



VOLUME  
**X**  
ISSUE 2, SPRING 2017

# 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 2017 was generally wetter than normal. Temperatures for the season averaged close to normal. However, there was significant month to month variation in both precipitation and temperature.

### March

March was warm. It was also wet at most locations, owing mainly to a major storm on the 29th and 30th.

During the first 28 days of the month there were no significant storms. Predominantly westerly or southwesterly flow aloft and eastward migrating high pressure ridges kept temperatures mild.

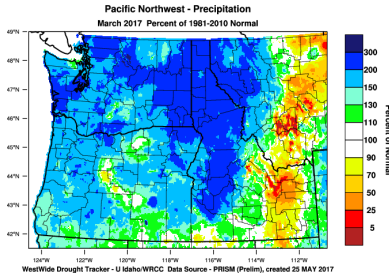
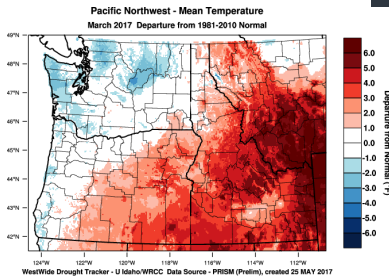
Pacific weather systems provided relatively light precipitation. Exceptions included a snowfall of 4 to 6 inches in the Magic Valley on the 6th, and a report of very heavy rainfall with a thunderstorm in Canyon County west of Wilder on the 21st. A wind gust estimated at 50 mph was also reported with this storm.

On the morning of the 29th an ordinary looking upper level trough off the British Columbia coast was approaching the northwest U.S. By evening it had noticeably deepened as it neared the Washington coast.

As the storm crossed eastern Oregon and southwest Idaho, precipitation at most locations totaled between four tenths and three quarters of an inch on the 29th and 30th. Exceptions were Baker City with a mere 0.15 inch, and Boise with 1.74 inches at the airport.

### April

A steady progression of upper level low pressure troughs crossing the Intermountain Region resulted in an unsettled, cool, wet, and breezy April. Across most of the region temperatures averaged between 1 and 3 degrees below normal, with precipitation totals commonly between 150 and



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200 percent of normal.

Most of the precipitation fell during four periods: April 6-10, 10-14, 16-18, and 23-27. With precipitation spread out over so many days, daily amounts were not unusually heavy at most locations. One exception was the 0.51 inch rainfall at Boise on the 18th, which set a new record for the date.

The 7th was a windy day across the region. Peak gusts exceeding 50 mph were measured at several locations. Convective showers formed in moist and unstable air ahead of a strong cold front. Southwest winds exceeded 40 mph at 5000 feet above the surface. Downdrafts from showers enhanced this wind as it descended to ground level.

But in general, weather during the month was not severe enough to warrant local storm reports.

### May

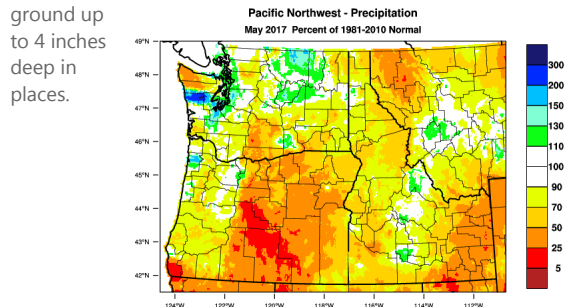
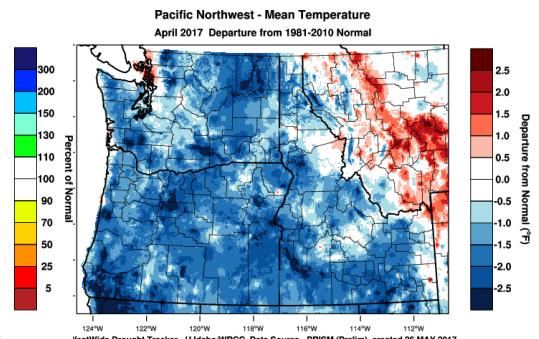
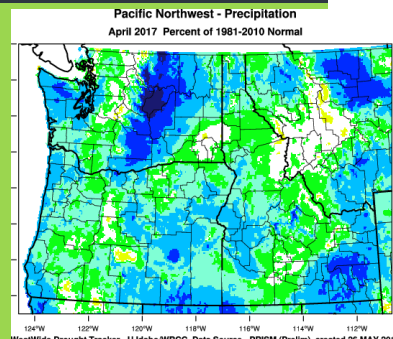
May is normally one of the wettest months of the year, but a significant portion of eastern Oregon and southwest Idaho received less than 50 percent of their normal precipitation. Much of Harney County Oregon was even drier, with less than 25 percent of normal.

Temperatures averaged close to normal, although the mountains of central Idaho were a bit warmer than normal.

Changing weather patterns brought a succession of warm and cool periods. Warm upper level high pressure ridges were displaced about every 6 days by cold fronts bringing unseasonably chilly north Pacific air, gusty northwest winds, and showers.

On the 12th a strong Pacific cold front brought non-thunderstorm wind gusts over 40 mph in the Snake River Valley south and east of Boise. Gusts exceeded 50 mph in the Magic Valley. The strongest reported gust was 62 mph near Hazelton in Jerome County.

The most noteworthy weather system arrived from the Gulf of Alaska on the 16th, spawning scattered thunderstorms with local brief heavy rain, strong winds, and small hail. Rainfall amounts of around half an inch were common. Near Keating in Baker County, trees were blown down, and hail covered the ground up to 4 inches deep in places.



