1	0.85	2.06	5.23	755
Having the start and end time	255	359	57	50	30	4	1.99	2	1.02	1.30	1.42	755

Assessing and Improving the NWS Point-and-Click Webpage

information (e.g., “now until 6 PM”) for more than one weather hazard is confusing.	33.8%	47.5%	7.5%	6.6%	4.0%	0.5%						
The start and end time information (e.g., “now until 6 PM”) makes the forecast look cluttered.	224 29.7%	351 46.5%	77 10.2%	76 10.1%	24 3.2%	3 0.4%	2.10	2	1.04	1.02	0.49	755
I would prefer <u>not</u> to have the start and end time information (e.g., “now until 6 PM”) in the boxes.	283 37.5%	348 46.1%	34 4.5%	54 7.2%	30 4.0%	6 0.8%	1.93	2	1.03	1.40	1.59	755
I would prefer <u>not</u> to have the start and end time information (e.g., “now until 6 PM”) in the red, underlined text/link.	287 38.0%	344 45.6%	50 6.6%	43 5.7%	26 3.4%	5 0.7%	1.90	2	0.99	1.41	1.85	755
With the boxes and the start and end time information written out, there is too much information in this forecast.	270 35.8%	348 46.1%	52 6.9%	56 7.4%	25 3.3%	4 0.5%	1.96	2	1.01	1.29	1.33	755

Assessing and Improving the NWS Point-and-Click Webpage

- a. You indicated you would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. Keeping in mind that there is limited space for information in a pop-up window, please indicate how important it would be to you to have each of the following types of information in a pop-up window. [Sub items randomized.](#)

Sub-question	Not at all important	A little important	Somewhat important	Very important	Extremely important	Don't know/I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
When the weather hazard <u>starts</u>	17 3.8%	22 4.9%	68 15.1%	185 41.0%	159 35.3%	0 0.0%	3.99	4	1.02	-1.12	1.01	451
When the weather hazard <u>ends</u>	21 4.7%	38 8.4%	108 23.9%	182 40.4%	102 22.6%	0 0.0%	3.68	4	1.06	-0.71	0.06	451
Main <u>impacts</u> of the weather hazard	11 2.4%	45 10.0%	102 22.6%	148 32.8%	142 31.5%	3 0.7%	3.81	4	1.07	-0.62	-0.38	451
Amount of precipitation expected (if relevant)	10 2.2%	41 9.1%	120 26.6%	179 39.7%	101 22.4%	0 0.0%	3.71	4	0.99	-0.53	-0.15	451
Location of weather hazard (if relevant)	1 0.2%	12 2.7%	45 10.0%	161 35.7%	231 51.2%	1 0.2%	4.35	5	0.79	-1.16	1.07	451
Precautionary/p reparedness actions to take in response to the weather hazard	58 12.9%	126 27.9%	123 27.3%	91 20.2%	52 11.5%	1 0.2%	2.90	3	1.21	0.17	-0.90	451

- b. If there is any other type of information about a weather hazard that you would like to have in a pop-up window, please tell us below. [Open-ended](#)

Assessing and Improving the NWS Point-and-Click Webpage

*** Ver2 – Two hazards (same – severe thunderstorm), partially overlapping in time ***

Your **National Weather Service** forecast

City, State

Enter Your "City, ST" or zip codeGo

BOOKMARKFacebookTwitter

NWS City, StateMobile Weather Information | En Español
Point Forecast: City, StateLast Update: 3:05 pm MDT May 18, 2011
99.99°N 99.99°W (Elev. 0000 ft)Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Now (until 6 PM)	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
 40% Severe Thunder- storm Warning	 20% Slight Chc Tstms Lo 43 °F	 40% Chance Rain Hi 57 °F	 80% Heavy Rain Lo 44 °F	 90% Heavy Rain Hi 56 °F	 80% Heavy Rain Lo 45 °F	 70% Showers Likely Hi 63 °F	 30% Chance Showers Lo 45 °F	 30% Chance Showers Hi 67 °F

Severe Thunderstorm Watch
(Now until 9 PM)

Detailed 7-day ForecastDetailed Point Forecast[Move Down]

Hazardous weather condition(s):

Severe Thunderstorm Warning (Now until 6 PM)
Severe Thunderstorm Watch (Now until 9 PM)

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Click Map for ForecastDisclaimer

MapSatelliteTerrain



Map data ©2011 Google - Terms of Use
Requested LocationForecast Area
Lat/Lon: 99.99°N 99.99°W Elevation: 0000 ft



