NATIONAL WEATHER SERVICE - MEDFORD, OREGON

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THE CRATER CHRONICLE

Medford NWS Office Receives Bronze Medal Award

John Lovegrove, *Meteorologist-In-Charge*

The National Weather Service office in Medford, along with the offices in Portland and Eureka, was presented with a Department of Commerce bronze medal award for actions on the Pony Fire in northern California in June 2016. Medford and Eureka directly supported the fire while the incident meteorologist on-site was based in Portland. The group is honored for providing significant decision support services that enabled the U.S. Forest Service to save $15 million fighting the Pony Fire in northern California. The group provided forecasts of significant rainfall over the fire, which enabled the U.S. Forest Service to make major strategic decisions aggressively attacking the fire in order to extinguish large portions, preventing it from becoming a season-long, major forest fire and allowing for the early release of personnel.

Based on reports from the National Interagency Fire Center, a total of 585 personnel were demobilized from the fire June 15th and 16th in anticipation of the rain. From June 11th-15th, the cost to fight the fire averaged $1.4 M a day. Over the next 5 days, the cost averaged about $500,000/day as the fire transitioned to smaller teams. The U.S. Forest Service was saving around $900,000 a day beginning June 16. Total suppression costs for the fire were around $17.5 M. Looking at historical fires in the area, suppression of the 2013 Butler/Forks Complex Fire was $60 M. Based on long range fire modeling, the Pony Fire had potential to grow to >30,000 acres. One of the major objectives of the team was to prevent the Pony Fire from becoming a season-long event. A conservative estimate of suppression costs per day are $500,000-$1 M. Using the lesser value, the Pony Fire would have cost $30 M more had it burned through Au-

Summer begins on June 21st at 3:07 am PDT.

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gust; therefore, NWS decision support saved the Forest Service and taxpayers over $15 M.

The accomplishment directly impacted the USFS saving $15 million in fire suppression at the Pony Fire by aggressively attacking the fire during a window of weather opportunity. Had the Pony Fire grown into a season long event, significant additional resources would have been spent fighting the fire, putting fire fighter safety at potential risk. Teresa Riesenhuber (USFS) stated "The forecast of significant rain allowed the team to pull resources out of the more dangerous portions of the fire, under the assumption that rain would take care of most of the work in those areas. The decrease in staffing led to significant cost savings to the fire, while enhancing firefighter safety by pulling firefighters out of areas with complex, dangerous terrain and allowing them to focus on areas where safer, greater progress could be made."

The Bronze Medal is the highest honorary award granted by the Under Secretary of Oceans and Atmosphere. A Bronze Medal is defined as superior performance characterized by outstanding or significant contributions, which have increased the efficiency and effectiveness of NOAA.

Cold Water Can Kill

Spencer Higginson, *Hydrologist*

On May 25th, the Respect the Water Safety Committee in Roseburg gathered for a press conference to remind those who play or work in and around water that cold water can be deadly. Even on a hot day, the rivers remain colder than one would expect and the water that feels refreshing can quickly turn dangerous. Each year, several people are lost due to the cold water in our rivers.

In an effort to save lives, the Respect the Water Safety Committee was formed in 2016 to find a way to help people stay informed about when the water is warm enough to safely recreate. The committee has members from the Douglas County YMCA, the Douglas County Sheriff's Office, Northwest Rafters Association, the National Weather Service, and local media partners. It has been a year since a thermometer was added to the river gage on the North Umpqua River near Winchester. This temperature reading is published daily by local media along with a symbol showing if the water is a safe temperature or if it is still too cold.

Cold water can kill in a couple of ways. First is cold water shock which can occur when you fall or jump into water colder than 60 degrees. The sudden exposure to cold water causes an involuntary gasp and rapid breathing. If your head is already under water when this gasp occurs, the inhalation of water can quickly lead to unconsciousness and death. Cold water shock can be prevented by a slow acclimation to the cold water. The problem with slow acclimation to very cold water is that you increase your exposure time. Exposure to cold water is the second way cold water can be deadly. Muscle fatigue sets in much more rapidly in cold water. Body heat is lost 30 times faster in cold water than in cold air. This means that in water below 60 degrees, you can become hypothermic in a matter of minutes. Hypothermia leads to the body shutting down blood flow to extremities in order to maintain the core temperature for the vital organs. This decreased blood flow and accelerated muscle fatigue causes a dramatic loss of mobility creating a situation where it becomes nearly impossible for even a strong swimmer to self-rescue.

