



The Dryline

The Official Newsletter of the National Weather Service in Amarillo

Winter Edition
January 2011

Early Season Winter Storm Hits the Panhandles

By Christine Krause, Forecaster

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On November 11th and 12th, 2010, a slow moving upper level storm system moved out of the desert southwest and into the Central Plains. As this system approached from the west, a cold front was steadily making progress to the south through the Panhandles. The atmosphere was becoming increasingly unstable as temperatures were rapidly cooling off in the middle levels of the atmosphere; while at the same time, low and mid-level moisture was increasing across the area. A line of thunderstorms developed along the cold front that was situated from the southern Texas Panhandle to the northeast Oklahoma Panhandle. Since there was an extremely moist air mass situated over the Texas and Oklahoma Panhandles, these storms produced heavy rainfall during the evening of the 11th. Amarillo was greatly impacted as the storms over

southwest Amarillo were aligned to the upper level winds, resulting in a series of storms that moved over this area during a relatively short period of time. These storms ended up dumping a daily record 1.60 inches of rain, which is nearly three times the normal amount for November, at the Rick Husband International Airport. However the southwest side ended up receiving 3 to 4 inches of rain. Flash flooding was a by-product of these heavy rains and was reported across portions of the city.



Tree branches weighted down by snow that fell during the early morning hours on November 12th on South Tyler Street in Amarillo. Photo courtesy of Amarillo Globe News.

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Early Season Winter Storm Hits the Panhandles

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Specifically, Interstate 27 had to be closed from Georgia St. to Hillside Rd. as the high water left numerous cars stranded while authorities had to perform high water rescues in the central and southern parts of town.

Early Friday morning, temperatures in the middle and upper levels of the atmosphere continued to cool off, further destabilizing the atmosphere. In addition, an area of strong winds aloft was positioned over the Southern Plains, which enhanced the upper lift across the area. Temperatures continued to cool to near the freezing mark overnight as strong north winds developed behind the front. As this colder air surged across the area, the rain transitioned to snow. Snow started in the southwest Texas Panhandle and spread into the central Texas Panhandle. Snowfall totals from this storm ranged from 1 to 3 inches, however, there was a swath of 4 to 5 inches in the southwest Texas Panhandle where mid-level instability contributed to a period of heavy snowfall. During the brunt of this storm, convective snowfall rates were as high as 1 to 2 inches per hour. Snow ended by mid-morning as the system headed east into Oklahoma.

WFO Amarillo Hosts 2nd Decision Support Symposium

On October 26th and 27th, the NWS in Amarillo hosted their second Decision Support Symposium. Forty meteorologists from the National Weather Service combined with sixty participants from the decision making community to discuss the various roles in incident response. Many of the non-NWS participants were from Emergency Management, but there were representatives from the DPS, Fire Department, National Guard, Red Cross, DOT, local police and many others.

WFO Amarillo meteorologist and symposium organizer JJ Brost said, "It was very inspiring to see so many individuals from a variety of backgrounds come together to discuss our shared mission of protecting lives. This was a wonderful opportunity to learn from our partners and discuss how the NWS can be involved in the decision making process."

The symposium consisted of fourteen presentations with topics including: relationship building, preparedness, incident response, societal impacts and many more. In addition to the presentations, the attendees participated in a two hour chemical spill simulation. This simulation provided an opportunity for the participants to not only respond to a high impact situation but to also learn how the ICS (Incident Command Structure) develops and operates.