Assessing and Improving the NWS Point-and-Click Webpage

20. Multiple weather hazards can occur in the same multi-day forecast. Please consider how the information is presented in the example forecast shown here, and indicate the extent to which you agree or disagree with the statements below. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	I don't know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
The “warning” and “watch” boxes help me better notice that there are different weather hazards.	15 2.0%	29 3.9%	31 4.1%	227 30.1%	429 57.0%	22 2.9%	4.40	5	0.90	-1.89	3.63	753
The “warning” and “watch” boxes help me better understand when the different weather hazards are in effect.	12 1.6%	24 3.2%	46 6.1%	241 32.0%	410 54.4%	20 2.7%	4.38	5	0.87	-1.72	3.20	753
Having more than one box is confusing.	223 29.6%	351 46.6%	76 10.1%	65 8.6%	31 4.1%	7 0.9%	2.10	2	1.06	1.09	0.70	753
I like that there are different colors for the “warning” and “watch” boxes.	14 1.9%	12 1.6%	33 4.4%	196 26.0%	468 62.2%	30 4.0%	4.51	5	0.82	-2.21	5.64	753
The boxes make the forecast look cluttered.	205 27.2%	356 47.3%	88 11.7%	76 10.1%	25 3.3%	3 0.4%	2.15	2	1.04	0.97	0.42	753
I would like to be able to click on each box to get information about that weather hazard.	25 3.3%	39 5.2%	59 7.8%	284 37.7%	325 43.2%	21 2.8%	4.15	4	1.01	-1.42	1.72	753
I would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. If “agree” or “strongly agree”, go to sub-questions (a) and (b)	55 7.3%	93 12.4%	82 10.9%	226 30.0%	262 34.8%	35 4.6%	3.76	4	1.28	-0.81	-0.51	753
I only want boxes for warnings and <u>not</u> for watches.	213 28.3%	382 50.7%	63 8.4%	45 6.0%	44 5.8%	6 0.8%	2.10	2	1.06	1.29	1.27	753
I would prefer <u>not</u> to have the boxes	384 51.0%	301 40.0%	36 4.8%	14 1.9%	13 1.7%	5 0.7%	1.62	1	0.81	1.79	4.36	753
Having the start and end time	196	347	71	98	39	2	2.25	2	1.13	0.90	-0.04	753

Assessing and Improving the NWS Point-and-Click Webpage

information (e.g., “now until 6 PM”) for more than one weather hazard is confusing.	26.0%	46.1%	9.4%	13.0%	5.2%	0.3%						
The start and end time information (e.g., “now until 6 PM”) makes the forecast look cluttered.	195 25.9%	346 45.9%	88 11.7%	99 13.1%	24 3.2%	1 0.1%	2.22	2	1.07	0.84	-0.04	753
I would prefer <u>not</u> to have the start and end time information (e.g., “now until 6 PM”) in the boxes.	277 36.8%	307 40.8%	52 6.9%	69 9.2%	40 5.3%	8 1.1%	2.04	2	1.14	1.17	0.57	753
I would prefer <u>not</u> to have the start and end time information (e.g., “now until 6 PM”) in the red, underlined text/link.	281 37.3%	345 45.8%	46 6.1%	54 7.2%	19 2.5%	8 1.1%	1.91	2	0.98	1.32	1.54	753
With the boxes and the start and end time information written out, there is too much information in this forecast.	218 29.0%	353 46.9%	60 8.0%	76 10.1%	41 5.4%	5 0.7%	2.16	2	1.12	1.07	0.43	753
I do not want a “watch” box if it overlaps with a “warning” box.	180 23.9%	307 40.8%	63 8.4%	130 17.3%	66 8.8%	7 0.9%	2.46	2	1.27	0.65	-0.76	753

Assessing and Improving the NWS Point-and-Click Webpage

- a. You indicated you would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. Keeping in mind that there is limited space for information in a pop-up window, please indicate how important it would be to you to have each of the following types of information in a pop-up window. [Sub items randomized.](#)

Sub-question	Not at all important	A little important	Somewhat important	Very important	Extremely important	Don't know/I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
When the weather hazard starts	14 2.9%	31 6.4%	68 13.9%	204 41.8%	171 35.0%	0 0.0%	4.00	4	1.00	-1.07	0.83	488
When the weather hazard ends	11 2.3%	41 8.4%	127 26.0%	187 38.3%	122 25.0%	0 0.0%	3.75	4	1.00	-0.56	-0.15	488
Main impacts of the weather hazard	24 4.9%	44 9.0%	111 22.7%	175 35.9%	133 27.3%	1 0.2%	3.72	4	1.11	-0.70	-0.15	488
Amount of precipitation expected (if relevant)	13 2.7%	49 10.0%	140 28.7%	190 38.9%	96 19.7%	0 0.0%	3.63	4	0.99	-0.47	-0.19	488
Location of weather hazard (if relevant)	3 0.6%	7 1.4%	44 9.0%	192 39.3%	242 49.6	0 0.0%	4.36	4	0.76	-1.25	2.03	488
Precautionary/preparedness actions to take in response to the weather hazard	87 17.8%	143 29.3%	133 27.3%	73 15.0%	52 10.7%	0 0.0%	2.71	3	1.23	0.33	-0.80	488

- b. If there is any other type of information about a weather hazard that you would like to have in a pop-up window, please tell us below. [Open-ended](#)

Assessing and Improving the NWS Point-and-Click Webpage

*** Ver3 – Two hazards (different – severe thunderstorm and flood), partially overlapping in time ***

**Your National Weather Service forecast**

City, State

Enter Your "City, ST" or zip codeGo

BOOKMARKFacebookTwitter

NWS City, State
Point Forecast: City, State
99.99°N 99.99°W (Elev. 0000 ft)
Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Mobile Weather Information | En Español
Last Update: 3:05 pm MDT May 18, 2011

Forecast at a Glance

Now (until 6 PM)	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
 40% Severe Thunder- storm- Warning	 20% Slight Chc Tstms Lo 43 °F	 40% Chance Rain Hi 57 °F	 80% Heavy Rain Lo 44 °F	 90% Heavy Rain Hi 56 °F	 80% Heavy Rain Lo 45 °F	 70% Showers Likely Hi 63 °F	 30% Chance Showers Lo 45 °F	 30% Chance Showers Hi 67 °F

Flood Watch (Now until 9 PM Fri)

