National Weather Service - Medford, Oregon

Spring 2019
Volume 8, Issue 1

The Crater Chronicle

NWS Medford Meteorologist-In-Charge, John Lovegrove, Retires

Q. Tell us about your service within the weather service and what made you want to become a meteorologist.

A. I was with the Weather Service for over 33 years, starting in September 1985 in Klamath Falls. It was a small station - I was the staff and the other guy was management. In between Klamath Falls and Medford were four other offices: Las Vegas, Reno, Phoenix and Eureka. How did I join the Weather Service? As with nearly everyone in the NWS, I enjoyed weather since I was a kid growing up in central Oregon and had a weather station in the '70s. This was pre-computer and Wi-Fi so it was all hard wired. I didn't immediately start out studying meteorology in college since I thought there were better career opportunities in other fields. At Oregon State University I majored in electrical engineering but quickly found out in my sophomore year that I needed to switch. I knew I wanted an earth science field and chose atmospheric sciences. I was thinking more about my interests and not career but honestly can't remember why I chose that over geography.

Q. What was the most exciting thing to happen during your career? How about the most challenging and why?

A. The most exciting time of my career was in Eureka. I was the Warning Coordination Meteorologist and teamed up with Troy Nicolini (and others) to really modernize the marine program in the whole NWS. At the time around the turn of the century, the marine forecast program was pretty primitive with limited information going to mariners and little science backing up the forecasts. One day Troy took a group of us out on the ocean in his boat to do some crabbing. There was a small craft advisory out for hazardous seas but the seas were actually quite benign - just long rolling waves. That got us thinking about better ways to write marine forecasts and the project snowballed. We ended up adding swell period forecasts, changing how hazardous seas are defined (steepness not height), adding marine watches, adding more information to marine headlines,

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Spring Began on March 20th at 2:58 pm PDT.

creating a new marine warning text product and adding hazardous seas warnings. We had to fight the current (so to speak) every step of the way but persevered and brought the marine program up to the same level of service as other programs in the NWS. The most challenging time of my career was as Meteorologist In Charge (MIC) in Medford. The MIC position carries much responsibility for how the office performs its mission and responsibility to the staff to support them as much as possible in executing the mission. It requires great people skills that were definitely not my strong point. The early years of my tenure in Medford was a period of great growth and stretching for me. That can always be a challenge. Later in my time as MIC, I became more comfortable with the people part of the job but it was never second nature.

Q. What are some things you wish more people knew about the National Weather Service?

A. I wish more people just knew the National Weather Service (NWS) exists and the great mission statement it has - to save lives and property and enhance the national economy. It seems most people think weather forecasts come from the TV weather people not realizing the 24/7/365 work the dedicated people of the NWS do. It does seem that the advent of social media has helped increase the awareness of the NWS but I would like people to be as aware of the NWS as other high profile federal agencies.

Q. What was your favorite position within the weather service?

A. This is an easy question - my favorite position in the NWS was as Warning Coordination Meteorologist (WCM) in Eureka, California. The WCM position offers tremendous opportunity and flexibility. The MIC in Eureka, Nancy Dean, gave me a lot of latitude in defining my role and the work I did. The WCM works closely with our core partners and can effect positive changes on the services provided. The marine work I previously discussed is an example. Many people say the WCM is the best job in the Weather Service and I agree it was the best one I held. An MIC does have considerable influence on the direction of an office but limited time to do that themselves. A WCM can do the work and that is very rewarding.

Q. Where do you hope to see the NWS in the future?

A. I would like to see the NWS as the "go to" source of weather information for the nation. The NWS can do that by providing that information at the level of detail that is already in its possession. Very detailed forecasts and warning services are available today. A way to get that information out is what is needed. The NWS is a large, diverse agency and change comes very slowly. I wish the leaders at regional and national levels and the leaders of NOAA understood this. The NWS needs a better web presence, a smartphone app and to nationally implement detailed hazard services. Unfortunately, I don't see any of these things happening soon.

Q. So, retirement. What are your plans?

A. When someone retires, you need to retire to something and not just stop working. I volunteered for Jackson County Search and Rescue (SAR) last year in anticipation of retirement. I also joined the K9 team in SAR and am currently training a young dog for wilderness air scent searching. We are close to becoming certified. My wife, Vicki, and I own flat coat retrievers. Being a member of the K9 SAR team is much like having a part time job, there is a large time commitment. In addition to the K9 team, I am also a regular SAR member available for all missions we are called upon to perform. SAR is a great group to be involved with. Over 100 people volunteering their time and effort to serve the community and save lives. This is a great follow up to being part of the National Weather Service. In what other spare time I have, we will travel and do other activities with our dogs. We show them and do agility. I may even go fishing once in a while.

