THE COASTAL BREEZE

Brownsville/Rio Grande Valley

SUMMER 2021

IN THIS ISSUE:

SUMMER FUN IS HERE!

What an issue you we have for you this season! From past hurricanes to hurricane preparedness, the NWS tsunami program, oil spill science and more we have it all for you in this summer's issue. Also, be sure to check out our special section on our staffs most memorable weather events.
Happy reading!

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On August 12, 1880, a strong category 4 hurricane made landfall approximately 15 miles south of Port Isabel in northern Tamaulipas Mexico. The storm passed right over Brownsville and moved northwest through the remainder of the Rio Grande Valley. At the time of landfall, the atmospheric pressure reading was 931 mb with sustained winds of 150 mph making this one of the strongest hurricanes to ever affect the Valley. Storm surge of 8 feet was observed on South Padre Island. The combination of wind and storm surge damaged many structures on South Padre Island. 7.82" of rainfall in one day occurred with this storm in Brownsville. To this day, this is still the daily rainfall record for the month of August for Brownsville and is also one of the top ten heaviest rainfall events to ever occur in Brownsville. Total fatalities were estimated to be at least thirty or more, mainly at sea and in the cities of Brownsville and Matamoros.

Track for the Hurricane of 1880. Source: NOAA

Other major hurricanes have made landfall across Deep South Texas since the 1880 hurricane. These include the 1916 hurricane (category 4 at landfall), the 1933 hurricane (category 3 at landfall), 1967's Beulah (category 3 at landfall), 1980's Allen (category 3 at landfall), and 1999's Bret (category 3 at landfall). The 1933 storm, Beulah, and Allen all reached category 5 status at one time over the open waters before landfall. Bret reached category 4 status over the Northwest Gulf of Mexico before landfall.

Damage from The Port of Brownsville from Hurricane Beulah. Photo from NWS Brownsville Archive

Flooding in Harlingen from Hurricane Beulah. Photo from NWS Brownsville Archive

For decades, the NWS and other government agencies have provided information for people to get prepared for the hurricane season: how to make a plan, how to build a kit, and general tips on how to prepare people, homes, businesses, and infrastructure from the hazards of wind, rainfall flooding, and storm surge flooding that tropical cyclones can bring. One thing we cannot do is assess *your* risk. Yet risk assessment – whether the homeowner, business owner, or community leader – is the key to success before, during, and after the storm.

In the most recent decade, NWS hurricane forecasts and threat communication have improved markedly. Increasingly accurate track forecasts allow more targeted decisions on evacuation and community readiness. New communication methods for potential impacts from wind, rainfall flooding, storm surge flooding, and tornados describe conditions that may occur on the ground. Each of these are great tools to begin the process of risk assessment.

Wind Risk

A home *may be* one's castle, and a business *may be* one's treasure chest, but each may suffer the consequences of hurricane force winds if risk is not accounted for. The following pointers can help:

- Check roofs, gutters, soffits, and more for damage or weak construction, and repair.
- Check the attic to ensure all trusses are securely strapped or clipped, and add bracing to gable-ends (i.e., A-frame construction) (Figure 1)
- Ensure carport connections are tight and stable. Replace any old or rusted connections.
- For mobile or manufactured homes, ensure all anchors and pier-block connections are stable and to the correct specifications (Figure 2)
- For mobile or manufactured homes, or other types of free-standing structures (such as sheds), check materials and connections for wear or rust. Replace and tighten.
- If you have an older home of any type, ensure that there is a continuous load path connection. A weak or broken load path connection is a recipe for foundation, wall, and roof failure – and potential destruction.

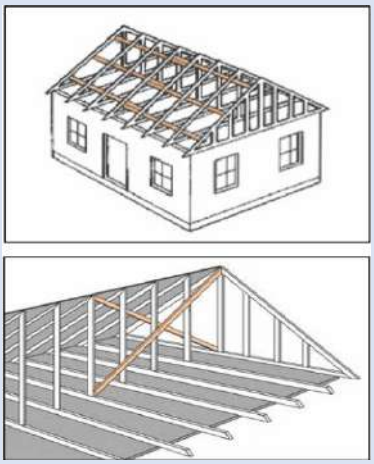


Figure 1: Examples of roof strengthening: Top, Lateral bracing for the length of a conventional slanted roof. Bottom: Diagonal bracing of the gable-end. From the Insurance Institute for Business and Home Safety (IBHS), via NOAA Texas Sea Grant/Texas General Land Office (GLO) Homeowner's Handbook to Prepare for Coastal Natural Hazards.

Figure 2: Example of pan anchorage for a pier-block foundation residential construction. From Analysis of Manufactured Home Vulnerability in Extreme Winds, Davis, B. M., 2020.

For all building types, wind risk can be mitigated by window and door coverings, and garage door bracing. Coverings should be airtight and leave no space exposed. Learn much more about retrofitting a home or business to mitigate against the wind with this guide, courtesy of FEMA.

Flood Risk

Did you know there are methods to limit the impact of high floodwaters? Before mitigation, however, one needs to understand their home's location in reference to the flood plain and local drainage infrastructure. First, use FEMA's Flood Map Service Center to find out your specific location's Flood Insurance Risk Map (FIRM). If you are in a designated risk zone (known as 1/100 or 1/500 annual probability of occurrence zones), you are required to carry flood insurance if you carry a mortgage or similar loan.

