



VOLUME IX
ISSUE 2, SPRING 2016

Sage Winds

NATIONAL WEATHER SERVICE BOISE

SUMMER Spotter Checklist

When should you call us?

HAIL: Pea size or larger.

REDUCED VISIBILITY: from fog, blowing dust, rain.

WIND: Greater than 40 mph or damage.

HEAVY RAIN: ½" + in 1 hour

FLOODING: Any water where it shouldn't be, or overflowing river/creek.

TORNADO or FUNNEL CLOUD.

ANY WEATHER RELATED DAMAGE, DEATH, OR INJURY.

How to contact us:

1-800-882-1428

@NWSBoise

facebook.com/NWSBoise

boise.weather@noaa.gov

Season in Review

Joel Tannenholz

Spring 2016 was warmer than normal across the region. In fact April was the warmest on record at many locations. It was drier than normal in Baker County and northern Harney and Malheur Counties in Oregon, much of Elmore County in Idaho, and the central Idaho mountains, but was wetter than normal near the Nevada border in both states.

As is typical of spring, the weather was changeable and sometimes extreme.

During the first two weeks of March, relatively mild southwest flow aloft carried a series of weather disturbances inland, with enough moisture for showers and isolated thunderstorms nearly every day. Strong thunderstorm winds hit Baker County on the 2nd, with gusts to 51 mph on Flagstaff Hill and 63 mph at Baker City.

On the 14th an upper level trough, followed by northwest flow aloft, cooled temperatures to below normal. The mountains received anywhere from 20 to 40 inches of snow from the 9th through the 16th. By early morning on the 18th, Boise experienced the first below-freezing temperature since February 25th, and residents in mountain locations were reminded that winter was still around. Lows ranged from 9 above at McCall and 18 at Baker City to 28 at Boise.

Temperatures rose to above normal again on the 19th and southwest flow aloft ahead of an incoming Gulf of Alaska trough maintained relatively warm weather through the 21st. The 20th, the first official day of spring, became the warmest day since late October. Temperatures reached 70 at Boise and Twin Falls, and 71 at Rome. As the trough drew closer on the 21st, strong thunderstorms with notable lightning developed in southwest Idaho along a cold front. Small hail covered the ground around Boise in some places, and brief heavy rain fell at a few locations in town. Three-quarter-inch hail pummeled one location in Meridian.

By the 29th, a deep surface low had formed near the Utah-Colorado border. As it approached Idaho, it strengthened into a major snowstorm. 3 to 6 inches of snow blanketed the Magic Valley, with amounts as high as 15 inches near the Burley area on the 29th. But with warming ground temperatures and daytime highs above freezing, the snow didn't stay long.

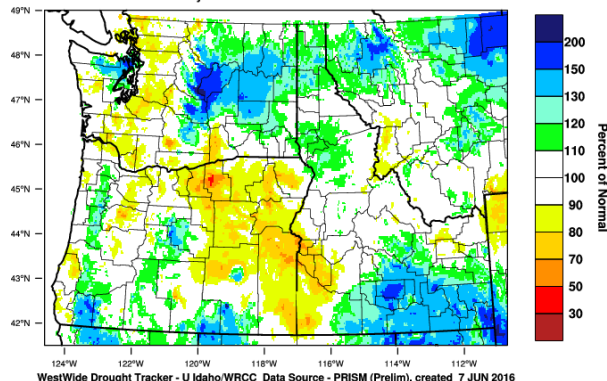
April was the warmest on record at the Boise airport, and the entire region averaged above or much above normal. It was generally dry, and less stormy than March. The high pressure ridge, which dominated the Intermountain West from the end of March through the first three weeks of April, was the main reason for the record warmth.

Like March and April, May was unsettled, with showery periods interspersed with warm dry weather; June-like temperatures alternated with cool blustery days more typical of March.

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Pacific Northwest - Precipitation

March-May 2016 Percent of 1981-2010 Normal



WestWide Drought Tracker - U Idaho/WRCC Data Source - PRISM (Prelim), created 7 JUN 2016

During the first week, temperatures averaged as much as 15 degrees above normal, thanks to an upper level ridge and southwest flow aloft. Highs from 80 to 85 were reported at Boise, Jerome, Mountain Home, and Rome. Ontario's highs were in the lower 80s every day from the 3rd through the 8th.