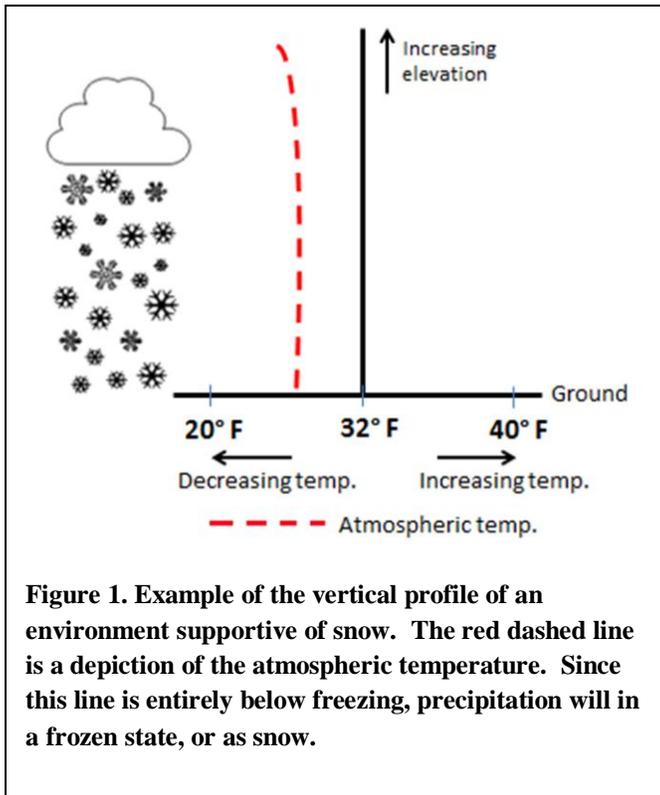


JJ Brost giving a presentation at the second Decision Support Symposium.

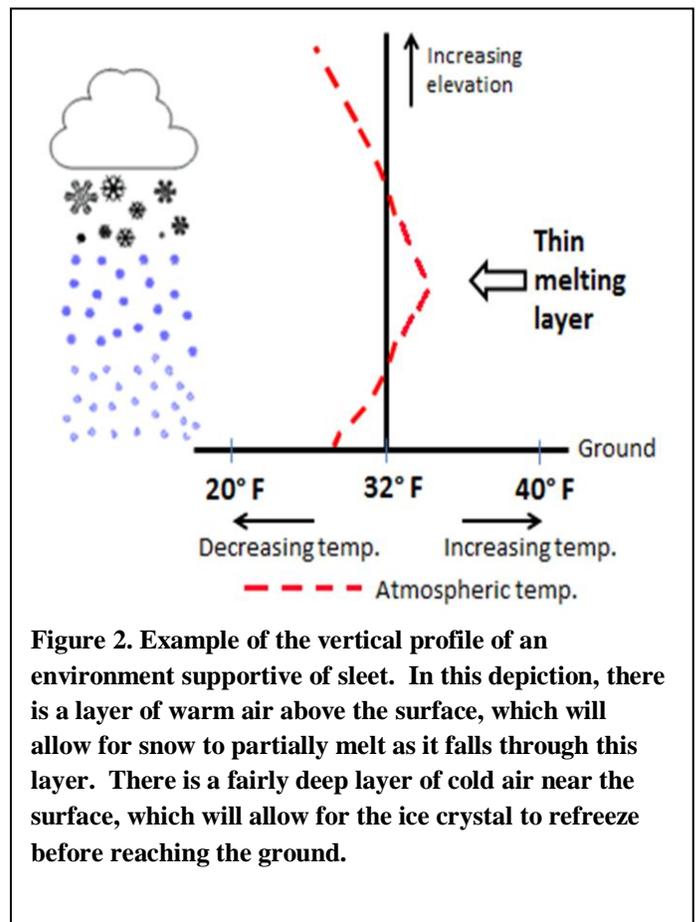
Winter Precipitation Types

By Justyn Jackson, Meteorological Intern

Winter weather is certainly not a stranger to the Texas and Oklahoma Panhandles from late fall through early spring. More often than not, the main precipitation type that is observed is snow. However, sleet and occasionally freezing rain also occur across the Panhandles. What causes these different types of precipitation? The vertical temperature profile is the most important aspect in controlling whether snow, sleet, or freezing rain occurs.



In order for the surface precipitation type to be snow, the atmospheric temperature (dashed red line in figure 1) must be at or below 32° F (0° C) to ensure that no melting occurs. However, there are other special circumstances when snow can occur at the surface despite the entire atmosphere not being below freezing. The first situation occurs when there is a very shallow melting layer aloft with a maximum temperature in the melting layer less than 33.8° F (1° C) The second situation occurs when the wet bulb zero height (the height where the evaporatively cooled temperature, goes below 32° F) is less than 1,500 feet. Wet snow is most likely to occur in both circumstances since the snow flake has been partially melted.



