

January 20-22, 2025 Cold Weather and Ice Event

For Third Winter in a Row, a Widespread Hard Freeze Impacts the Rio Grande Valley

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Figure 1: A photo showing significant ice accretion on trees and lines in Zapata county, TX on Tuesday, Jan 21 2025
(Credit: Spectrum News)

Overview

Between January 20th and early January 22nd, 2025, an arctic air mass moved through all of Texas and deep into northern and eastern Mexico. The primary impacts to the Valley were a period of dangerously cold “feels-like” temperatures during the morning of the 21st, and a one-day widespread hard freeze during the late night and early morning of the 22nd. Joining the impacts was a period of freezing drizzle, mixed in with some sleet in some areas. Prolonged freezing drizzle left ice accretion across the ranchlands of northern Zapata (**Figure 1**), Jim Hogg, Brooks, and Kenedy County from the 20th through late morning/midday on the 21st, with a shorter period of less-impactful freezing drizzle and a thinner ice glaze across the Rio Grande Valley mainly west of IH-69E/US 77. Strong winds, courtesy of the difference between developing low pressure just east of the Lower Texas coast and a very strong high pressure ridge building into south Texas, reached 40 to 50 mph along and east of IH-69E, mainly in Willacy and Cameron County. Winds gusted between 30 and 40 mph in Hidalgo County.

In a sense, the event was similar to the [January 15th-17th, 2024](#), arctic outbreak, including its start on (celebrated) the Martin Luther King holiday, its peak on the second day (wind chill and overall cold), and a final morning of a fairly widespread hard freeze. Aside from the impacts related to the more widespread icing this time, general impacts were also similar.

The Event: Freezes, “Feels Like Temperatures”, and Ice

Freezes:

January 20th: A light freeze occurred across the south Texas Brush Country and Coastal Plains, which extended south to northern Zapata, Jim Hogg, Brooks, and Kenedy County. Temperatures fell to or just below 32 degrees.

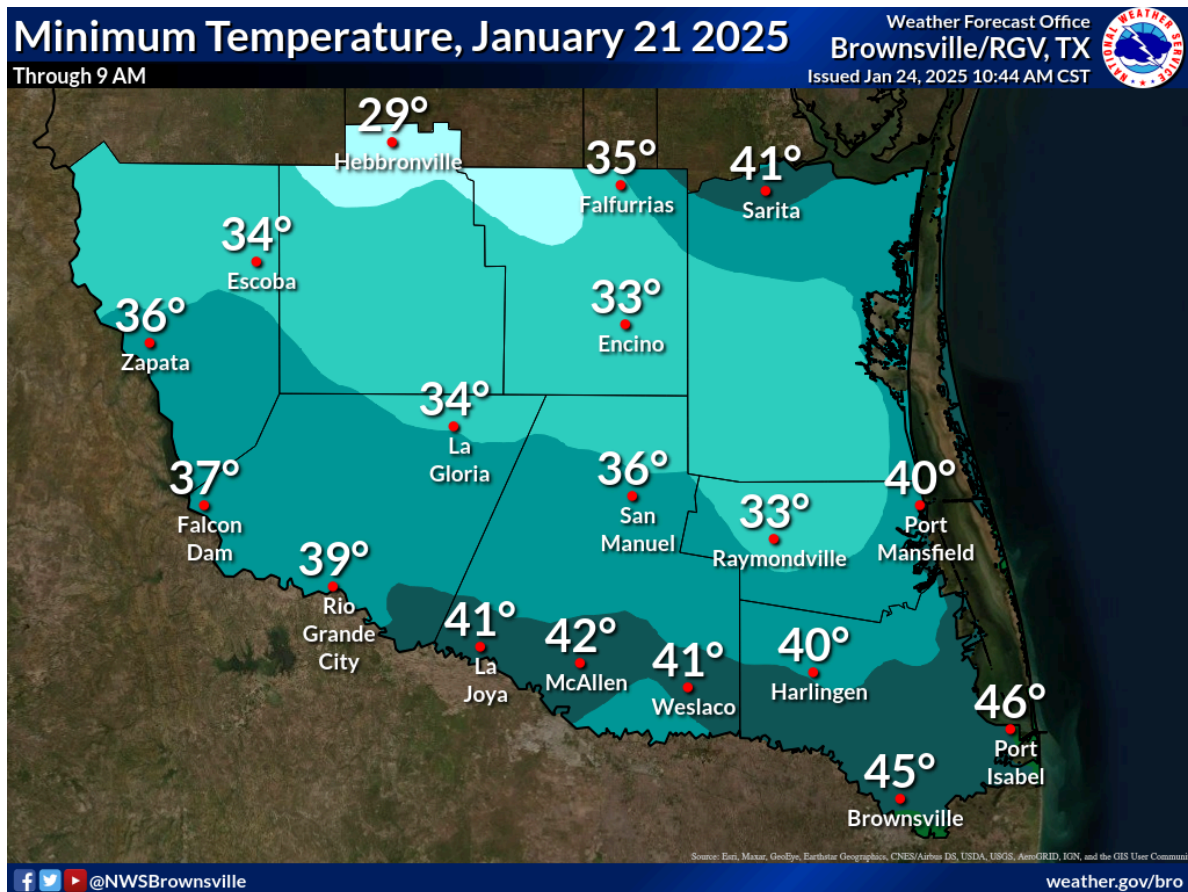


Figure 2: Measured and estimated minimum temperature for January 20th, 2025.

January 21st: A more widespread freeze occurred across all areas except areas in Willacy and Cameron County near the coast. For most areas, temperatures fell to between 30 and 32 degrees, with pockets of the Brush Country and Rio Grande Plains dipping into the upper 20s.