Detailed 7-day Forecast

Hazardous weather condition(s):
Severe Thunderstorm Warning (Now until 6 PM)
Flood Watch (Now until 9 PM Fri)
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Detailed Point Forecast [\(Move Down\)](#)

Click Map for Forecast [Disclaimer](#)

MapSatelliteTerrain



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Requested Location  Forecast Area

Lat/Lon: 99.99°N 99.99°W Elevation:0000 ft

 XML

Assessing and Improving the NWS Point-and-Click Webpage

20. Multiple weather hazards can occur in the same multi-day forecast. Please consider how the information is presented in the example forecast shown here, and indicate the extent to which you agree or disagree with the statements below. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	I don't know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
The “warning” and “watch” boxes help me better notice that there are different weather hazards.	11 1.5%	24 3.2%	26 3.5%	230 30.8%	437 58.5%	19 2.5%	4.45	5	0.84	-1.97	4.36	747
The “warning” and “watch” boxes help me better understand when the different weather hazards are in effect.	8 1.1%	24 3.2%	39 5.2%	227 30.4%	432 57.8%	17 2.3%	4.44	5	0.83	-1.79	3.48	747
Having more than one box is confusing.	253 33.9%	343 45.9%	61 8.2%	61 8.2%	26 3.5%	3 0.4%	2.01	2	1.03	1.19	0.99	747
I like that there are different colors for the “warning” and “watch” boxes.	16 2.1%	12 1.6%	31 4.1%	185 24.8%	474 63.5%	29 3.9%	4.52	5	0.84	-2.29	5.86	747
The boxes make the forecast look cluttered.	237 31.7%	331 44.3%	86 11.5%	67 9.0%	24 3.2%	2 0.3%	2.07	2	1.04	1.03	0.55	747
I would like to be able to click on each box to get information about that weather hazard.	19 2.5%	51 6.8%	66 8.8%	251 33.6%	333 44.6%	27 3.6%	4.15	4	1.03	-1.29	1.09	747
I would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. If “agree” or “strongly agree”, go to sub-questions (a) and (b)	71 9.5%	95 12.7%	78 10.4%	224 30.0%	260 34.8%	19 2.5%	3.70	4	1.33	-0.76	-0.67	747
I only want boxes for warnings and <u>not</u> for watches.	216 28.9%	357 47.8%	63 8.4%	56 7.5%	47 6.3%	8 1.1%	2.14	2	1.11	1.18	0.77	747
I would prefer <u>not</u> to have the boxes	408 54.6%	279 37.3%	28 3.7%	12 1.6%	17 2.3%	3 0.4%	1.59	1	0.83	2.02	5.19	747
Having the start and end time	231	345	66	68	32	5	2.09	2	1.07	1.11	0.67	747

Assessing and Improving the NWS Point-and-Click Webpage

information (e.g., “now until 6 PM”) for more than one weather hazard is confusing.	30.9%	46.2%	8.8%	9.1%	4.3%	0.7%						
The start and end time information (e.g., “now until 6 PM”) makes the forecast look cluttered.	229 30.7%	341 45.6%	73 9.8%	76 10.2%	25 3.3%	3 0.4%	2.10	2	1.05	1.03	0.47	747
I would prefer <u>not</u> to have the start and end time information (e.g., “now until 6 PM”) in the boxes.	315 42.2%	310 41.5%	40 5.4%	48 6.4%	30 4.0%	4 0.5%	1.88	2	1.04	1.44	1.66	747
I would prefer <u>not</u> to have the start and end time information (e.g., “now until 6 PM”) in the red, underlined text/link.	304 40.7%	303 40.6%	58 7.8%	53 7.1%	24 3.2%	5 0.7%	1.91	2	1.03	1.30	1.24	747
With the boxes and the start and end time information written out, there is too much information in this forecast.	259 34.7%	343 45.9%	47 6.3%	69 9.2%	27 3.6%	2 0.3%	2.01	2	1.05	1.21	0.91	747
I do not want a “watch” box if it overlaps with a “warning” box.	230 30.8%	305 40.8%	62 8.3%	76 10.2%	62 8.3%	12 1.6%	2.23	2	1.23	0.97	-0.07	747

Assessing and Improving the NWS Point-and-Click Webpage

- a. You indicated you would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. Keeping in mind that there is limited space for information in a pop-up window, please indicate how important it would be to you to have each of the following types of information in a pop-up window. [Sub items randomized.](#)

Sub-question	Not at all important	A little important	Somewhat important	Very important	Extremely important	Don't know/I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
When the weather hazard <u>starts</u>	13 2.7%	32 6.6%	68 14.0%	201 41.5%	170 35.1%	0 0.0%	4.00	4	1.00	-1.04	0.75	484
When the weather hazard <u>ends</u>	11 2.3%	37 7.6%	117 24.2%	192 39.7%	127 26.2%	0 0.0%	3.80	4	0.99	-0.64	0.01	484
Main <u>impacts</u> of the weather hazard	21 4.3%	50 10.3%	112 23.1%	168 34.7%	131 27.1%	2 0.4%	3.70	4	1.11	-0.63	-0.30	484
Amount of precipitation expected (if relevant)	11 2.3%	52 10.7%	128 26.4%	190 39.3%	103 21.3%	0 0.0%	3.67	4	1.00	-0.49	-0.28	484
Location of weather hazard (if relevant)	1 0.2%	5 1.0%	37 7.6%	187 38.6%	253 52.3%	1 0.2%	4.42	5	0.70	-1.12	1.39	484
Precautionary/p reparedness actions to take in response to the weather hazard	71 14.7%	143 29.5%	138 28.5%	92 19.0%	39 8.1%	1 0.2%	2.76	3	1.16	0.22	-0.78	484