As shown in figure 2, notice that the entire atmosphere is not below freezing. In fact, there is a thin layer above the surface that is above freezing. In this example, sleet would be the dominant precipitation type. Sleet occurs when a snow flake partially melts and then refreezes. For partial melting to occur, the maximum temperature in the melting layer is typically between 34 and 37° F (1 and 3° C) in a relatively thin layer (less than 2,000 feet thick).

When the snow flake completely melts and the surface temperature is below freezing, freezing rain will be the dominant precipitation type. Figure 3 shows a deep melting layer above the surface and a shallow freezing layer just above the surface. When the maximum temperature in the melting layer exceeds 37° F (3° C), the snow flake completely melts and becomes a rain drop. Since the freezing layer just

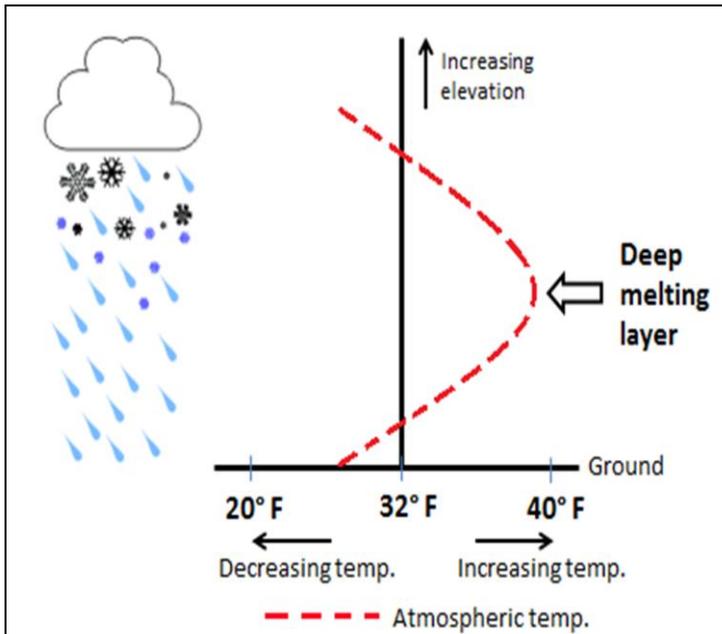


Figure 3. Example of the vertical profile of an environment supportive of freezing rain. There is a substantial layer of warm air above the surface with a shallow cold layer near the surface. Snowflakes will completely melt as they encounter this warm layer aloft, but as they descend through the cold air near the surface, they will freeze upon contact with exposed surfaces.

above the surface is shallow, there is not enough time for the rain drops to freeze into sleet. As a result, the rain drops freeze on contact with the surface and can create very hazardous conditions. Freezing rain can also occur when the surface temperature is below freezing and there is not sufficient moisture present in an atmospheric layer with temperatures between 14 and -4° F (-10° and -20° C).



Snow blanketing downtown Amarillo from the March 28, 2009 blizzard.



2011 SEVERE WEATHER CONFERENCE

Amarillo Civic Center March 19, 2011

Booths: 9AM-12:30PM

General Session: 12:30PM-4PM

Spotter Training: 4:30PM-6:30PM

2010 Year in Review

By JJ Brost, Forecaster and Justyn Jackson, Intern

Once again, Panhandle weather provided plenty of diversity during 2010. The winter season really started off in late December 2009 and continued through March. Amarillo typically averages about 20 inches of snow each year, and we measured nearly 24 inches of snow from January through March. In addition, these three months were quite a change from 2009. The average temperature for January through March 2009 was nearly 4 degrees above normal while this same time period in 2010 experienced an average temperature that was nearly 3 degrees below normal with twice as much snowfall. For the entire year, 28.8 inches of snow were measured at Amarillo, which makes 2010 the 15th snowiest year on record.

The moist conditions continued through April with the four month combined precipitation total being nearly 4 inches above normal. However, the moisture was not to last as a two month dry period developed. May and June precipitation totals were 2.5 inches below normal. A general warming trend started in June and continued through the end of the year. The average temperature from June through December was more than 2.5 degrees warmer than normal. Our highest temperature of the year actually occurred in September when the thermometer hit triple digits on two consecutive days.

Interestingly enough, half of the months in 2010 ended up with below normal precipitation while the other half recorded above normal precipitation. However, the wet months were very wet. Three months out of the year (April, July, and November) combined to experience nearly 10 inches more precipitation than normal. By the end of the year, Amarillo received nearly 7 inches more precipitation than normal, and in fact, 2010 will go down as the 11th wettest year on record at Amarillo.