Where Do You Go For A Snow Forecast?

Ryan Sandler, *Warning Coordination Meteorologist*

In the spring of 2015, a writer for the website FiveThirtyEight.com created a simple poll for a SurveyMonkey audience and received 939 responses. The survey, located HERE, asked "how do you check the weather." The results are shown below and the #1 answer was the phone's default weather app. It has been four years since this survey came out when about 2 out of 3 of Americans owned a smartphone. Today, nearly 8 out of 10 Americans own a smartphone and an even higher percentage of people probably get their weather forecast from their phone's default weather app.

Here's where people go for weather forecasts:

METHOD	PERCENTAGE
Phone's default weather app	23.2%
Local TV news	20.6
A specific website or app	19.1
The Weather Channel	15.2
Internet search	14.2
Newspaper	3.5
Radio weather	3.4
Newsletter	0.9

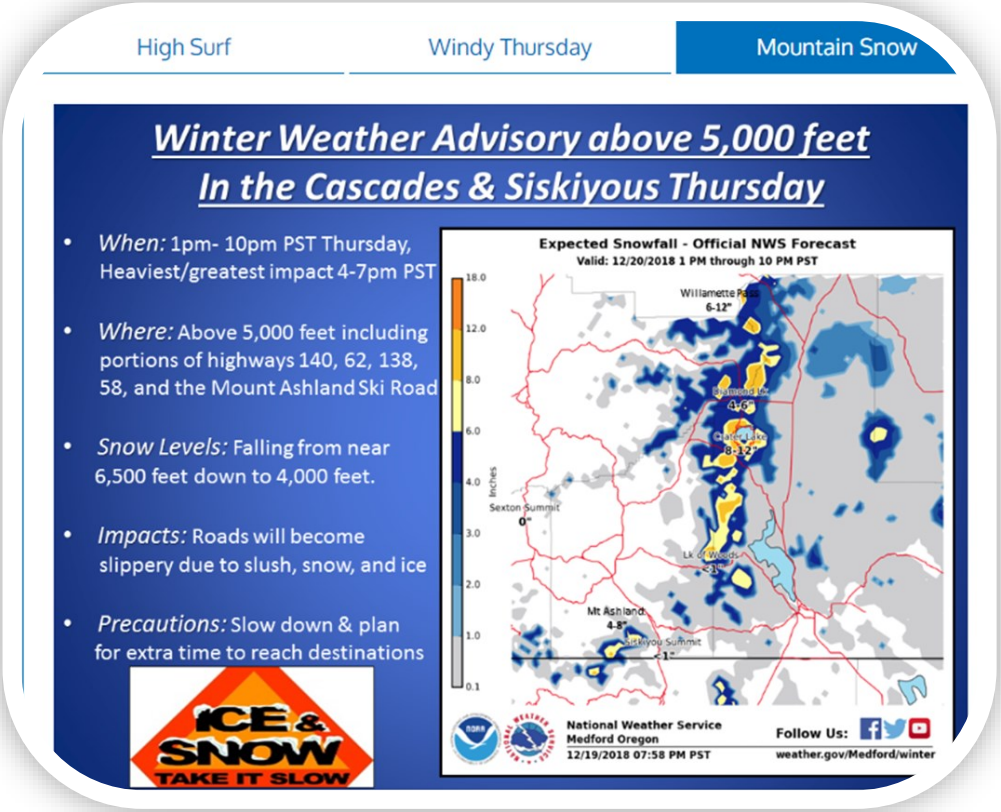
This survey also showed that those people who check the weather daily were more likely to go to a specific website or app or The Weather Channel than casual weather checkers. I want you to imagine that a friend or family member just told you about a big snowstorm coming soon to your area. Where would ***you*** go for forecast information?

Maybe I can persuade you to go to the National Weather Service (NWS) webpage. The NWS has 122 weather offices across the country so we know the local weather patterns and details of the area. You found this article so you probably already know about us and our website covering southern Oregon and far northern California.