- b. If there is any other type of information about a weather hazard that you would like to have in a pop-up window, please tell us below. [Open-ended](#)

Assessing and Improving the NWS Point-and-Click Webpage

*** Ver4 – Multiple hazards (with a warning) at the same time ***



Your **National Weather Service** forecast



City, State

Enter Your "City, ST" or zip code

Go

BOOKMARK

NWS City, State

Point Forecast: City, State

99.99°N 99.99°W (Elev. 0000 ft)

Mobile Weather Information | En Español

Last Update: 8:42 am CDT Jun 28, 2011

Forecast Valid: 10am CDT Jun 28, 2011-6pm CDT Jul 4, 2011

Forecast at a Glance

Now	Tonight	Wednesday	Wednesday Night	Thursday	Thursday Night	Friday	Friday Night	Saturday
								
Multiple Hazards in Effect (see below)	Partly Cloudy Lo 73 °F	Mostly Sunny Hi 92 °F	Mostly Clear Lo 71 °F	Sunny Hi 94 °F	Mostly Clear Lo 73 °F	Hot Hi 97 °F	Mostly Clear Lo 78 °F	Hot Hi 99 °F

Detailed 7-day Forecast

Hazardous weather condition(s):

Severe Thunderstorm Warning (Now until 915 AM)

Flash Flood Warning (Now until 1030 AM)

Severe Thunderstorm Watch (Now until noon)

Hazardous Weather Outlook

Short Term Forecast

Today: Showers and thunderstorms likely. Some of the storms could be severe. Mostly cloudy, with a high near 91. Calm wind becoming north northwest between 10 and 15 mph. Chance of precipitation is 60%. New rainfall amounts between a tenth and quarter of an inch, except higher amounts possible in thunderstorms.

Tonight: Partly cloudy, with a low around 73. Northeast wind between 5 and 10 mph.

Wednesday: Mostly sunny, with a high near 92. East northeast wind between 5 and 10 mph.

Wednesday Night: Mostly clear, with a low around 71. East northeast wind between 5 and 10 mph.

Thursday: Sunny, with a high near 94. East southeast wind around 5 mph.

Current Conditions

[Move Down]

view Yesterday's Weather

City, State

Lat. 99.99999 Lon: 99.99999 Elev. 0000

Last Update on Jun 28, 7:54 am CDT

Humidity: 74 %

Wind Speed: SW 9 MPH

Barometer: 29.96" (1014.0 mb)

Dewpoint: 73 °F (23 °C)

Heat Index: 87 °F (31 °C)

Visibility: 10.00 mi.

More Local Wx: 3 Day History

'Overcast'

82 °F (28 °C)

Radar and Satellite Images



Assessing and Improving the NWS Point-and-Click Webpage

20. Multiple weather hazards can occur in the same multi-day forecast. Please consider how the information is presented in the example forecast shown here, and indicate the extent to which you agree or disagree with the statements below. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	I don't know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
The box helps me better notice that there are different weather hazards.	7 0.9%	33 4.4%	40 5.4%	277 37.2%	372 49.9%	16 2.1%	4.34	5	0.85	-1.53	2.46	745
The box helps me better understand when the different weather hazards are in effect.	18 2.4%	52 7.0%	63 8.5%	272 36.5%	322 43.2%	18 2.4%	4.14	4	1.01	-1.28	1.15	745
Having only one box when there are multiple hazards is confusing.	182 24.4%	383 51.4%	87 11.7%	57 7.7%	24 3.2%	12 1.6%	2.12	2	0.98	1.09	1.02	745
I like that the box indicating there are multiple hazards in effect is red.	9 1.2%	42 5.6%	59 7.9%	265 35.6%	349 46.8%	21 2.8%	4.25	4	0.92	-1.34	1.51	745
The box makes the forecast look cluttered.	198 26.6%	378 50.7%	81 10.9%	54 7.2%	26 3.5%	8 1.1%	2.09	2	0.99	1.14	1.12	745
I would like to be able to click on the box to get information about all the weather hazards at once.	27 3.6%	71 9.5%	88 11.8%	280 37.6%	248 33.3%	31 4.2%	3.91	4	1.10	-0.97	0.21	745
I would like to be able to “mouse over” the box and have a pop-up window appear that gives key information about the weather hazards. If “agree” or “strongly agree”, go to sub-questions (a) and (b)	58 7.8%	112 15.0%	89 11.9%	234 31.4%	223 29.9%	29 3.9%	3.63	4	1.29	-0.65	-0.77	745
I would prefer <u>not</u> to have the boxes	355 47.7%	317 42.6%	36 4.8%	18 2.4%	10 1.3%	9 1.2%	1.66	2	0.80	1.64	3.75	745
Having the start and end time information (e.g., “now until 9:15 AM”) for more than one weather hazard is confusing.	184 24.7%	343 46.0%	70 9.4%	97 13.0%	43 5.8%	8 1.1%	2.28	2	1.15	0.88	-0.09	745
The start and end time	162	339	88	100	46	10	2.36	2	1.15	0.80	-0.23	745

