

HAZARD IDENTIFICATION

ALAMO AREA COUNCIL OF GOVERNMENTS
REGIONAL MITIGATION ACTION PLAN UPDATE

6.5.9 Winter Storms

6.5.9.1 Hazard Identification

Description of the Winter Storm Hazard

A winter storm can range from a moderate snow over a period of a few hours to blizzard conditions with blinding wind-driven snow that lasts for several days. Some winter storms may be large enough to affect several states, while others may affect only a single community. Many winter storms are accompanied by low temperatures and heavy and/or blowing snow, which can severely impair visibility.

Winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Sleet—raindrops that freeze into ice pellets before reaching the ground—usually bounce when hitting a surface and do not stick to objects; however, sleet can accumulate like snow and cause a hazard to motorists. Freezing rain is rain that falls onto a surface with a temperature below freezing, forming a glaze of ice. Even small accumulations of ice can cause a significant hazard, especially on power lines and trees. An ice storm occurs when freezing rain falls and freezes immediately upon impact. Communications and power can be disrupted for days, and even small accumulations of ice may cause extreme hazards to motorists and pedestrians.

A freeze is weather marked by low temperatures, especially when below the freezing point (zero degrees Celsius or thirty-two degrees Fahrenheit). Agricultural production is seriously affected when temperatures remain below the freezing point.

Severity of the Winter Storm Hazard

The National Weather Service (NWS) uses a variety of advisories, watches and warnings to measure the severity of impending winter storms. These products also help to advise the public, and to allow for emergency planning.

A Winter Weather Advisory is issued by the NWS when a low pressure system produces a combination of winter weather (snow, freezing rain, or sleet) that presents a hazard, but does not meet warning criteria. A Winter Weather Advisory is similar to significant weather alert, though a winter weather advisory is an official product. A "Winter Weather Advisory" means that a period of winter weather will make traveling difficult.

A Winter Storm Watch is issued by the NWS when there is a potential for heavy snow (6 or more inches) or significant ice accumulations. The watch is usually issued at least 24 to 36 hours before the storm's arrival in the area. The criteria for this watch can vary from place to place.

A Winter Storm Warning is a statement made by the NWS which means a winter storm is occurring or is about to occur in the area, usually within 24 hours. Generally, a Winter Storm Warning is issued if at least 4 to 6 inches or more of snow or 3 inches or more of snow with a large accumulation of ice is forecast. In the Southern United States where winter weather is far less common, warning criteria is lower. Usually, a large accumulation of ice alone with no snow will result in an Ice Storm Warning, or in the case of light freezing rain, a Winter Weather Advisory, a Freezing Rain Advisory, or Drizzle Advisory.

