



Welcome to Spotter Training for the Inland NW – Winter 2018 edition.

Agenda

- Role of National Weather Service
- Weather Spotter Program & Reporting
- Weather Hazards & Safety Rules
- Getting the Word Out
- Other Ways to Get Involved
- Winter Outlook



The agenda includes: describing the role of the National Weather Service, what is the weather spotter program and what to report, weather hazards and safety rules, how we get the word out, learning other ways to get involved, and lastly the Winter Outlook for 2018. Enjoy this winter scene at the NWS Spokane office.

National Weather Service

- Federal Government
- 126 offices across the country!
- Works with local agencies
- Responsible for all weather/water Watches & Warnings
- Observe & Forecast
- “Behind the Scenes”
- Gives expert advice
- Preparedness Education



National Weather Service Spokane, WA

www.weather.gov/Spokane



The National Weather Service (NWS) is a federal agency with 126 offices across the county. The main responsibility is to issue the weather/water watches and warning for the county warning area and work with local agencies to get the word out. NWS works behind the scenes, giving expert advice, collecting weather observations and composes weather forecasts for 7 days in advance. NWS also provide preparedness education.



Staffed 24/7 • 22 Employees • Duties

- Meteorologists
- Hydrologist
- Technicians
- Observations (Weather Balloon)
- Forecasts (Out to 7 days)
- Weather Watches & Warnings

NWS Spokane

The image shows a photograph of the NWS Spokane office building and a weather balloon tower in a snowy winter setting. The text is overlaid on the top half of the image. There are two small circular logos in the bottom corners: the NOAA logo on the left and the NWS Spokane logo on the right.

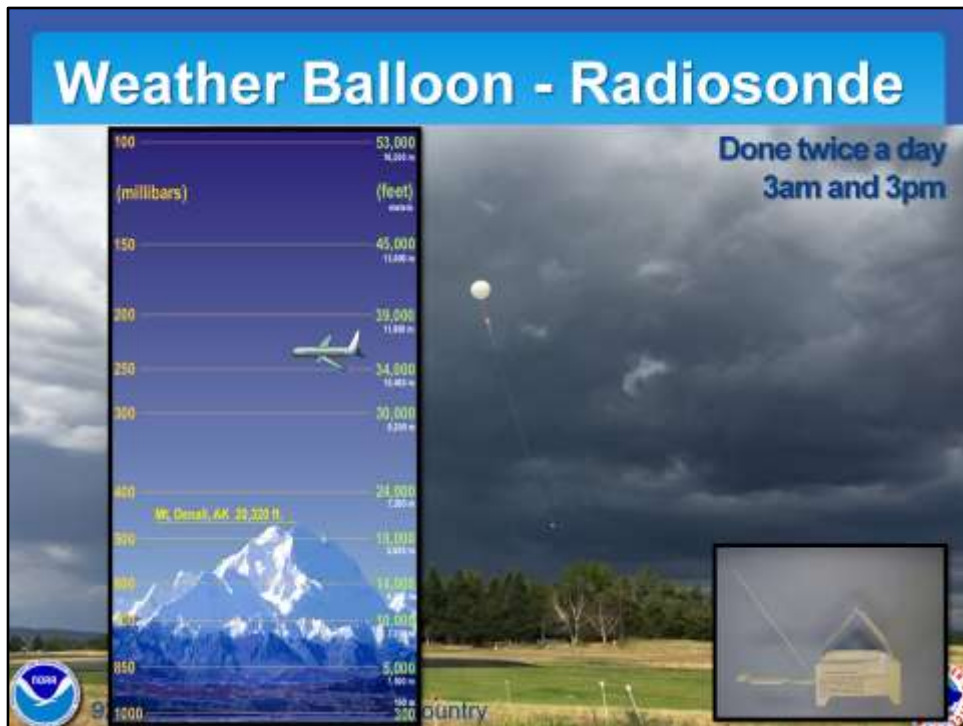
The NWS Spokane is open 24 hours a day, 7 days a week with 22 employees, mostly meteorologists coming from all parts of the county. There is also a hydrologist that concentrates on the rivers and a staff of electronic technicians that fix and maintain the equipment. The main duties at the NWS Spokane include: observations including the daily weather balloon, forecasts out 7 days and all weather/water watches & warnings for the Inland NW.



