



# Rain or Shine

2019 Shareholders Report | NWS Rapid City, SD

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# Welcome from the MIC

Meteorologist in Charge

Dave Hintz

A portrait of Dave Hintz, a middle-aged man with short, light-colored hair and glasses, wearing a light blue dress shirt and a patterned tie. He is smiling slightly and looking towards the camera. The background shows an office setting with a window covered in horizontal blinds, a coffee maker, and some papers on a desk.

Welcome to the 2nd edition of “Rain or Shine”, the National Weather Service (NWS) Rapid City’s Shareholders Report. The purpose of this report is to document to you—our partners, our customers, and the American taxpayer—our activities and highlights from the past year. 2019 will go down as a record wet year in some locations, and from our perspective, one remembered for significant weather impacts. From the brutally cold February and March highlighted by late season blizzards, record or near record spring flooding, or perhaps the “short” autumn that was experienced, this past year was one that won’t be soon forgotten.

Looking ahead to 2020, our top 5 priorities are:

- Increase our Impact-Based Decision Support Services (IDSS)
- Continue to focus our efforts on providing more detail in the 0-48 hr forecast
- Implement live social media sessions
- Provide on-site meteorologists at your Emergency Operation Centers (EOCs) for briefings/forecasts/exercises
- Look at hosting an Integrated Warning Team (IWT) meeting in 2020

It is my wish that you will find that our activities show the kind of stewardship and fiscal responsibility you want to see from your public servants. For fiscal year 2019, the National Weather Service was appropriated a budget \$1.1 billion, which is an investment of \$3.55 per American. As the Meteorologist in Charge of the office, I feel it is my obligation to let you know how we are accounting for that investment in us. I want to express my deepest thanks to Meteorologists Katie Pojorlie and Keith Sherburn and Observation Program Leader Alzina Foscatto for producing “Rain or Shine”. If you have suggestions on how the NWS can better serve you, I welcome your comments. I can be reached at [david.hintz@noaa.gov](mailto:david.hintz@noaa.gov).

# 2019 Climate Review

Meteorologist  
Scott Rudge

Cool and wet sum up the weather experienced across the area in 2019. Average temperatures for the year were around 4 degrees below average, with most locations seeing well above average precipitation.

The year started off quite ordinary in January, but February turned bitterly cold and snowy. Temperatures for February were between 15 and 25 degrees colder than average, and snowfall averaged twice the normal across the area. Cooler temperatures persisted across the area into March, with April near normal. May was cool again with higher than average precipitation. It looked like the area would break out of the wet cycle in June, but the remainder of the summer turned very wet with slightly below average temperatures. Typically, mid to late July is when western areas tend to dry out and warm up, but this year was an exception. Near to above average precipitation was experienced from July through November for most locations.

This helped several locations set all-time precipitation records for the year. By early December, several locations had already set all-time annual precipitation records.

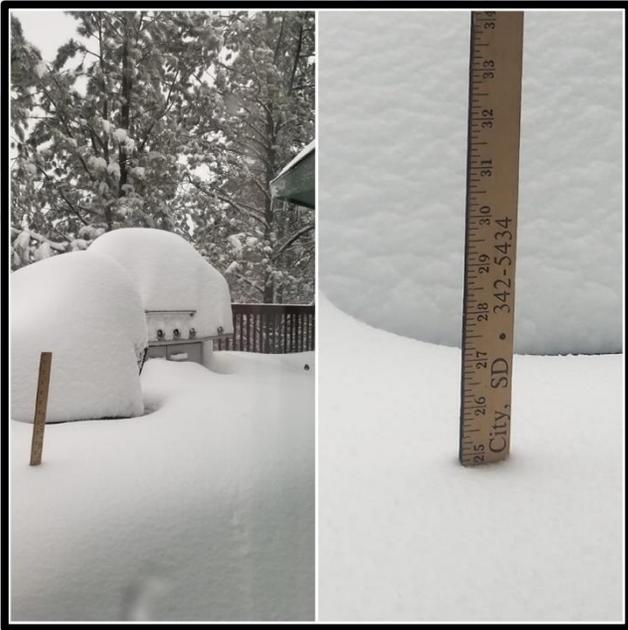
## **2019 Annual Precipitation**

<i>Location</i>	<i>This Year</i>	<i>Old Record</i>	<i>Year</i>
Bison, SD	28.33"	25.86"	2013
Dupree, SD	29.39"	28.48"	1982
Hill City, SD	32.74"	31.60"	2018
Interior, SD	32.19"	27.07"	1998
Mt. Rushmore, SD	39.30"	33.04"	1998
Pactola Dam, SD	32.24"	31.87"	1962
Rapid City, SD	31.73"	28.89"	1962
Weston, WY	24.83"	20.51"	2013

# 2019 Significant Events: Spring Snow

Science and Operations Officer  
Matt Bunkers

Two blizzards occurred in the spring. The first blizzard was March 13-14, which brought heavy snow and strong winds to northeastern Wyoming and western South Dakota. Snow amounts across the area varied widely, ranging from only an inch across northwestern South Dakota and the downsloped Newcastle area, to 16 inches in the central Black Hills, and 18 inches near Kadoka. Wind gusts reached 60 to 70 mph, which created a blizzard. Less than one quarter-mile visibility was reported across the area and drifts several feet deep resulted, even in areas that received only a few inches of snow. Warmer conditions after the snow, combined with the significant ice cover on the rivers and streams, frozen culverts, and “snow dams” formed by snow sitting in drainage areas, resulted in extensive flooding. The hardest hit area was the White River Basin, where roads were washed out, homes were flooded, dams failed, and stream channels were drastically changed by the combination of the ice and runoff from the snowmelt.