Assessing and Improving the NWS Point-and-Click Webpage

information (e.g., “now until 9:15 AM”) makes the forecast look cluttered.	21.7%	45.5%	11.8%	13.4%	6.2%	1.3%						
I would prefer <u>not</u> to have the start and end time information (e.g., “now until 9:15 AM”) in the red, underlined text/link.	248 33.3%	346 46.4%	60 8.1%	54 7.2%	22 3.0%	15 2.0%	1.98	2	1.00	1.23	1.25	745
With the box and the start and end time information written out, there is too much information in this forecast.	198 26.6%	342 45.9%	82 11.0%	77 10.3%	38 5.1%	8 1.1%	2.21	2	1.10	0.97	0.26	745
It’s hard to know which of the multiple hazards in this forecast is most serious.	89 11.9%	248 33.3%	94 12.6%	222 29.8%	81 10.9%	11 1.5%	2.94	3	1.25	0.07	-1.22	745

Assessing and Improving the NWS Point-and-Click Webpage

- a. You indicated you would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. Keeping in mind that there is limited space for information in a pop-up window, please indicate how important it would be to you to have each of the following types of information in a pop-up window. [Sub items randomized.](#)

Sub-question	Not at all important	A little important	Somewhat important	Very important	Extremely important	Don't know/I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
When the weather hazard starts	10 2.2%	33 7.2%	53 11.6%	195 42.7%	165 36.1%	1 0.2%	4.04	4	0.98	-1.09	0.84	457
When the weather hazard ends	9 2.0%	47 10.3%	116 25.4%	175 38.3%	109 23.9%	1 0.2%	3.72	4	1.00	-0.50	-0.32	457
Main impacts of the weather hazard	13 2.8%	45 9.8%	89 19.5%	162 35.4%	146 31.9%	2 0.4%	3.84	4	1.07	-0.73	-0.18	457
Amount of precipitation expected (if relevant)	16 3.5%	69 15.1%	142 31.1%	136 29.8%	93 20.4%	1 0.2%	3.48	4	1.08	-0.25	-0.67	457
Location of weather hazard (if relevant)	3 0.7%	9 2.0%	44 9.6%	180 39.4%	218 47.7%	3 0.7%	4.32	4	0.78	-1.22	1.82	457
Precautionary/preparedness actions to take in response to the weather hazard	71 15.5%	142 31.1%	114 24.9%	74 16.2%	55 12.0%	1 0.2%	2.78	3	1.24	0.31	-0.88	457

- b. If there is any other type of information about a weather hazard that you would like to have in a pop-up window, please tell us below. [Open-ended](#)

Assessing and Improving the NWS Point-and-Click Webpage

*** Ver5 – Multiple watches at the same time ***



Your **National Weather Service** forecast

City, State

Enter Your "City, ST" or zip code

BOOKMARK

NWS City, State

Point Forecast: City, State

99.99°N 99.99°W (Elev. 0000 ft)

Mobile Weather Information | En Español

Last Update: 8:42 am CDT Jun 28, 2011

Forecast Valid: 10am CDT Jun 28, 2011-6pm CDT Jul 4, 2011

Forecast at a Glance

Now	Tonight	Wednesday	Wednesday Night	Thursday	Thursday Night	Friday	Friday Night	Saturday
								
40% Chance Showers	Partly Cloudy	Mostly Sunny	Mostly Clear	Sunny	Mostly Clear	Hot	Mostly Clear	Hot
Hi 59 °F	Lo 73 °F	Hi 92 °F	Lo 71 °F	Hi 94 °F	Lo 73 °F	Hi 97 °F	Lo 78 °F	Hi 99 °F

Multiple
Watches
in Effect
(see below)

Detailed 7-day Forecast

Hazardous weather condition(s):

Severe Thunderstorm Watch (Now until noon)

Flash Flood Watch (Now until 1030 AM)

Hazardous Weather Outlook

Short Term Forecast

Today: Showers and thunderstorms likely. Some of the storms could be severe. Mostly cloudy, with a high near 91. Calm wind becoming north northwest between 10 and 15 mph. Chance of precipitation is 60%. New rainfall amounts between a tenth and quarter of an inch, except higher amounts possible in thunderstorms.

Tonight: Partly cloudy, with a low around 73. Northeast wind between 5 and 10 mph.

Wednesday: Mostly sunny, with a high near 92. East northeast wind between 5 and 10 mph.

Wednesday Night: Mostly clear, with a low around 71. East northeast wind between 5 and 10 mph.

Thursday: Sunny, with a high near 94. East southeast wind around 5 mph.

Current Conditions

[Move Down]

City, State

Lat. 99.99999 Lon: 99.99999 Elev. 0000

Last Update on Jun 28, 7:54 am CDT

'Overcast'

82 °F
(28 °C)

Humidity: 74 %

Wind Speed: SW 9 MPH

Barometer: 29.96" (1014.0 mb)

Dewpoint: 73 °F (23 °C)

Heat Index: 87 °F (31 °C)

Visibility: 10.00 mi.