Outside of designated risk zones, flood insurance is not required. However, flooding can and does occur in these "preferred risk" zones, especially in cases when high rainfall rates may overwhelm drainage systems that have not kept up with development, may be recently clogged, or have other unknown issues not addressed when risk maps were originally developed.

Even if you have flood insurance, flood mitigation can protect property by reducing risk and increasing resilience. There are six primary methods to mitigate flooding to homes and businesses through retrofitting: Elevation, Relocation, Demolition, Wet Floodproofing (Figure 4a), Dry Floodproofing (Figure 4b), and Barrier Systems. Poor drainage rainfall-induced flooding is by far the most common type across the Rio Grande Valley. Elevation, Relocation, and Demolition may not be feasible options for most residents. However, Flood Proofing and Barrier Systems may be options, including in more vulnerable neighborhoods where financial assistance may be available.

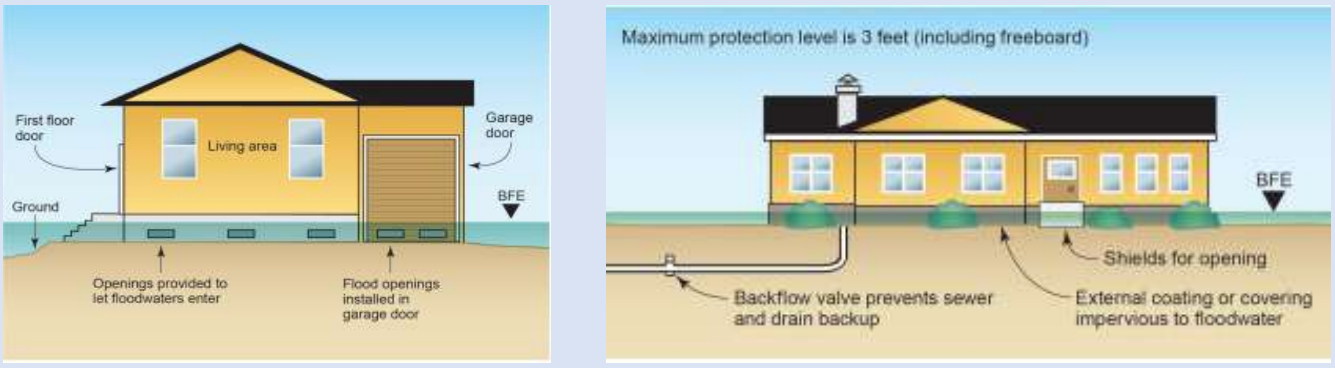


Figure 4a and 4b: Schematic example of wet floodproofing (4a, left) and dry floodproofing (4b, right).

Storm Surge Risk

Fortunately, the vast majority of the Rio Grande Valley's permanent population reside outside of areas that could be affected by most storm surge events. Unfortunately, the growth of South Padre Island since 1980 (Hurricane Allen) has placed more structures at risk from flooding and battering waves than ever before. Much of the newer buildings will be able to survive storm surge, but a reasonable worst-case scenario of 7 to 9 feet of above-ground water combined with wave action is likely to cause significant damage to first-floor or ground-level properties.

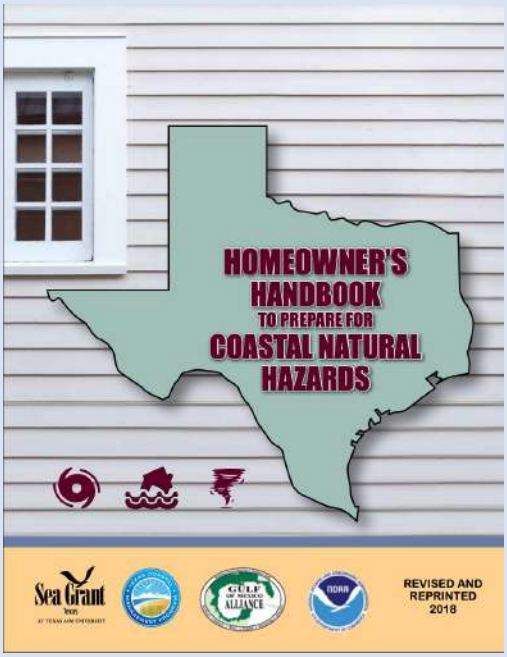
Other more precarious risk zones include portions of Port Isabel, Laguna Heights, and Laguna Vista. Residents living in the latest Hurricane Evacuation Study Zone A are at most risk, and should consider both Flood Proofing and Barrier Systems, but also elevating the structure (if not done already).

The Sandbag Myth

While sandbags are a common method used by communities to prevent flooding, they will provide little to no protection from a significant flood event, whether from rainfall rates or storm surge. At best, sandbags can provide some absorption of minor flooding of water "lapping" at a front door or the edge of a foundation, perhaps for water depth to six inches. Higher water levels will quickly overwhelm and exceed the height and/or ability of the porous bags to keep water out, and any wave action – whether from the sea (storm surge) or from high-profile vehicles navigating flooded streets – will push water through or above any sandbag barrier. Floodproofing or Barrier Systems are a much better bet.