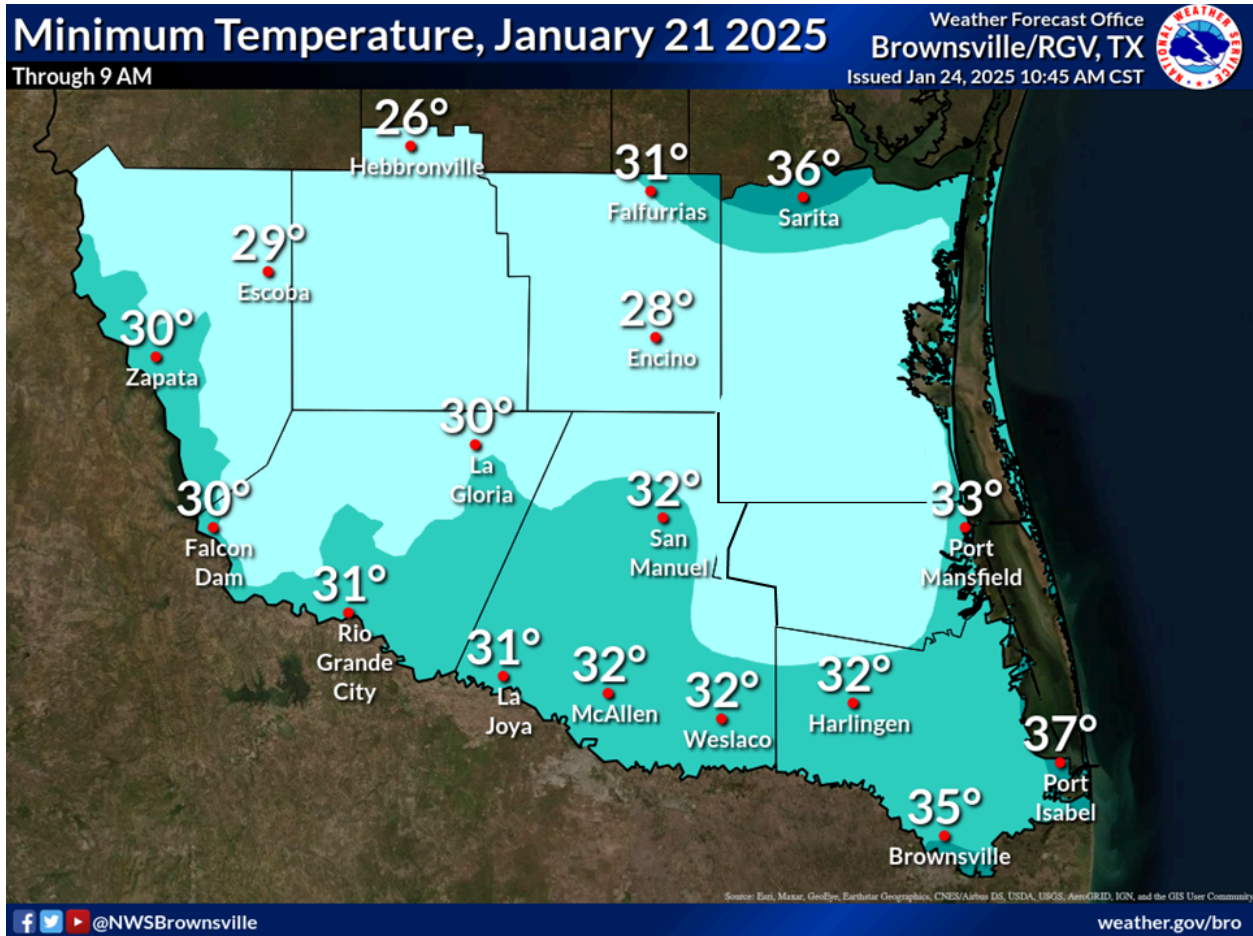


Figure 3: Same as Figure 2, except for January 21, 2025.

January 22nd: A widespread **hard** freeze (temperatures ≤ 27 degrees for 2 hours or more) covered all but areas along/east of IH-69E/US 77 in Cameron and Willacy, as well as the urban center of McAllen. Elsewhere, freezing temperatures (28 to 32 degrees) occurred, including near the beaches.