More Local Wx: 3 Day History

Radars and Satellite Images



Detailed Point Forecast [Move Up]

NCAR Societal Impacts Program

G-102

Assessing and Improving the NWS Point-and-Click Webpage

20. Multiple weather hazards can occur in the same multi-day forecast. Please consider how the information is presented in the example forecast shown here, and indicate the extent to which you agree or disagree with the statements below. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	I don't know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
The box helps me better notice that there are multiple watches.	9 1.2%	34 4.6%	52 7.0%	298 39.9%	341 45.6%	13 1.7%	4.26	4	0.87	-1.40	2.08	747
The box helps me better understand when the multiple watches are in effect.	8 1.1%	56 7.5%	66 8.8%	305 40.8%	297 39.8%	15 2.0%	4.13	4	0.94	-1.13	0.86	747
Having only one box when there are multiple watches is confusing.	158 21.2%	380 50.9%	97 13.0%	68 9.1%	34 4.6%	10 1.3%	2.24	2	1.04	1.01	0.59	747
I like that the box indicating there are multiple watches in effect is orange.	13 1.7%	45 6.0%	129 17.3%	293 39.2%	247 33.1%	20 2.7%	3.98	4	0.96	-0.87	0.41	747
The box makes the forecast look cluttered.	207 27.7%	377 50.5%	80 10.7%	54 7.2%	23 3.1%	6 0.8%	2.07	2	0.98	1.14	1.15	747
I would like to be able to click on the box to get information about all the weather watches at once.	18 2.4%	70 9.4%	80 10.7%	288 38.6%	274 36.7%	17 2.3%	4.00	4	1.04	-1.03	0.39	747
I would like to be able to “mouse over” the box and have a pop-up window appear that gives key information about the weather watches. If “agree” or “strongly agree”, go to sub-questions (a) and (b)	52 7.0%	126 16.9%	97 13.0%	225 30.1%	221 29.6%	26 3.5%	3.61	4	1.28	-0.57	-0.87	747
I would prefer <u>not</u> to have the box.	340 45.5%	311 41.6%	45 6.0%	28 3.7%	16 2.1%	7 0.9%	1.74	2	0.89	1.58	2.84	747
Having the start and end time information (e.g., “now until noon”) for more than one watch is confusing.	190 25.4%	368 49.3%	66 8.8%	80 10.7%	36 4.8%	7 0.9%	2.19	2	1.09	1.03	0.41	747
The start and end time	186	382	64	80	30	5	2.17	2	1.05	1.05	0.55	747

Assessing and Improving the NWS Point-and-Click Webpage

information (e.g., “now until noon”) makes the forecast look cluttered.	24.9%	51.1%	8.6%	10.7%	4.0%	0.7%						
I would prefer <u>not</u> to have the start and end time information (e.g., “now until noon”) in the red, underlined text/link.	263 35.2%	359 48.1%	57 7.6%	41 5.5%	23 3.1%	4 0.5%	1.93	2	0.96	1.36	1.87	747
With the box and the start and end time information written out, there is too much information in this forecast.	210 28.1%	378 50.6%	49 6.6%	68 9.1%	33 4.4%	9 1.2%	2.10	2	1.06	1.19	0.91	747
It’s hard to know which of the multiple hazards in this forecast is most serious.	76 10.2%	227 30.4%	119 15.9%	242 32.4%	69 9.2%	14 1.9%	3.00	3	1.20	-0.04	-1.14	747

Assessing and Improving the NWS Point-and-Click Webpage

- a. You indicated you would like to be able to “mouse over” each box and have a pop-up window appear that gives key information about that weather hazard. Keeping in mind that there is limited space for information in a pop-up window, please indicate how important it would be to you to have each of the following types of information in a pop-up window. [Sub items randomized.](#)

Sub-question	Not at all important	A little important	Somewhat important	Very important	Extremely important	Don't know/I am not familiar with this	Mean	Median	SD	Skewness	Kurtosis	n
	2	3	4	5	6	7						
When the weather hazard starts	5 1.1%	18 4.0%	67 15.0%	182 40.8%	173 38.8%	1 0.2%	4.12	4	0.89	-0.98	0.84	446
When the weather hazard ends	6 1.3%	40 9.0%	98 22.0%	185 41.5%	116 26.0%	1 0.2%	3.82	4	0.97	-0.60	-0.16	446
Main impacts of the weather hazard	14 3.1%	42 9.4%	97 21.7%	169 37.9%	121 27.1%	3 0.7%	3.77	4	1.05	-0.68	-0.11	446
Amount of precipitation expected (if relevant)	10 2.2%	57 12.8%	146 32.7%	150 33.6%	82 18.4%	1 0.2%	3.53	4	1.01	-0.26	-0.51	446
Location of weather hazard (if relevant)	3 0.7%	14 3.1%	37 8.3%	171 38.3%	219 49.1%	2 0.4%	4.33	4	0.81	-1.33	1.94	446
Precautionary/preparedness actions to take in response to the weather hazard	72 16.1%	112 25.1%	117 26.2%	88 19.7%	56 12.6%	1 0.2%	2.87	3	1.26	0.13	-0.99	446

- b. If there is any other type of information about a weather hazard that you would like to have in a pop-up window, please tell us below. [Open-ended](#)

Assessing and Improving the NWS Point-and-Click Webpage

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Now (until 6 PM)	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
40% Severe Thunderstorm Warning	20% Slight Chc Tstms Lo 43 °F	40% Chance Rain Hi 57 °F	80% Heavy Rain Lo 44 °F	90% Heavy Rain Hi 56 °F	80% Heavy Rain Lo 45 °F	70% Showers Likely Hi 63 °F	30% Chance Showers Lo 45 °F	30% Chance Showers Hi 67 °F

Severe Thunderstorm Watch
(Now until 9 PM)

Detailed 7-day Forecast [More Down]

Hazardous weather condition(s):

Severe Thunderstorm Warning (Now until 6 PM)
Severe Thunderstorm Watch (Now until 9 PM)

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Detailed Point Forecast [More Down]