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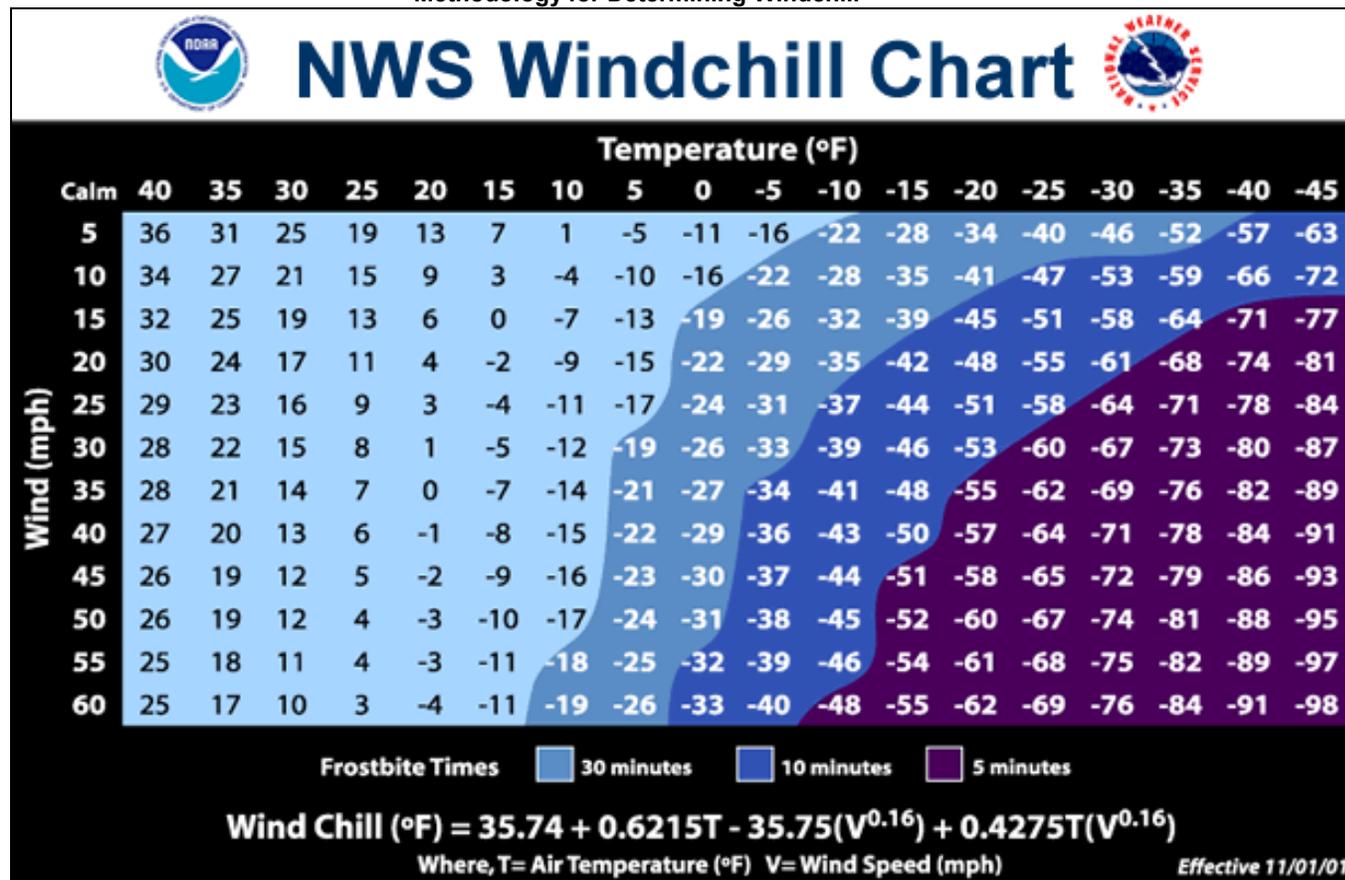
A Blizzard Watch is an advisory issued by the NWQ which means winds greater than 35 MPH, mixed with falling or blowing snow, and visibilities of ¼ mile or less is forecast for a period of 3 hours or more. A blizzard watch is issued 36 to 12 hours before an expected blizzard event.

A Blizzard Warning is an advisory issued by the NWS which means sustained winds or frequent gusts of 35 mph or greater with heavy snow is forecast for a period of 3 hours or more. A blizzard tends to reduce visibilities to 1/4 of a mile or less. A Severe Blizzard Warning is a variety issued in some cases of winds above 45 mph and temperatures below 10°F. Many local weather offices will activate the Emergency Alert System and broadcast the alarm tone on relevant NOAA Weather Radio stations for both varieties of warning.

The NWS also uses a scale to determine the wind chill. Wind chill (often called the wind chill factor) is the felt air temperature on exposed skin due to wind. It measures the effect of wind on air temperature. The wind chill temperature is usually lower than the air temperature, since the air temperature is usually lower than the human body temperature.

Figure 6.5.9.1-1 depicts the National Weather Service's methodology for determining wind chill, using wind speed and actual temperature.

Figure 6.5.9.1-1
Methodology for Determining Windchill



(Source: National Weather Service)

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On average, the planning area can expect to experience the milder to mid-range of the severity scale. Based on previous occurrences, they typically experience Winter Weather Advisories, Winter Storm Watches and Winter Storm Warnings. While Blizzard Watches and Warnings are not impossible in the planning area, they are far less frequent in this part of Texas.

The same is true for wind chill. The planning area generally experiences the temperature range appearing in light blue on the scale, which is the lower end of the range.