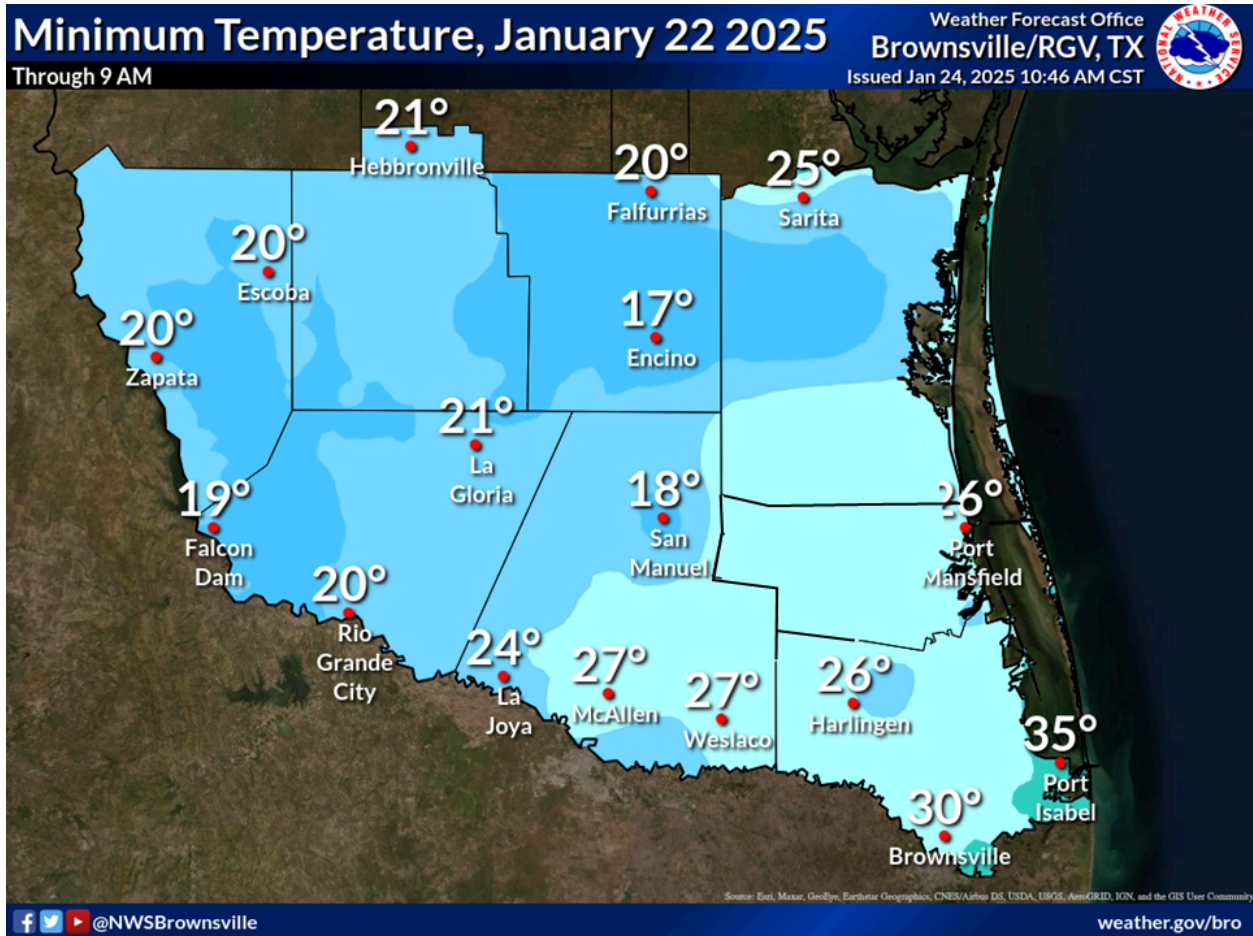


Figure 4: Same as Figure 3, except for January 22, 2025.

“Feels Like” Temperatures (Wind Chill)

January 21st: Wind chill values fell into the “Extreme Cold” territory (20 degrees or lower for the Rio Grande Valley counties) from the pre-dawn hours through noon, with values only rising into the 20s to near 30 for the remainder of the day.

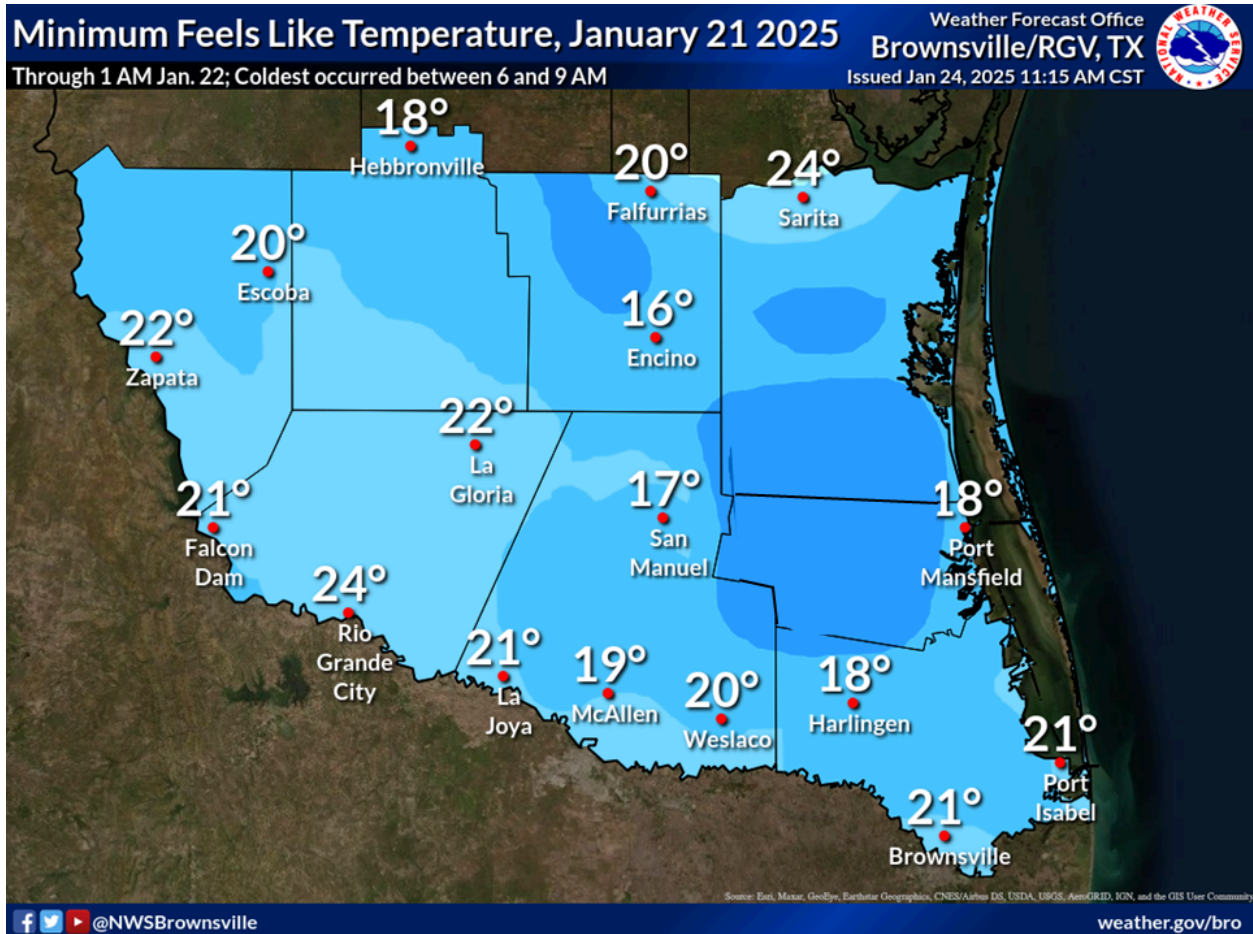


Figure 5: Measured and estimated minimum wind chill for January 21, 2025. Darker blue shading indicates estimated values around 15 degrees.