More than two feet of snow near Pactola on May 22, courtesy of Michelle V

Less than a month later, April 10-12, a powerful spring blizzard brought heavy snow and strong winds to parts of northeastern Wyoming and much of western South Dakota. Some areas experienced periods of intense snowfall rates associated with thundersnow. Snow amounts across the area varied widely, ranging from a couple of inches in the southern Black Hills to 30 inches over the northern Black Hills, and over two feet of snow over parts of the western South Dakota plains. Wind gusts up to 50 mph caused whiteout conditions in blowing and drifting snow. Travel was hazardous to impossible.

Although not classified as a blizzard, a large storm brought heavy rain and historic late-season snowfall to the Black Hills region on May 20-22. A deep low pressure system slowly moved from the Four

Corners region northward through the plains, leading to a prolonged period of precipitation over western South Dakota and northeastern Wyoming. Precipitation type throughout the event was largely dependent on elevation; the plains north and east of Rapid City saw predominantly rain, while higher elevations in the foothills just to the west and south of Rapid City, along with the Black Hills, received several inches to a few feet of snow. For the Black Hills and western South Dakota plains, this 3-day period was among the coldest, wettest, and snowiest stretches on record over the latter half of May, with several temperature and precipitation records set.

# 2019 Significant Events, Continued: Flooding



May 28<sup>th</sup> flooding in Rapid Valley,  
courtesy of Rapid City Fire Department

Following the heavy spring snow and rain, extensive flooding was widespread across the area. Major to record flooding occurred along rivers through mid-May due to widespread heavy precipitation, and then conditions were primed for additional flooding when rain began on Sunday, May 26<sup>th</sup>. Heavy rainfall of up to 4 inches was observed near Faith, over the north-central South Dakota plains, while 1-2 inches of rain fell over portions of the White River basin. This was the start of several days worth of heavy rain and flooding across portions of the area, which eventually affected much of the South Dakota plains and foothills, along with portions of northeastern Wyoming along the Belle Fourche River and Powder River. The event culminated with heavy rainfall and thunderstorms over the Rapid City area during the afternoon and evening of May 31<sup>st</sup>, which led to widespread flooded roadways and multiple water rescues.

Damaging floods continued through most of the summer across almost all of western South Dakota. A few of the significant events included, the 4<sup>th</sup> of July flash flooding along Bear Butte Creek from Deadwood to Sturgis. This flash flood damaged most of the crossings across Bear Butte Creek in the city of Sturgis and caused flooding of Highway 34/79. In mid-July, flash flooding caused two sections of Highway 79 to collapse in Butte



July 4<sup>th</sup> flooding on Bear Butte Creek in Sturgis,  
courtesy of City of Sturgis

County. On August 1, a culvert was compromised under the railroad tracks east of New Underwood, causing a train to derail. On August 2, nearly stationary thunderstorms dumped five to seven inches of rain on French Creek, which flooded most of Custer, South Dakota (see [video](#), courtesy of Custer County Search and Rescue) Then on August 11, flash flooding along Porcupine Creek inundated BIA 27, with flood waters eventually flooding BIA 2 on August 12.

# 2019 Significant Events, Continued: Tornadoes

The cool and wet weather in spring suppressed tornado activity until mid-June. The first tornado of the season was reported June 19. It was very weak (rated EF-0) and lasted less than a minute, but damaged a residence west of Mission, South Dakota. On June 25, two tornadoes, both rated EF-1, developed northwest of Hulett, Wyoming. The tornadoes were not visible because they traveled over hilly terrain and were embedded in rain, but they blew down numerous trees.

The most notable tornado of the season occurred near Allen, South Dakota, on June 29. The tornado, rated EF-1, was visible for many miles, moved very slowly in a circle, and lasted 40 minutes. It tracked through corn fields most of the time; however, it damaged a house and barn, blew over a couple of grain bins, snapped power poles, and lofted grain bags.



Allen Tornado on June 29, courtesy of Gail S

A tornado touched down southeast of Newcastle, Wyoming on July 3 and crossed the state line into South Dakota, but no damage was reported. A rather rare event happened on July 4 when three short-lived tornadoes

(all rated EF-1) formed along a line of thunderstorms over the Black Hills. Each tornado only lasted 1-3 minutes and caused tree damage west of Jewel Cave, east of Deerfield Dam, and west of Rochford.

Another highly visible tornado occurred in a pasture east of Rozet, Wyoming, just south of I-90, on July 16. No damage was reported,



Rozet tornado on July 16, courtesy of Dwayne Sisson

resulting in an EF-0 rating. The final tornado of the year touched down northwest of Four Corners, Wyoming and downed large pine trees at the edge of the Black Hills, giving it a rating of EF-2.