The year of 2010 will also be remembered as an active severe weather year for the Panhandles. Although the severe weather season started somewhat slowly, the severe weather reports increased substantially from late April through mid-June. The Texas and Oklahoma Panhandles typically see about 21 tornadoes per year, and this year, 38 were reported. Fortunately, the vast majority was weak and caused no damage.

YEAR 2010 SUMMARY FOR AMARILLO

High for the year: 101°, September 5th

Low for the year: 2°, January 8th

Average High Temperature: 71.4° (1.1° above normal)

Average Low Temperature: 44.7° (1.1° above normal)

Average Annual Temperature: 58.1° (1.1° above normal)

Annual precipitation: 26.54 inches (6.83 inches above normal)

Annual snowfall: 28.8 inches (10.9 inches above normal)

Days with temperature \geq 100 degrees: 5

Tornadoes: 38 Total – 34 EF0's, 3 EF1's and 1 EF2

NWS Meteorologists Give Pilot Briefings for Local Hot Air Balloon Festivals

By Sarah Johnson, Forecaster

In October, meteorologists from the National Weather Service office in Amarillo gave pilot weather briefings for not one, but two local hot air balloon festivals. The NWS provided weather briefings to balloon pilots for the 5th year in a row at the Pirates of the Canyon Balloon Rally, and for the first time to Up in the Air for Family Care Balloon Rally. Through both events, a total of seven on-site briefings were given to dozens of balloon pilots.

Hot air ballooning is highly dependent on the weather, arguably more so than fixed wing aviation activities. Cloud heights, visibility, wind speed, and wind direction all have a big impact on ballooning. Unfortunately, for the first time in a few years, the weather did not cooperate either weekend, resulting in very few flights. Through much of the festivals the wind was to blame, as many mornings the wind speed (either on the ground or in the lowest levels of the atmosphere just above the ground) was too high for safe flights and landings.



Though there were limited opportunities for balloon flights this year, some balloons inflated, such as this balloon, the Green Hornet, at South Georgia Elementary School as a part of Up in the Air for Family Care Balloon Rally. Photo courtesy of Lance Goehring.

2011 Spotter Training

The 2011 severe weather season is almost here! The National Weather Service will again be hosting Spotter Training sessions at many locations in the Texas and Oklahoma Panhandles from late February through April. If you would like to schedule a spotter training class please email Krissy Scotten at kristin.scotten@noaa.gov or call (806) 335-1421. If you would like to help the National Weather Service by becoming a storm spotter, please attend one of the spotter training classes this season. To see when there is a storm spotter training class near you, visit: www.srh.noaa.gov/ama/?n=spottertalks. We have just started scheduling classes so check back often.



Third High Water Mark Sign Unveiled in Texas

By Lance Goehring, Senior Forecaster

The third high water mark sign in Texas was unveiled in Canyon, Texas on October 21, 2010. This was the first high water mark sign for the National Weather Service (NWS) forecast office in Amarillo. The sign commemorates the record flood on the Palo Duro Creek, which occurred on May 26, 1978.



José Garcia, MIC of the Amarillo National Weather Service Office, presents Mike Webb, EOC director and fire chief of Canyon, with a replica of the high water mark sign. Bill Lawrence, SCH from the Arkansas-Red Basin River Forecast Center in Tulsa, looks on.

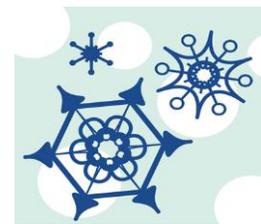
On May 26, 1978, severe thunderstorms with very heavy rain developed to the west of Canyon. These storms slowed as they approached the west side of Canyon. Most of the heavy rain fell in just an hour and a half. Bucket surveys from a few miles west of Canyon indicated amounts over 10 inches. This heavy rain ran off into the Palo Duro and Tierra Blanca Creeks and caused extensive flash flooding in Canyon. The flood killed four people and caused approximately 20 million dollars in property damage.

At this particular site, the Palo Duro Creek rose to 13 feet, or 8.3 feet above flood stage. The NWS has placed the High Water Mark sign at Hunsley Park to show people that frequent the park how high flood waters have risen from the creek. This park has many visitors throughout the year, so this sign will serve as an educational tool for many people.