# Bridging Gaps Between NWS Boise and its Partners

Katy Branham

On May 9th, the National Weather Service in Boise hosted a special meeting with some of its most crucial partners. Coined as an Integrated Warning Team (IWT) Workshop, these meetings are held by NWS offices across the country as a method to interact with multiple partnering entities at once. A sampling of partners in attendance included: transportation departments, school districts, emergency management, airports, and media. The inaugural IWT Workshop was a daylong event held in response to the abnormally active winter season, as well as the ongoing flooding. Held at the National Interagency Fire Center in Boise, presentations at the workshop were led by NWS Boise, FEMA, Boise Airport, Avalanche Forecasters at the Idaho Transportation Department, and a member from the NWS Regional Headquarters in Salt Lake City. The goal of these workshops is to obtain feedback on products and services provided by the NWS to ensure we are meeting our partners' changing needs.

Is this the only activity NWS Boise does to interact with its partners? The short answer is no. Throughout the winter and early season flooding, staff from NWS Boise attended and presented at many local and state meetings and briefings. Warning Coordination Meteorologist Jay Breidenbach, and Service Hydrologist Troy Lindquist were common faces as such presentations – ensuring partners had up to date information for our sections of Idaho and Oregon, and at times expanding to include the entire state of Idaho.

Not all support is completed outside of the NWS Boise location. As storms approached during the winter months, staff at NWS Boise organized and disseminated numerous "Heads-Up" emails to partners. These emails contained pertinent information such as Where, What, Intensity Duration, and the staff's confidence level in developing impacts. These "Heads-Up" statements were meant to help partners with early planning, and were updated for accuracy and confidence throughout events. In addition to emails, remotely-hosted video and phone briefings were held for some more impactful events. These briefings were crucial in getting partners together to ensure all weather-related questions were being answered in a timely and effective manner.

The goals of the National Weather Service include the protection of life and property. Additionally, the NWS Boise vision statement includes, "...[being] a customer service powerhouse and leader of unique collaborative efforts..." which has led staff at NWS Boise to develop new or updated methodologies to work effectively with our partners. As a result of these efforts, look for additional upgrades to provided services, and additional articles detailing further efforts to enhance NWS Boise's partnerships.



Meteorologist-in-Charge Mike Cantin (right) and Warning Coordination Meteorologist Jay Breidenbach (left) welcome attendants to NWS Boise's IWT Workshop on May 9<sup>th</sup>.

## Meet & Greet

Aviva Braun

The winter and spring seasons were quite active this year as the region was pounded with storms that brought above normal snow and rain amounts. This led to active flooding and a busy season for the National Weather Service Senior Hydrologist, Troy Lindquist. Since Troy has been working double duty making sure that our core-partners are equipped with the information necessary to make good decisions about how to protect the public, we thought it would be interesting to sit down with Troy and learn more about his job and what he has been working on these last few months.

**NWS:** Troy, you are the Service Hydrologist for the Boise National Weather Service office. What makes your job unique as a Service Hydrologist versus as a Meteorologist?

**Troy:** I think the unique part of my job is that I really know the forecast, understand what is going on, am able to tell others in simple terms what is going to happen, and then translate that into how the forecast will impact the rivers and streams and any flooding that may occur.

**NWS:** This has been an active flooding season. Tell us about what happened to have a season like this occur.

**Troy:** Well it all started last fall when we had a really wet weather in October. We had record precipitation over much of the area and that started setting the stage for an active flood season in the spring by recharging soil moisture and putting a lot of moisture back into the system. As we moved into the winter, we got really cold temperatures in December and January and a record snowpack at low elevations; then we moved into February and March and the snowpack continued to build at higher elevations, so the stage was really set for a big spring runoff with the way the snowpack built over the winter months. The spring brought warming temperatures which induced excessive melt, as well as rain events on top of the melt. We ended up with a lot of water in the system as a whole, thus high river levels, streams, sheet flooding, river flooding, and so forth.

**NWS:** We did get quite a lot of moisture! Is there any one river flooding event that stands out to you as most impactful this season?

**Troy:** Definitely the Boise River. Just because it was at flood stage for 100 days and it's right here in our community. We did numerous briefings out at the Emergency Operations Center in Ada County and we were able to go out and see the impacts and it was in the news daily. Within the Boise Hydrologic Service area, the Boise River certainly caused the most amount of damage. However, in February and early March, the sheet flooding in the Magic Valley was quite damaging as well, though maybe not to the same extent. The Boise River area definitely had the most infrastructure at risk.

**NWS:** A lot of our partner agencies have been in contact with you through this flood season. What are the main topics about which they are seeking guidance?

**Troy:** Since most of our interactions with our partners have been about flooding along the Boise River and since it's a regulated flood by the Corps of Engineers and the Bureau of Reclamation and we knew what the flows were going to be, they were more wanting to know how much water remained in the snowpack in the mountains, how much we could expect to runoff, and what kind of inflows we were going to see into the Boise Reservoir system. This information was provided so the Corps and the Bureau could make their decisions about scheduled water releases. Of course, emergency managers and emergency operation center staff were interested in that information as well so they could have an understanding of what was yet to come.

**NWS:** Recently, you've been attending weekly briefings at the Idaho Office of Emergency Management and the Ada County Emergency Operations Center. How do you and the information you can provide them fit into their planning process?

**Troy:** We did a lot of weather briefings and hydrologic briefings. We would start with the current weather and what we expected over the next 10 days, and then we would translate that information into how the hydrologic system was going to respond to the weather over the next 10 days. So how the upcoming weather pattern was going to impact snowmelt, stream flows, inflows into the reservoir system, and what kind of runoff volumes we were going to see over the next 10 days. We also addressed whether we were going to see any peaks that were going to cause problems in terms of maintaining a safe reservoir space. Things like that.

**NWS:** What would the natural flows have been had the reservoir system not been in place? Can you explain the Boise reservoir system and how each of their capacities is intertwined?