Four Corners tornado on July 17, courtesy of Ryan and Jess Lorenz

# 2019 Significant Events, Continued: Wind and Hail

Hailstorms are common to the Black Hills area, and Rapid City typically sees 3-4 per season. Fortunately, there was only one major hailstorm to hit Rapid City this season, which was on June 2. This started as a supercell thunderstorm that formed near Tilford, South Dakota, and moved through Rapid City, Hermosa, and Fairburn before dissipating by late afternoon. This storm produced large hail (up to 2.5 inches in diameter), which damaged homes, vehicles, and crops. The southwestern side of Rapid City, along with Hermosa to Fairburn, were the hardest hit areas.

Gillette was struck with two major hailstorms this year (1-2 per season is typical). Severe thunderstorms moved across northeastern Wyoming and the Black Hills area the afternoon and evening of July 17. Tennis ball to baseball size hail was reported around Gillette and the northern Black Hills. Then, on August 14th, the evening's Pyrotechnics Guild International (PGI) fireworks display was disrupted around 10 pm by a severe thunderstorm that did extensive damage on Gillette's northeastern side with 2 to 3 inch hail, strong winds, and heavy rain.

On June 26, a rare phenomenon called a "heat burst" occurred near Rosebud, South Dakota when winds gusted to 65 mph at 1:30 am CDT. Heat bursts occur when air rapidly rushes down to the surface in a decaying thunderstorm. In this case, the temperature shot up to 85°F and the dew point dropped to 42°F as the thunderstorm decayed. This is referred to as a "heat burst" because the temperature shoots up rapidly, despite it occurring overnight when temperatures typically decrease.

A more significant event occurred on July 4th near Midland, South Dakota. Strong winds and large hail were reported throughout the area, and a 104-mph wind gust was reported a mile northeast of Midland, while a 108-mph wind gust was measured in Stanley County (four miles north northeast of Bunker, South Dakota). The active weather pattern continued on July 9th, with another round of strong to severe thunderstorms across northeastern Wyoming and western South Dakota. The hardest hit areas included Campbell County, Wyoming (south of Gillette), far southern Fall River County, and portions of Tripp County near Winner. At least 70 mph winds were reported in each area (with 90 mph winds near Ardmore), while widespread downed trees and power poles were observed in Fall River and Tripp Counties. Strong winds occurred again on August 26th, with an 86-mph gust reported east of Pine Ridge.



Tennis ball sized hail near Fairburn on June 2,  
courtesy of Mikkel Skaare

An early season winter storm moved into the region on October 9, bringing widespread snow and gusty northerly winds. The highest snow totals were in the northern Black Hills (around a foot), with several inches on the plains (4 to 6 inches in the Rapid City area). Northerly winds gusting near 50 mph created areas of blowing and drifting snow, especially on the South Dakota plains.

A strong storm system moved out of the central Rockies into the northern and central plains over the Thanksgiving weekend. The storm brought a large amount of moisture in the form of ice and snow, and very strong winds. Freezing drizzle on Thanksgiving and Black Friday transitioned to snow, which became heavy Friday night and Saturday. Strong winds, with gusts of 45 to 60 mph, developed across northeastern Wyoming and western South Dakota Saturday morning. The winds, combined with snowfall amounts of 8 to 18 inches on the plains, created blizzard conditions. In the northern Black Hills, over two feet of snow was reported. Due to the wind direction, areas around and south of Custer, South Dakota only received 3 to 6 inches of snow.



2 mi north of Central City after the November blizzard, courtesy of Kayla Kaul Mahowald

Several new records were set at the NWS office for precipitation and snowfall due to this event:

- 14.5" of snow for November 30 set a new daily and monthly snowfall record. The previous monthly 1-day snowfall total was 10.6" on November 6, 1998.
- 15.9" of snowfall was reported in 2 days (November 29-30). This was the greatest 2-day November total. The previous record for November was 12.5" November 21-22, 2003
- 2019 November Snowfall was 26.0". This is the highest amount of snowfall ever reported in November. The previous record was 22.4". However, there weren't any records kept in 1985, when the Rapid City Airport received 33.6" of snow for the month.

During the November blizzard, three NWS employees became stranded at work. This was the second time during 2019 for this to happen; in March, five employees were stranded (see next story). Click these links to see videos of OPL Alzina Foscatto [releasing the balloon](#) and [measuring snow](#) on November 30.

The record wet year couldn't end without one final storm on December 28-29, which brought several inches of snow to the northern Black Hills and central South Dakota.

# Stranded during the March Blizzard

Meteorologist  
Shane Eagan

Our office is staffed with at least two meteorologists 24/7/365; we're always here. What happens when the weather throws a huge wrench into our schedule? Look no further than this past spring for the blizzard that affected the region March 13-14, that stranded five of us in the office for nearly 24 hours. What does that look like?

In the days leading up to the event, the lead meteorologists along with management helped determine our staffing needs for the upcoming event. The three meteorologists on the day shift and the two on the swing shift were told they should be prepared to stay rather than risk heading home in blizzard conditions. Coming into work that day, all of the cots, sleeping bags, air mattresses, overnight bags, and MREs (meal, ready-to-eat; none were eaten) were strewn about in preparation for what was to come. By 3 PM MT, we had five meteorologists on-site ready to simultaneously provide our partners support and to keep the forecast up-to-date.