Now back to that potentially big hypothetical snowstorm for southern Oregon and far northern California. You heard about the big upcoming winter storm and want to know what we think. You could start by going to https://www.weather.gov/mfr which is our local webpage. You may see a Weather Story on the main page with forecast storm information similar to the one below. Sometimes there is more than one Weather Story available.

On our homepage you might click on your location on our main map for details out to 7 days. People who are really into weather like to read our forecast discussion shown as an icon on our homepage. This forecast discussion will often mention our confidence levels and more details about the storm.

On our homepage you can click on the **"Forecasts"** tab to see other winter storm products such as the experimental Winter Storm Severity Index and Probabilistic Snow Amount Potential. The main point here is you can do a lot better than your phone's default weather app. While we're talking about apps, the NWS does have a widget for your phone. On your phone go to https://mobile.weather.gov to use this widget for your weather forecasts. For instructions on how to create a permanent icon (similar to an app) on your phone go to https://www.weather.gov/wrn/mobile-phone



I invite you to explore our homepage at https://www.weather.gov/mfr. There is a ton of information available including radar, satellite, current and historical observations, river levels, climate data, and many other weather, water, and climate related information.

What Are Ensembles? The Anatomy of a GEFS Plot

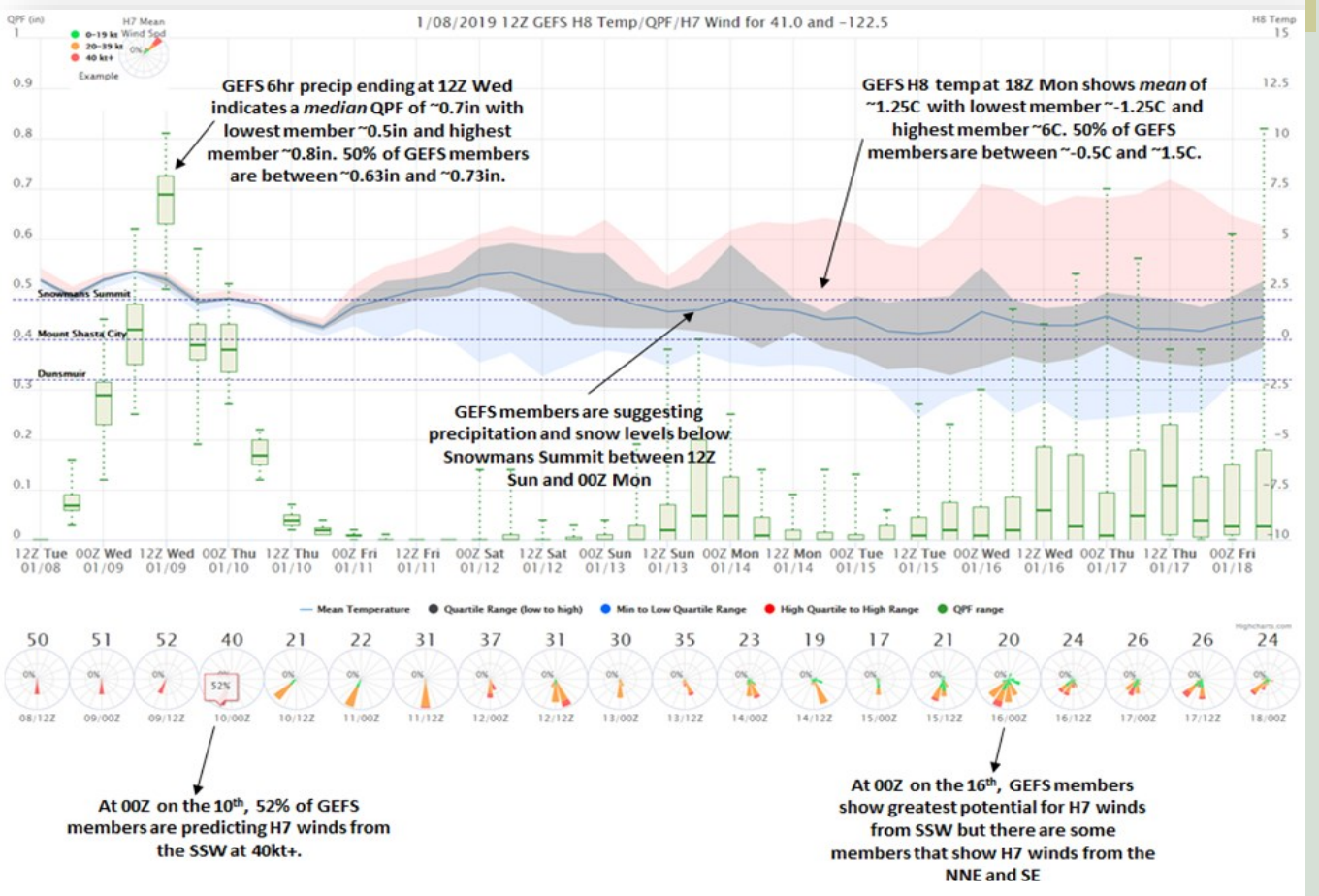
Shad Keene, *Lead Forecaster*

A weather model starts with the initial conditions of the atmosphere. For instance, a model ingests all kinds of data, including surface observations, satellite imagery, aircraft weather data, etc., and then a set of mathematical equations predicts what will happen 1, 3, 5, and even 10 days into the future, based on these initial conditions. It's quite remarkable when you think about it.

Even though we have so much more observational data than we did just 10 years ago, we still are far from knowing what the actual conditions of the atmosphere are at every single point on the globe. Therefore, there is some uncertainty in initial conditions. An ensemble represents a model being run with multiple initial conditions, in hopes of understanding the range of potential outcomes based on these varying initial conditions. You've probably heard the term "The Butterfly Effect" which is attributed to an idea from MIT Meteorology professor and father of chaos theory, Edward Lorenz. In the early 1960s, Lorenz suggested that the flapping of a butterfly's wings could ultimately cause a tornado. While this suggestion is technically an exaggeration, it essentially means that slightly-altered initial weather conditions can have major impacts on future weather. According to Paul Roebber, mathematician and meteorologist at the University of Wisconsin-Milwaukee, even individual clouds can influence our weather 1, 3, and 5 days out.