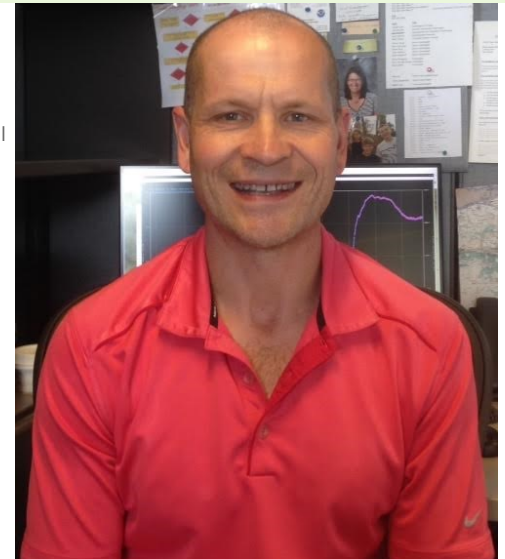
**Troy:** Well, the Corps of Engineers and the Bureau of Reclamation operate the three reservoirs as one system: Lucky Peak is a Corps project; Anderson Ranch and Arrowrock are Bureau projects. They have to work together to manage all water within the Boise Basin as it comes down through the system and supply water to the irrigators and keep flow hopefully, below flood as it goes through Boise, Garden City and downstream. The reservoir system is multipurpose and has many benefits; it acts as flood control, water supply, and provides recreation opportunities. At one point this spring, we had inflows into the system up around 20,000 cfs. Had the reservoir system not been in place, those flows would have come downriver, through Boise, Garden City and Eagle and we would have had a huge flood on our hands. However, the reservoirs were able to catch those large inflows and fortunately they had the space to hold these inflows and release gradually over time, minimizing the flood amounts through Boise and downstream.

**NWS:** The reservoir system has been close to capacity at times, but there was still space in it, so why did we have to be at flood stage despite having capacity for inflow and who made those release decisions?

**Troy:** The Corps of Engineers is ultimately responsible for regulation during flood situations but they make those decisions jointly with the Bureau of Reclamation and input from other agencies like the National Weather Service. It's really a multi-agency effort with a lot of coordination necessary. Typically they like to operate with a certain amount of space within the system for safety reasons, in case a single large rain event occurs. However, there was such a large snowpack and water volumes were so high – this season ranks amongst the top 5 for the amount of water in the snowpack, historically. There was so much water to run off through the spring snowmelt season, they had to raise the river levels up to flood stage to allow that kind of water to pass through the system and they had to forgo their safety margin within the reservoir system at times. There was a risk to their decisions, but the risk worked out pretty well in that they didn't actually have to cause a larger flood.