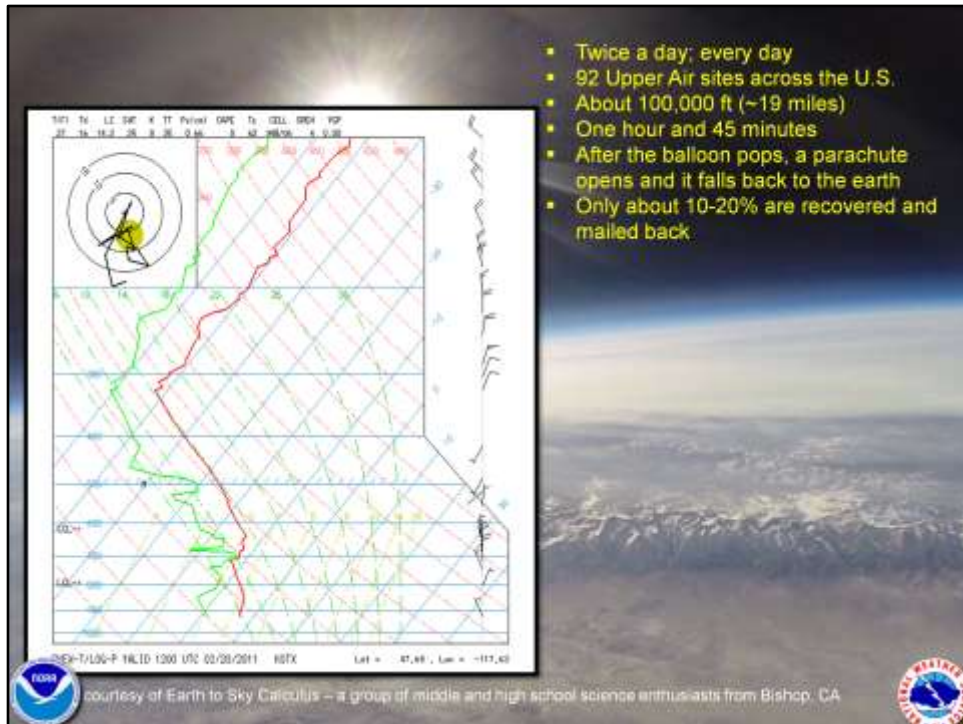
Here is a map of the county warning area for NWS Spokane.



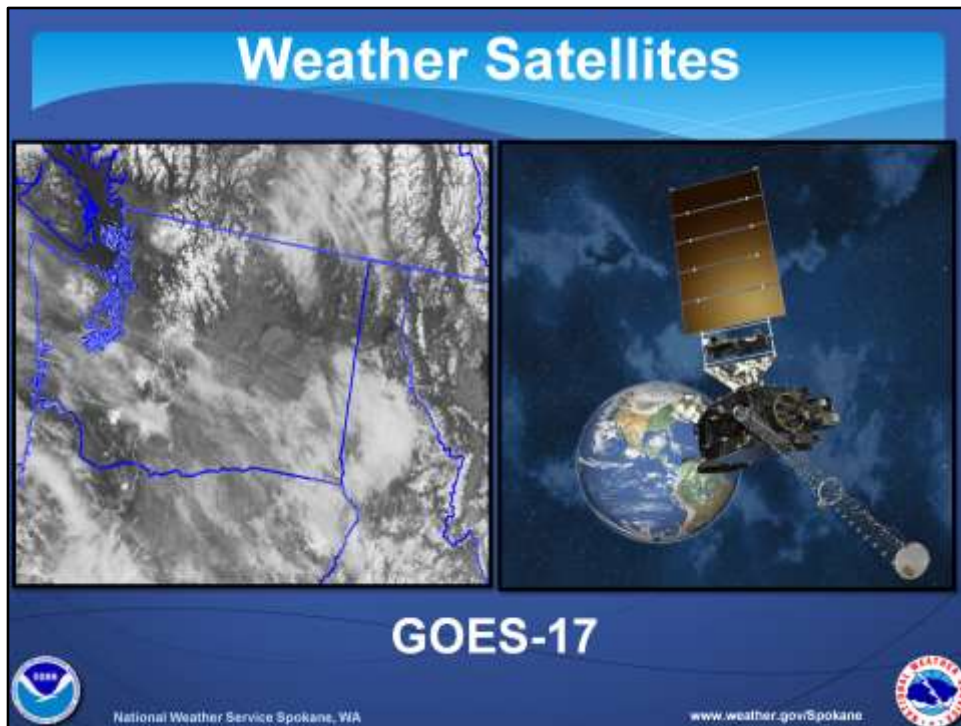
Taking observations is a priority for the National Weather Service.



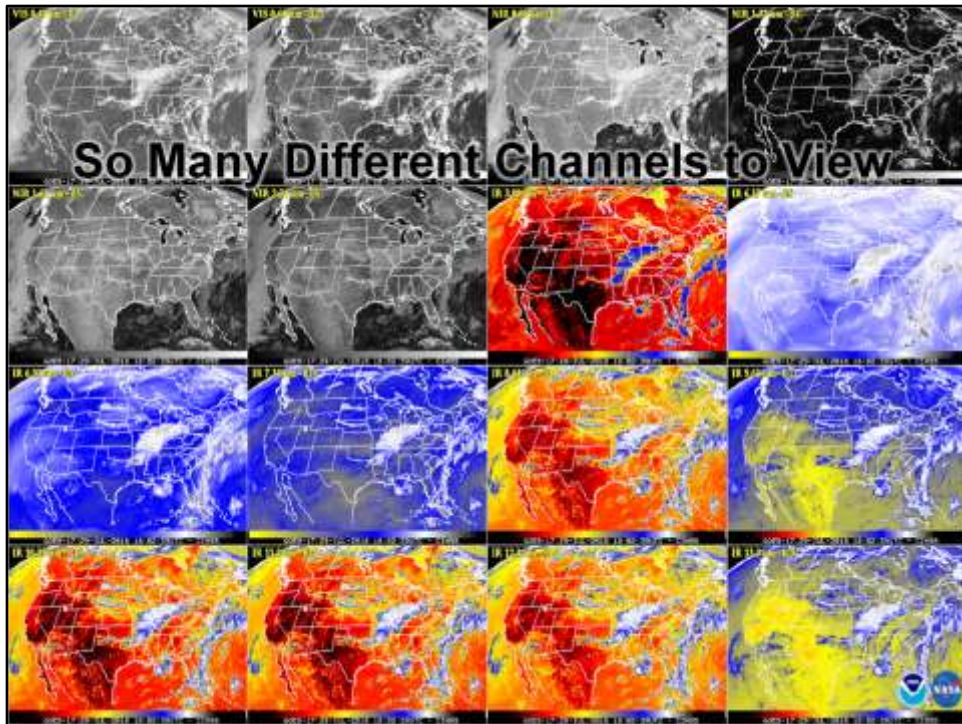
Weather balloons are launched at NWS Spokane twice daily – 3am PST and 3pm PST. These weather instruments collect valuable weather data through the entire atmosphere including air pressure, temperature, wind and humidity.