To help us with the problem of imperfect initial conditions, we now have many ensemble forecasting systems that tweak the initial conditions of the atmosphere to see the various potential outcomes. One of them is the Global Ensemble Forecasting System, or GEFS. Here at NWS Medford, we visualize these potential outcomes to help determine what type of weather impacts we expect in different portions of the forecast area.

Here's a look at a fairly technical graphic we use to capture the range of potential outcomes that the GEFS predicts:



Z=Zulu Time (aka UTC, GMT) = +7 hours PDT

Dazzling but Deadly: Long Period Swell

Brian Nieuwenhuis, *Forecaster*

Some may think that when a large, powerful storm blows across the western Pacific near Japan and the Kamchatka Peninsula, we in the Pacific Northwest couldn't possible feel any effects. The truth is, these storms produce large waves that then travel across the ocean to crash on our shores as long-period swell. "Period" refers to the time between each wave, and to be classified as long-period, the waves typically must have 15 seconds or greater between them. The longer the period, the more powerful the waves are. The more power there is behind the water, the higher the breaking wave is, and the higher the water sweeps up the beach. It is these waves, originating from thousands of miles away, that produce the spectacular surf at Oregon coastal viewpoints such as Shore Acres, and which draw visitors to our area from across the country.

Though awe-inspiring, these towering waves come at a deadly price. At sea, long-period swell poses little hazard to vessels, as it typically manifests as a long, rolling wave that is easily surmounted. Once these waves reach the shore, however, they become much steeper and higher due to shoaling and drag produced by the ocean floor. They then become particularly hazardous to beachgoers and any ocean-going vessels that attempt to enter or leave port.

Shore Acres Jan 18, 2018. Photo: Brian Nieuwenhuis, NWS

The coastline of the Pacific Northwest is not the safest place to be, despite the beauty and wonder. Jetties and rocks can be swept by waves at any time, even when the ocean appears calm. Sneaker waves, which can run much further up the beach than normal and sweep people into the cold water, are a particularly dangerous hazard as they occur without warning and when the beach may otherwise appear to be safe. Current research suggest that these waves may be a result of long-period swell, specifically when the leading edge of these waves begin to reach the coast. Every year, lives are lost to this poorly understood phenomenon. While research is ongoing to find a way to predict them, the National Weather Service will issue Beach Hazard Statements when we believe the threat for sneaker waves is high. When these are issued, it is best to stay away from the water, especially rocky shores, jetties, and beaches with logs that can easily become killing debris in the roiling surf.