Icing

Based on reports and estimates, peak icing occurred for the longest duration across the Brush Country ranchlands of northern Zapata, northern Jim Hogg, and northern Brooks County (and likely northwest Kenedy County) from around midnight through 9-10 AM on the 21st. Some initial minor icing also occurred during the morning and early afternoon of the 20th between Falfurrias and west of Hebbronville. Due to treatment of elevated roads by the Texas Department of Transportation, as well as relatively warm roads, ice accretion was largely limited to tree limbs, fences, grass blades, elevated walking surfaces, etc. In total, ice accretion was as follows:

- **Northern Zapata through northern Kenedy:** one-quarter to three-eighths of an inch - mostly on tree limbs, fence posts, grass blades, etc - across the Rio Grande Plains and Brush Country areas
- **Southern Zapata through Starr, Hidalgo, and western Willacy/southern Kenedy:** one-eighth to one-quarter inch accretion. **Western Cameron, Willacy** (away from the coast): Less than one-eighth an inch of accretion - a very light glaze.

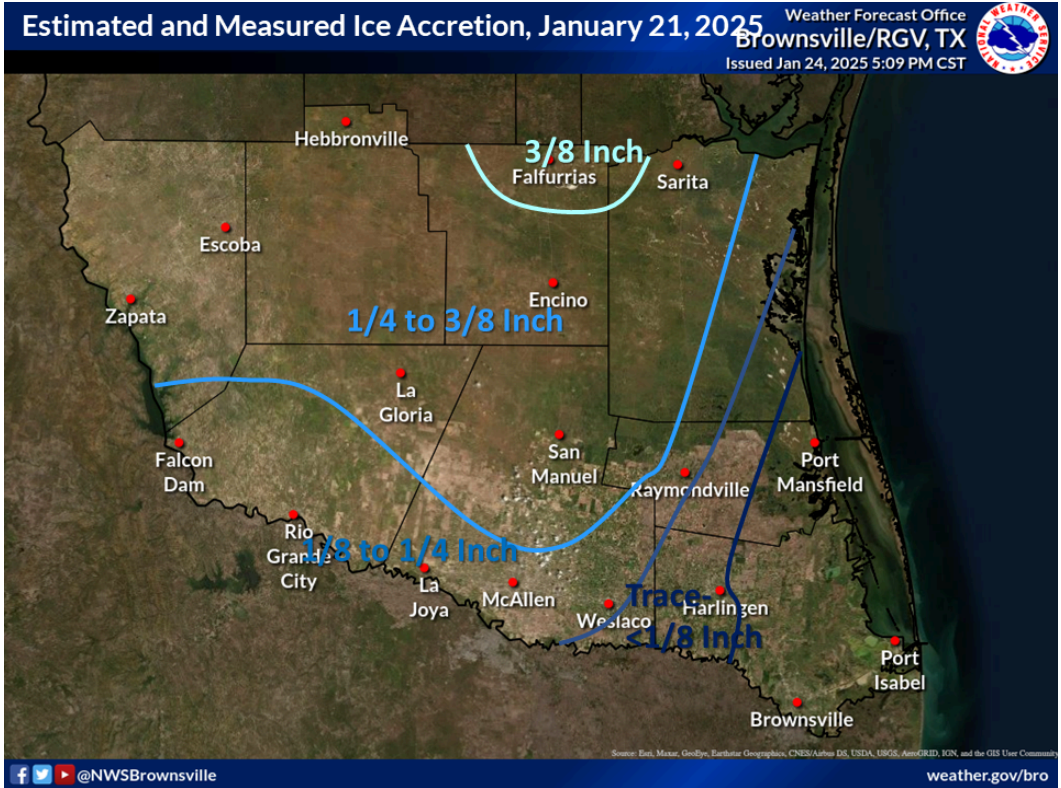


Figure 6: Measured and estimated ice accretion by early-mid morning, January 21, 2025