At the National Weather Service we encourage everyone to pay close attention to the temperature of the water in which they wish to recreate. Keep exposure to cold water brief and wear a life jacket so that if something does go wrong, your head will remain above water until help arrives. Stay informed and be safe this summer!

For the current river temperature on the North Umpqua River near Winchester, visit https://www.ymcaofdouglascounty.org/ and look for this symbol on the upper right portion of the webpage.

Summer Breeze Makes Me Feel Fine

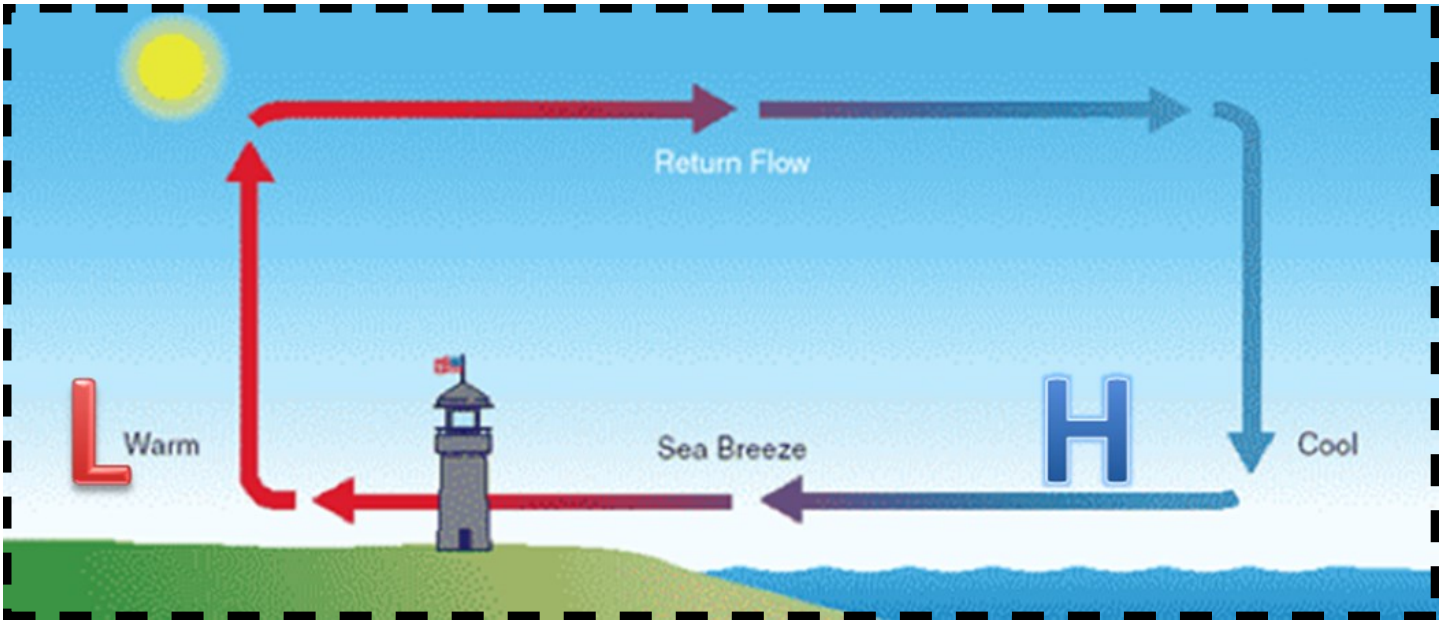
Ryan Sandler, *Warning Coordination Meteorologist*

Today's article gets its title from the 1972 Seals & Crofts song I enjoyed as a kid in my parents' car. I grew up in the Northeast, in a city about 16 miles from the Atlantic Ocean. My hometown was too far inland to get a refreshing sea breeze for much of the summer so we often had sweltering heat and high humidity.

Everyone has their own idea of what the perfect climate looks like. Some people enjoy the stable climate of San Diego while others prefer a full four seasons such as Kansas City, MO. Many Alaskans couldn't take the Hawaiian heat while many Hawaiians could never last a winter in Alaska. If I could pick the perfect summer climate, I would vote for Coquille, OR. and I'll explain this later in the article.