During an event like this, the routine becomes far more interesting. Take the balloon launch for example (see the link below). Sixty mile per hour winds, icy ground, and blowing snow lead to a balloon launch that is anything but routine. Later, around midnight, the day shift went to sleep while the evening shift covered the overnight shift (kudos to the forecasters who thought to bring an air mattress... my back wishes I planned a bit more thoroughly). What happens when, at 2 AM, the satellite dish that delivers so much of our critical data is covered in snow and ice? At first glance, going out into a blizzard at 2 AM to clear ice off of a large satellite dish doesn't sound very appealing, but it provided a welcome respite from the traditional duties.

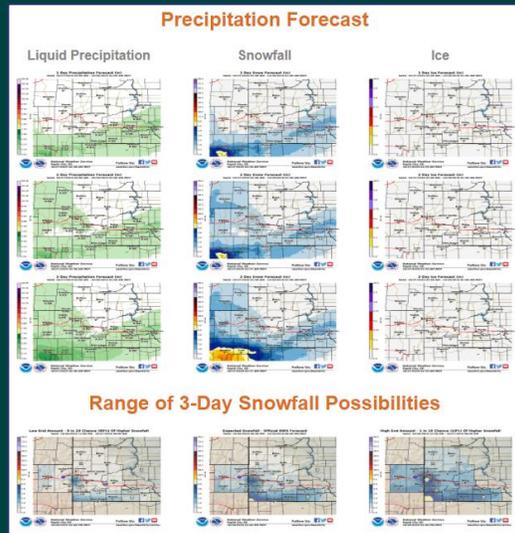
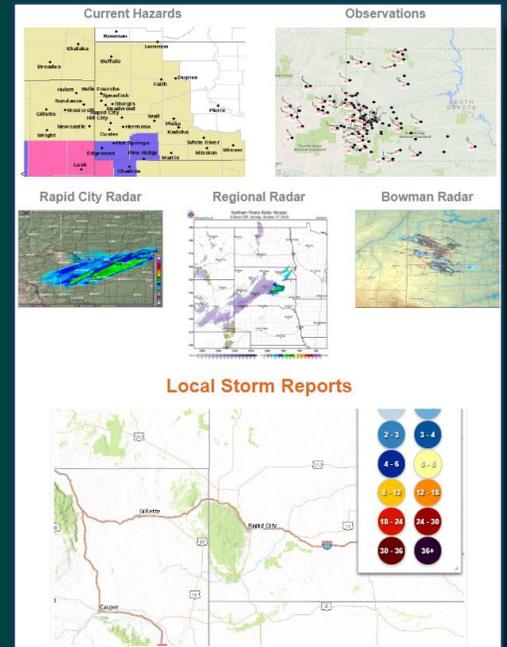
Once the forecast package was completed and disseminated after 4 AM, the day shift woke up to relieve the evening/midnight shift. After catching a couple hours of sleep, we were right back at work gathering reports and fielding phone calls. It wasn't until late morning when travel advisories were rescinded were the five of us able to go home; over 24 hours after coming on shift. While an event of this magnitude doesn't happen very often, we're always prepared to stay as long as needed to ensure reliable weather information is always available. And I'll remember an air mattress next time.



Aftermath of the March 13 blizzard in Rapid Valley, courtesy of Kayleigh Schmidt

As of the past year, we have developed a web page for those looking for an easy-to-navigate, one-stop shop for the latest forecast information for northeastern Wyoming and western South Dakota, found at this URL: [www.weather.gov/unr/briefing](http://www.weather.gov/unr/briefing).

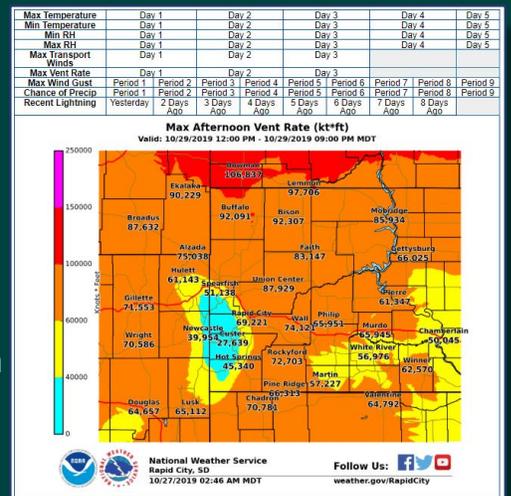
This page is separated into four sections – summer, winter, fire, and text. The first three contain maps and links to current weather hazards, observations, and local storm reports (right). Where these pages differ is in the forecast, which is tailored to each weather type. For example, you'll find snowfall and ice forecasts on the winter page, as well as probability graphics for snow amounts (below).



You won't find these on the summer page, but you will find maps for the Storm Prediction Center's severe weather forecasts, as well as flooding and drought information. The fire page was made specifically for our fire partners. It includes an inset of our spot forecast page, where users

can monitor and request spot forecasts. The South Dakota Grassland Fire Danger maps are also available, as well as forecast information for variables such as maximum transport winds and maximum vent rate (below right). For predicting where a fire might start, there are maps to

show where lightning struck during the past week. Finally, the text page displays our text products. Here you can find our latest zone forecast, regional weather roundups, temperature and precipitation reports from around the area, and any watches, warnings, or advisories that have been issued. We invite you to use this page for your forecast needs, and let us know if you have any suggestions for improvement.



# Decision Support Services

Warning Coordination Meteorologist

Susan Sanders

This spring, our MIC provided river and weather forecasts to the South Dakota state EOC in Pierre from March 19 to 29, following the March blizzard. While the extensive flooding affected eastern South Dakota and was less serious in western South Dakota, deploying our personnel gave the other NWS offices in the state sufficient staff to work with their local partners.