Showers and thunderstorms crossed the Boise area on the 6th, dumping heavy rain on a few locations. One observer in southwest Boise measured 1.36 inches of rain in 20 minutes, causing local flooding. Another observer in the foothills north of Boise reported 0.64 inches in 30 minutes. As is typical with convective showers, other locations in southwest Idaho received little or no rain. Only a tenth of an inch fell at Jerome. Mountain Home and Ontario only received a trace.

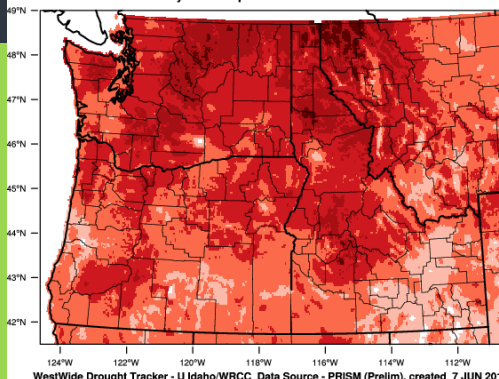
The low was kicked east out of the Intermountain Region on the 7th and 8th by a cold upper level trough which moved over western Canada from the Gulf of Alaska. Cooler drier air associated with the trough drifted south over southeast Oregon and southwest Idaho, keeping temperatures a few degrees below normal from the 9th through the 11th.

Temperatures soon rebounded, with highs in the low to mid 80s from the 12th through the 14th under a short-lived upper level ridge. The warm spots were Mountain Home and Rome with 87 degrees on the 13th.

It was abruptly ended by another Gulf of Alaska trough, which arrived over the Pacific Northwest on the 19th and covered most of the Intermountain Region on the 21st. Rainfall was significant across much of our area. Some larger amounts for the period include (in inches): 0.49 at Rome, 0.71 at Baker City, 0.89 at Jerome, 0.91 at McCall, and 1.34 at Twin Falls. Highs on the 20th were 15 to 20 degrees below normal, mostly in the 50s, but the high at both Burns and Twin Falls was only 47.

Although the trough remained over the western U.S., temperatures moderated to near normal by the 23rd due mainly to long days and widespread sunshine.

Pacific Northwest - Mean Temperature
March-May 2016 Departure from 1981-2010 Normal



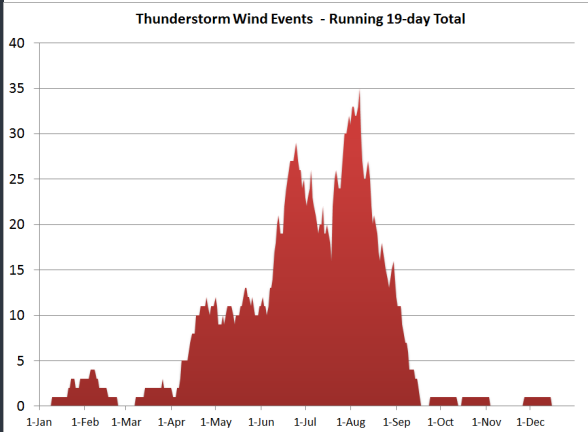
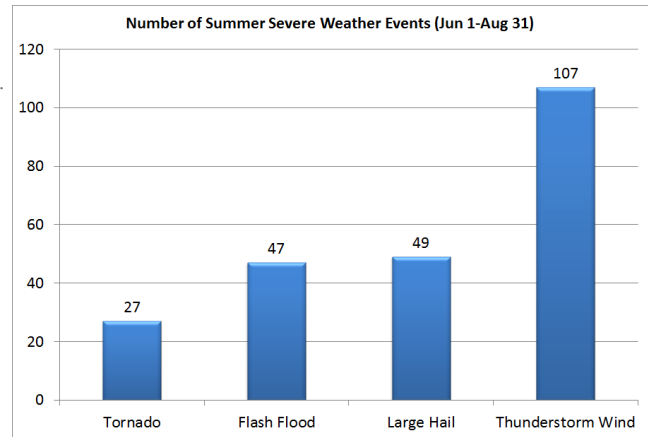
Departure from Normal (°F)

Convective Severe Weather Events

Stephen Parker

Summer is the peak of severe convective weather for eastern Oregon and southwest Idaho. Although summer is defined astronomically as extending from the summer solstice until the fall equinox (June 20 to Sep 22 of this year), for the purposes of this paper, we will use the three months of June, July, and August to define a meteorological summer. We'd like to give you a look at the number of severe weather events in the summer months, and how it relates to the distribution of severe weather events through the whole year. The following chart shows the number of severe weather events (defined as either tornadoes, flash flooding, hail (1 inch in diameter or greater), wind damage, or wind gusts 52kt or greater (60 mph) from 1955 to 2005 in our County Warning Area (CWA).