**NWS:** Wow, we were lucky! Anyway Troy, that's all I have for you. Thank you for your time. I know it is precious!

**Troy:** Thank you.

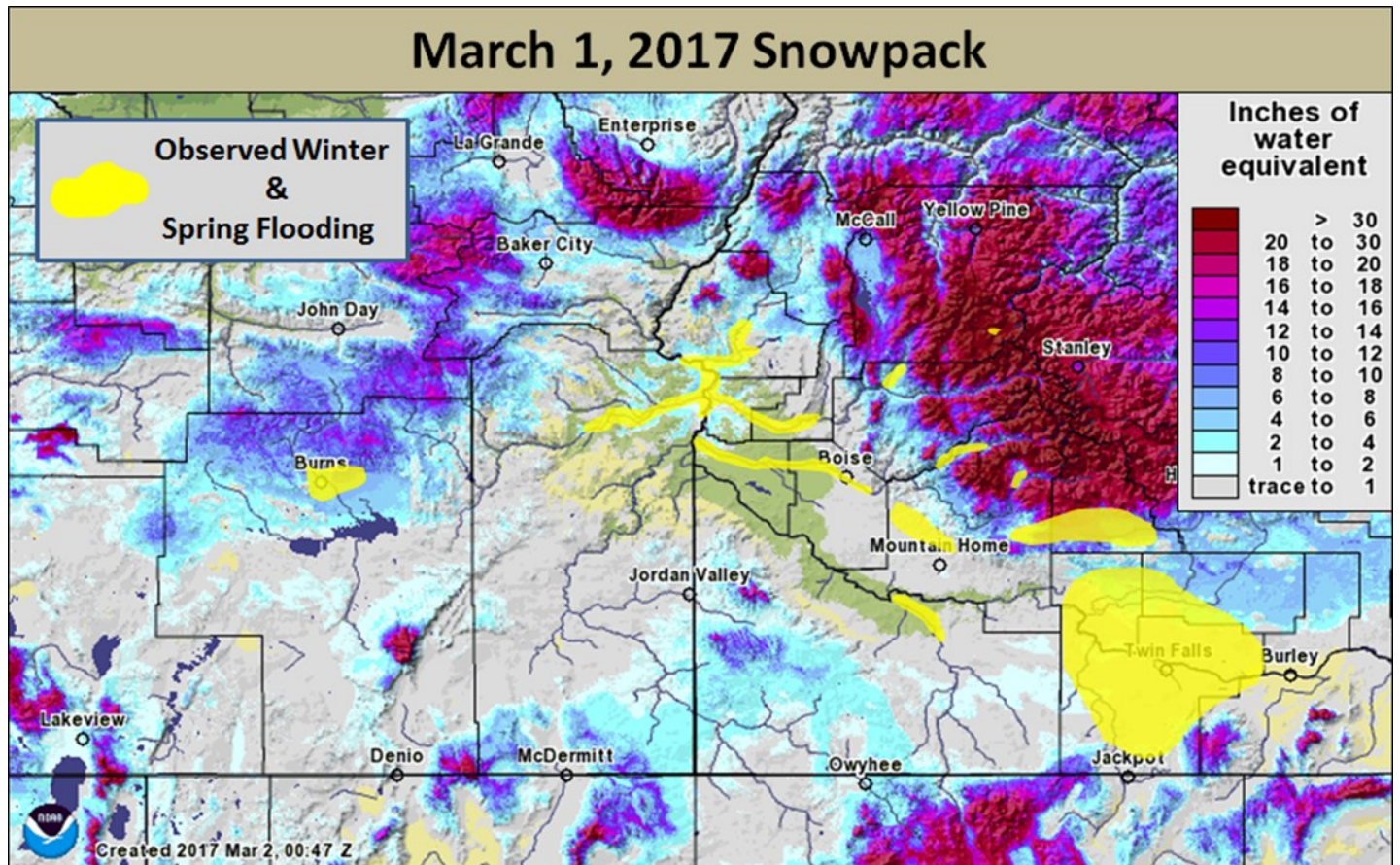




# Winter and Spring Flood Summary

Troy Lindquist

This past winter and spring had its share of flooding across southeast Oregon and southwest Idaho. Not only did spring runoff bring flooding to rivers and streams, but ice jams and snowmelt caused flooding during the winter as well. The stage was being set for an active spring flood season as far back as October 2016, when 150 to 400 percent of normal precipitation occurred across much of the region which moistened the soil profile. The winter storm track brought well above average snowfall to most of southeast Oregon and southwest Idaho, with extreme snowfall across lower valleys. A relatively cool and wet early spring was the final piece of the puzzle to ensure abundant spring runoff. An indicator of how wet this past winter and spring have been, water supply forecasts for the April through September period rank in the top 10 for most of southeast Oregon and southwest Idaho, dating back to 1970. Additionally, all major reservoir systems either have filled or are expected to fill.



The map above shows March 1 snowpack along with areas where flooding had a significant impact.

Although the threat of snowmelt flooding has diminished, summertime thunderstorms can pose a serious flood risk. Areas of steep terrain and areas burned by wildfire are at particular risk for flash flooding due to thunderstorms. For flood safety information, visit <http://www.floodsafety.noaa.gov/>. For the latest river conditions, see <http://water.weather.gov/ahps2/index.php?wfo=boi>.