Large outdoor events during severe thunderstorm season can be a concern to public safety officials, especially if they need a lot of time to move the people into shelters. Through our IDSS, the office provided special forecasts and monitored weather conditions for many of these events.

August was an especially busy time for this work. During the Sturgis Motorcycle Rally, forecasters attended a daily briefing in Sturgis, participated in several conference calls for other agencies, and provided a detailed forecast to officials. Forecasters also provided on-site weather monitoring for the Pyrotechnics Guild International (PGI) convention at the Cam-Plex Events Center in Gillette. Strong winds threatened to cancel one show, and a severe hail storm moved across



Fireworks at the PGI Convention in Gillette

the grounds during another. By having a meteorologist working alongside the emergency manager, he was able to advise the event organizers to stop the program and evacuate the people to shelter before tennis ball sized hail pelted the area.

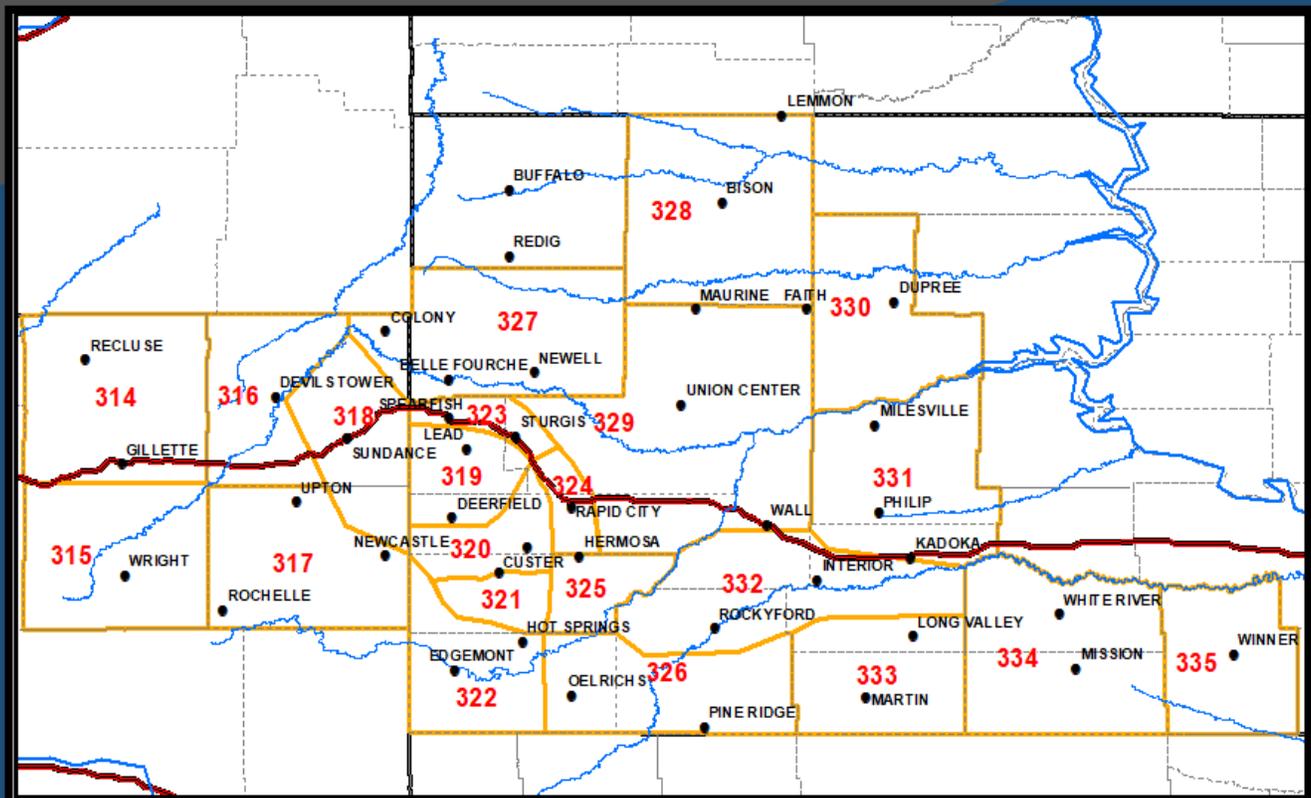
# New Fire Weather Zones

Lead Meteorologist Jeff Johnson

On October 10<sup>th</sup>, WFO Rapid City modified fire weather zone boundaries across northeastern Wyoming and western South Dakota. The purpose of this change was to better meet the needs of fire partners and improve fire weather support, including improved watch, warning, and forecast products.

WFO Rapid City has fire weather responsibility for much of northeastern Wyoming and western South Dakota. There has been significant improvement in forecast models since 2004, which is the last time fire weather zone boundaries were changed. Based on model improvement and a better understanding of climatology, shrinking some of the larger fire weather zones and reworking zone boundaries in the Black Hills were needed to obtain a more representative forecast for each fire zone.

The effort to rework fire weather zones involved numerous consultations with the Great Plains Interagency Dispatch Center Operations Committee and Board of Directors, along with other local, state, federal, and tribal partners. This goal could not have been achieved if not for the strong relationships we have with our fire weather partners.