Click Map for Forecast Disclaimer

Map Satellite Terrain

Map data ©2011 Google - [Terms of Use](#)

Lat/Lon: 99.99°N 99.99°W Elevation: 0000 ft

Forecast A

Your National Weather Service forecast

City, State

Enter Your "City, ST" or zip code

NWS City, State Mobile Weather Information | En Español
 Point Forecast: City, State Last Update: 3:05 pm MDT May 18, 2011
 99.99°N 99.99°W (Elev. 0000 ft) Forecast Valid: 5pm MDT May 18, 2011-6pm MDT May 25, 2011

Forecast at a Glance

Now (until 6 PM)	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
40% Severe Thunderstorm Warning	20% Slight Chc Tstms Lo 43 °F	40% Chance Rain Hi 57 °F	80% Heavy Rain Lo 44 °F	90% Heavy Rain Hi 56 °F	80% Heavy Rain Lo 45 °F	70% Showers Likely Hi 63 °F	30% Chance Showers Lo 45 °F	30% Chance Showers Hi 67 °F

Flood Watch (Now until 9 PM Fri)

Detailed 7-day Forecast [More Down]

Hazardous weather condition(s):

Severe Thunderstorm Warning (Now until 6 PM)
Flood Watch (Now until 9 PM Fri)
Hazardous Weather Outlook

Late Afternoon: A 40 percent chance of showers and thunderstorms. Mostly cloudy, with a high near 59. Northeast wind around 13 mph.

Tonight: A slight chance of showers and thunderstorms. Mostly cloudy, with a low around 43. Northeast wind between 9 and 13 mph. Chance of precipitation is 20%.

Thursday: A 40 percent chance of rain. Cloudy, with a high near 57. Northeast wind between 11 and 17 mph.

Thursday Night: Rain. The rain could be heavy at times. Low around 44. North wind between 14 and 18 mph. Chance of precipitation is 80%.

Friday: Rain. The rain could be heavy at times. High near 56. North northwest wind around 18 mph. Chance of precipitation is 90%.

Detailed Point Forecast [More Down]

Click Map for Forecast Disclaimer

Map Satellite Terrain

Map data ©2011 Google - [Terms of Use](#)

Lat/Lon: 99.99°N 99.99°W Elevation: 0000 ft

Forecast B

Assessing and Improving the NWS Point-and-Click Webpage

21. Please consider both forecast images shown.

- Forecast A has overlapping watch and warning boxes for the same type of weather hazard (a severe thunderstorm).
- Forecast B has overlapping watch and warning boxes for different types of weather hazards (a severe thunderstorm and a flood).

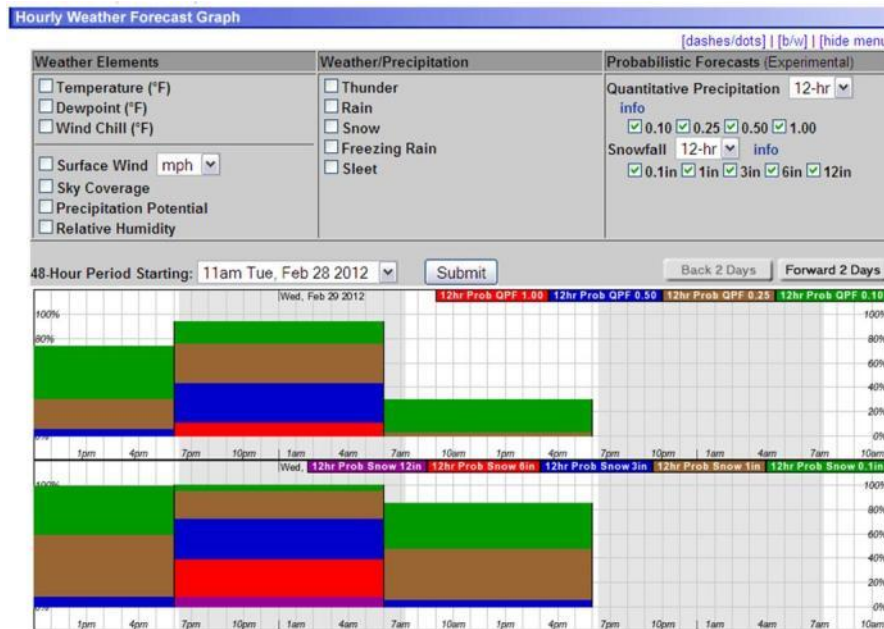
Which way do you prefer the information be provided? [Response options NOT randomized.](#)

Prefer overlapping watch and warning boxes in <u>both</u> cases	Prefer overlapping watch and warning boxes only in the case of Forecast A – for the <u>same</u> type of weather hazard	Prefer overlapping watch and warning boxes only in the case of Forecast B – for <u>different</u> types of weather hazards	I do not like the boxes in either forecast	I don't know/No opinion	Other	n
1	2	3	4	5	6	
2236 59.7%	217 5.8%	994 26.5%	155 4.1%	101 2.7%	44 1.2%	3747

22. If you have any additional comments about the forecast images we have shown or about how the National Weather Service can better communicate hazardous weather threats on its website, please share them below.

Assessing and Improving the NWS Point-and-Click Webpage

23. Below is a probabilistic forecast that shows the chances of different amounts of precipitation (top graph) and snowfall (bottom graph) over time.