There are 92 upper air sites across the U.S. Each balloon can rise to about 100,000 ft or roughly 19 miles high. The flight takes about 1 hour and 45 minutes. The chart shows traces of temperature, humidity and winds.



Weather satellites are cameras that orbit the earth and take images of clouds and the atmosphere. Most of the cloud cover viewed are the cloud tops; not what is seen from the ground. The newest satellite is GOES 17 which will be made operational in the western U.S. in January 2019.



GOES 17 satellite will have at least 16 different channels to show cloud cover, temperatures and water vapor across the county.

Weather Radar - WSR-88D



National Weather Service Spokane, WA

159 Radars across the country

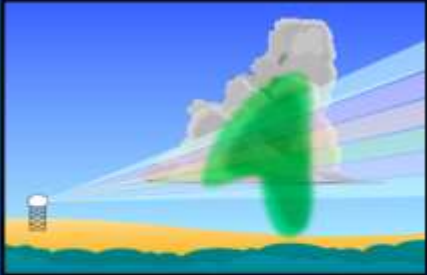
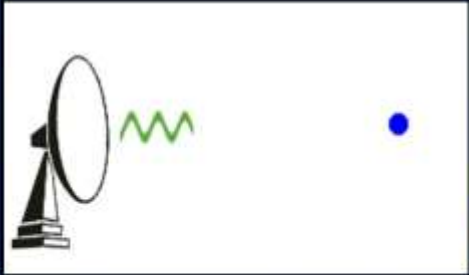
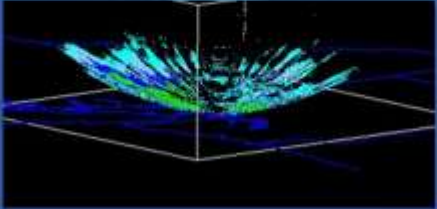
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Each NWS office has a weather radar which scans the skies detecting precipitation.

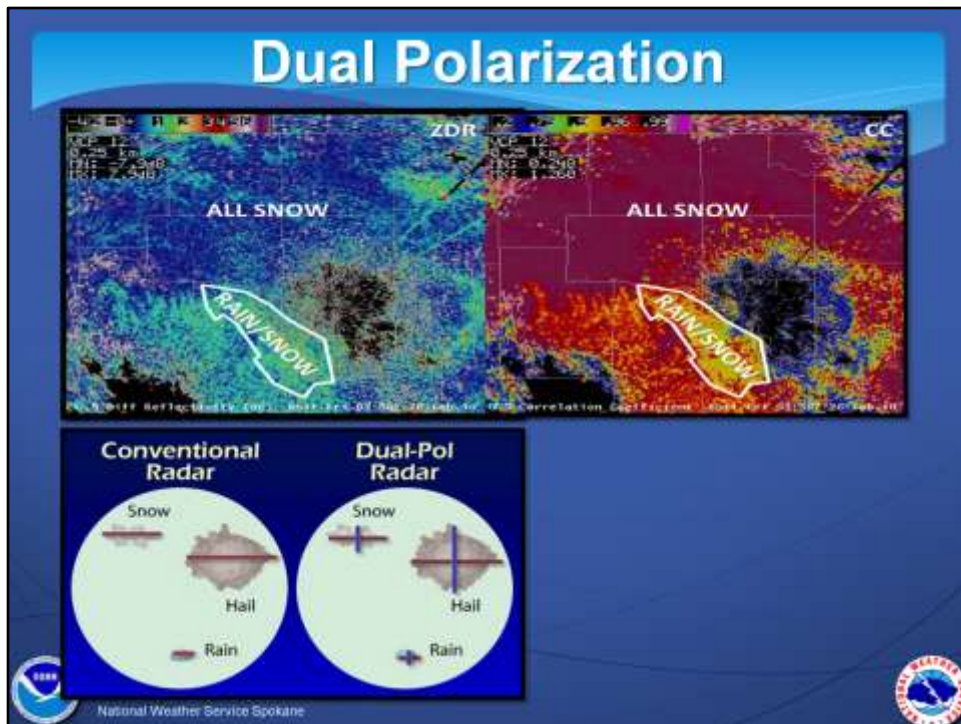
How the Weather Radar works

- * Radar sends a radio signal - pulse
- * Listens for a return signal
- * Rotates 360 degrees = "slice"
- * Multiple slices at higher elevations
- * Completes a "volume scan" 4-8 min