## Did you know?

Elizabeth Padian

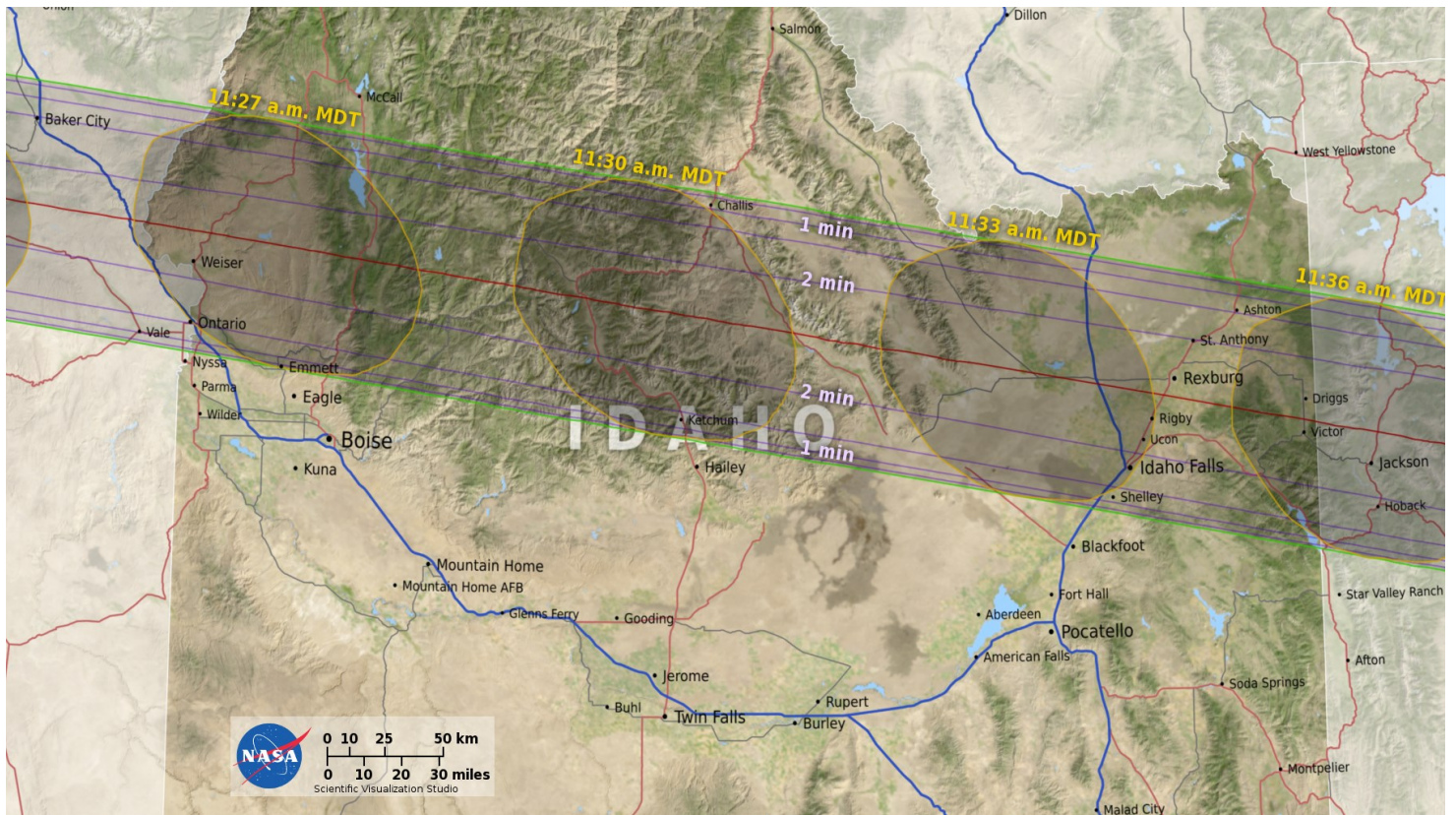
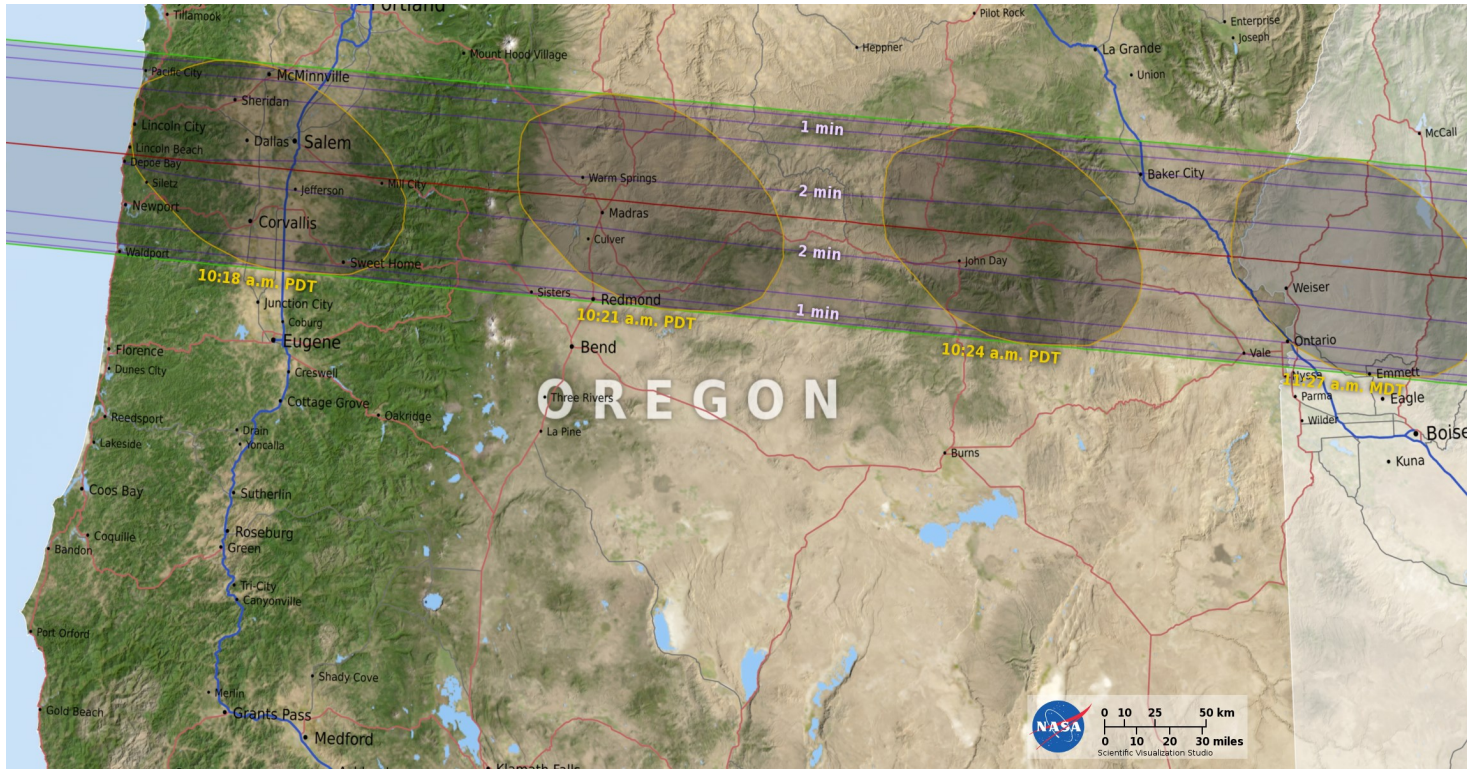
**9 out of 10 wildfires in 2016** in our area were started by humans. Help ensure that you don't become a part of the statistic! Don't flick cigarettes out of your car window; make sure chains on your vehicle don't drag along the road and create sparks; down out all of your campfires.



**FOLLOW US on Twitter @NWSBoise and LIKE US on Facebook!**



# Eclipse Maps



For more eclipse information, see <http://eclipse2017.nasa.gov>.

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# National Weather Service Boise Staff