Thunderstorm wind events far outnumber the others, with tornadoes a distant fourth place. We will next look at the yearly distribution of each type, from most to least common.

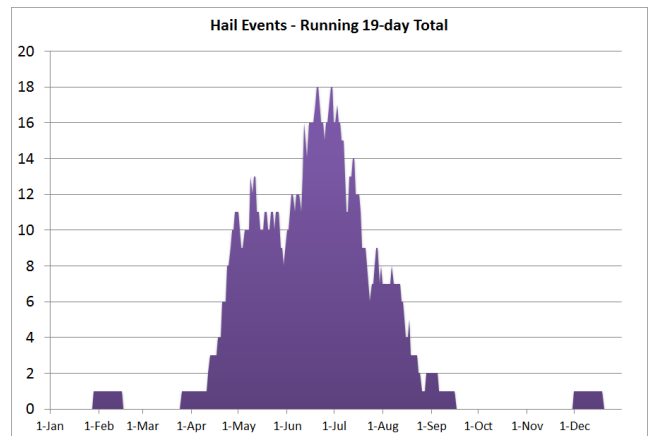


In summer, the relatively dry low levels of the atmosphere allow rain from high-based thunderstorms (and sometimes even just showers) to evaporate, cool, and descend with increasing speed. These winds reach the earth and spread out, creating strong winds on the surface and occasionally reaching severe criteria.

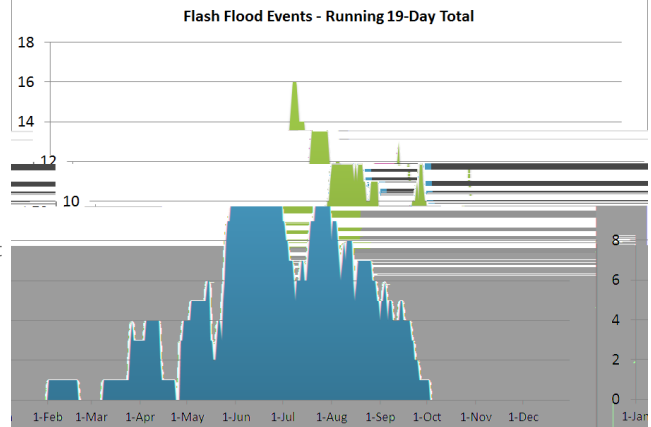
Although thunderstorm wind events can happen any time of the year, occurrences increase rapidly in April and peak from early June through late August. The following chart shows the daily

distribution of wind events, totaled over a running 19-day period (done to remove some of the randomness of the data and present a more meaningful graph).

The second most-common type of severe event is large hail. Hail forms within the updraft of stronger thunderstorms, as initially small particles of ice are suspended long enough to grow by having supercooled water droplets stick to them and then freeze. Sometimes, the hailstones are "recycled" in the updraft, and their final appearance can show rings as evidence of this. At other times, small hailstones covered in supercooled water can freeze together in mid-air, creating an uneven and often peculiar-looking final, larger, hailstone. The following chart shows their distribution through the year, again as a running 19-day total.