Map of our new fire weather zones

# Equipment Maintenance

Electronic Systems Analyst

Pat Baye

Although this past year did not include any major equipment upgrades like last year's radar antenna pedestal replacement, the maintenance staff stayed busy with many office building facility updates, as well as maintenance and repair of electronic equipment.

Early 2019 was all about wrapping up the Service Life Extension Program (SLEP) for the WSR-88D. After the install of the refurbished antenna pedestal in December 2018, we found the newly installed components had increased the power output by 50 kW. This caused the radar to have a higher ground clutter return. Due to these changes in the equipment performance, it was decided to perform a full system alignment in order to ensure that the new components were operating at their full capability and within the set parameters. We reached out to the Central Region radar Regional Maintenance Specialist (RMS) to invite him to see the newly refurbished radar and to assist in a full calibration of the radar. The local maintenance staff and the RMS performed alignments on the transmitter, receiver, and pedestal. These alignments corrected all issues within the system, and it is now operating at peak efficiency.

Spring of 2019 saw the last step of the radar SLEP completed. Contractors refurbished all the building exteriors at the radar site. This included resealing the building roofs, installing new lock sets, as well as painting all trim and building exteriors. This makes the Rapid City office one of the first in the nation to have this major radar upgrade (SLEP) completed. On July 16th, the WSR-88D took a lightning strike, which brought down the radar during a severe thunderstorm warning. The electronic technician was dispatched in the evening to try to restore the radar to service. It was determined that the lightning took out the Signal Processor Interface Panel (SPIP), which would have to be ordered to replace the damaged one. Due to impending storms, a new SPIP was "hot shot" here, which is a way to have a part driven directly to its destination instead of utilizing normal delivery methods. The part arrived early in the morning and it was installed by 8:00 AM, thus keeping the downtime of the radar under 30 hours, and ensuring it was brought back online for the impending storms.

Early this year we replaced the original HVAC equipment that maintains the temperature and humidity of our data center room. These units were original to the building and have been in constant use since they were installed in 1995. The new units are much more energy efficient and less expensive to maintain. During this time, we also had a new reheat system installed throughout the office. This system removes the heat from our data center room and redistributes the heat, via a water loop, throughout the office areas, eliminating the need for our old electric duct heaters. With these new systems, we have seen a significant decrease in our electricity use. The six months prior to these systems being installed we averaged 44,230 kWh per month, the six months since the install we are now averaging **24,392 kWh** per month, a huge improvement in our energy use.

# GenCyber Girls Camp

Information Technology Officer  
Kelly Whitaker



Kelly's "arrest" during GenCyber Girls Camp

The South Dakota School of Mines and Technology (SDSM&T) GenCyber camp for girls in grades 8-11 provides classes and activities centering around cybersecurity. This year, 30 girls spent the week with professional IT women from Microsoft and Google. Kelly Whitaker (ITO) was on the camp Q&A panel with these women and SDSM&T professors. Kelly also organized a four-hour event that taught the girls many of camp's core concepts, especially how to "think like an adversary."

The event's main premise was a mystery whodunit where the girls had to find clues that would help them figure out who had taken control of the NOAA Weather Satellite. After a cybersecurity Jeopardy game that Kelly hosted, the NOAA director (played by SDSM&T Computer Science director) came crashing into the room to tell Kelly that a hacker was going to crash the satellite into earth! He recruited the girls to help find the hacker and sent them to the NWS Rapid City office where some very talented WFO staff actors helped them find clues.

First, Karen Maudlin (ASA) signed them in and scanned their (fake) badges. Then they did three different tours: outside with Mike Ford (CRH RMS), who showed them the satellite dish, tower, and upper air; the computer room with Nathan Rambo (ET), where they were shown the servers and where the satellite data come in and were processed; and finally, the operations area with Alzina Foscatto (OPL), who talked with them about the duties of a meteorologist and showed them the AWIPS display with satellite data.

Their clues were found in hacked web pages, Linux scripts, and Social Media, but they were also privy to a lot of complaining about a certain coworker from the NWS staff. The afternoon excitement built up to the girl's discovery that Kelly was the hacker who received a bad yearly review. So they called the police (SDSM&T security), who handcuffed her and hauled her away among much clapping and squeals of delight! They learned that the number one cybersecurity threat is disgruntled system administrators.

Kelly wants to personally thank her MIC, coworkers, and SDSM&T staff for making this event such a super fun success and great time with the girls!

This year, the Cooperative Observation Program has expanded with 2 new stations and one new observer who took over a station. The Cooperative Program helps us, with the observers reporting temperatures, precipitation, snowfall, and snow depth to support forecast, warning, and other public service programs in the NWS. These observations also help measure long-term climate changes.

The first new observer took over the station Maurine/Opal. The previous observers were relocating, so they found a neighboring ranch to take over. Since observations will be taken in the same area, this station (which started in 1974) can continue. This observer has had an automated weather station for a few years and has loved the weather. He is very excited to help us out with observations for that area.

The second new observer helped us reopen an old station east of Martin, South Dakota, that was closed since 1998. The observer also has an automated weather station and has always had an interest in weather. She is known for having the latest weather information and is now submitting her observations to us.

The third new station is located at the Little Powder School, which is 15 miles north of Weston, Wyoming. This station was requested by one of the teachers for helping them with their science classes. We were able to fill this request because of the lacking weather data for that area.