For More

Become #HurricaneStrong. Visit the Hurricane Strong website, where information on resilience building and risk reduction against wind and water can be found. Short "home improvement" videos in English and Spanish are a great help to get started with mitigation. Also, check out the Texas Gulf Coast Homeowners Handbook, courtesy of NOAA Sea Grant and the Texas General Land Office.



ARE YOU AT RISK?

HAVE A PLAN

HAVE SUPPLIES READY

FIND OUT MORE AT: https://www.weather.gov/wrn/hurricane-preparedness

NWS Brownsville Upper Air Roster Now Boasts 16 Meteorologists

By Rick Hallman

Since 1958, twice-daily upper air observations have been taken in Brownsville, TX. In those 63 years, it's safe to estimate that over 50,000 weather balloons have been launched from this southernmost U.S. location west of the Gulf of Mexico. Aside from helping to pinpoint hazardous weather and flooding potential, as well as everyday forecasting use, soundings from the lower Texas coast become especially important during the Atlantic Hurricane Season, sampling the environment ahead of any development off of the Yucatán Peninsula, the Bay of Campeche, or in the warm western Gulf waters. Brownsville is also one of only seven contiguous U.S. upper air stations in the Global Climate Observing System (GCOS), which makes obtaining consistent high-quality observations that much more vital.

The importance of these observations and location within the radiosonde networks is not lost on the staff of the National Weather Service office in Brownsville. Over the past year, in an extensive ongoing cross-training effort, the upper air team led by Chris Birchfield and Rick Hallman has worked to certify every meteorologist on staff, including management. This has given much needed flexibility to the office schedule and daily shift duties. With two recent additions, the roster has now expanded to 16, with each and every meteorologist taking at least one observation in May 2021, solidifying the Whole Office Concept by walking the walk (and occasionally using a train regulator).

The NWS Tsunami Program

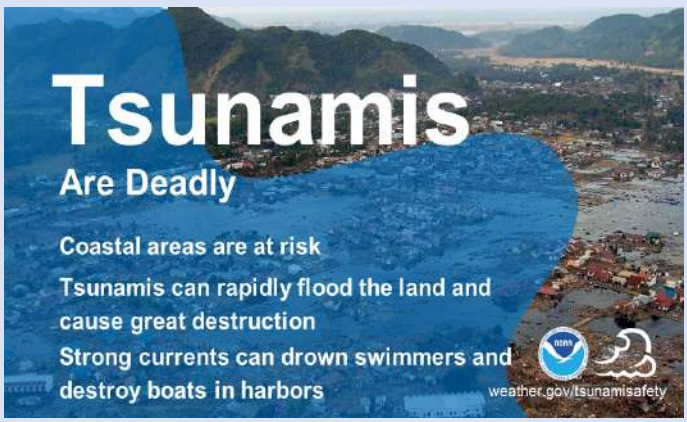
By Timothy Speece

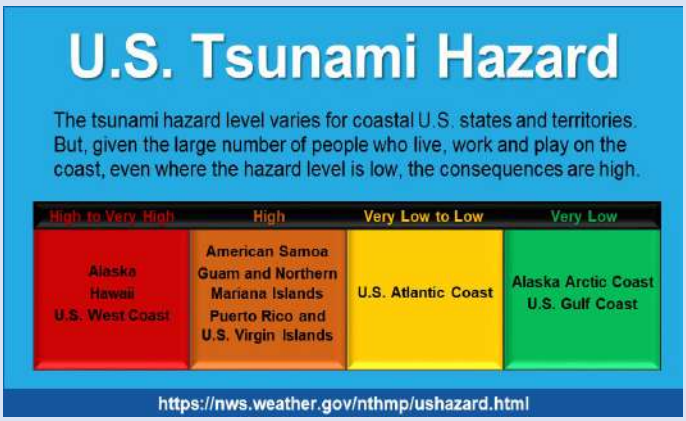
The NOAA/NWS Tsunami Program was developed during the latter half of the 20th Century after the Pacific areas of the United States were repeatedly impacted by a series of destructive tsunamis. In response to this series of tsunamis, NOAA/NWS, established two tsunami warning centers dedicated solely to protecting U.S. interests from the tsunami threat. The scale of destruction and unprecedented loss of life following the December 2004 Sumatra tsunami, in particular, served as the catalyst to refocus efforts on reducing tsunami vulnerability of coastal communities. On December 20th, 2006, the U.S. Congress passed the 'Tsunami Warning and Education Act' under which education and warning activities were thereafter specified and mandated.

The Tsunami Program is a federal, multi-state, and international partnership focused on reducing the impact of tsunamis along the U.S. coastlines. Administered by the National Weather Service (NWS), the program uses the capabilities of NWS and other NOAA line offices to ensure timely and accurate tsunami watches and warnings to the U.S. coastlines in addition to increasing preparedness and mitigation activities aimed at minimizing the potential impacts of tsunamis at the local level.

The Tsunami Warning Centers use tsunami forecast models combined with data from seismic and sea-level networks to continuously monitor for earthquakes that could produce tsunamis that threaten the U.S. coastline. When the centers issue Tsunami Warnings, they are broadcast through local radio and television broadcasts, wireless emergency alerts (WEA), NOAA Weather Radio and NOAA websites (like Tsunami.gov).