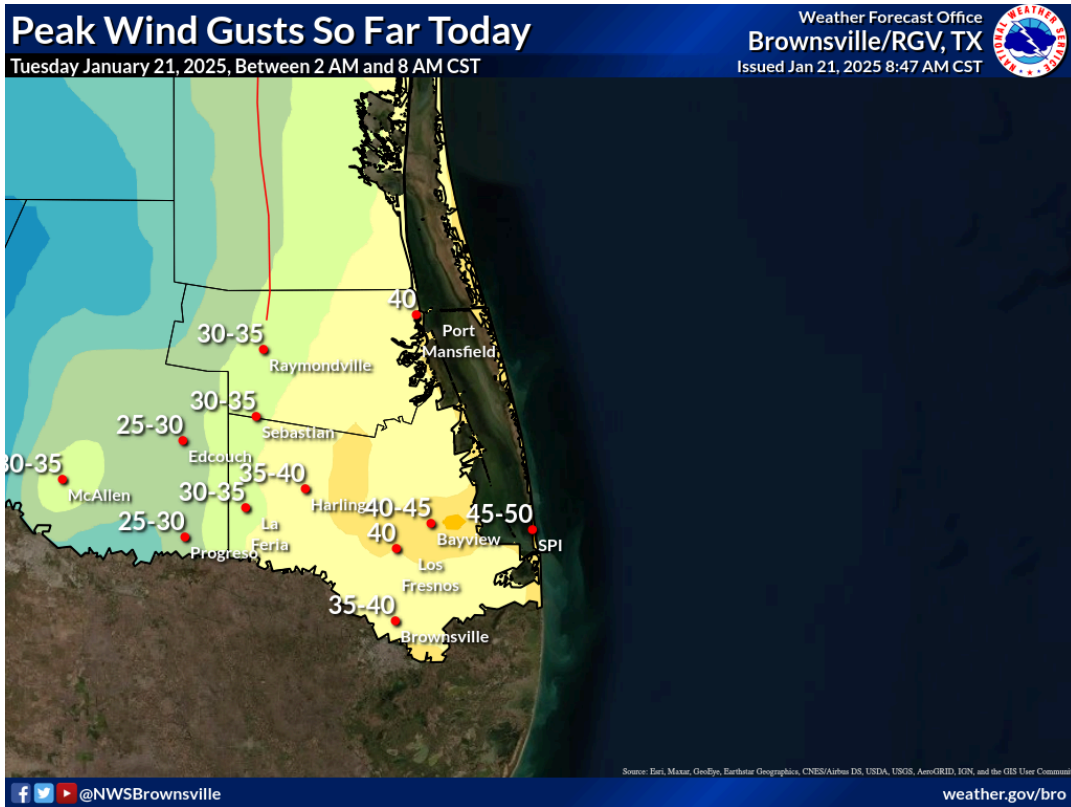


Figure 7: Measured and estimated peak wind gusts through mid morning, January 21, 2025

Actions and Impacts

Note: The following are initial protective actions, and known impacts based on reports received through midday January 24th, 2025. Additional impacts will be provided as we receive them, and a full report will be available in a future StoryMap (example from December 22-24, 2022) to be published later this winter.

Schools: Most schools across Hidalgo and Cameron County closed on January 21st, and had a two to three hour delayed opening on the 22nd. The primary reason for closure was due to prolonged extreme cold (“feels like” temperature) as well as the potential for elevated road icing on untreated secondary roads on the 21st, with the cold start triggering delays on the 22nd.

Shelters: Nearly 20 shelters were opened to provide heated spaces to persons who might be otherwise exposed to the cold. This included at least seven in Cameron County, eight in Hidalgo County, and two each in Willacy and Starr County.

Power: The combination of wind-driven rain and freezing rain and high residential usages contributed to scattered power outages across the region. At the peak of the outages - mid morning on the 21st - between 22 and 24 thousand customers were without power in the Valley/Deep S. Texas ranchlands. 15 to 17 thousand were located in Hidalgo, but nearly 75% of residents in Jim Hogg (mainly Hebbronville) were without power at the peak of the event, mid morning of the 21st.

Icing: Excellent work to brine (treat roads with salt solution) prior to and during the initial wet period kept elevated highways largely ice-free. The one known exception was in western Hidalgo County, where minor icing along the IH-2 (elevated) bypass around La Joya temporarily closed the highway during the early to mid morning hours.

Marine Life: A minor to moderate sea turtle “cold stun” event occurred from Lower Laguna Madre to the nearshore waters of the Gulf, where sea surface temperatures fell to or below 50 degrees for several periods between the 21st and 24th. As of the 25th, a little more than 375 stunned turtles had been rescued. This number was higher than the December 22-24, 2022 rescue, but a bit lower than the January 15-17, 2024 rescue. The turtles were rehabilitated and released on Sunday, January 26, 2025.

Meteorology

An amplified ridge that developed over Alaska associated with a negative Eastern Pacific Oscillation (EPO) index allowed for cross-polar flow of an Arctic air mass from Siberia (**Figure 8**) to drop down into the Central and Southern Plains. This is a case of the well-documented McFarland Signature, which is characterized by a shortwave omega block superimposed on a long-wave ridge through central Alaska with a deep low between Hudson Bay and Greenland (**Figure 9**). At the surface, the expansion of a 1045 mb surface high over the plains resulted in a major Arctic outbreak and led to the coldest temperatures of the season and widespread freeze across the Rio Grande Valley (RGV) and the Deep South Texas ranchlands. In addition, a wave

of low pressure developed off the South Texas coast (**Figure 10**), leading to a period of precipitation beginning on Monday afternoon. As arctic air continues to surge southward behind the deepening low pressure system, a cold drizzle/rain switched over to freezing drizzle/light freezing rain, first across the ranchlands of northern Zapata, Brooks, and Jim Hogg County, then the upper RGV overnight. By the pre-dawn into early morning hours on Tuesday, the freezing line has expanded southeastward into Hidalgo and inland Cameron counties, leading to a hazardous early morning commute. While there were reports of sleet and even a few wet snowflakes or flurries, the predominant precipitation type was freezing drizzle/rain. This was because there was a deep warm layer aloft, as shown by the Jan 21, 2025 1200 UTC (6 AM CST) observed sounding from Brownsville (**Figure 11**). This resulted in falling snowflakes to melt completely before reaching the surface, and then refreezing upon contact with sub-freezing surfaces (**Figure 12**). While the RGV/Deep South Texas ranchlands did not get the kind of once-in-a-generation historic snowfall like the Central and Eastern Gulf Coast, we saw 0.25 to 0.38 inches of ice accretion across the northern Zapata through Kenedy County ranchlands into the upper RGV (**Figure 6, above**) and a light glaze to a few hundredths of an inch across the mid/lower RGV, which was in line with our forecast (**Figure 13**). And as the pressure gradient tightened overnight, 40-50 mph winds developed over the coastal counties (**Figure 7, above**), leading to dangerous wind chill values in the mid teens to low 20s on Tuesday morning (**Figure 5, above**). The precipitation ended from west to east by mid to late morning, as the coastal trough moved away from the South Texas coast and eastward into the central and eastern Gulf coast. As Arctic high pressure built in and became centered over Texas (**Figure 14**), excellent radiational cooling led to a widespread hard freeze across the entire region on Wednesday morning (**Figure 4, above**).