## Meteorologist In Charge

Michael Cantin

## Science Operations Officer

Tim Barker

## Warning Coordination Meteorologist

Jay Breidenbach

## Service Hydrologist

Troy Lindquist

## Information Technology Officer

Jason Baker

## Electronic Systems Analyst

Travis Mayer

## Electronics Technicians

George Buckwold

Eric Johnson

## Observing Program Leader

David Decker

## Administrative Support

Kelly Jardine

## Senior Meteorologists

Katy Branham

Les Colin

Dave Groenert

Stephen Parker

Bill Wojcik

## Meteorologists

Korri Anderson

Elizabeth Padian

Josh Smith

Joel Tannenholz

Vacant

## Fire Weather Meteorologists

Chuck Redman

Megan Thimmesh

## Hydrometeorological Technician

Wasył Hewko

## Meteorologist Interns

Aviva Braun

Jessica Caubre

# Summer 2017 Outlook and Fire Weather Outlook

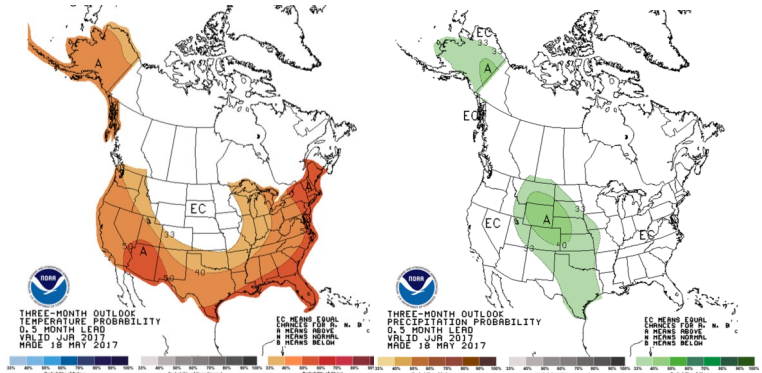
Stephen Parker and Chuck Redman

The ENSO (El Niño/Southern Oscillation) forecast for the summer is for neutral or weak El Niño conditions. This means that there will be no strong forcing from ENSO to help guide the forecast. However, there are other patterns which lend themselves to forecasting for the summer season, particularly with regard to temperature.

The following graphics show the official three-month outlook for the summer of 2017 (Jun-Jul-Aug). The country's temperature outlook is for a better chance of above-normal temperatures across all but the north-central part of the country, with near equal chances of above- and below-normal centered over the Northern Plains and surrounding states.

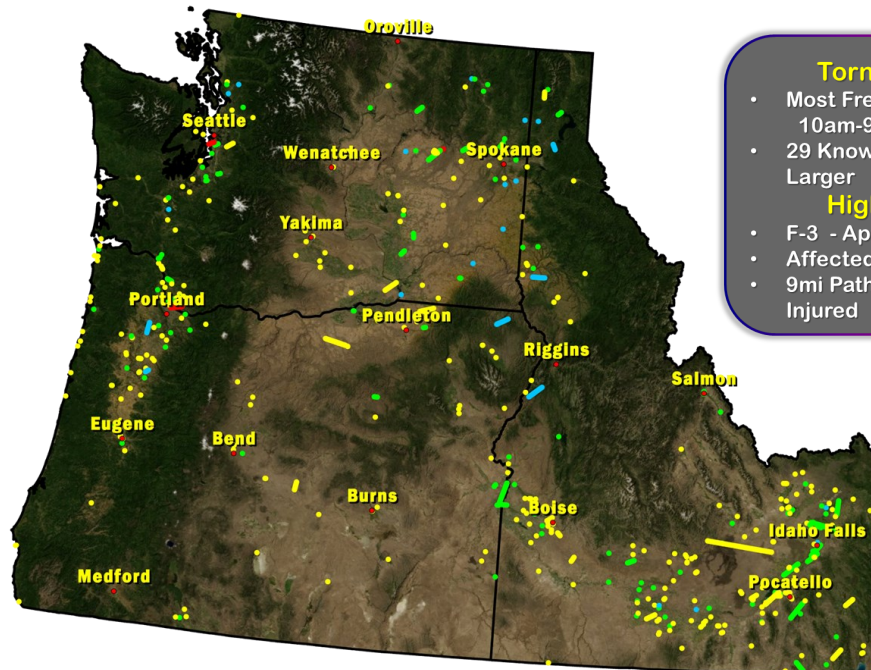
The country's precipitation outlook is for equal chances of above- and below-normal in most areas, with an axis of better chances for above-normal amounts from Montana southeast to the Kansas-Colorado state line, and then south into most of Texas. Alaska also has better chances of above-normal precipitation.

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 (although the above-normal precipitation chances are just off to our east). This means that there is no strong signal in the precipitation probability data, and therefore it is basically a forecast of "near-normal".



**Fire Weather Outlook:** Due to the heavy winter snowpack and spring rains, fire activity across the region is expected to have a late start across the Boise and Payette National Forests, if there is activity at all. It's a different story across the rangelands of Southeast Oregon and Southwest Idaho. Winter precipitation brought abundant grass growth, which has already begun to cure and dry. At this time, fires across the Boise and Twin Falls BLM have picked up and are experiencing rapid fire growth. These conditions will continue through the remainder of the summer with a few tempered time periods due to summer rain that moves over the area.

## Tornadoes across the Pacific Northwest since 1950: 420 Tornadoes



### Tornado Tidbits:

- Most Frequent: 10am-9pm Local Time
- 29 Known To Be F/EF-2 or Larger

### Highest Rated:

- F-3 - April 5, 1972
- Affected OR & WA
- 9mi Path: 6 Dead & 300 Injured

### F/EF Scale:

Unknown

0

1

2

3

4

5



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](mailto: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.



[weather.gov/heat](http://weather.gov/heat)



### Job Sites

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



### Indoors

Check up on the elderly, sick and those without AC.



### Vehicles

Never leave kids or pets unattended - LOOK before you LOCK



### Outdoors

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

# Heat Related Deaths ARE Preventable LOOK BEFORE YOU LOCK



[weather.gov/heat](http://weather.gov/heat)

[nhtsa.gov](http://nhtsa.gov)

The temperature in your car can quickly become deadly!