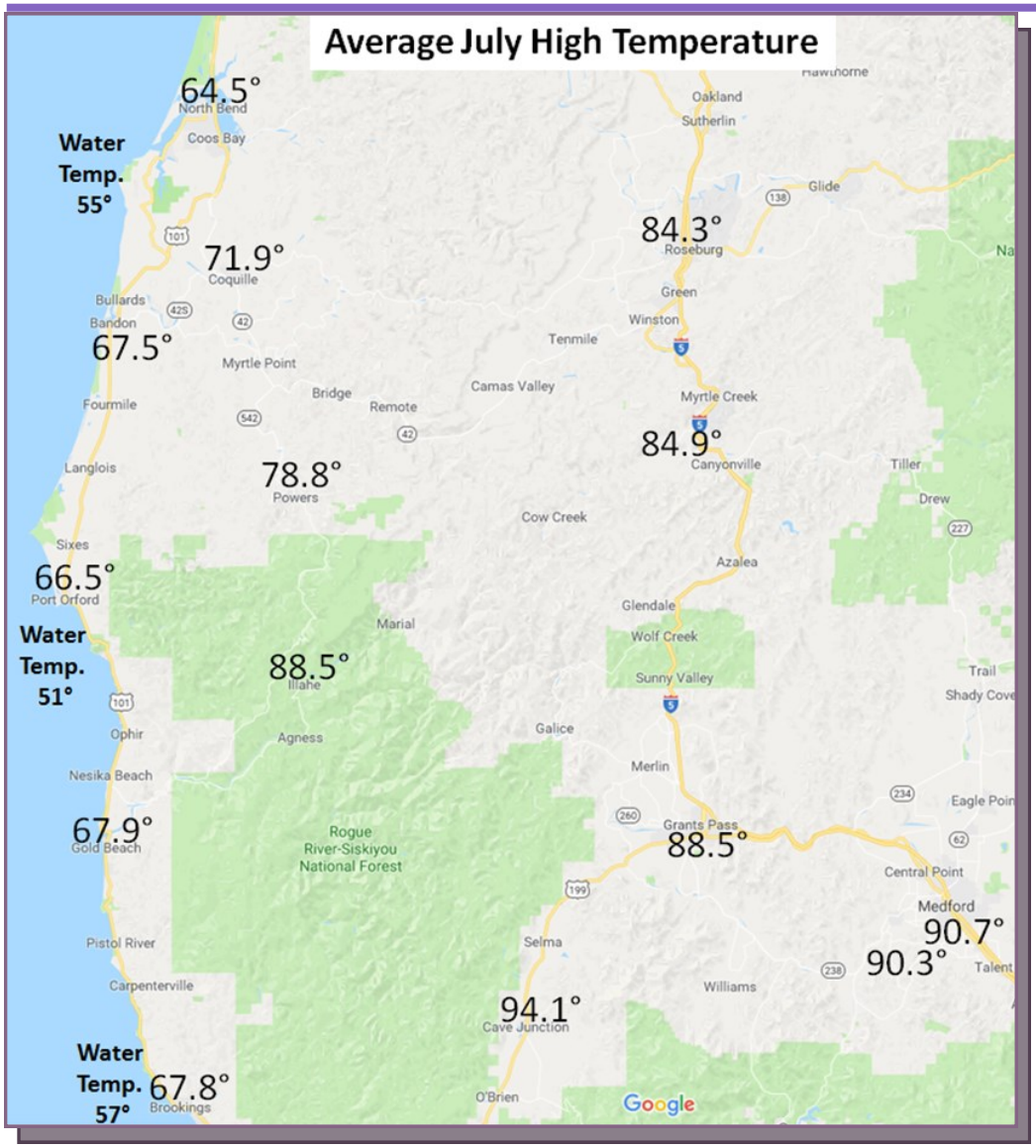
You don't hear much about the sea breeze in southern Oregon, but it has a dramatic impact on the climate of the region. In July, the average ocean water temperatures close to shore are only in the 50s. Very few weather systems impact our area in the summer because the main storm track keeps them well to the north into Canada. This allows the sea breeze to control temperatures for much of the summer west of the Cascades, especially near the coast.