NOAA HYSPLIT MODEL
 Backward trajectory ending at 2100 UTC 21 Jan 25
 12 UTC 14 Jan GFSG Forecast Initialization

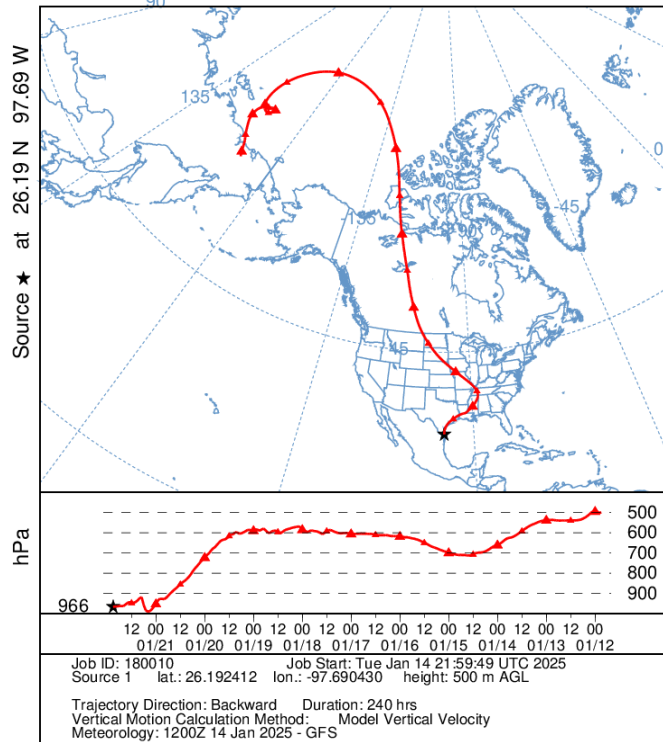


Figure 8: NOAA HYSPLIT model showing the Siberian origins of the major Arctic outbreak that impacted the Rio Grande Valley (RGV and Deep South Texas ranchlands from Jan 20-22, 2025).

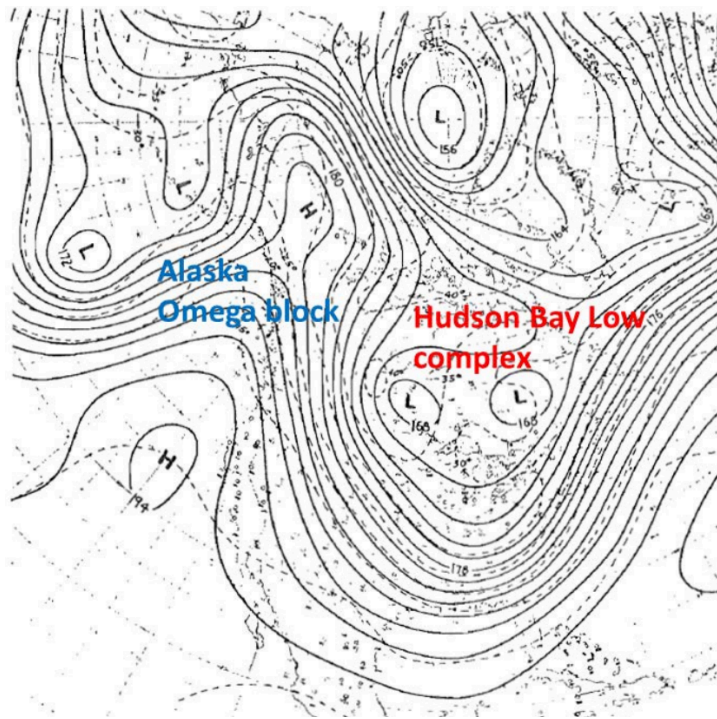


Figure 9: A schematic showing the McFarland Signature (1976) with an Alaska omega block and the Hudson Bay low that is typically associated with major Arctic outbreaks for the RGV and Deep South Texas ranchlands.

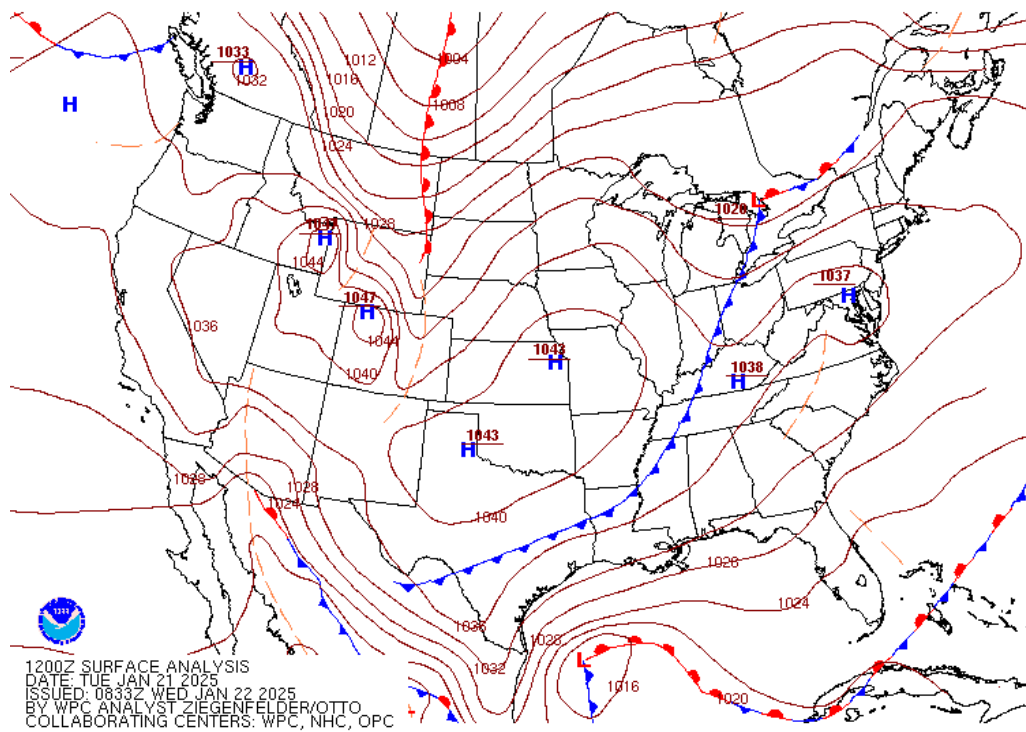


Figure 10: WPC surface analysis showing a coastal low pressure developing east of the Texas/Mexico border on the morning of Tuesday, Jan 21 2025.