Outside Temperature 80°



Time Elapsed: 10 Minutes



Time Elapsed: 20 Minutes



Time Elapsed: 30 Minutes



Time Elapsed: 60 Minutes

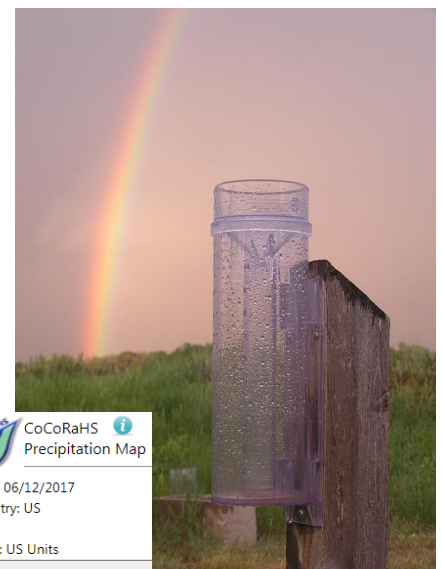
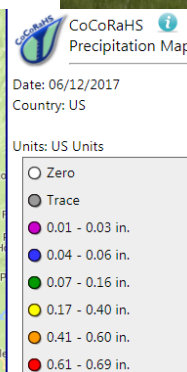
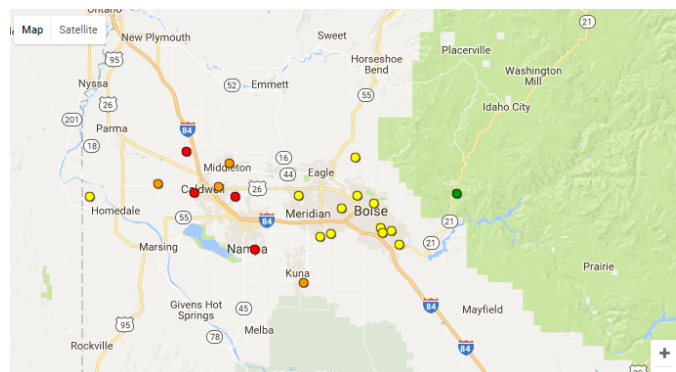
## Want to become a weather observer?

Become a citizen weather observer with CoCoRaHS. There are limited precipitation observations across southwest Idaho and southeast Oregon, compared to the rest of the country. To learn more about the CoCoRaHS program and to see where your fellow observers have recorded rain amounts, visit <http://www.cocorahs.org/>.

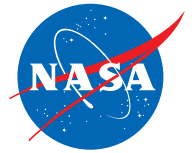
Precipitation Maps: <http://data.cocorahs.org/cocorahs/maps/?country=US>

Invite your neighbors, relatives and friends by sending them this "Join" link:

<http://www.cocorahs.org/application.aspx>







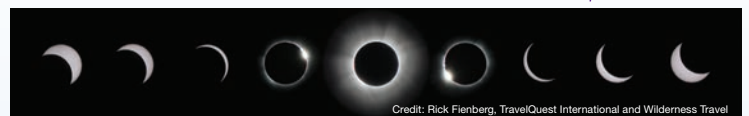
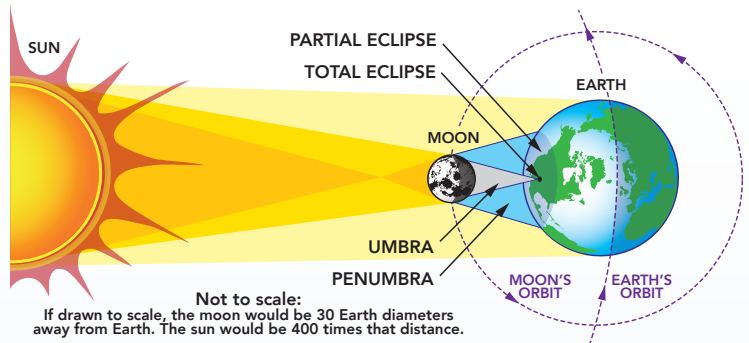
# EXPERIENCE THE 2017 ECLIPSE ACROSS AMERICA THROUGH THE EYES OF NASA

<http://eclipse2017.nasa.gov>  
**MONDAY • AUGUST 21, 2017**



## TOTAL SOLAR ECLIPSE: Monday • August 21, 2017

This will be the first total solar eclipse visible in the continental United States in 38 years.



In this series of stills from 2013, the eclipse sequence runs from right to left. The center image shows totality; on either side are the 2nd contact (right) and 3rd contact (left) diamond rings that mark the beginning and end of totality respectively.



### WHERE TO WATCH

Find a nice, clear spot with a good view of the sky.



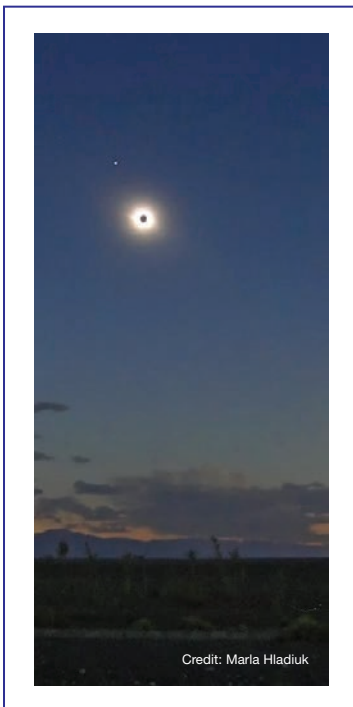
### HOW TO WATCH

You can see the sun and the eclipse with special eclipse glasses. **NEVER** look directly at the sun without appropriate eyewear. Regular sunglasses are not safe to view the eclipse. More: <http://eclipse2017.nasa.gov/safety>



### HOW LONG WILL IT LAST

The total eclipse, when the sun is completely blocked by the moon, will last up to 2 minutes and 40 seconds, depending on your location.