Tsunamis are extremely rare in the Gulf of Mexico. Nonetheless, some tsunami vulnerability exists for the Lower Texas coastal waters. Locally, tsunamis would most likely be produced by powerful underwater earthquakes, underwater landslides caused by slippage of underwater sediment, or meteor strikes in the Gulf of Mexico, Caribbean Sea, or Atlantic Ocean.





Sources: https://www.noaa.gov/explainers/us-tsunami-warning-system
https://www.tsunami.noaa.gov/ https://www.tsunami.gov/?page=info

”Operation Unify” Brings Together Amateur Radio and the Red Cross

By Brian Miller and Pablo Gonzalez

On Saturday, May 8, 2021, WFO Brownsville Ham (amateur radio operator) Brian Miller (KE5AWU) participated in extraordinarily successful Operation Unify. Operation Unify is a nationwide communications exercise run by the American Red Cross to demonstrate the ability of amateur radio to provide accurate and timely messaging by forms using email over the radio (Winlink), to further the mission of the Red Cross. The Red Cross worked with several partners during the operation, including the Amateur Radio Emergency Service (ARES). Mr. Miller is the ARES Emergency Coordinator for Cameron County.

Image credit: ARC-EmComm-Training.org

The exercise was predicated on a natural hazard that does not always get a lot of attention yet is bound to become increasingly important. That hazard is space weather. In this exercise, an earth-directed solar flare caused earth-based communication blackouts, followed by disabled communication satellites, resulting in communications chaos. The ensuing solar storm, when it reached earth, damaged transformers and brought down power grids. Some grids may take weeks to repair. Due to fuel shortages, cell phone sites will become increasingly disrupted. Fortunately, there are still enough Winlink sites to help with passing traffic. Amateur radio operators (Hams) have been asked to pass essential traffic to their designated clearinghouse site for distribution to the Red Cross.

Winlink Global Radio Email is a network of amateur radio and authorized government-licensed stations that provide worldwide radio email using radio pathways where the internet is not present. Winlink has the capability to save lives and mitigate property loss. For an example of the power of Winlink in the recent Texas freeze event, see http://www.arrl.org/news/ares-and-red-cross-cooperate-to-assist-storm-affected-residents-in-texas. From the Winlink.org website, "The system is built, operated and administered entirely by licensed "Ham" volunteers. It supports email with attachments, position reporting, weather, and information bulletins and is well-known for its role in interoperable emergency and disaster relief communications. It is capable of operating completely without the internet, automatically using smart-network radio relays. Licensed Winlink operators/stations use both amateur radio and government radio frequencies worldwide.”

Mr. Gonzalez is seeking to install Winlink on office equipment, where any licensed radio operator, or operator under the supervision of a licensed operator, can use the software. To that end, NWS-BRO is working with Southern Region Headquarters Computer Configuration Board (CCB) to gain office use approval.

The New England Blizzard of 1978 (often called the Blizzard of '78) was my most memorable weather event.

Southern New England (Quincy, MA), where I lived at the time, received more than two feet of snow with drifts as high as the second story of homes. We also experienced hurricane force wind gusts which along with the heavy snow produced prolonged "true" blizzard conditions. Major coastal flooding also accompanied this storm. This along with large waves produced tremendous damage to many homes and structures along the Massachusetts coastline. I remember surveying these damaged and destroyed homes (in Scituate, MA) with my parents and younger brother after the storms.

Thousands of vehicles were stranded on area highways and roads due to the rapid rate of snowfall. We didn't have school for two weeks due to the conditions of the roads and there were many down electrical lines buried underneath the snow. It was very dangerous to travel after the storm. Only emergency vehicles were allowed initially.

Category 4 Hurricane Harvey in 2017 and the Perfect Storm in 1991 are close seconds to the Blizzard of '78. **-Meteorologist in Charge, Mike Buchanan**

One of the most memorable weather events for me was the only "snow day" in my college career on February 17th, 2003, in State College, Pennsylvania.

After nearly half a foot of snow fell on Sunday night, Penn State cancelled all classes for the first time in 7 years for Washington's Birthday, the next day. Nearly another foot of snow fell by 11 AM on Monday morning for a storm total of 14 inches. As a student meteorologist, and forecaster for the Campus Weather Service, the days leading up to the storm and through the event were the first real life test of my newest meteorology skills.

While snow and heavy snowfall were nothing new to me, having grown up in Cleveland, OH with lake effect snow, the snowflakes in central Pennsylvania with this storm were huge - at well over 1 inch, and sometimes closer to 2 inches in diameter! Aside from the forecasting, the snow day, or witnessing giant snowflakes in over a foot of snowfall, this storm proved memorable for the impacts and aftermath as well. Classes resumed the next morning and catching city busses to and from the campus with snowdrifts and curbside piles nearly 4 feet tall or more made every day that week an adventure. It was a great reminder that the toughest part of most major weather events is the impacts or aftermath and how they affect life in the days (or weeks) following a storm. **-Meteorologist Rick Hallman**