When larger long-period waves approach the shore, the National Weather Service issues High Surf Warnings and Advisories to alert the public, warning that beaches and jetties are particularly hazardous due to large breaking waves and strong currents. During these times, waves are particularly powerful, posing not only a threat to people along the shore, but also to infrastructure and structures close to or in the water. Jetties and walls can be damaged by the breakers, and beaches eroded. Sometimes waves can even push up the beach and damage buildings, which we saw just last December in Cannon Beach, Oregon.

High surf poses another deadly threat, which can make a big impact on coastal economies and lives. Fishing vessels and any other boats that use most area ports must cross the bar, where the river meets the ocean. Typically protected by jetties along both sides of the channel, the bars are protected from most every-day wave hazards. During long-period swell events, the jetties offer limited shelter, and bars become extremely hazardous as waves combine with river flows and tidal influences to create very large breakers and dangerous, unpredictable currents. Boats and their crews can be placed in extreme risk anytime they are caught off-guard by these waves, which can swamp or capsize boats and toss the crews into the cold, pounding seas.

The loss of life and vessel in this fashion is a tragically common occurrence in our area.

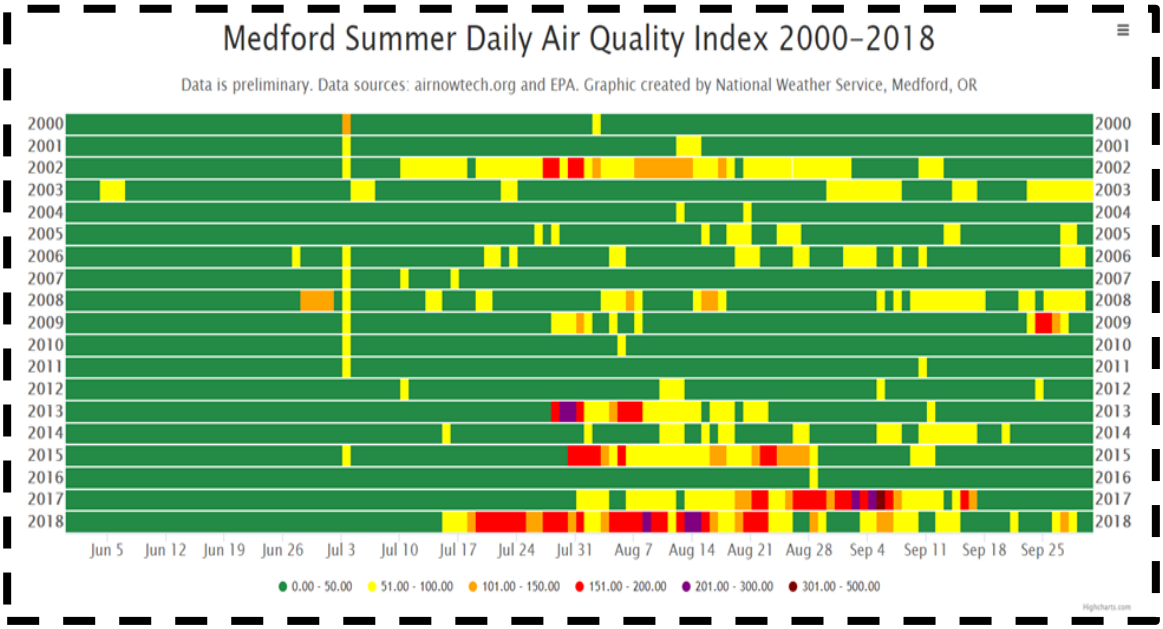
Coos Bar, Jan 18th, 2018. Photo: Brian Nieuwenhuis, NWS

The best way to protect yourself from these hazards is to stay away from them, as there is nothing that can hold back the power and weight of the ocean. Jetties and exposed rocks are dangerously close and can be easily swept by the waves, and sandy beaches can become quickly inundated from water with no warning at all. In spite of the hazards, beachgoers can still enjoy the sights and sounds of the Oregon coast by keeping up to date with NWS forecasts and warnings, and can protect themselves by watching the water and staying aware of the conditions at all times. Just remember, the next time you go to the coast to see the pounding surf and those towering plumes of spray, make sure to do so from a safe distance, as those wondrous sights can come at a deadly price to those that wander too close.