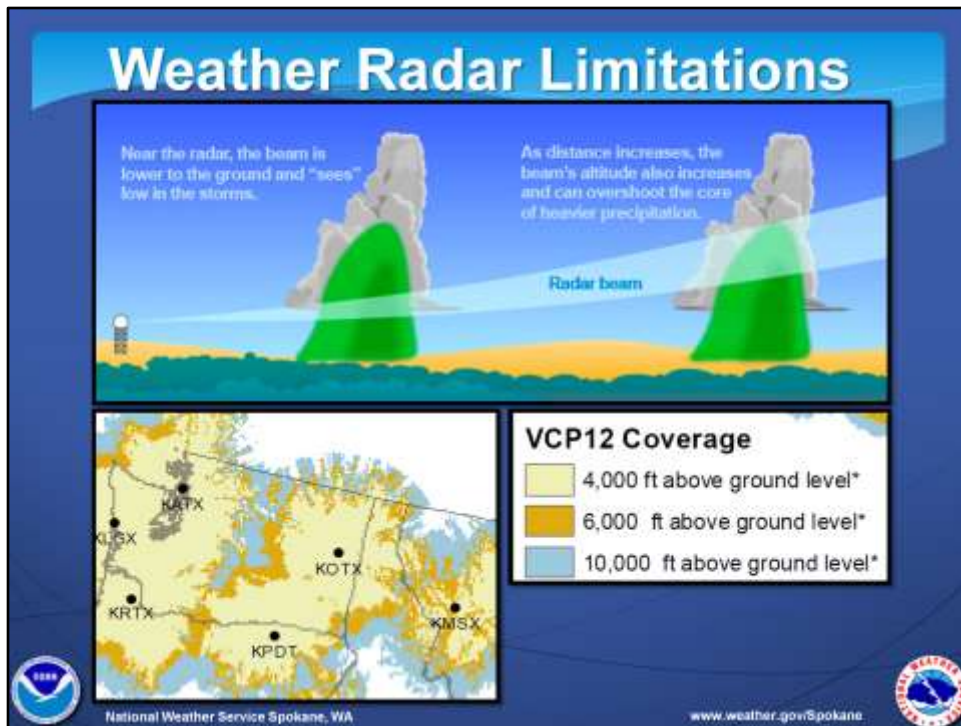


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The weather radar works by sending out a radio signal – pulse. This pulse will bounce off rain drops, snow flakes and hail, returning the signal back to the radar. The radar rotates 360 degrees to make a slice and raises at multiple increment elevations. The radar completes a volume scan in 4-8 minutes.



Weather radars have dual polarization, allowing them to scan not only in the horizontal but the vertical as well to better detect precipitation.



Weather radars do have limitations. As storms move farther away from a radar, the radar beam is unable to scan the lower portions of a storm. Radar beams are hampered by trees and mountains, and radar data is lost.

Common Radar Image



- Widespread precipitation on the west side
- East of the Cascade crest – Shadow effect due to downslope
- Rising terrain east of the Columbia Basin & more precipitation