- In your own words, please explain what you think the forecast information in each graph means. Please be as specific as you can.
- According to the forecast, what is the chance there will be 1 inch of snow in the period from 6 pm Feb 28 to 6 am Feb 29? [Response options NOT randomized.](#)

10% chance	30% chance	60% chance	95% chance	I don't know	Other	n
1	2	3	4	5	6	
288	329	153	1551	1052	374	3747
7.7%	8.8%	4.1%	41.4%	28.1%	10.0%	

Assessing and Improving the NWS Point-and-Click Webpage

c. Please indicate the extent to which you agree or disagree with the statements listed below about the probabilistic forecast information. Sub-items randomized.

Sub-question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	I don't know	Mean	Median	SD	Skewness	Kurtosis	n
	1	2	3	4	5	6						
Overall, this forecast information is useful to me.	608 16.2%	714 19.1%	807 21.5%	1041 27.8%	469 12.5%	108 2.9%	3.01	3	1.29	-0.13	-1.12	3747
I would like a link to a tutorial explaining what this forecast information means.	281 7.5%	421 11.2%	755 20.1%	1209 32.3%	945 25.2%	136 3.6%	3.59	4	1.21	-0.61	-0.53	3747
Overall, this forecast information is too confusing for me to use.	243 6.5%	773 20.6%	612 16.3%	912 24.3%	1132 30.2%	75 2.0%	3.52	4	1.30	-0.37	-1.13	3747
The probabilistic forecast over the 12-hour time period is hard to understand.	130 3.5%	572 15.3%	602 16.1%	1163 31.0%	1204 32.1%	76 2.0%	3.75	4	1.17	-0.61	-0.69	3747
Having the different probabilities of precipitation stacked on top of each other is confusing.	130 3.5%	480 12.8%	516 13.8%	1103 29.4%	1414 37.7%	104 2.8%	3.88	4	1.17	-0.79	-0.43	3747

Socio-Demographic Characteristics

About You and Your Household

The remaining survey questions are about you and your household. This information will be used to help group your responses with responses of others. You do not have to answer any question you are uncomfortable answering. All of your responses will remain anonymous, and your responses will not be reported in a way that can be linked to you.

24. What is your age in years?

Mean	Median	SD	n	# missing
53.47	55.00	12.93	3697	98

25. What is your gender? *Select ONE box.*

Male	Female	n	# missing
1	2		
72.4% 2716	27.6% 1035	3751	44

26. What is your home 5-digit zip code? [Open-ended](#)

27. How long in years have you lived within 50 miles of your current residence?

Mean	Median	SD	n	# missing
24.82	22.00	17.51	53	3742

28. How many people are there in your household, including yourself?

Mean	Median	SD	n	# missing
2.49	2.00	1.22	72	3723

29. Which of the following best describes the highest level of education you have completed? *Select ONE box.*

Did not complete high school	High school diploma or equivalent	Some college, technical school, or associate's degree	Bachelor's degree	Master's degree	Professional degree or doctorate	Mean (yrs)	Median (yrs)	SD (yrs)	n	# missing
1	2	3	4	5	6					
0.3% 9	4.4% 149	25.8% 873	34.2% 1156	22.9% 775	12.3% 417	16.49	16.00	2.64	416	3379

30. What is your present employment status? *Select ALL that apply to you.*

Sub-question	No	Yes
	0	1
Employed full time	43.1% 1636	56.9% 2159
Employed part time	88.1% 3345	11.9% 450
Retired	74.2% 2817	25.8% 978
Homemaker	96.2% 3652	3.8% 143
Student	96.6% 3665	3.4% 130
Unemployed	96.6% 3666	3.4% 129
In Armed Forces	99.4% 3774	0.6% 21

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31. Which of the following best describes your race? *Select ALL that apply to you.*

Sub-question	No	Yes
	0	1
White	7.9% 299	92.1% 3496
Black or African American	99.5% 3775	0.5% 20
American Indian or Alaska Native	98.5% 3738	1.5% 57
Asian	99.2% 3765	0.8% 30
Native Hawaiian or other Pacific Islander	99.8% 3788	0.2% 7
Other	97.8% 3713	2.2% 82

32. Are you of Hispanic, Latino, or Spanish origin? *Select ONE box.*

No, not of Hispanic, Latino, or Spanish origin	Yes, Mexican, Mexican American, Chicano	Yes, Puerto Rican	Yes, Cuban	Yes, another Hispanic, Latino, or Spanish origin please specify	n	# missing
1	2	3	4	5		
98.3% 3463	0.7% 23	0.2% 8	0.1% 4	0.7% 25	3523	272

33. What is your primary language?

English	Spanish	Other	n	# missing
1	2	3		
99.5% 3568	0.2% 6	0.4% 13	3587	208

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34. What was your total household income for 2010 before taxes? *Select ONE box.*

Under \$15,000	1	\$7500	3.0% 98
\$15,000 to \$24,999	2	\$22500	4.3% 140
\$25,000 to \$34,999	3	\$30000	6.5% 209
\$35,000 to \$49,999	4	\$42500	10.9% 350
\$50,000 to \$74,999	5	\$62500	21.1% 680
\$75,000 to \$99,999	6	\$87500	18.9% 609
\$100,000 to \$124,999	7	\$112500	15.1% 486
\$125,000 to \$149,999	8	\$137500	8.1% 262
\$150,000 to \$199,999	9	\$175000	6.2% 199
\$200,000 or more	10	\$200000	5.9% 191
N			3224
# missing			571

35. If you have any further comments, please write them below. [Open-ended](#)

We greatly appreciate the time you took to complete this survey. Thank you!