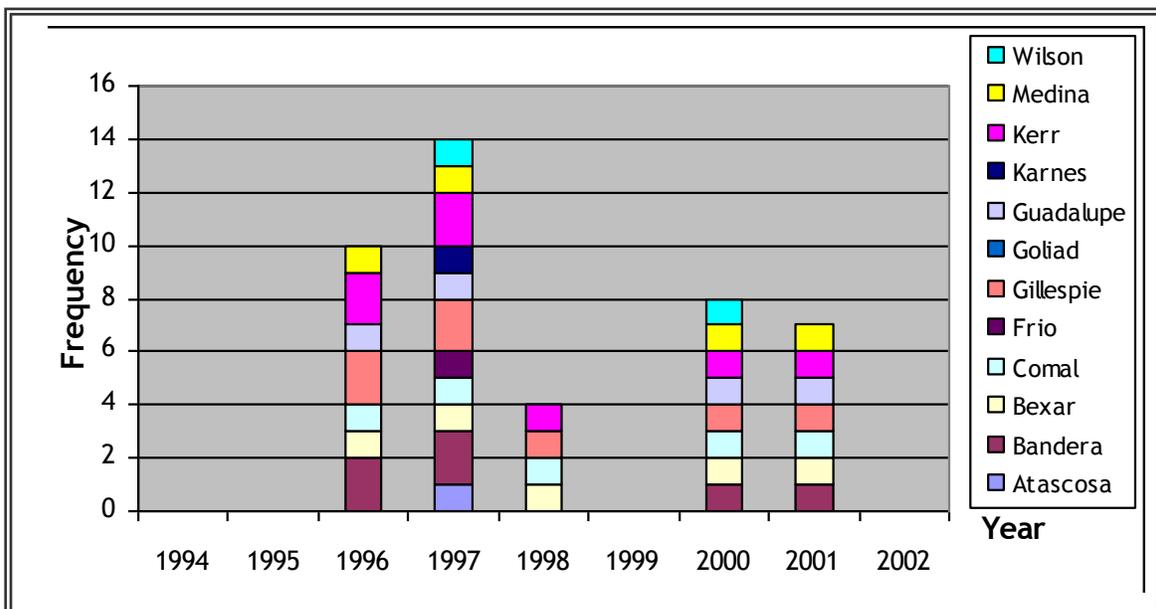
Impact to People and Property from the Winter Storm Hazard

Although relatively infrequent, severe winter storms can cause significant damage when they occur. Being in south central Texas, many counties in the planning area do not have the supplies or equipment for a proper response to a winter storm. Therefore, any winter storm can have a dramatically intense impact on everyday life, though the impacts tend to be short lived. Slick or iced-over roadways can lead to hazardous travel, particularly to a population that is relatively unaccustomed to travel in such conditions. Ice can accumulate on power lines, and lead to widespread, and sometimes long-term, power outages, which can significantly impact vulnerable populations. Similarly, ice can accumulate on tree limbs, and lead to toppled trees or fallen limbs, which can land on structures and damage roofs.

Occurrences of the Winter Storm Hazard

Figure 6.5.9.1-2 shows the frequency of winter storm events in the planning area from 1996 - 2002. Historical records of winter storms prior to 1996 are incomplete.

Figure 6.5.9.1-2
Frequency of Recent Winter Storm Events



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Significant or notable winter storm events since 2000 are discussed below. This list is not intended to be exhaustive of all events; rather, it is representational.

12/12/2000

Temperatures plunged rapidly into the 40s and 50s shortly after a cold front's arrival. Northerly winds gusting to 30 and 35 MPH further emphasized this dramatic temperature change. By mid-afternoon, temperatures over the Texas Hill Country had fallen below the freezing mark and light rain and drizzle had begun to change into freezing rain and freezing drizzle. The combination of freezing rain, freezing drizzle, and sleet continued to spread across Bandera, Bexar, Comal, Gillespie, Guadalupe, Kerr, Medina and Wilson counties, forcing the closing of numerous bridges and overpasses. Storm damage generally consisted of accidents on slick roads and trees and tree limbs toppling over on power lines.