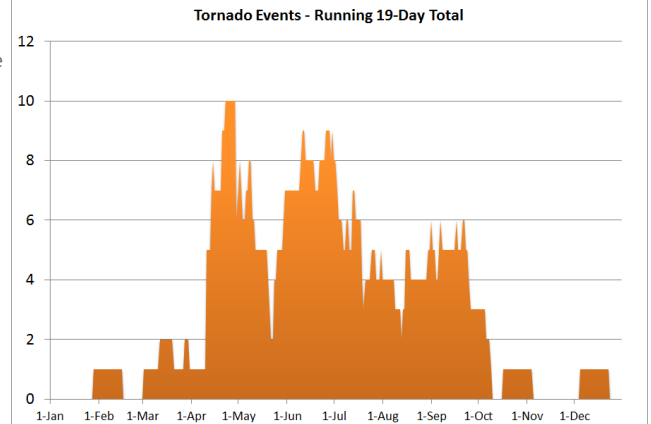


One notable difference in the distribution of wind and hail occurs in late July and the first half of August. While the number of wind events increases, the number of hail events holds steady and then decreases. Typically, the atmosphere is too hot during this time of year for large hail to make it to the ground without significant melting. It's quite possible that large hail is still being created within thunderstorms during this period, but never makes it down to where it can be measured.



Flash flooding is the next most common form of severe weather during the summer, and its distribution is shown below. These events are mainly in higher terrain, and the early-June maximum indicates heavy rain falling on leftover snowpack (in some cases). The secondary maximum around August 1st is likely related to increased monsoonal moisture.

Our least-common type of severe weather is tornadoes. The daily distribution in the following chart shows a sharp start to "tornado season" in April, followed by a slow decreasing trend through the summer months. Note there were only three events over 50 years from mid-October through February.



We hope you enjoyed this brief look at occurrences of severe weather throughout the year. Please let us know if you have any questions. We'd be happy to answer them!

Meet & Greet

Aviva Braun

The Shoshone Paiute Tribe located on the Duck Valley Reservation, straddles the Idaho-Nevada border. An area served by both National Weather Service (NWS) Boise and Elko Offices. Elko has historically worked with the Tribe and provided them the critical weather information and notifications of upcoming weather events. However, the NWS Boise office has recently reached out and is working on building their relationship with the Tribe, which promises to be beneficial to both communities. This past month, while on a trip to Duck Valley to give a spotter talk to their community, we had the opportunity to sit down with Brent Hunter, the Duck Valley Fire Management Officer and Emergency Manager.

NWS: Tell us about yourself and how you moved into the Emergency Management sector.

Brent: I started out as a wildland firefighter back in 1986 and went out to Bureau of Land Management and Forest Service fires across the western US. In 1993, I took a break from the job and went to a technical college in Albuquerque, NM for three years and got my Associates Degree in Natural Resources. I then relocated to Boise in 1996 and attended Boise State U for a degree in Business, until my Tribe needed a Fire Management Officer (FMO). I put my education on hold and got back into firefighting again. As the FMO, I was also doing all the emergency management work for our Tribe as we didn't have an official Emergency Manager (EM). Around this time, my Tribal Council passed a resolution to accept the National Incident Management System program and put together a Tribal Emergency Response Commission (TERC). After the resolution, the EM position was added to our Tribal Administration positions and eventually they added it to my duties.

NWS: Would you describe the nature of your work for us?

Brent: I work the regular 40-hour week until an incident or emergency comes along. When in emergency status, we will meet with the Tribal Council, Law Enforcement, EMS, Fire Dept., Program & Dept. Heads, schools, the telephone company and the electric company (to name a few) to first recognize and identify the emergency. Then we will inventory all our resources for what is available currently and order the rest of what we need. The emergency operations plan is activated and all the respective cooperators and agencies are notified. When in non-emergency mode, I'm usually updating our community emergency operations plan, evacuation plan, hazards mitigation plan as well as running meetings and travelling to trainings, conferences, and meetings. Right now, we are coming up on the wildland fire season so I'm working on getting all my crew qualified and outfitted properly.

NWS: How does your office reach out and notify your community of critical weather events?

Brent: We have a local radio station (102.5 Owyhee Radio) that we use to send out emergency notifications and weather reports. We also have an email subscriber list that we use to reach out to the community, as well as a marquis sign in the middle of town. Usually all it takes is someone posting a notification on Facebook and the word will spread like wildfire!

NWS: How have the Weather Service Offices (Boise and Elko) contributed to your team's success?

Brent: The NWS has conducted Weather Spotter Training classes annually and has contributed to our working knowledge of weather which has furthered our emergency preparedness mission. Additionally, NWS Elko helped our community achieve Storm Ready Community status in 2012. Our Shoshone Paiute Tribe is the first Tribal Nation to become a Storm Ready community in Idaho and Nevada! It's something we are very proud of. We look forward to continued work with the NWS in the coming years as they are a valuable resource for our Tribal Emergency Preparedness; and it is our hope that we can be as dynamic a resource to them as they are to us.