So, why is there a sea breeze? The ocean off our coast is a huge pool of cold water which chills the air from below. This colder ocean air is denser than the warmer air over the land during the daytime. The denser ocean air creates high pressure while the warming land creates low pressure. The atmosphere is always trying to be in balance so the air (wind) blows from high pressure to low pressure to equalize the pressure differences which results in the sea breeze shown below.



Depiction of pressure pattern that creates a sea breeze.

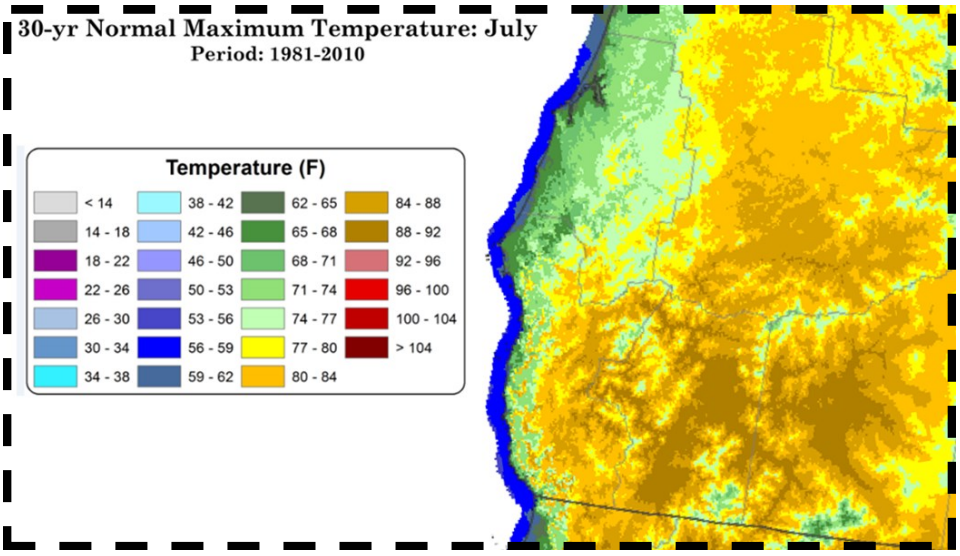
Take a look at the map on the next page. This map shows the average July high temperatures across southern Oregon where data is available. Normal highs at the coast are only in the 60s due to the cold ocean water constantly influencing temperatures. The cooler sea breeze weakens as it blows inland with normal highs in the 70s across Coquille and Powers. Once you get all the way to I-5 the sea breeze is much weaker or non-existent with highs in the 80s and lower 90s.



Now, to get back to my favorite summer climate of Coquille. A typical summer day might start out with some marine clouds and lows in the 50s across the Coquille Valley. These clouds dissipate as the morning progresses followed by abundant sunshine, a nice breeze, and high temperatures in the lower 70s. No need for air conditioning or heat.

Lastly, let's take a look at the figure below This is a high resolution model best guess of what the normal high temperatures should be across the region. Since we don't have thousands of real observations across the region, we rely on these models to show us the climatology between weather stations. There are a few features that stand out. The sea breeze penetrates farther inland across Coos County than Curry County because the Coastal Mountains are higher in Curry County and more effectively block the sea breeze. The Umpqua Valley is significantly cooler than the Rogue Valley because again, the higher Coastal Mountains block the inland penetration of marine air (sea breeze).

Keep in mind that the figure to the right is just an average so there can be wide day-to-day swings in temperature. One day there might be an offshore flow (east to west wind) with highs of 108° in Medford and 98° in Brookings. The next day the sea breeze could kick in and it's cloudy and 60 degrees in Brookings and a high of only 88° in Medford.



During the summer there's a constant push-and-pull between the cool marine air and warm land air. Think of it as a mini cold front that is always moving across the region, creating forecast challenges for meteorologists.