# New COOP Observers

Observation Program Leader

Alzina Foscato

# Outreach

Warning  
Coordination  
Meteorologist  
Susan Sanders



OPL Alzina Foscatto (left), WCM Susan Sanders (middle), and Alzina's daughter Gracie (right) at the Pennington County Disaster Awareness and Safety Day

The Rapid City NWS staff provided numerous presentations, briefings, and office tours to various groups. Schools and scout groups learned about science and careers and got to watch the weather balloon launch.

The regional Women in Science Workshops continued to grow. More than 800 seventh-grade girls and teachers from Rapid City and the southern Black Hills attended the program at the South Dakota School of Mines & Technology on March 6; 400 students from the northern Black Hills, northwestern South Dakota, and northeastern Wyoming were at Black Hills State University on May 8. NWS women led sessions on meteorology, hydrology, and computer programming while other personnel staffed a table in the exhibit hall. Kelly Whitaker (ITO) was the keynote speaker at the SDSMT event.



ITO Kelly Whitaker, giving the keynote speech at SDSM&T for Women in Science.

Our staff promoted weather safety at several events, which included drawings for NOAA Weather Radios. We participated in the Northern Hills Preparedness Fair in Spearfish on June 1 and Pennington County Disaster Awareness & Safety Day on September 8. We also had a table at the Black Hills Home Show in March. Additionally, the office conducted 18 spotter training classes, with a total of 294 people attending this year.

# Congressional Staff Visit

Meteorologist in Charge  
Dave Hintz

On Thursday, August 22, we had 5 staff from Senator Thune's office visit WFO Rapid City:

- Qusi Al-Haj (Deputy State Director/Air Force Affairs Advisor)
- Mark Haugen (West River Regional Director)
- Chance Costello (Legislative Assistant)
- Angela Merkle (Legislative Aide)
- Lauren Greenwood (Legislative Aide)

We began the visit with a weather balloon launch performed by our Pathways student, TJ Gunkel. Once we were back inside, they were very interested in how the data obtained were processed, ingested into our models, and made available to all interested parties. Senior Forecaster Kyle Carstens showed them some some high-resolution GOES-16 meso-sector images that were over our area due to the threat of severe weather and explained how that helps us and our partners with IDSS capabilities. They were impressed with the imaging and the speed that it is delivered to us. We explained that each day, one forecaster's duties are dedicated solely to DSS activities. They had questions about our computer models and software updates and how they impacted our office. We let them know that as the computer models get better and more refined, it allows us to focus our attention on the "near term" and the needs of our partners and customers.

At the end of the 2 hours, all agreed this was a productive meeting. Mr. Al-Haj and Mr. Haugen stated that they will work with Senator Thune's schedule to get him to visit our office to see the good work that we do.



MIC Dave Hintz with the congressional staff

# Our Training

...and how it helps us serve you

## Central Region SOO Meeting

Science and Operations Officer

Matt Bunkers

Each NWS office has a Science and Operations Officer (SOO). SOOs are responsible for serving as the principal science adviser to the local NWS office, and their duties consist of a) assuring technical integrity of products and services, b) transferring research results into operations, c) providing training on operational and scientific principles, d) maintaining operational forecasting proficiency, e) participating in outreach activities, f) assisting the office management team, and g) handling customer inquiries. In order to brush up on several of these skills, SOOs from across much of the central United States had a meeting in Kansas City on September 23-27. The first day was spent on leadership topics, NWS goals over the next five years, and the changing role of the SOO. Day two had a heavy focus on science topics, including the use of probabilities to convey levels of confidence in the forecast process. The third day covered training delivery, with an emphasis on collaborative training among forecast offices. Day four covered several research-to-operations topics that SOOs could bring back to their local office to enhance the watch and warning program, along with other services. Finally, the last day covered topics related to office culture and ways to get optimal performance out of our workforce. Overall, there was a lot of good material covered, and we will be working to implement some of these items over the coming months and years at NWS Rapid City.

## IT Training

Information Technology Officer

Kelly Whitaker

In the fall, Kelly Whitaker (ITO) attended two conferences: the Golden West Technology Conference in Rapid City and the Wild West Hacking Fest in Deadwood. During the latter conference, Kelly served as a speaker, sharing a presentation titled "Hacking Pioneers", about women in the computer science field. The common thread throughout these sessions was that internal safety measures should be just as strong as those on the perimeter. Once intruders break through the perimeter, their mayhem is exponential due to loose or non-existent IT security standards. With this insight, Kelly is working to ensure stability and security of our IT infrastructure. Having these good IT security practices decreases our downtime and protects us from hazards like Ransomware, ensuring that our meteorologists will be ready to serve our partners at all times.

## Hazard Services

Lead Meteorologist

Jon Chamberlain

The National Weather Service will be transitioning to new software to issue watches, warnings, and advisories over the next 2-3 years. The new software, called Hazard Services, has been in development over the last 10 years and will eventually replace the legacy software such as RiverPro and WarnGen. Training workshops on Hazard Services began this winter in Norman, Oklahoma. One of the biggest benefits of Hazard Services is its ability to easily interact with the multitude of data available to NWS forecasters, making the issuance of hazard-based products quicker and easier while incorporating the latest science and technology. The first phase of the software will arrive this year, with all flood-related hazards transitioning to Hazard Services by this fall.