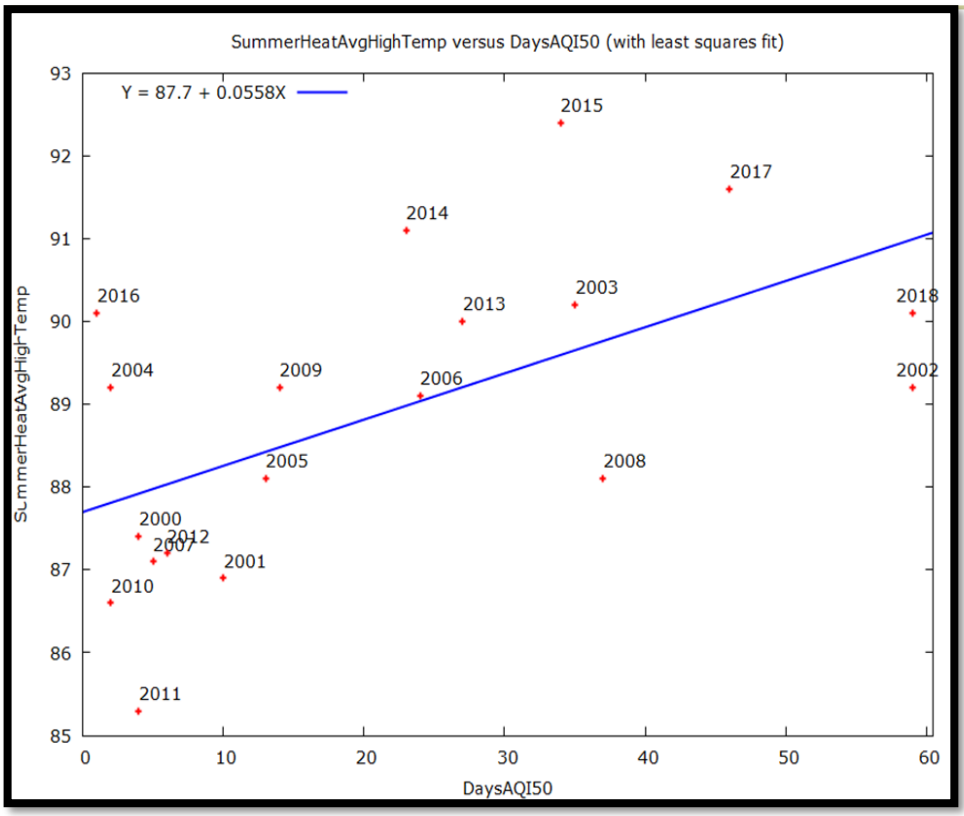
Correlating Medford's Summer Air Quality Index Values to Weather & Climate

Shad Keene, *Lead Forecaster*

Here at the Weather Forecast Office in Medford we're fascinated with data. We look at it all the time, and we rely on it to make sound, science-based decisions. Observational and computer model datasets are growing at a rapid pace, and we often find ourselves swimming in data, but often to the benefit of the forecast and end user. Even when we have a "hunch" about what a storm might do, we're essentially relying on rough data from past experience (e.g. I've observed models underforecasting temperature in Medford when winds are strong from the south).



The National Weather Service is focused more and more on impacts. Fire season is approaching, and the main wildfire impact to communities in our area has been the smoke that's transported from near and distant blazes. I thought it would be interesting to see if there was a strong connection between the number of moderate (yellow) Air Quality Index