Developing a Lightning Climatology

Shad Keene, *Forecaster*

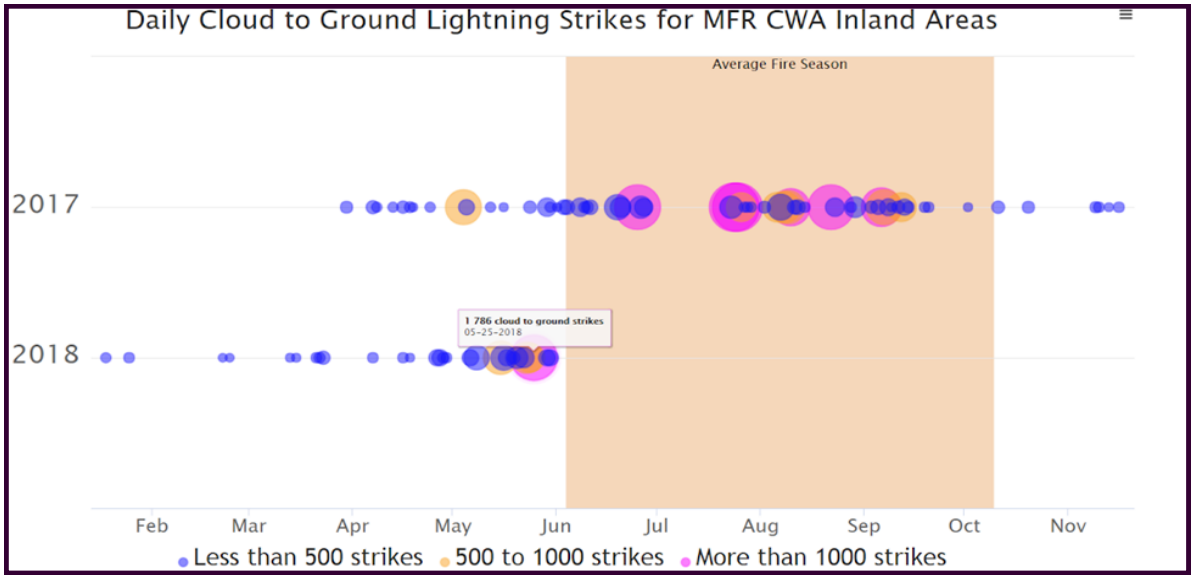
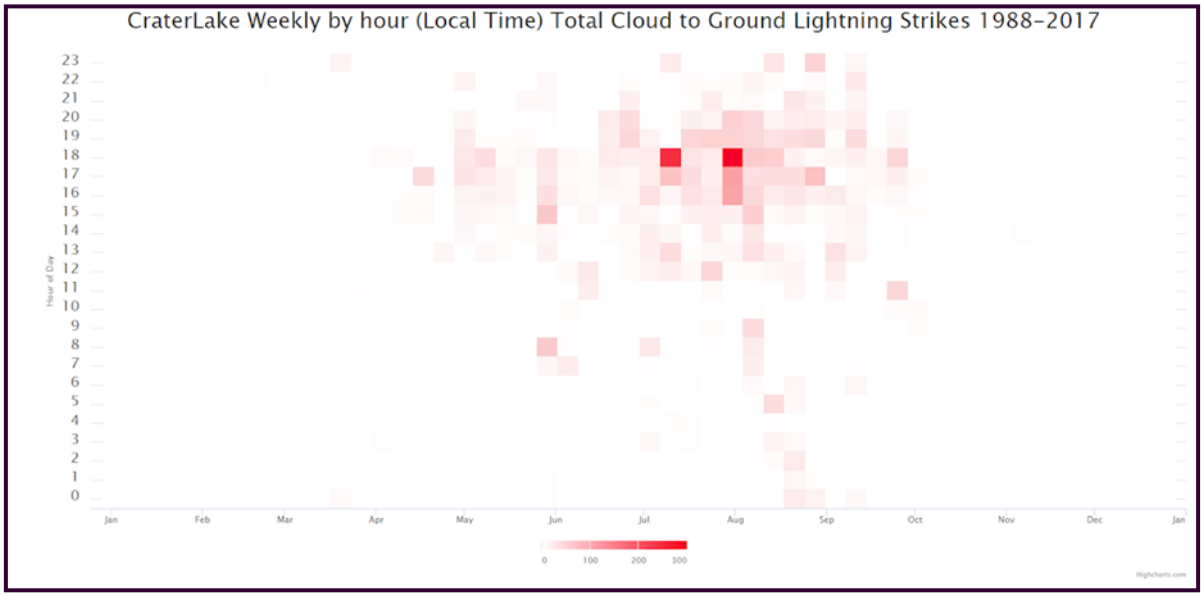


Image that uses recent lightning data to track magnitude and frequency of lightning events

To say that lightning has an impact on life and property is an understatement. Across the United States, lightning kills an average of 27 people per year, and it injures approximately 400 people per year. Additionally, lightning-caused wildfires account for 4.2 million acres burned each year, about 50 percent more acres burned than human-caused wildfires. There's so much to learn about how lightning impacts our landscape and what weather and climate patterns connect most to lightning. Lightning is big data, and it's data worth exploring.