NWS: How large is your team and who is it composed of?

Brent: Within our tribal government organization we have many department directors and program managers. These are the people that make up our TERC. The TERC meets once a month and the Emergency Manager runs the meeting and keeps the commission updated on trainings, meetings, outstanding memoranda of understanding and agreement, and the upkeep of the various tribal emergency response plans. If a large incident occurs locally, we will use the TERC to fill an incident management team and to create and open our emergency operations center. On most days, I have a staff of 4 that also does updating and maintenance of all the equipment and engines.

NWS: What type of weather event has the largest impact on your community?

Brent: At this point, we are concerned about flooding within our community. We have taken precautionary measures by requiring the construction of any new structures to be out of the flood plain, identifying at risk buildings and residences and adjusting our plans accordingly. Also, we have a lot of wildland fuels on our lands, so fire is a big issue during the summer; snow storms in the winter are another great concern of ours due to the number of homebound and elders we have here.

NWS: What has been the highest impact weather event that you have ever handled? How did you prepare for the event and how did you react?

Brent: That would be the "Bull Run Complex" fire which occurred in 2012. It was a series of huge wildland fires that all ignited in one day around our jurisdiction. The wind was so strong that we had to back up and protect our residents and houses rather than fight the fire. The community held a meeting and an evacuation was put into place with the help of Law Enforcement and Emergency Medical Services. Our preparedness level was at its highest level, 5, and we had a crew on standby. Another wildland fire called the Murphy Complex Fire in 2007 caused a two week power outage that impacted our community as we had no potable water and food was spoiling. Two of the main issues we had during this two week period were heat stroke and that older people needed their medication refrigerated. These are the two incidents that have impacted us the most during my lifetime. Otherwise, the Elders speak of 12 foot snow drifts of winters past and being snowed in for weeks at a time.

NWS: Can you tell me a little about your tribal community? How does the local weather impact the cultural norms?

Brent: We are a small, tight-knit community as everyone knows each other and weather incident notifications get around fast. Our Tribal Council is the governing board of our people and do a good job of keeping our members updated on issues that affect all of us, including weather events and mitigation. Currently, we are dealing with climate change as our streams are drying up and native plants and medicines are going away due to invasive species, among other issues. The Elders tell us how much the weather has changed and of the patterns that they have never seen. These problems are very real and very important as we all need to look at climate change and mitigations. It will only get worse.

NWS: Sage advice Brent. Well, that's all of the questions I have for you today. Thank you for your time.



Brent Hunter

What exactly is a Remote Automatic Weather Station?

Eric Johnson

There are nearly 2,200 remote automatic weather stations (RAWS) strategically located throughout the United States. This type of surface observation fills a unique role for land management agencies, such as the Forest Service and their partners at National Weather Service (NWS). Because they are deployed in remote locations where there is no power or data services, they are able to provide critical weather data that otherwise would not be available; they help fill surface observation gaps that are common across the west.

RAWS operate exclusively on battery power charged by a solar panel because they are so remotely placed. A few steps are taken to receive RAWS data in-office. First, the RAWS units collect, store and transmit the data to the Geostationary Operational Environmental Satellite (GOES) that sits above the west coast. Then, GOES links directly to the RAWS dish that sits next to the NWS building in Boise, and ingests the data into the NWS system. Every RAWS has a dedicated time and channel on which they transmit to the GOES. Most transmit windows are five seconds or less! Time accuracy is managed by GPS to prevent GOES transmission collisions.

There is a standard compliment of sensors on every RAWS, there to collect the necessary data. Typically, this includes relative humidity, air temperature, wind speed, wind direction, solar radiation, fuel temperature and precipitation accumulation. These sensors provide what is needed to monitor the weather, in addition to fire danger and flash flood potential.

RAWS can be deployed either as a full size permanent station or a more compact portable station. The main difference in data is found between the wind sensors. Permanent station winds will read at 20 feet above ground level and portable station winds will read at approximately 5-9 feet above ground level. Permanent stations make up most of the RAWS surface observation network, as portables are used only for incidents or prescribed burns and are designed to be temporary.