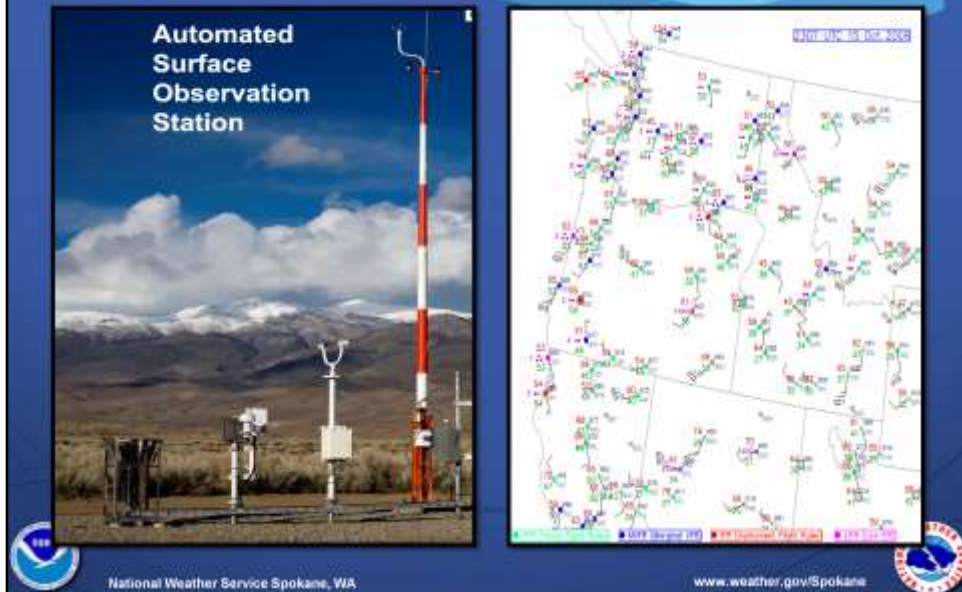
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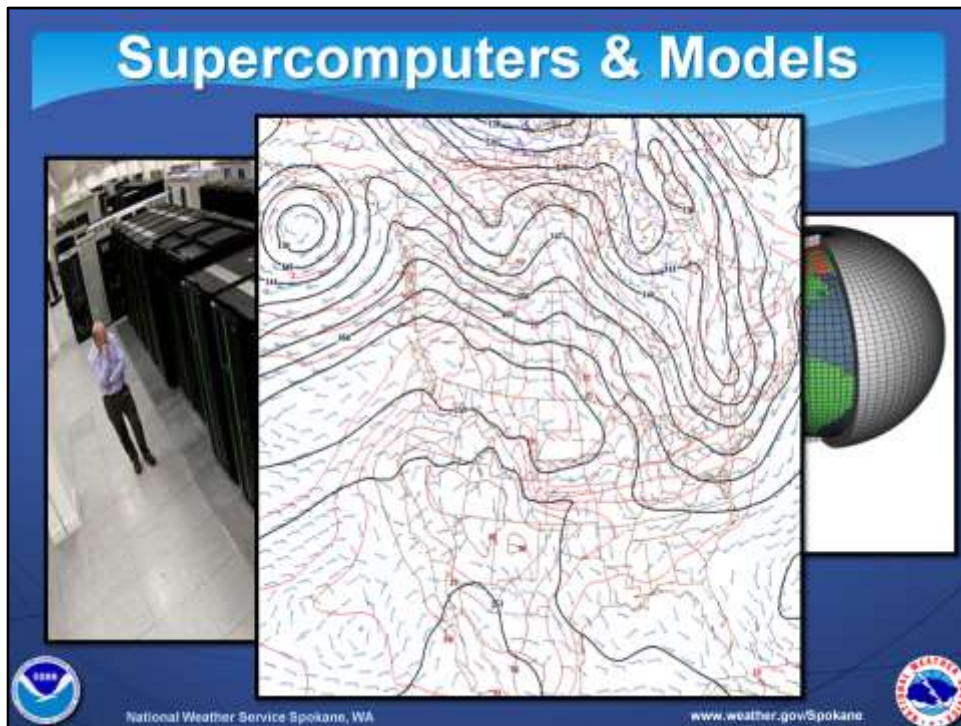


Here is a common radar image for the Pacific NW with widespread precipitation on the west side of Washington. East of the Cascade crest, a shadow effect sometimes develops due to downslope flow and less precipitation. Rising terrain east of the Columbia Basin into north Idaho can lead to more precipitation seen on radar.

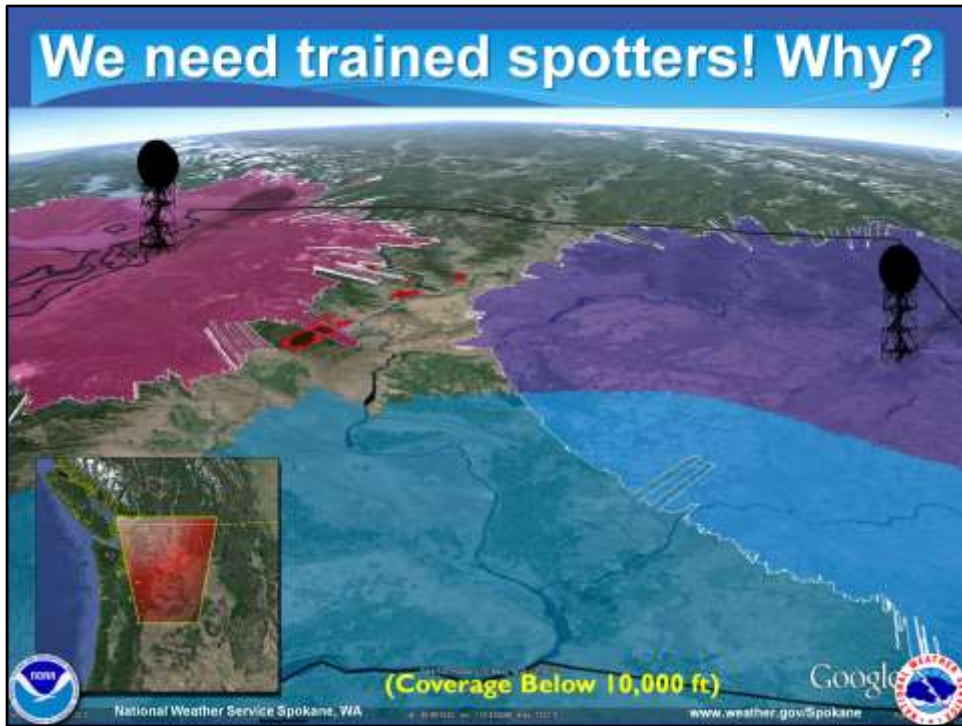
Surface Observations



Surface observations are a valuable source of weather data. Most are located at local airports and can give hourly automated weather. This data can be plotted on a weather map.



Computer power is immense in the National Weather Service, collecting the weather data from surface observations, weather balloons, satellites and radar. In addition, supercomputers run programs that model the atmosphere and give updates every 6 hours and some hourly.



So with all this technology and tools, why does the NWS need weather spotters?

We need trained spotters! Why?