## Mesoanalyst Boot Camp

Meteorologist

Keith Sherburn

during severe weather operations and, in turn, communicating critical details to partners and the public.

Throughout the week, facilitators from the OPG and the Storm Prediction Center led meteorologists from across the country through a variety of simulations highlighting key environmental and observational data that may be underutilized during severe weather operations. During each simulation, meteorologists were tasked with sharing critical forecast information and updates via graphical forecasts or text discussions, mimicking the flow of information to the public and partners in real events. Findings from the boot camp will be shared with meteorologists at NWS Rapid City during spring training, allowing for these techniques to be incorporated into our severe weather operations next season.

## Impact-Based Decision Support Services Deployment-Ready Boot Camp

Each year, the NWS Training Center in Kansas City hosts a series of week-long boot camps aimed at providing meteorologists with hands-on training in IDSS. With several hours of remote training under their belts prior to arriving in Kansas City, meteorologists are ready to hit the ground running. Scenarios throughout the week provided experience in sharing critical weather information to a variety of partners via multiple means, including stand-up briefings, one-on-one conversations, forecast graphics, and media interviews, all the while responding to unexpected changes in the forecast.

Although the week is stressful, it actively prepares meteorologists for future IDSS deployments, such as onsite support at the Sturgis Motorcycle Rally or Pyrotechnics Guild International (PGI) events that the office provided this year. Additionally, by providing personalized feedback on each task, the boot camp sharpens the skills of meteorologists when sharing critical, actionable information with partners, both in and out of the office. This experience allows our meteorologists to better serve you by focusing on your thresholds and delivering the critical details you need in a clear and timely manner.

Meteorologist

Keith Sherburn

## FEMA Joint Information System Planning for Public Information Officers

Our Warning Coordination Meteorologist, Susan Sanders, attended the FEMA Joint Information System/Center Planning for Public Information Officers course. The training will help us use effective communication tools to support a joint information system during incidents.

Warning Coordination

Meteorologist

Susan Sanders

# Summer Students

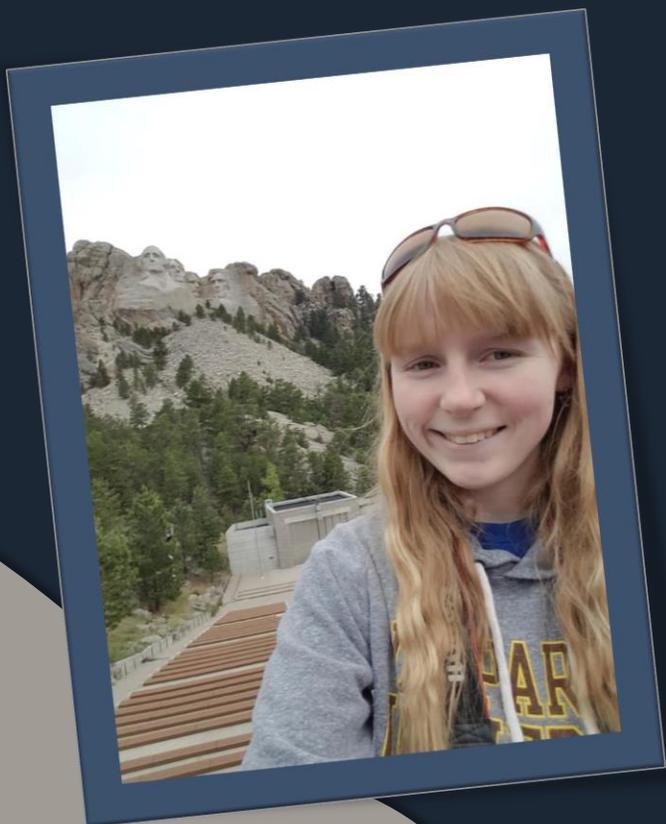
Science and Operations Officer

Matt Bunkers

NWS Rapid City had a Pathways student during the summer of 2019. The Pathways Program provides students in high schools, colleges, trade schools, and other qualifying educational institutions with paid opportunities to work in agencies and explore Federal careers while completing their education. Our Pathways student was Timothy (“TJ”) Gunkel, who is a graduate student at the University of Nebraska at Lincoln. TJ spent the summer learning about NWS day-to-day operations, which included launching the weather balloon, measuring and recording weather and climate data, obtaining and transmitting severe storm reports, and issuing routine weather products. In addition, TJ started learning about forecast operations and gained valuable experience with the variety of software programs used by the NWS. TJ headed back to Lincoln in September to finish his last year of graduate school.



NWS Rapid City also had a Hollings Scholar student during the summer of 2019. The Hollings Scholar Program provides successful undergraduate applicants with awards that include academic assistance (up to \$9,500 per year) for two years of full-time study and a 10-week, full-time paid (\$700/week) internship at a NOAA facility during the summer. Our Hollings student was Angela Mose, who is in her senior year at Valparaiso University. Angela’s main focus was a research project, but she did spend a little time learning about NWS operations. For her research, Angela reviewed considerable radar data and storm reports from across the country to help better predict severe winds from thunderstorms. This involved measuring the speed of the storms and comparing that to the severe storm reports to see what relationships might be apparent. Angela will be presenting her findings at the Annual Meeting of the American Meteorological Society in January.



# National Weather Service

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