Waiting out a typhoon in a high-rise hotel in Busan, Korea. I was on reserve duty aboard a Navy ship in the West Pacific when a typhoon started tracking our way. We were given the option of debarking early in Busan, Korea, or remaining at sea evading the typhoon. I chose to debark. The hotel where we were billeted was quite tall, and I was on one of the higher floors. The typhoon passed relatively close to Busan, and it was quite nerve-racking to listen to strong winds and rain on the window, not knowing for a time whether the typhoon or the hotel would win the battle. **-Senior Meteorologist Brian Miller**

Monday, February 19, 1979 - The "Presidents Day Snowstorm", Potomac, Maryland (northwest of DC)

Sunday morning, February 18th, dawned with a crackling cold. The thermometer had dropped to -14 (F) prior to sunrise and had only risen to 2 by 10 AM under a now slate-gray overcast. About fourteen inches of hard snowpack was in place, and the clouds held daytime temperatures to 6. My sister and I were already happy for the three-day weekend, having awoken late after celebrating a cousin's wedding the prior evening. Hearing the Winter Storm Warning and forecast of 6 to 10 inches of snow for that night made us even more joyful. Light snow began just before twilight and continued through 11 PM - probably 2 or 3 inches of new snow was on the ground when we turned in. I fell asleep in my sister's room after sharing stories and jokes, to the whistle of a late evening train passing by several miles away. Ever the eager future meteorologist, I awoke at 5 AM to deafening...silence! The silence where all you can hear is the blood whooshing between the ears. I peeked through the window shade on the back (north) side of the house. Couldn't see a thing. Fog, I figured. Still, I had to find out how it looked out front, so I ambled down the stairs and opened the door. The streetlight just 30 yards away was...gone! Just a blur of brightness. Stepping on the porch, that "fog" was not fog at all, but countless, large snowflakes! Returning upstairs, I woke my sister up and had her see what I had just seen. Euphoria! But also, wonderment. We headed back to her room and looked out the back window again. The 3-foot-high picket fence? Gone. We figured it was just the low visibility but continued to look...and realized the fence was buried under the snow. After a little dozing, we awoke at daybreak. Within an hour, sunshine and blue skies greeted us. And snowpack. Tons of it! With yardstick in hand, we measured where a flat, non-grassy surface (a flagstone paver) would have been. 36 inches of snow. The exact length of the yardstick. Nearly two feet had fallen overnight, by our unofficial count. A spectacular scene for this young teen. **-Warning Coordination Meteorologist Barry Goldsmith**

My mother frantically looking for me around the neighborhood after seeing a green sky to the south. Being herded into the basement along with my two younger brothers. Seeing nothing out the windows but a swirling mass of gray. The shattering of glass as hailstones broke windows in our house. Later hearing tales of friends standing in open garages and swinging at hailstones with whiffle-ball bats...

These are my childhood memories of a severe hailstorm that struck Mendota, IL in May of 1985. I was six years old at the time. -**Science and Operations Officer Joshua Schroeder**

My most memorable weather was when I went to Sacramento, CA last month and enjoyed perfectly clear blue skies and no humidity and a slight breeze and went for a walk carrying my 1-year-old grand daughter. **-Electronics Technician Gregory Saunders**

I have several here at the office. Picking just one is hard. Most of them have been during tropical events but the one that probably was the most impactful was the Great Rio Grande Valley Flood of 2018. Even though it was not a tropical system, the rainfall from the event was essentially like a tropical storm or hurricane. It was a hybrid of a tropical wave and a 500mb low in combination with tropical moisture. We had several rounds of heavy rainfall across the Rio Grande Valley and northern ranchlands from June 18th through June 22nd. It was the worst widespread flooding since Hurricane Dolly in 2008. I was working day shifts during the event and issued multiple flash flood warnings for the event including flash flood emergency warnings. I also issued areal flood warnings for portions of Hidalgo and Cameron counties after the event which were needed several days after the flood for the standing flood waters. -**Senior Meteorologist Mike Castillo**

I have many memorable weather experiences, from being 3 years old and watching lightning out the sliding glass door in Nebraska, to a record setting snowfall in the early 2000s in North Carolina.

The most memorable was the aftermath of a tornado that struck York county South Carolina in 2011. At the time I was a preschool teacher, and my husband and I went to the area to see the damage left behind. I will never forget seeing people pushing the rubble of their homes into a pile and setting it on fire, or finding pieces of tables legs, silverware and a phone in a field, and seeing the slab where a house once stood. I was heartbroken for these people and when we left, I vowed to go back to school so I could help warn people in the future. -**Meteorologist Amber McGinnis**

The most memorable weather experience I have is from the Blizzard of January 2016 in Central Virginia. Snow started Friday, January 22nd and didn't end until the following evening. By the time the storm wrapped up, we had 16" to 24" of snow on the ground with higher drifts. It's memorable for two reasons: It is the most snow I have ever seen at once; and the unique challenges it presented me from forecasting and messaging that much snow, to dealing with the height of the storm, and the several days it took to clean up. It's certainly a storm I won't forget. **-Meteorologist David Reese**

The Dodge City, KS tornadoes on May 24th, 2016, will forever be my most memorable weather experience. It was my first time seeing a tornado, let alone nearly a dozen in one day. There were a few times that multiple tornadoes were on the ground simultaneously, and I even caught a picture of two simultaneously spinning! By far my best storm chasing day. Although... I do still go back and forth over whether seeing the tornadoes or the late-night pizza was the most satisfying experience of the day. **-Meteorologist Brian Adams**