- Radar Limitations
- Report events not seen by radar or satellite
- Fill in the “holes” not covered by observations
- Ground Truth
- Goal – maximize warning effectiveness and lead times



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(Coverage Below 10,000 ft)

www.weather.gov/spokane



There are many reasons. One – the limitations with the radar. Two – give reports not seen or captured by radar or satellite. Three – to fill in the holes not covered by observations. Four – to give ground truth on weather. Five – to maximize the warning effectiveness and increase lead times on severe weather.

Spotters are very important!

SKYWARN

1,200+ Weather Spotters!!

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Weather spotters are very important to the National Weather Service. These volunteers number over 1200 across the Inland Northwest, clustering in the major city locations. Weather spotters are the “eyes and ears” of the National Weather Service.



How to give a weather spotter report.



The easiest is to give a phone call. Dial the toll free number. Tell the forecaster what you see, where you are and what time it is.

Online Spotter Reports

Storm Reports
Alerting the NWS to local weather

Report Type -> Details -> Location -> Review and Send

Please select a report type

Back Next

[Privacy policy for weather reports](#)

www.weather.gov/Spokane

Local Data Satellite Images Weather Maps General Forecasts

Weather Data Forecasts Climate Graphics Rivers and Lakes Observations & Alerts Fire Weather Aviation Weather

Weather Alerts Radar Forecasts Spacenet Information Climate **Submit a Storm Report** View Storm Reports

National Weather Service - Spokane, WA www.weather.gov/Spokane

If you don't feel like calling, an online report system is available on the NWS Spokane web page at www.weather.gov/spokane. Scroll to the bottom of the page and click on Submit a storm report.





Social Media

Twitter

- @NWSSpokane
- #wawx & #idwx
- Send reports & pictures
- Monitored 24/7

FaceBook

- NWS Spokane
- Send reports & pictures
- Monitored 24/7



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NWS Spokane is active on social media and you are welcome to share your reports on Facebook and Twitter.

mPING

- Available on iOS and Android
- Reports sent to NWS
- Reports are anonymous
- Very easy to use
- Website: <https://mping.nssl.noaa.gov>



The screenshot shows the mPING app interface. On the left, a list of features is displayed in blue rounded rectangles. On the right, a map of the United States is shown with various colored dots representing precipitation reports. Overlaid on the map is a form titled 'The mPING Project' with the subtitle 'Meteorological Phenomena Identification Near the Ground'. The form includes a 'Report Type' dropdown menu, a 'Select Report Type' button, a 'Current Location' field with a map of the United States, a 'Submit Report' button, and a 'View Reports' button. At the bottom of the slide, there are logos for NOAA and the National Weather Service Spokane, WA, along with the website address www.weather.gov/Spokane.

Another useful weather app is mPING. It is a crowd sourcing app that allows you to report precipitation type on your phone. This data is collected and plotted on NWS radars to give ground truth reports.

Email Reports & Photos

nws.spokane@noaa.gov



If ARES/RACES Hams, relay report to your central collection point.

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Email is a great way to send pictures and images.

Spotter Report

- **Specifics...Tell us the story!**
 - **Who...What...and Where**
 - **When the event began and/or ended**
 - **Estimate of wind speed and/or hail size**
 - **Damage and injury reports**
- **If unsure report your uncertainty**
- **Reports while traveling**
- **Delayed or second hand reports**



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Remember in a spotter report to include: Who, What, Where and When. If you are describing wind, you can estimate wind speeds. Include any damage reports.

TLCS Reporting Format

Keep Your Report Brief & Simple

- **T – Time of the Event**
 - **L – Location of the Event – Intersection or roadways**
 - **C – Condition – What!**
 - **S – Source**
- Reportable Criteria:**
- Tornado
 - Funnel Cloud
 - Wall Clouds (rotating or not)
 - Winds greater than 50 mph (measured or estimated)
 - Flooding or Flash Flooding
 - Hail (size of the largest stone, how deep, and duration)
 - Storm damage



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Keep your report brief and simple and follow these great criteria.



The poster is titled "Inland Northwest Weather Spotter Checklist" and features the National Weather Service logo on the top left and the SKYWARN logo on the top right. The checklist items are listed in colored horizontal bars:

- Tornado or Funnel Cloud:** ANY Kind (red bar)
- Strong Winds:** +30 mph/Damage (58mph severe) (orange bar)
- Hail:** +1/2" in diameter (1" severe) (yellow bar)
- Heavy Rain:** +1/2" in 1 hr or +1" in 12 hrs (light yellow bar)
- Flooding:** ANY Kind (light green bar)
- Mixed Precipitation:** freezing rain or sleet (light blue bar)
- Snow:** +2" below 3K ft (valleys) or +6" abv 3K ft (mtns) (medium blue bar)
- Poor Visibility:** 1/2 mile or less (darker blue bar)
- Travel Problems:** due to weather (purple bar)
- Damage, Injury or Loss of life:** ANY (magenta bar)
- Excessive Heat:** ANY (pink bar)
- Excessive Cold:** ANY (grey bar)

 At the bottom, it provides the contact information: "NWS Spokane: 1-800-483-4532". Logos for the National Weather Service and the NWS Spokane office are also present at the bottom corners.

Here is the NWS Spokane weather spotter checklist. Please provide a weather spotter report when you encounter any of this criteria.