This sign was a joint effort between the City of Canyon, the National Weather Service offices in Amarillo and Lubbock, and the Arkansas-Red Basin River Forecast Center in Tulsa, OK.

The ceremony lasted about 30 minutes with rain pouring down and thunder clapping by the end of the event. About 20 people took part in the ceremony with one person from a local T.V. station. The sign is displayed in the gazebo near the message board at Hunsley Park. José Garcia, Meteorologist-in-charge of the Amarillo National Weather Service office, and Bill Lawrence, Service Coordination Hydrologist at the Arkansas-Red Basin River Forecast Center, both presented at the ceremony. Lance Goehring, Senior Forecaster and Hydrologic Focal Point at NWS Amarillo and John Lipe, Senior Service Hydrologist, NWS Lubbock were also present. Lance coordinated and led the effort to have the sign installed. He also worked closely with John to survey and find a place for the high water mark sign.

Did you know...



- The all-time coldest temperature for Amarillo occurred on February 12, 1899 when the mercury fell to -16 degrees.
- Amarillo averages one 6 inch snow every two years.
- Amarillo averages one 12 inch snow every 19 years.

Weather Review and Outlook

By Rich Wynne, Science and Operations Officer

REVIEW OF FALL 2010

The La Niña pattern was established during Fall 2010. Drier conditions have developed overall for the Texas and Oklahoma Panhandles and were reflected in below average precipitation totals. The exception to this was a narrow band of heavy rain and snow which formed during a two-day period in November. In general, warmer and drier conditions occurred as expected.

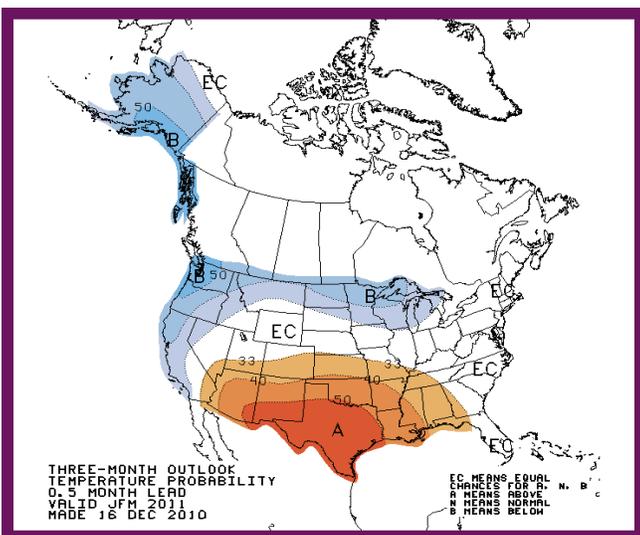
| | AVG HIGH | AVG LOW | AVG TEMP | PRECIP |
|-----|-------------|-------------|-------------|--------------|
| SEP | 88.3 (+6.5) | 56.3 (+3.1) | 73.8 (+4.7) | 1.79 (-0.09) |
| OCT | 76.4 (+4.6) | 46.6 (+2.0) | 61.5 (+3.3) | 0.78 (-0.72) |
| NOV | 62.0 (+3.6) | 30.9 (-0.9) | 46.5 (+1.4) | 2.88 (+2.20) |