One of the most memorable weather experiences I've had was on May 21, 2019, when I lived in Topeka, Kansas. I had just finished work and it was around 6:30pm when I decided to go to a local high school and do a track workout. I knew there were small showers and thunderstorms forming around the area, but I had checked the radar before I left work and it seemed that I had a window to get a quick workout in! Halfway through my run I felt what looked like little Sonic ice pellets hitting my head. The high school track was next to a busy street, so I thought someone had just thrown Sonic ice at me from their car? So, I stopped and looked up and saw some very dark clouds coming my way. It was so strange to me how there was no thunder or lightning but just pea sized hail and a little bit of rain! Anyway, I got into my car and waited about 10 mins for it to pass by. I finished my workout and decided to check radar again. Suddenly I heard the tornado sirens and see a huge anvil had formed. Turns out that same storm turned tornadic maybe 15 mins after it passed by me just a few miles north of town. I definitely will never forget that day and I will never underestimate how an unstable environment can quickly turn tornadic! **-Meteorologist Angelica Soria**

Dr. Paige Doelling, NOAA's Scientific Support Coordinator (SSC) for the portion of Coast Guard District 8 that covers the Texas Gulf coast (Fig. 1), presented a webinar to WFO Brownsville/RGV on March 30, 2021. The talk focused on the role of the SSC in oil spill response. The purpose was to give forecasters at the Brownsville office basic information about how an oil spill would be handled if it occurred in their area of responsibility.

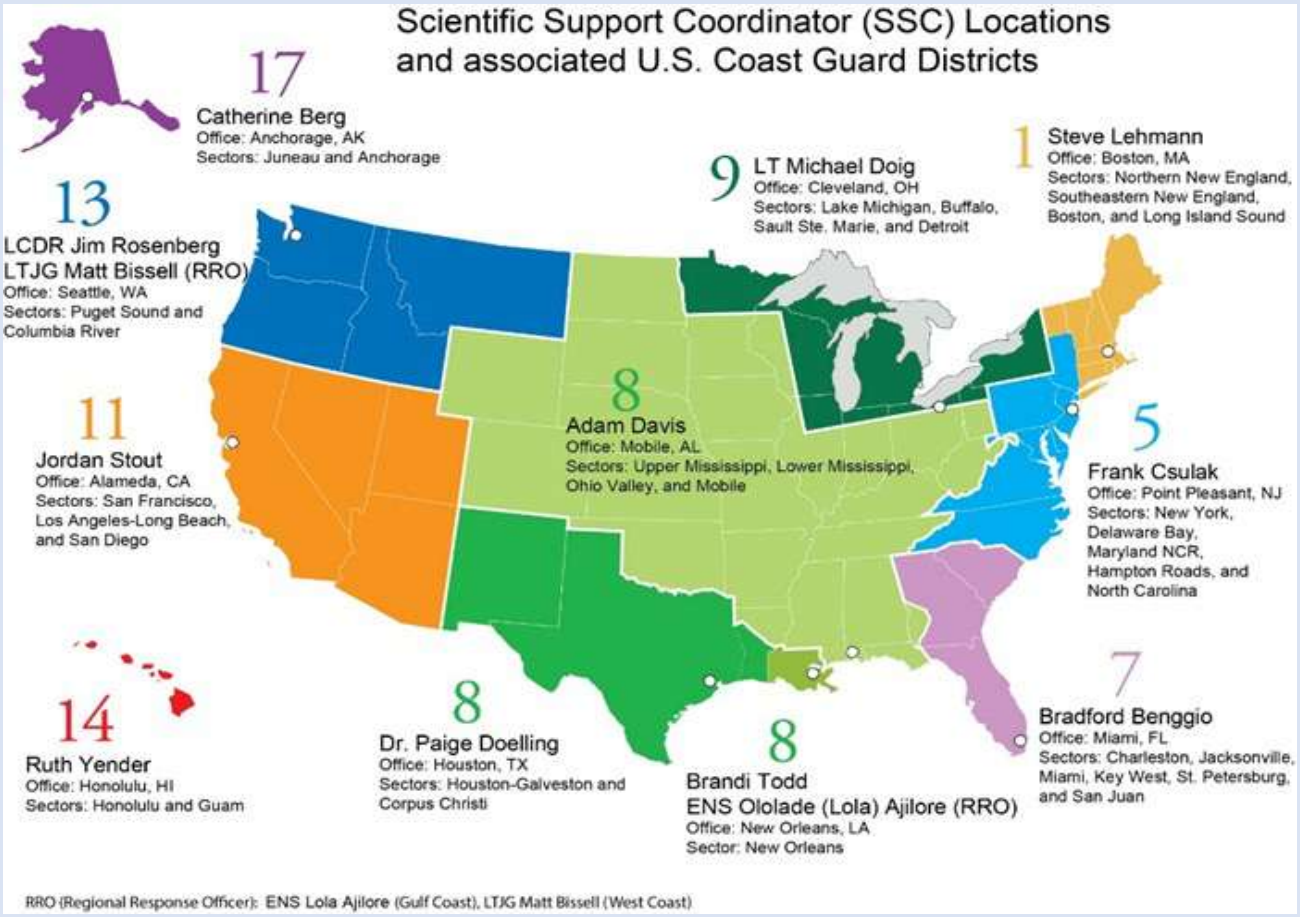


Figure 1. Credit to the Office of Response and Restoration. Relation of SSC area of responsibility and U.S. Coast Guard Districts.