Good Spotter Report

This is John Smith, Spotter Spokane 85 calling from my home on the South Hill. There is currently a heavy snow falling with about 1" on the ground. It began about 30 minutes ago.



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www.weather.gov/Spokane



Here is an example of good spotter report!

Good Spotter Report

This is Tom Smith, Kootenai 103. I'm currently driving along I-90 near mile marker 170. I see lots of standing water on the roadway and in the ditches. A car slid off the road. It's pouring out. I'll email you a photo when I get back home.



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Here is an example of another good spotter report!

Not Good Spotter Report

Hi there, how are you doing? Who is this?Well hi Bryce! I'm a spotter in Okanogan County. I see lightning to the north and it rained here a little bit ago. The news is saying it's much worse to the south. Are we going to get another thunderstorm?How long is it supposed to last? What's your favorite kind of weather?



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This is not a good spotter report and will need improvements. Remember to keep your reports brief and to the point.

During Hazardous Weather


**If we see severe or hazardous weather
near your location....**

**We will likely try to call and get
information on what you are
experiencing (ground truth)**



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During a hazardous weather event, NWS may call you to solicit a weather report and gain ground truth.

Spotter Resources

www.weather.gov/spokane

- Latest radar and satellite images
- Current watches, warnings, forecasts
- Latest NWS Storm Reports
- NOAA Weather Radio frequencies
- Newsletter
- Spotter Guide

Spotter Resource Page
Updated by 1/25/2011 11:58 AM Eastern Standard Time

Spotter Resource Page

[Send Spotter Reports](#)

This website is an easy method to send spotter reports online through your computer! You have to be a registered weather spotter for the Inland Northwest to gain access to the system.

[Weather Spotter Sign-up Form](#)

[Weather Spotter Checklist](#) [Training Schedule](#)

[Ways to be a Weather Spotter](#) [Virtual Training - June 2011](#)

[Weather Watcher Newsletter](#) [Latest NWS Storm Reports](#)

What is an NWS Weather Spotter?
The National Weather Service in Spokane is constantly looking for volunteers who would like to become weather spotters. Weather spotters provide us the spot weather reports - which cannot be replaced by other reports. These weather reports greatly assist the National Weather Service in determining the strength of a storm and its effects on the surrounding area.

What Kind of Weather Do Spotters Report?
Most people think weather spotters are only useful to the National Weather Service during flood-prone seasons. However, spotters are vital to the year-round operations of the National Weather Service. For example, reports of freezing rain, snow and flooding are equally useful to forecasters. Visit the local [Spokane Weather Checklist](#) to see what types of weather is important to report. For a current list of any active reports, please see the [August 2011's Spotter Storm Report](#).

Where are weather spotters needed?
The National Weather Service is always recruiting new weather spotters in all parts of the Inland Northwest. There is currently a large concentration of spotters in the bigger cities of the region like the Spokane metro area, Coeur d'Alene, Venatche, Lewiston, Moses Lake, and Pullman. There is a big need for spotters in many of the more isolated areas of the Columbia Basin and the southern Okanogan. Overall, we welcome spotters from every county across the Inland Northwest.


in eastern Washington, this includes the counties of Adams, Asotin, Chelan, Douglas, Ferry, Lincoln, Grant, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens & Whitman. **in north Idaho**, this includes the counties of Boundary, Benewah, Kootenai, Benewah, Blaine, Idaho, Nez Perce & Latah.

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You can find a list of weather spotter resources on the NWS Spokane web page. Go to the Local Programs tab on the far right and select the Spotter Program.



MetEd www.meted.ucar.edu

SKYWARN® Spotter Convective Basics
Presented by the SKYWARN Program



- **300 FREE modules**
- **Skill Levels 0-5**
- **Wide range of topics**
 - **Spotter Basics**
 - **Convective Storms**

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You can get additional weather spotter training and access to free weather classes at www.meted.ucar.edu

Email Notification

You will likely be notified the day before or the day of by email when there is a WIDESPREAD Severe Weather Risk

- Hail, Wind, Snow, Flooding, etc...
- Receive the quarterly Weather Watcher Newsletter



National Weather Service Spokane, WA

www.weather.gov/Spokane



NWS appreciate weather spotter emails. They are used to send you quarterly newsletters and to notify you on widespread severe weather risks.



Now let's review cold season hazards.

Heavy Snow



Heavy Snow!
4"+ in 12 hours
6"+ in 24 hours

Please Report:
First Snow of the Season
Then at least 2" new snow



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Please report the first snow of the season. Then at least 2" of new snow. Keep in mind: Heavy snow is 4"+ in 12 hours and 6"+ in 24 hours in most valley locations. Mountains have higher criteria.

What Criteria Must Be Met To Be Considered a BLIZZARD?

WIND
35 mph or greater

BLOWING SNOW

VISIBILITY
1/4 mile or less

TIME
At least 3 hours

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A blizzard has specific criteria that include: winds 35 + mph, causing blowing snow with visibility of 1/4 mile or less and lasting at least 3 hours. The snow will be fine and dry and usually accompanied by very cold air. These type of conditions are not very common in the Inland NW.