Here at the Medford Weather Forecast Office, Charles Smith and Shad Keene have been working over the past 3 years to gather, store, and develop customized displays for both real-time and archived cloud to ground lightning strike data for the entire United States. We're currently storing over 1 billion lightning strikes in a local database. This work was started to solve two problems. First, we field many questions from the media about the number of lightning strikes that impacted the various counties in our forecast area, and real-time numbers help answer these questions quicker and more accurately. Additionally, it's not easy to find raw lightning data, and a local database of lighting data could allow for much easier access and customization of lighting data displays.

Image that shows what time of day most of the lightning has occurred at Crater Lake NP over the past 30 years



So far, real-time

and recent data have helped us objectively assess how much cloud to ground lightning strikes are affecting our forecast area, divvied up into counties and Fire Weather Zones, so we can gauge which areas are experiencing the greatest impacts. Recent data has allowed us to create custom maps after a lightning event for public awareness and partner decision-making.

We're just beginning to scratch the surface with the utility of archived lightning, going back to 1988. A few of our initial uses involve comparing total summer lightning to independent climate-oriented variables like ONI, PDO, spring precipitation, and summertime average temperatures. Additionally, we're developing a robust visual climatology for lightning across our forecast area.

The two graphics on the previous page are some of what we've created that utilize the near-term lightning data and the longer-term archived lightning data. We're still fine-tuning the database queries that are the basis for the graphics, but we hope to share some finalized imagery

References:

[1] http://www.nws.noaa.gov/om/hazstats.shtml

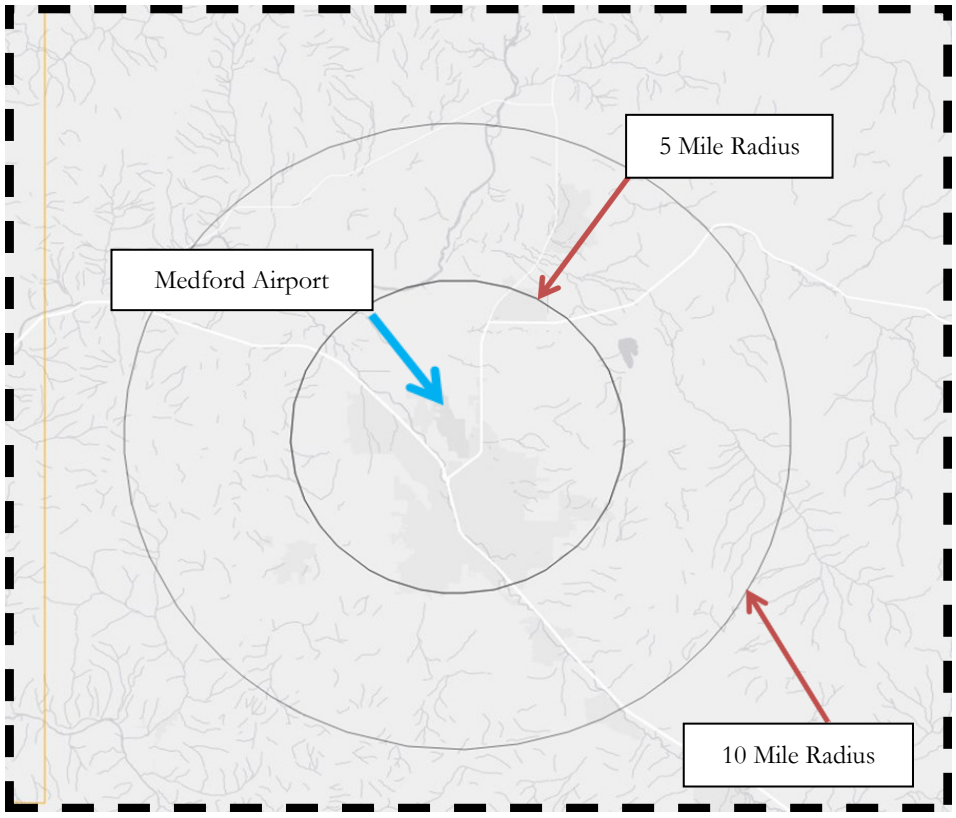
[2] https://www.ncbi.nlm.nih.gov/books/NBK441920/

[3] https://www.nifc.gov/fireInfo/fireInfo_stats_lightng.html

Aviation Forecasts Explained

Mike Petrucelli, *Forecaster*

Here at the National Weather Service in Medford, and other forecast offices, a product called Terminal Aerodrome Forecast (TAF's for short) are issued. TAF's are a critical element of the NWS aviation weather services because they are a key product in decisions for flight planning and for aircraft movement within the National Airspace System (also known as NAS).