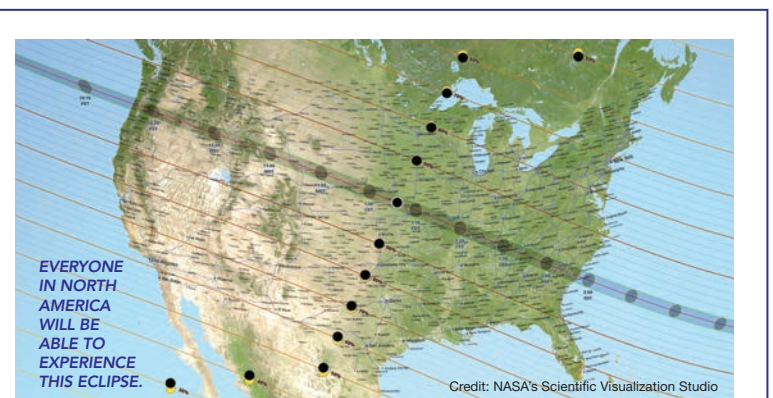
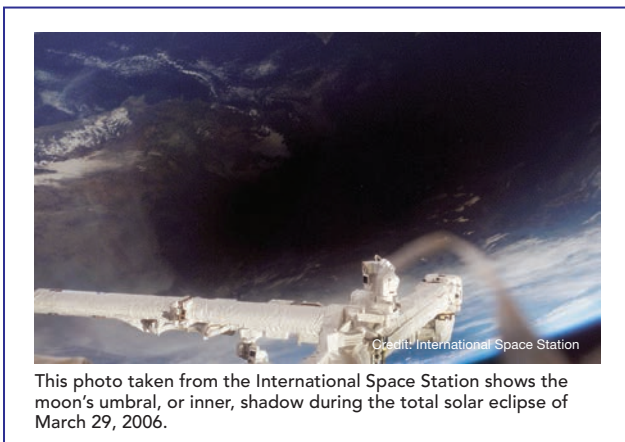
### WHAT IS A SOLAR ECLIPSE?

A solar eclipse happens when the moon casts a shadow on Earth, fully or partially blocking the sun's light in some areas.

Observers within the path of totality will be able to see the sun's corona (weather permitting), like in the images above and left. Observers outside this path will see a partial eclipse.

### THE NEXT ECLIPSE

After the 2017 solar eclipse, the next total solar eclipse visible over the continental United States will be on April 8, 2024.



This map shows the path of the moon's umbral shadow—in which the sun will be completely obscured by the moon—during the total solar eclipse of August 21, 2017. The lunar shadow enters the United States near Lincoln City, Oregon, at 9:05 a.m. PDT. Totality begins in Lincoln City, Oregon, at 10:16 a.m. PDT. The total eclipse will end in Charleston, South Carolina, at 2:48 p.m. EDT. The lunar shadow leaves the United States at 4:09 p.m. EDT. Outside this path, a partial solar eclipse will be visible throughout the continental U.S., and this map shows the fraction of the sun's area covered by the moon outside the path of totality.



# SAFELY observing THE SUN

**WARNING!** Never look directly at the sun without proper eye protection. You can ***seriously*** injure your eyes.



Check with local science museums, schools and astronomy clubs for eclipse glasses—or purchase an ISO 12312-2 compliant and CE certified pair of these special shades!



View the eclipse with special eclipse glasses.



Regular sunglasses are not safe to view the eclipse.

## SUN FUNNEL



Inexpensive and easy to build, the sun funnel is a device that completely encloses the light coming from a telescope and projects a magnified image of the sun, large enough for many people to view at once.  
<http://eclipse2017.nasa.gov/make-sun-funnel>

### STRANGE SHADOWS!



Copyright © Elisa J. Israel

Sunlight from a partial eclipse funnels through tree leaves to project images of crescents on the ground.

### ECLIPSE DETAILS FOR CITIES IN THE PATH OF TOTALITY

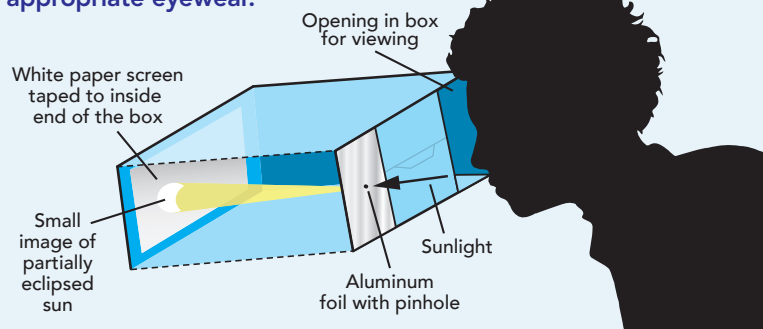
	Eclipse Begins	Totality Begins	Totality Ends	Eclipse Ends	
Madras, OR	09:06	10:19	10:21	11:41	PDT
Idaho Falls, ID	10:15	11:33	11:34	12:58	MDT
Casper, WY	10:22	11:42	11:45	01:09	MDT
Lincoln, NE	11:37	01:02	01:04	02:29	CDT
Jefferson City, MO	11:46	01:13	01:15	02:41	CDT
Carbondale, IL	11:52	01:20	01:22	02:47	CDT
Paducah, KY	11:54	01:22	01:24	02:49	CDT
Nashville, TN	11:58	01:27	01:29	02:54	CDT
Clayton, GA	01:06	02:35	02:38	04:01	EDT
Columbia, SC	01:13	02:41	02:44	04:06	EDT

### MAKE YOUR OWN ECLIPSE PROJECTOR

You can make this simple eclipse projector with almost any cardboard box, paper, tape and foil.

The longer the distance from the pinhole to screen, the larger the image of the sun will be.

**NEVER** look directly at the sun without appropriate eyewear.



More on eclipses | <http://eclipse2017.nasa.gov>  
| <http://www.nasa.gov/eclipse>

More on safe viewing of eclipses | <http://eclipse2017.nasa.gov/safety>  
| <http://go.nasa.gov/2evRZBG>

### MIRROR IN AN ENVELOPE

Slide a mirror into an envelope with a ragged hole about 5/8 inch (1.5 cm) cut into the front. Point the mirror toward the sun so that an image is reflected onto a screen about 15 feet (5 meters) away. The longer the distance, the larger the image.

**DO NOT LOOK AT THE MIRROR, ONLY AT THE SCREEN.**