Dr. Doelling outlined the history of the SSC position in the Office of Response and Restoration under NOAA's National Ocean Service. The various SSCs and the Seattle, WA based Scientific Support Team (SSC) have their roots in the 1976 *Argo Merchant* spill off Nantucket Island, MA where it became apparent that the federal On Scene Commander (OSC) required a specialist for coordinating scientific activity (SSC) and a scientific support team/technical specialist (SST) who focused entirely on the scientific support needs of the incident. This concept was incorporated into the Oil Pollution Act of 1990 (OPA) following the 1989 *Exxon Valdez* oil spill.

The SSC is on the command staff of the lead federal agency in an oil spill incident, typically either the U.S. Coast Guard (coastal spills) or the Environmental Protection Agency (EPA) (inland spills). Typically, the National Weather Service office (NWS) may be called upon to provide Impact-Based Decision Support Services (IDSS) to a core partner such as a local emergency manager, but in larger scale oil spill incidents the SSC may reach out directly to a local NWS office for meteorological support.

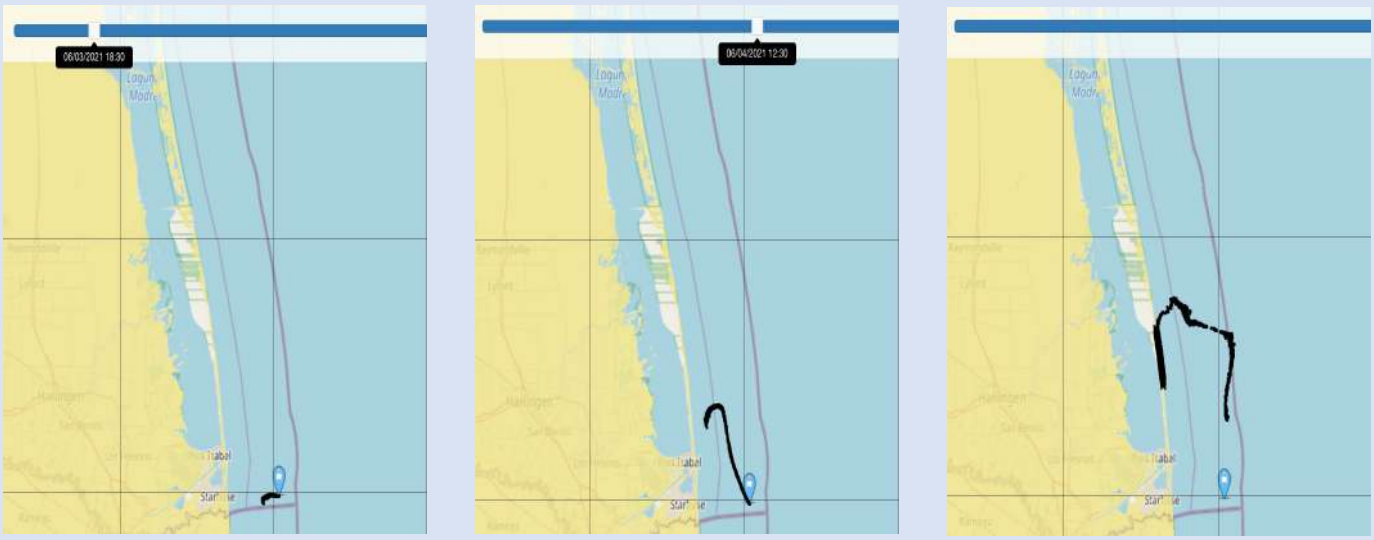
The type of support requested could be as targeted as running the Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model, which depicts the atmospheric dispersion of a pollutant, or the CAMEO® software suite, which depicts highly detailed chemical dispersions over short distances and times. On the other hand, the SSC might request a weather forecast to support the OSC. The forecast may include atmospheric conditions to assist safety decisions for agencies working the spill – i.e., thunderstorms, temperature changes, winds, etc. The forecast may also include information on wind-driven marine elements such as wave heights, swell period and swell direction, which help support the General NOAA Operational Modeling Environment (GNOME). GNOME is used to predict the possible trajectory a spill might follow in bodies of water.

Argo Merchant, Nantucket, MA 1976. Photo credit to the Office of Response and Restoration

Exxon Valdez, Prince William Sound, AK 1989. Photo credit to the Office of Response and Restoration.

Weather Forecasting. Photo credit to the Office of Response and Restoration.

During the webinar, Dr. Doelling explained that the National Incident Management System (NIMS) was used in addressing oil spill incidents. Dr. Doelling recommended ICS-300, Intermediate Incident Command System for Expanding Incidents as a good course for meteorologists to take to prepare for oil spill incidents. In addition, the Office of Response and Restoration offers a class in Oil Spill Science, which Dr. Doelling also recommended for meteorologists. Finally, many thanks to Dr. Paige Doelling for accepting WFO Brownsville/RGV's invitation to give us a presentation.



Example of Gnome Model Oil Spill Trajectory from near start to end of time frame selected (36 hours) from a continuous oil spill off the lower Texas coast.