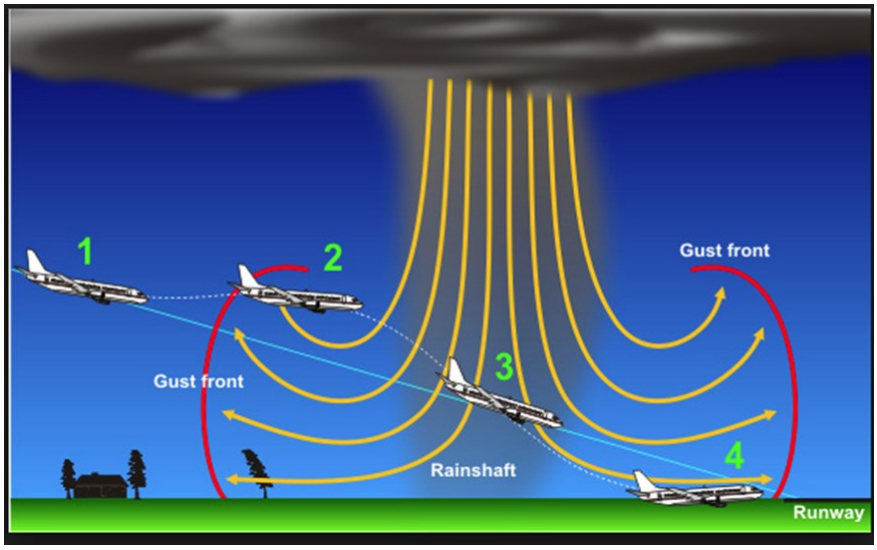


TAF's are used by a variety of aviation users. They include domestic and international commercial airlines, general aviation (GA), civilian, and military operators. A NWS TAF consists of the expected meteorological conditions significant to aviation at an airport for a specified time period. For the U.S., this is the area within five (5) statute miles (SM) of the center of an airport's runway complex.

A TAF includes a forecast of surface wind speed (speed and direction), surface visibility, weather, obstructions to vision (if any), clouds (or vertical visibility into a surface-based obscuration, Low Level Wind Shear (also known as LLWS) and any expected significant change or changes to one or more of these elements during the specified time period. In our area it's 24 hours, however some larger international airports, the forecast goes out to 30 hours.

Conditions that have the most significant impact for aviation near an airport are wind, the distance from the ground to

the base of clouds (also known as ceiling), visibility and thunderstorms.