11/29/2001

Very frigid arctic air moved southward into South Central Texas, as an upper level disturbance approached from the west. The disturbance began to produce widespread rain and showers that became a combination of sleet and snow as it fell through the cold near-surface air in Bandera, Bexar, Comal, Gillespie, Guadalupe, Kerr and Medina counties. Ice was reported up to an inch thick over the area and hundreds of automobile accidents were reported. Snow accumulation was two (2) inches in Hunt, in west central Kerr County.

December 2004 – White Christmas in Southern Texas and Northern Mexico

This was the first white Christmas ever experienced by locations in southern Texas and in Northern Mexico. Cold, arctic air pushed south into Texas with the passage of a cold front. The front, which came from over the Rocky Mountains, passed through the Brownsville area on the 22nd. Another reinforcing shot of cold air came down from the north on the 23rd, and although rain was the only precipitation type reported with it, things were about to change. With the cold air now trapped at the surface, the combination of moisture in the atmosphere and an upper-level low that moved over the area from New Mexico caused snowfall to breakout on Christmas Eve. By the time residents awoke in the morning, the ground was covered in white, with snowfall totals ranging from 1.5 inches in Brownsville to 11 inches in Victoria. Although the snow was a pleasant surprise for most residents, it did create hazardous conditions for drivers that are very unaccustomed to winter weather conditions. The storm was blamed for at least three traffic deaths along with numerous other automobile accidents. Off the roads however, it was a different story, as many kids enjoyed building their first snowman or having their first snowball fight.

Probability of Future Occurrences of the Winter Storm Hazard

Probability has not been mapped but it can be assumed based on past events that winter storms will impact the region in the future and the entire region is vulnerable to these events. Based on historic occurrence, the probability of a future occurrence is low.

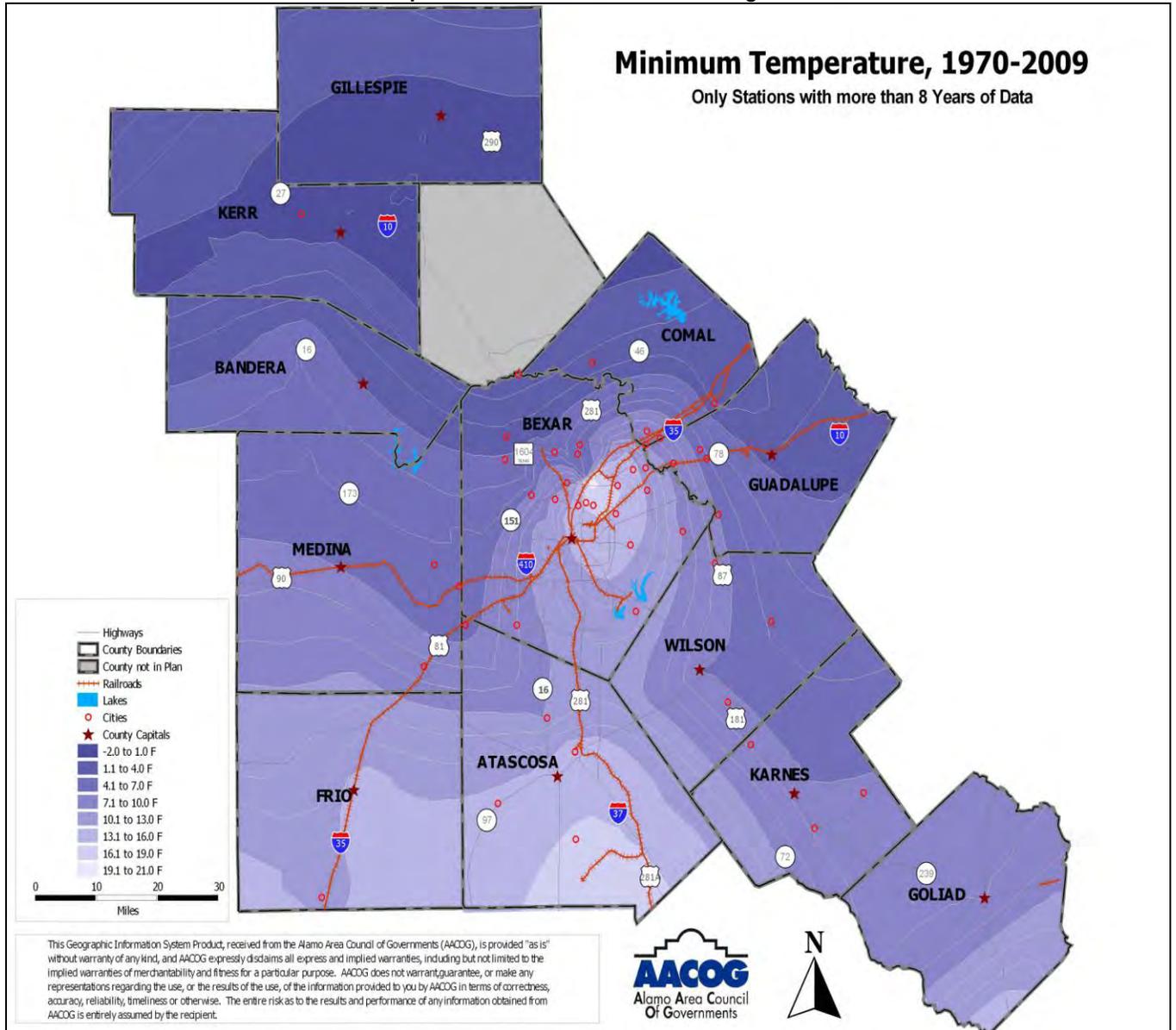
Location and Extent of the Winter Storm Hazard

