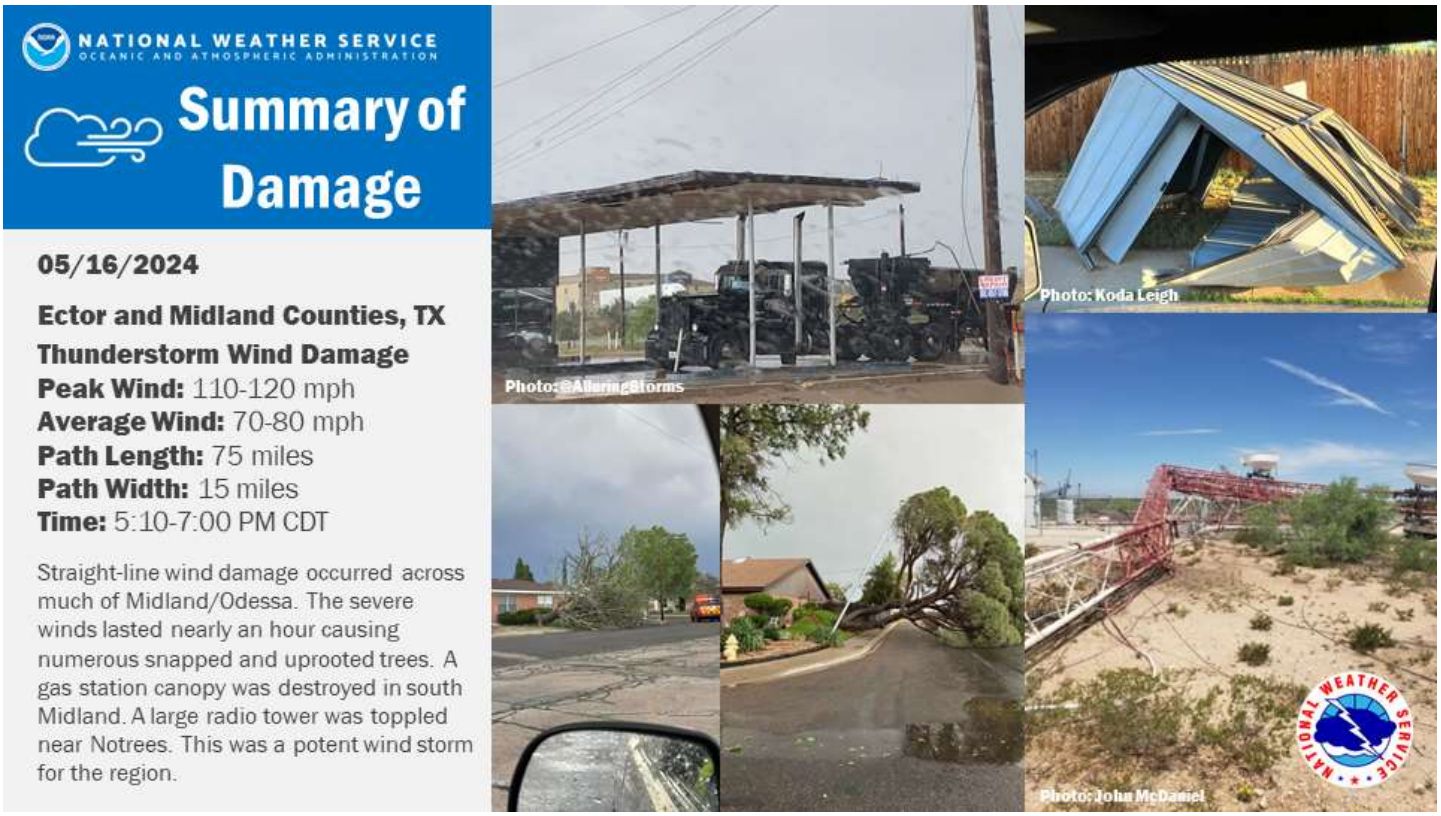
May 16th, 2024 Severe Weather



A potent weather system brought severe weather to much of the Permian Basin on May 16th. A stalled cold front roughly along the Pecos River helped focus thunderstorm development behind the front across the Permian Basin. The core of the upper-level jet was over the region during this event. Southwest winds were between 40-50 kts at 500 mb (mid-levels) and 90-100 kts at 300 mb (upper-levels). Temperatures aloft were relatively cold as a trough approached the area. Temperatures at 500 mb were around -10 C with temperatures at 300 mb around -40 C. While temperatures were cold aloft, the airmass was fairly stable at the low-levels as the Permian Basin was behind a cold front during this event. With that said, lapse rates were around 8 C/km above this frontal inversion and helped generate modest but sufficient elevated instability. Several factors possibly led to the severity and extended duration of the severe winds. Numerous thunderstorms further to the west likely contributed to a strengthening cold pool behind the line of thunderstorms that impacted the Permian Basin. At the same time, the trough began to pivot across the region and this may have allowed for some of the stronger winds and cold air aloft to descend into the rear of this line

of thunderstorms. Large amounts of rain and hail caused substantial cooling within the line of thunderstorms further influencing the strength of the cold pool. This strong cold pool developed what is known as a wake low behind our line of thunderstorms likely increasing the strength and duration of the winds. It is difficult to say what all contributed to the winds experienced during this event but one or more of the above factors likely played a role. Above is a summary of some of the damage observed with the line of thunderstorms and below is a look at the severe hail that was observed.