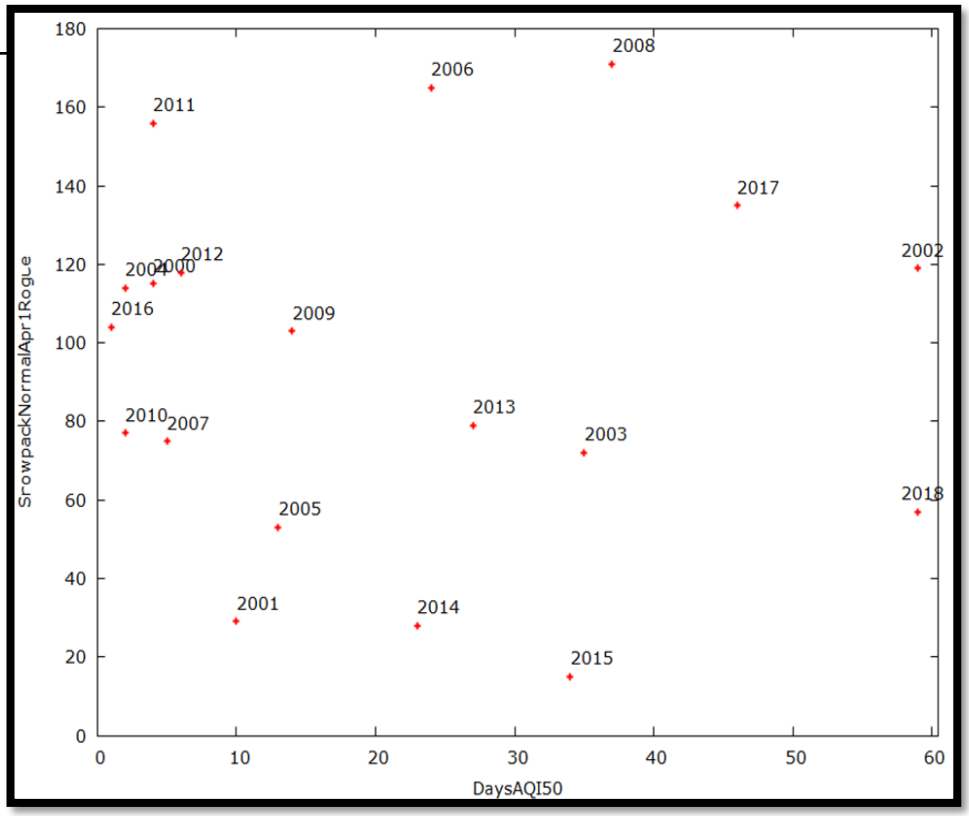
Statistically significant connection between Jun-Aug Avg High Temperature in Medford and Number of AQI Days 50 or Higher in Medford, OR

(AQI) days each summer and annual weather/climate data. Here are the weather and climate parameters I compared to AQI for each summer:

- April 1st (the date when snowpack generally peaks) Rogue Basin snowpack percent of normal
- Average high temperature from June to August for Medford
- Number of 90 degree F days in June for Medford
- Number of 90 degree F days in July for Medford

The strongest and only statistically significant correlation I found was between AQI and average Jun-Aug high temperature (left). This makes sense because generally vegetation becomes more receptive to fire starts during and after periods of hot weather, and heat waves generally cause wildfires to grow more rapidly, making them more difficult to contain.

Even with a strong correlation, the average high temperature from June to August only explained 29% of the moderate AQI day variance in the summer. That means that less than one third of the Medford AQI values from year to year can be explained by Medford heat. This is a good reminder that there are a lot of variables that contribute to the amount of smoke that impacts communities on a yearly basis. That said, I think we could all use some cooler conditions this summer!! That won't guarantee less smoke in the valleys, but it makes it more likely that the number of moderate AQI days will be less than recent years.



No significant connection between Apr 1 Rogue Basin Snowpack and Number of AQI Days 50 or Higher in Medford, OR

National Weather Service - Medford, Oregon

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Our Vision

Professionals focusing on science, teamwork, and customer service to design and deliver the best decision-support information to our community.

Our Mission

Our team at the National Weather Service Office in Medford strives to deliver the best observational, forecast, and warning information through exceptional customer service, extensive training and education, maintaining quality electronic systems, and relying upon an outstanding team of weather spotters and cooperative observers. We do this within the overall mission of the NWS to build a Weather-Ready Nation:

To provide weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community.

Our Values

Trust, Integrity, Professionalism, Service, Teamwork, Ingenuity, Expertise, and Enthusiasm.

About Us

The Weather Forecast Office in Medford, Oregon, is one of more than 120 field offices of the National Weather Service, an agency under the National Oceanic and Atmospheric Administration and the United States Department of Commerce. The Weather Forecast Office in Medford serves 7 counties in southwestern Oregon and 2 counties in northern California, providing weather and water information to more than a half-million citizens. We are also responsible for the coastal waters of the Pacific Ocean from Florence, Oregon, to Point St. George, California, extending 60 miles offshore. The office is staffed 24 hours a day, 7 days a week, and 365 days a year by a team of 26 meteorologists, hydrologists, electronic technicians, hydrometeorological technicians, and administrative assistants.