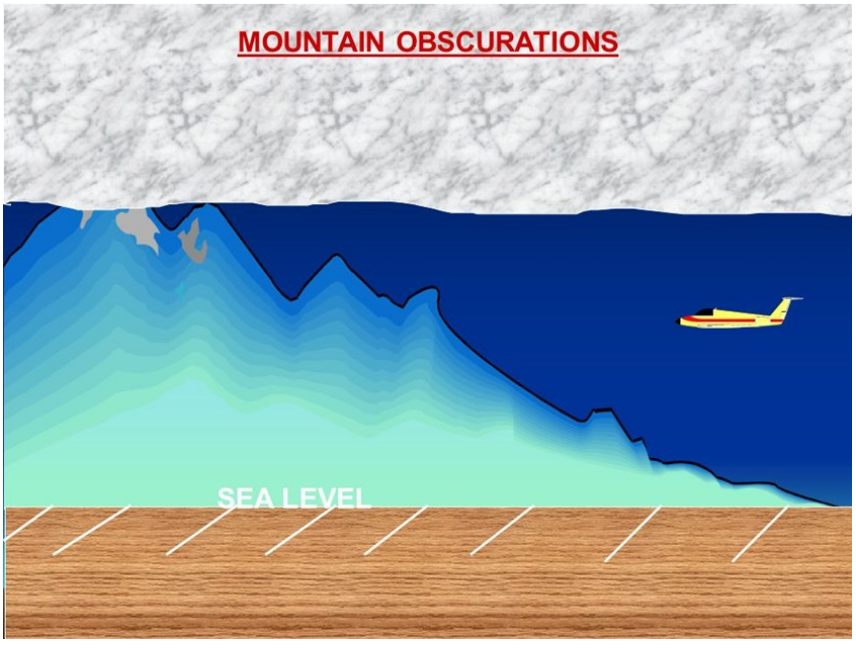


Moderate to strong winds (speed and direction) can have a major impact on aircraft if they are strong enough. This is especially the case when there are thunderstorms in the area because wind speed and direction can be unpredictable and change quickly.

Winds have a larger impact on smaller aircraft, although larger commercial aircraft can be affected. This can be dangerous for planes trying to take off or land. One problem is head or tail winds that can affect the overall speed of the aircraft. A second problem is cross winds. This is when winds are blowing across a runway. When this happens, pilots have to compensate for this in order for aircraft to maintain the desired course.

Strong cross winds make for a difficult landing, Courtesy of CNN.com

Cloud ceilings and visibility are a contributing factor in over 35% of all weather related accidents in the U.S. civil aviation sector and a major cause of flight delays nationwide. Ceiling and visibility are most impactful on General aviation pilots (GA), particularly during in-route flight where unexpected conditions result in reduced ceiling and visibility. In these situations, the GA pilot may face serious risk of disorientation, loss of control, and controlled flight into obstructed terrain.



Cloud ceilings and visibility can also have an impact on commercial travel. During adverse conditions, airports impose restrictions which help control the flow of air traffic in and out. For example aircraft have to maintain a greater distance from each other compared to normal when approaching an airport. This can affect the capacity and efficiency of U.S. traffic as a whole.

NWS Medford Participates In TREX Controlled Fires

Tom Wright, *Lead Forecaster*

Ashland Prescribed Fire Training Exchange (TREX) took place in Ashland, OR from May 7 to May 18, 2018, and WFO Medford, OR had the opportunity to participate in the exercise. Run and partially funded by The Nature Conservancy, TREX brought together federal, state, tribal, and local fire officials as well as other participants from around the country to conduct a series of controlled fires across portions of southwest Oregon.

Left to right: WFO MFR IMET Trainee Sven Nelaimischkies, Service Hydrologist Spencer Higginson, and IMET Tom Wright

One of the stated goals of the project was to "use mild fire to fight wildfire," especially in the wildland/urban interface. In other words, teams used controlled fire to clean up dead fuels (as would normally occur naturally) in order to lessen the threat of catastrophic wildfire in the future and to add beneficial nutrients to the forest floor. Other important goals of the project included: the exchange of expertise, meeting and working with partners, and training.

Organized by Fire Weather Program Manager, Brett Lutz, and led in the field by Incident Meteorologist, Tom Wright, WFO Medford used TREX as an opportunity to familiarize the forecast staff with field operations and the Incident Command System (ICS), learn from the fire officials, reach out to our partners, train for the upcoming fire season, and pass on our expertise.

WFO Medford staff provided spot forecasts and a weather watch for safety throughout the project. In the field, WFO MFR meteorologists provided daily operational weather briefings, forecast verification and updates based on direct observations from the fire line, and other guidance throughout the project.

WFO meteorologists also provided training to fire personnel on the proper taking of weather observations and took every opportunity to educate firefighters on weather's impact on operations, watch-out situations, and safety. WFO MFR Service Hydrologist and Burned Area Emergency Response (BAER) team member, Spencer Higginson, also directly worked the fire line.

Left to right: WFO MFR meteorologists Brian Nieuwenhuis, Mike Petrucelli, IMET Tom Wright, Firefighter Rich Howe, Service Hydrologist Spencer Higginson, and Meteorologist Shad Keene

In exchange, WFO MFR meteorologists got to see, up close and personal, how firing operations are conducted, how ICS works, and gained a much better understanding of how weather forecasts are used by and affect those in the field. In addition, several WFO meteorologists were able to practice giving briefings and further their goal of becoming IDSS deployment ready.

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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, under the direction of Meteorologist-In-Charge John Lovegrove.