Fall 2010 statistics for Amarillo, TX

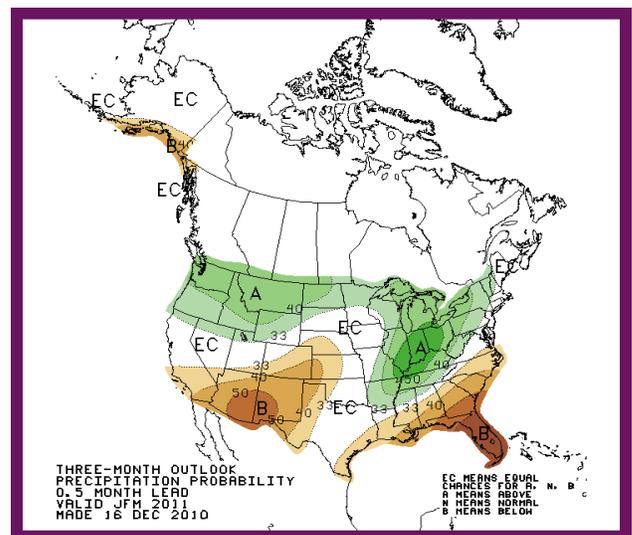
OUTLOOK FOR WINTER 2010

Indicators at the Climate Prediction Center (CPC) show that the La Niña episode should peak during the coming winter season. The trends for the late winter and early spring, however, are a little more uncertain. The duration of La Niña events can vary. A majority of the CPC computer models show La Niña weakening next spring and early summer, but a few computer solutions extend the La Niña pattern into next summer. Therefore, stay tuned for updated information.

The three-month outlook for January, February, and March (JFM) reflects the developed La Niña pattern expected through the period. The outlook shows higher chances for near or above normal temperatures for much of the winter, especially for the southern Texas Panhandle. The precipitation outlook slightly favors the below normal category for all of the Oklahoma and Texas Panhandles.



JAN-FEB-MAR 2011 Temperature Outlook



JAN-FEB-MAR 2011 Precipitation Outlook

New Hires

Kristin "Krissy" Scotten - Krissy is our new Warning Coordination Meteorologist. Krissy was a Senior Forecaster at the National Weather Service office in Huntsville, AL. She holds a Bachelor's Degree in Meteorology from the University of South Alabama and a Master's Degree in Geoscience from Mississippi State University. She has worked in offices in Birmingham, Huntsville and Memphis. Krissy has been involved in outreach at all offices where she served, leading many educational and public service events. She has a strong background in Storm Spotter Training and has worked effectively with the Emergency Management community in each of the offices where she worked.



Michael Scotten – Michael is our newest Senior Forecaster. Michael was a Senior Forecaster at the National Weather Service office in Memphis, Tennessee where he served as Assistant Science and Operations Officer and Fire Weather Focal leader. Michael has several professional publications and presentations to his credit. He holds a Bachelor's Degree in Meteorology from Penn State University and is currently pursuing a second degree in Computer Science from American Sentinel University.

Kurt Buffalo – Kurt is our newest General Forecaster and transferred to Amarillo from the National Weather Service office in Hastings, Nebraska. He served as focal for several operational programs as well as an Assistant Science and Operations Officer. Kurt also has several professional publications and presentations to his name. He holds a Bachelor's Degree in Meteorology from the University of Northern Colorado and a Master's in Atmospheric Science from Texas A&M.



Electronics Staff Earn Regional Cline Award

The WFO Amarillo electronics staff was recently recognized with a Regional Level National Weather Service Isaac Cline Award for dedicated oversight of our office facilities and outstanding support of operational and outreach programs. The prestigious Isaac M. Cline Awards are named for the man whose courage and dedication is credited with saving thousands of lives during the Galveston, Texas hurricane of 1900. Cline was in charge of the forecast office in Galveston

when the popular coastal city was struck with the deadliest natural disaster in the nation's history. The death toll exceeded 8,000, but could have been much higher if not for his acute understanding of the weather and his early hurricane warnings in an era when meteorology was in its infancy and ship-to-shore communications were non-existent. Cline awards are presented at the local office level, regional level and national level.



Electronics Technicians Dave Wilburn (left) and Oferal Wise (far right) together with Electric Systems Analyst, Paul Schaafsma (middle), posing with their Regional Cline Awards.

The electronics staff at WFO Amarillo (Paul Schaafsma, David Wilburn, Oferal Wise) are a tremendously dedicated team of individuals. Their support to the entire operations of this office is highly evident in all of the activities they participate in both within and outside the engineering arena. This past year they began preparations for a scheduled facility upgrade for the heating and air conditioning (HVAC) system. This upgrade required a major temporary relocation of operational equipment from our main operations area while new ductwork was

installed throughout the office. Due to their swift actions and advanced planning, there was very minimal impact on the operational services provide by the office. Late last year, we incurred a fire at the Upper Air system. The electronics staff worked around the clock for five days to bring system back on line. In addition to the specific incidents above, the electronics staff carries out a number of duties in our office. They are all "team" players and it reflects in their willingness to also assist in the office outreach program. Each of the team members have participated in educational outreach in our office. They have hosted job shadow students and have been proactive in representing the NWS.

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