Past events have not been mapped because each event generally affects the entire region uniformly. Map 6.5.9.1-1 shows the minimum temperatures recorded in the planning area between 1970 and 2009.

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Map 6.5.9.1-1
Minimum Temperatures Recorded in the Planning Area



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6.5.9.2 Risk Assessment

This subsection of the Plan Updates provides estimates of future winter storm losses, i.e. risk. Each of the loss calculations is based on best available data, but they must be considered estimates because highly detailed engineering was not performed as part of this planning process.

Methodology and Limitations

After discussion and review of the best available data regarding this hazard, and in consideration of the potential impacts of this hazard to the planning area, the EMC determined that the risk assessment should be limited to a qualitative analysis. At the time of this update, insufficient data exists to quantify the planning area's risks from and exposure to this hazard.

Qualitative

Each participating jurisdiction was asked to provide a qualitative risk assessment ranking regarding the winter storm hazard. (For definitions of these rankings, please see Table 6.4-1, earlier in this section.) The results of this assessment are presented in the table below.

**6.5.9.2-1
Qualitative Risk Assessment Results – Winter Storm**

Jurisdictions Ranking Hazard as Low		Jurisdictions Ranking Hazard as Moderate	Jurisdictions Ranking Hazard as High
Atascosa County	Frio County	City of Converse	
City of Charlotte	Gillespie County	City of Leon Valley	
City of Christine	City of Fredericksburg	City of San Antonio	
City of Jourdanton	City of Schertz	City of Terrell Hills	
City of Lytle	Karnes County	City of Universal City	
City of Pleasanton	City of Karnes	City of Von Ormy	
City of Poteet	City of Runge	Comal County	
Bandera County	City of Falls City	City of Garden Ridge	
City of Bandera	City of Kerrville	City of Bulverde	
Bexar County	Medina County	City of New Braunfels	
City of Alamo Heights	City of Castroville	City of Dilley	
City of Balcones Heights	City of Devine	City of Pearsall	
City of Helotes	City of Hondo	Guadalupe County	
City of Kirby	City of Natalia	City of New Berlin	
City of Live Oak	Wilson County	City of Seguin	
City of St. Hedwig	City of La Vernia	City of Kenedy	
City of Somerset	City of Stockdale	Kerr County	
City of Windcrest	San Antonio River Authority	City of Ingram	

Data to collect in order to improve this methodology prior to the Plan Update includes:

- Information on infrastructure, particularly power lines.

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Risk Assessment Conclusions

The majority of participating jurisdictions consider the impacts from this hazard to be low. This is currently not a high priority hazard for the planning area.