RAWS data can be viewed from a variety of sources:

<http://www.raws.dri.edu/index.html> <http://mesowest.utah.edu/>



Electronics Technician next to a portable RAWS.

Will they ever stop YELLING at us?

Tim Barker

Yes, finally!

For more than fifty years, most National Weather Service text products have been in ALL CAPS. Originally, this was because warnings and forecasts were sent to news services and other customers via teletypes that only had capital letters and a very limited set of punctuation marks. Although the teletypes have long since been replaced, the ALL CAPS convention has remained. As the world moved on to newer technologies for communicating, like the web, text messaging, and social media, many people now interpret messages written in ALL CAPS as the person YELLING AND SCREAMING! While that might be fine for something like: "TORNADO WARNING. TAKE COVER NOW." It came across as quite a bit of overkill for things like: "PARTLY CLOUDY AND A LITTLE WARMER THIS AFTERNOON."

Well, we are finally going to produce our text products in "mixed case". A few products like our "Forecast Discussions" and "Public Information Statements" transitioned to mixed case in early May. Most of our warning products will transition over in mid-summer, and all products should be in mixed case by this fall.

Why has it taken so long? Well, pretty much everything is computerized these days. And, when you do things one way for more than 50 years - many people write software expecting you to ALWAYS do it that same way. When we first tested mixed case products, there were cases where messages were dropped by various software programs because they didn't look like the typical National Weather Service products! We didn't want to take a chance with that. Our warnings and products can be very important to public safety. When we issue critical information like a Tornado or Flash Flood Warning, we want to be absolutely sure that the message gets through to the appropriate emergency services personnel, so that they can respond. It has been a long process to make sure that all software would properly handle mixed-case messages, and that they would "get through" to the appropriate people in every single instance. Thankfully, all the software programs have now been changed, and we are finally able to write messages that make more sense in our modern world.

So, no - we won't be yelling as much anymore. We hope you'll enjoy our "softer and gentler" messages. We'll still occasionally "yell" certain things like "TORNADO WARNING"; But we hope that the contrast from our day-to-day messages, will help people recognize the significance of dangerous situations, and take appropriate actions to protect themselves.

National Weather Service Boise Staff

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Vacant

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Wasyli Hewko

Meteorologist Interns

Aviva Braun
Jessica Caubre

Summer 2016 Outlook

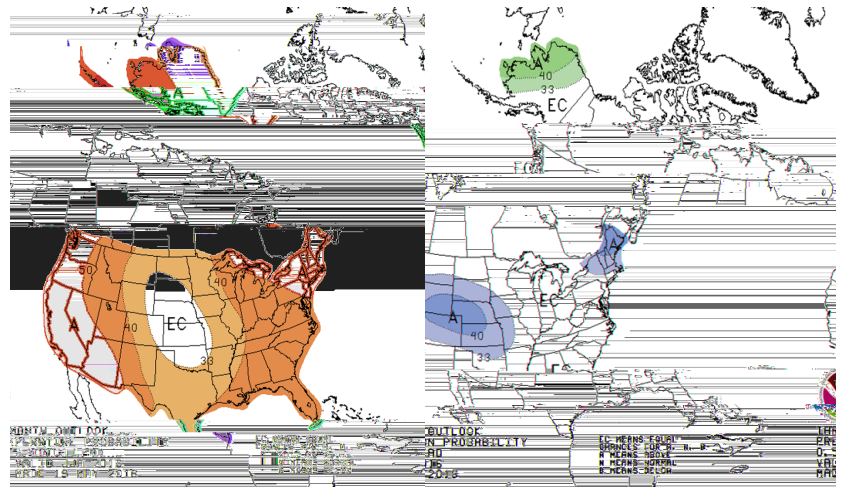
Stephen Parker

The strong El Nino of 2015 has ended, and it appears we are headed right into La Nina conditions. While this won't happen in time to impact our summer weather, it may give us a slightly above-normal chance for above-normal precipitation this coming winter.

The following graphics show the official three-month outlook for the summer of 2016 (Jun-Jul-Aug). The country's temperature outlook is for a better chance of above-normal temperatures across all but the Central Plains, with near equal chances of above-and-below normal centered over Nebraska and surrounding states.