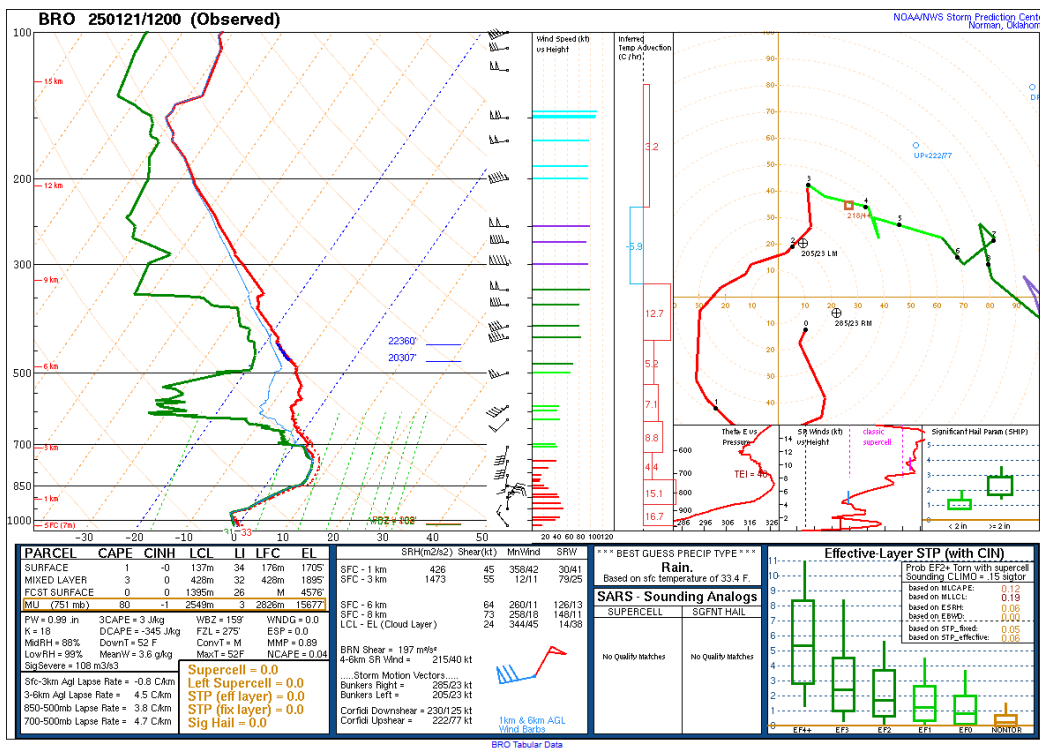


Figure 11: Jan 21 2025, 12z (6 AM CST) observed sounding or balloon launch by NWS Brownsville, TX showing a very deep warm nose (above freezing layer) aloft and a classic freezing rain/drizzle setup. Note that there was more drizzle across inland Cameron county and Hidalgo county due to the abundance of dry air above 700mb.

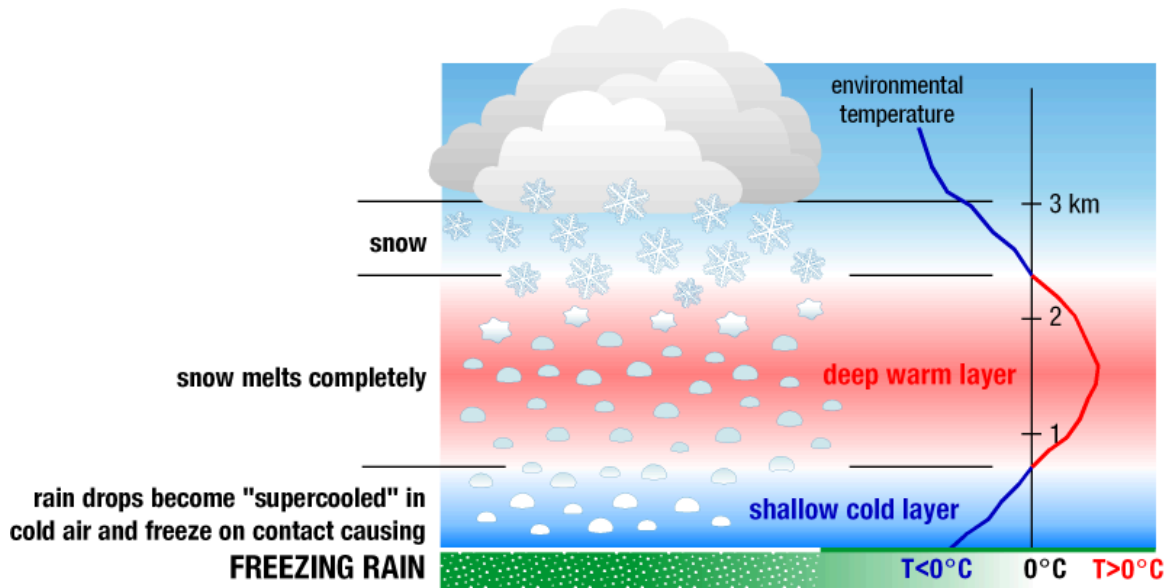


Figure 12: A graphic showing an idealized atmospheric setup for freezing rain (Credit: NWS NSSL)