Engaging Vulnerable Rio Grande Valley Communities to Reduce Weather Risk

By Barry Goldsmith

On Inauguration Day 2021, President Joseph R. Biden issued an Executive Order codifying Support for Underserved Communities Through the Federal Government. The order clearly conveys the need to advance social equity across the Nation. Social equity is defined as the "fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities, such as […] persons otherwise adversely affected by persistent poverty or inequality." The Rio Grande Valley is a clear example where social inequity exists on a large scale. Couple the high rate of poverty with language and cultural barriers, and the need to leverage equitable weather information to meet our core mission to protect life and livelihoods is both stark…and motivational.

Data from recent U.S. Census updates indicated that poverty rates across the Valley range from 26 to 30 percent, and around one-third of the population speaks English "less than well". A sizeable number of residents – well over 100 thousand – live in one of at least 1200 *colonias*, where thousands of structures are poorly built and at substantial risk for damage or destruction from wind, flooding, hail, and more. Many of these residents have a distrust of government information, no matter the source.

Photo of destroyed stick-built residence in a colonia near Alton, TX, following a severe thunderstorm in 2015.

But help is out there. And NWS Brownsville/Rio Grande Valley intends to lead the way.

This longstanding philosophy of preventing or ameliorating poverty by educating people to learn a skill has some resonance when applied to improving resilience – and decreasing risk. In 2016, we worked with a collection of faith-based leaders, public safety officials, and non-governmental organizations to find ways to build trust in life-saving weather information from the NWS and the Weather Enterprise overall – and use that information to find a trusted safe zone to evacuate to in the case of a potentially catastrophic weather event bearing down, such as a squall line with hurricane-force wind gusts. Churches and community centers would monitor potential for dangerous storms, provide notice to vulnerable residents that safe zones would be open for shelter, and Spanish-language NOAA Weather Radio would provide the warning message to rouse residents to escape to the safe zone before disaster strikes their residence.

Collage from the Conferencia de Emergencias Para Las Colonias Del Valle, July 2016, in Pharr. This is one example of a "Resiliency Rally" that we plan to repeat and expand on later in 2021 and beyond.

Though well-intentioned, the "Shelters of Faith" concept comes with caveats. Will at-risk residents purchase a weather radio, even at deep discounts? Will they monitor frequently, or will the receiver gather dust if not seen as an item used daily, like a cell phone or television? These questions remain. At the same time plans were being developed for Shelters-of-Faith, two local churches in Pharr and Alamo hosted home improvement workshops for *colonia* residents (below). Dubbed "Resiliency Rallies", the workshop provided a private-public partnership among churches, community resource centers, public safety officials, home improvement/hardware stores, and NWS Brownsville/Rio Grande Valley to promote low-cost, highly effective methods to residents to improve home construction in *colonias*. Simple fixes to roofs, walls, anchors, and pier block connections could be the difference between survival and destruction. For the building, *and* the family inside.

After a three-year hiatus, which included a delayed restart to these programs due to the pandemic, we are ready to take the next steps later in 2021 and beyond. Using the Executive Order as justification to push forward, we're looking forward to helping these communities become stronger against the weather.

New Climate Normals Released

By Kirk Caceres

New climate normals from across the United States were released by the National Centers for Environment Information (NCEI) on May 4, 2021.

What are climate normals?

They are three-decade averages that consist of climatological variables such as temperatures and precipitation. The climate normals are produced every 10 years and the newly released climate values span from 1991 to 2020. The national climate normals data set consists of daily and monthly averages of temperature, precipitation, snowfall, heating, cooling degree days, frost and freeze dates, and growing degree days calculated from around 9,800 National Weather Service operated stations across the United States. Climate normals can be used as a reference period for monitoring current weather and climate, and a good description of the expected climate at a location over seasons. Also, they can be useful to plan weather conditions beyond the time span of reliable forecasts.

Why are normals calculated for a 30-year period?

The World Meteorological Organization, the governing body for international meteorology, decided in the 1930's to calculate normals based on the longest length of reliable climate data that most countries had. Brownsville, Harlingen, McAllen, and Bayview are the four local climate sites here in the Rio Grande Valley.

What were the general trends that were observed with the new climate for the local area?

Temperatures were generally warmer with less precipitation in the Rio Grande Valley and winters (December through February) locally were substantially warmer and slightly drier compared to 1981 -2010. The next updated climate normals will be released by the NCEI again in 2031.

Previous Climate Normals vs. New Climate Normals for Brownsville

1981-2021

Season	MAX TEMP (°F)	MIN TEMP (°F)	AVG TEMP (°F)	PRECIP (IN)
Annual	83.6	65.4	74.5	27.44
Winter	72	52.9	62.5	3.5
Summer	93.4	76.1	84.7	7.05
Spring	83.6	65.9	74.8	5.41
Autumn	85.1	66.5	75.8	11.48

1991-2020

Season	MAX TEMP (°F)	MIN TEMP (°F)	AVG TEMP (°F)	PRECIP (IN)
Annual	85.4	67.1	76.2	26.78
Winter	74.3	54.9	64.6	3.32
Spring	85.5	67.8	76.7	5.14
Summer	95.1	77.6	86.4	7
Autumn	86.6	68	77.3	11.32

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