The country's precipitation outlook is for equal chances of above- and below-normal in most areas, with an axis of better chances for above-normal amounts from the Idaho-Utah state line east-southeast to Missouri, across much of New England and northern New York, and western Alaska.

For southeast Oregon and southwest Idaho, these charts indicate a better chance of above-normal temperatures with an equal chance of both below-normal and above-normal precipitation. This means that there is no strong signal in the precipitation probability data; therefore, it is basically a forecast of "near-normal".



2016 Fire Season Outlook

Chuck Redman

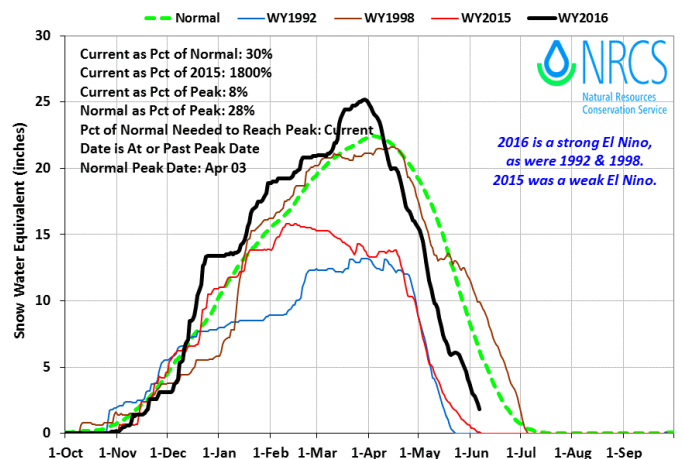
Above normal temperatures recorded across the Pacific Northwest and Great Basin during the winter months, continued through the months of March and April. In some areas, maximum temperatures ran three to five degrees above than normal.

Despite near to below normal temperatures reported in May, warm early seasonal temperatures dramatically lowered the snowpack across the region. Peak snowmelt occurred two to four weeks ahead of normal. As shown in the figure, snow in the Boise River Basin normally melts completely by early July; this year it is on pace to melt completely by early June.

Near-normal snowpack and above normal precipitation was recorded across most of Idaho and the eastern portions of Oregon this winter and spring; but due to a combination of above normal temperatures and rapid snowmelt, the reported moisture in the fuels (sagebrush and timber) are at or above normal. Also of interest, are streamflow predictions across the region. The amount of streamflow is a good indication of the "health" of both the BLM lands and national forests. Current predictions indicate a near normal amount of water moving through the drainages and rivers through the summer months.

Going into the typical fire season, from June through September, the biggest concern is the potential large amount of new fuel across the landscape. Once the fuel is dry (cured), it becomes available for wildfires. As the summer continues and fuels continue to cure in the lowest elevations first, the fuels in the higher elevations slowly come into play. The current thought is that the low elevations across southwest Idaho and southeast Oregon have higher chances of seeing an above normal fire season (from a higher amount of fuels due to above normal precipitation), while the higher elevations elsewhere are more likely to see a normal fire season.

Boise Basin 2016 Snowpack Comparison Graph (10 sites)
Based on Provisional SNOTEL data as of Jun 06, 2016



2016 is a strong El Nino, as were 1992 & 1998.
2015 was a weak El Nino.

Want to help NOAA weather scientists with research?

If you own a smartphone or tablet download the free **mPING** app in the App Store or Google Play.

SUMMER is HERE!

Friendly reminders on keeping you and your family safe

Lightning Safety:

If you hear thunder, lightning is close enough to strike you, and on average, lightning kills 49 people in the U.S. every year. What should you do if a thunderstorm is near?

- ◆ Move inside a shelter: a substantial building with plumbing and electricity, or a metal-topped vehicle with the windows up.
- ◆ Stay in shelter for 30 minutes past the last thunder heard.
- ◆ If inside a building, stay away from windows and doors, and stay off porches.

If you're caught outside with no safe shelter nearby take the following actions to reduce your risk:

- ◆ Get off any elevated area such as a hill or mountaintop
- ◆ NEVER shelter under an isolated tree, or lie flat on the ground.
- ◆ Get out of and away from bodies of water.
- ◆ Avoid being near objects that conduct electricity, such as barbed wire fences, power lines, or windmills.