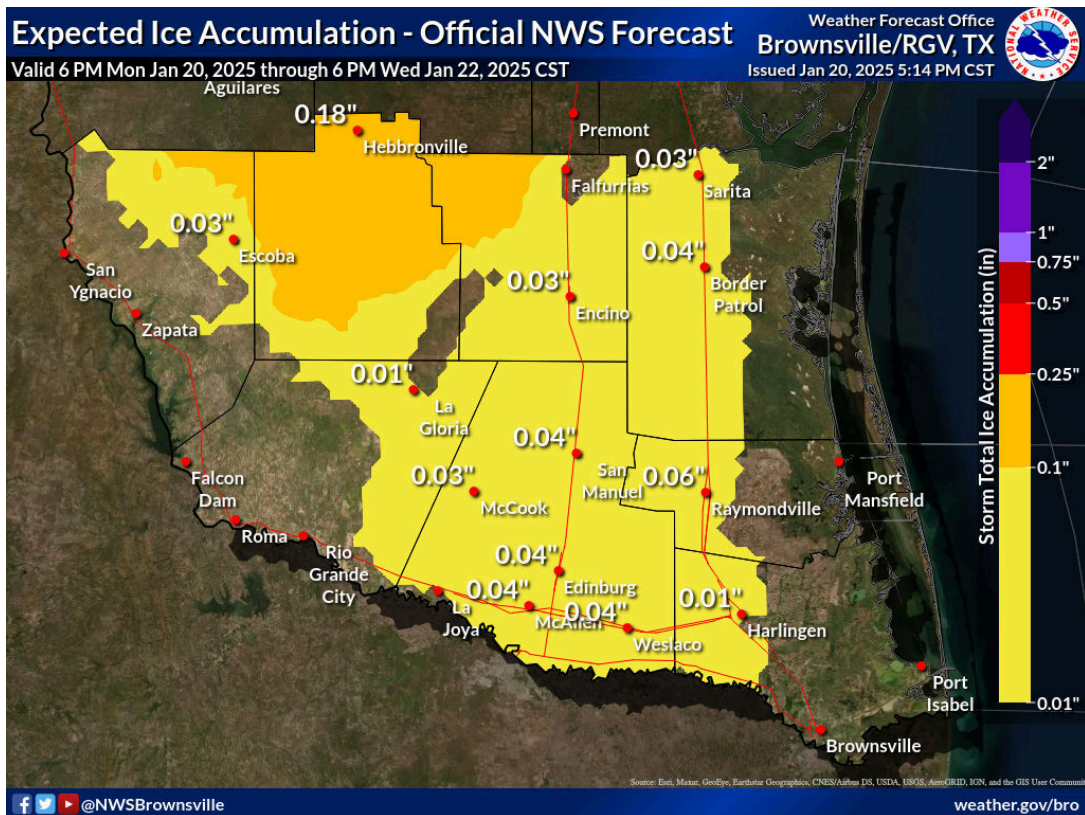


Figure 13: NWS Brownsville/RGV's ice accretion forecast issued on Monday, Jan 20 2025.

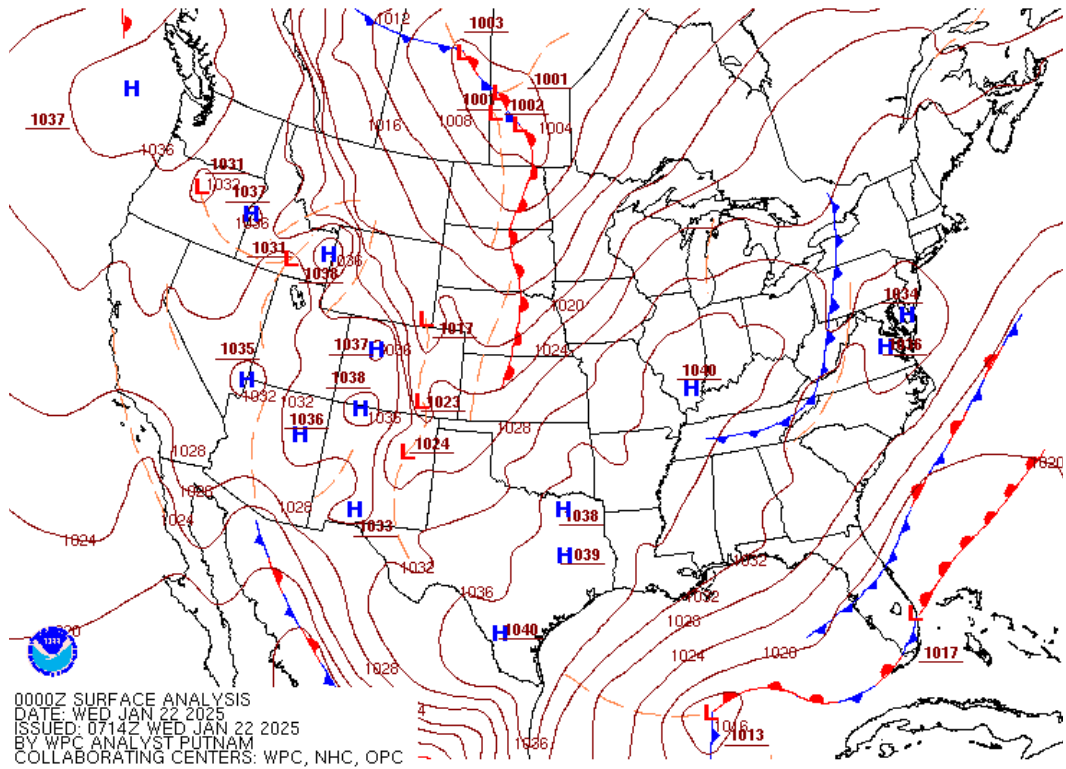


Figure 14: WPC surface analysis showing Arctic high pressure centered over Texas on the morning of Wednesday, Jan 22 2025.