For more information, visit: <http://www.lightningsafety.noaa.gov/>

Fire Safety:

How to protect your home from wildfires:

1. Create defensible space by clearing brush away from your home
2. Use fire-resistant landscaping and harden your home with fire-safe construction.
3. Assemble emergency supplies and belongings in a safe place
4. Plan escape routes and make sure all members of the household know the plan.

For more information, visit: <http://www.nws.noaa.gov/om/fire/ready.shtml>

Questions? Comments? Suggestions?

Email: boi.spotter@noaa.gov

Practice HEAT SAFETY Wherever You Are

Heat related deaths are preventable. Protect yourself and others from the impacts of heat waves.



Job Sites
Stay hydrated and take breaks in the shade as often as possible.

Indoors
Check up on the elderly and others without AC.

Vehicles
Never leave kids or pets unattended - CHECK the BACKSEAT!

Outdoors
Limit strenuous outdoor activities, find shade, and stay hydrated.

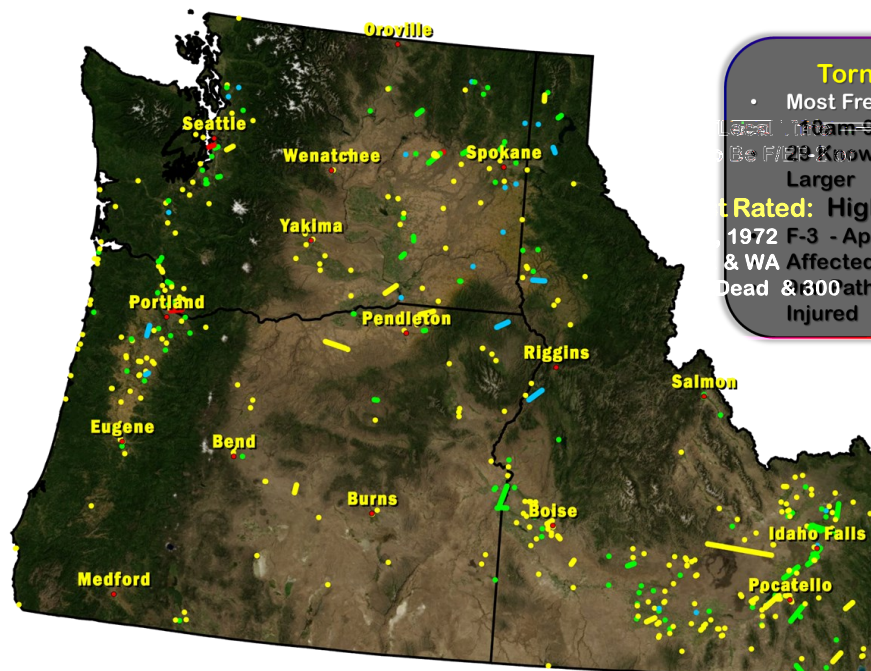
Did you know? Tornado Classification

Elizabeth Padian

Did you know that when classifying tornados there is a difference between an F-1 and an EF-1? In 2007, the scale was updated after new research and observations led to a revised scaling system of how tornados are classified. Remember, tornados are classified by the damage they do, taking into consideration the types of materials used in buildings. This damage is then analyzed to estimate a wind speed that was experienced.

Fujita Scale		Enhanced Fujita Scale* * In use since 2007	
F-0	40-72 mph winds	EF-0	65-85 mph winds
F-1	73-112 mph	EF-1	86-110 mph
F-2	113-157 mph	EF-2	111-135 mph
F-3	158-206 mph	EF-3	136-165 mph
F-4	207-260 mph	EF-4	166-200 mph
F-5	261-318 mph	EF-5	>200 mph

Tornadoes across the Pacific Northwest since 1950: 420 Tornadoes



Tornado Tidbits:

- Most Frequent: 10am-9pm Local Time
- Largest: 29' Known To Be F/EF 2 or Larger
- Highest Rated: Highest Rated: Higher than F-3 - April 5, 1972
- Affected OR & WA: Affected OR & WA
- Dead & Injured: 6 Dead & 9 Injured
- Path: 6 mi Path: 6 mi

F/EF Scale:

- Unknown
- 0
- 1
- 2
- 3
- 4
- 5