Mixed Precipitation

- Freezing rain or drizzle
- Sleet
- Snow changing to rain
- Ice accumulation over $\frac{1}{4}$ inch = Ice Storm Warning!



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Mixed precipitation is any time the precipitation changes type: including freezing rain or freezing drizzle, sleet, snow changing to rain or rain changing to snow, any ice accumulation. Keep in mind $\frac{1}{4}$ inch of ice accumulation is an Ice Warning.

Strong or Damaging Winds

- Report any winds estimated to be over 30 mph
- Winds that produce any damage
- Severe/high winds \geq 58 mph



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Report any wind damage or winds estimated to 30 mph or greater. Keep in mind severe or high winds are 58 mph or greater (50 knots +).

Strong or Damaging Winds

Stay indoors & away from windows if straight-line damaging winds are in your area. Wind damage can be just as destructive as an EF-1 tornado.



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During extreme wind events, stay indoors and away from windows. Wind damage from straight line winds can be as destructive as an EF 1 tornado. Remember November 20, 2015.

Don't have a weather station?

Not to worry...

Use the
Beaufort Wind Chart
to estimate wind speeds

 National Weather Service Spokane, WA

Beaufort Number	MPH		Terminology	Description
	Range	Average		
0	0	0	Calm	Calm. Smoke rises vertically.
1	1-3	2	Light air	Wind motion visible in smoke.
2	4-7	6	Light breeze	Wind felt on exposed skin. Leaves rustle.
3	8-12	11	Gentle breeze	Leaves and smaller twigs in constant motion.
4	13-18	15	Moderate breeze	Dust and loose paper is raised. Small branches begin to move.
5	19-24	22	Fresh breeze	Smaller trees sway.
6	25-31	27	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult.
7	32-38	35	Near gale	Whole trees in motion. Some difficulty when walking into the wind.
8	39-46	42	Gale	Twigs broken from trees. Cars veer on road.
9	47-54	50	Severe gale	Light structure damage.
10	55-63	60	Storm	Trees uprooted. Considerable structural damage.
11	64-73	70	Violent storm	Widespread structural damage.



You don't need weather equipment to be a weather spotter. You can estimate wind speeds by using the Beaufort Wind Scale.

Heavy Rain

- Report heavy downpours or long periods of rain
- 0.50"+ in 1 hour - convective
- 1"+ in 12 hours or
- 1.5"+ in 24 hours - stratiform



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Give reports of heavy downpours or long periods of rain.

Flooding & Ice Jams

Rising water on rivers, streams & low lying areas



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Give reports of flooding on rivers, streams or low lying areas, and especially if it associated with ice jams.

Mud & Debris Flows

Water-saturated rock, mud & debris
moving down a slope



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Too much rain may lead to mud and debris flows, especially in an area that has seen recent wild fire activity.

Typical Winter Storm Scenario

- Cold air in place over the Inland Northwest
- Mild Pacific air rides over the cold air
- Precipitation begins as snow, gradually changes to rain with possible freezing rain

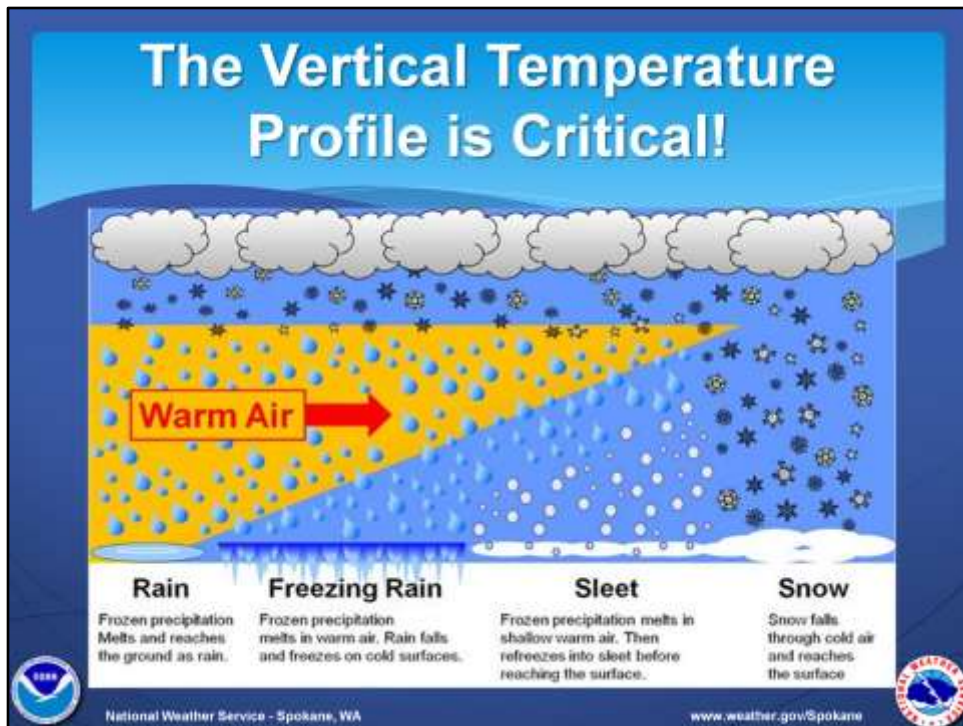


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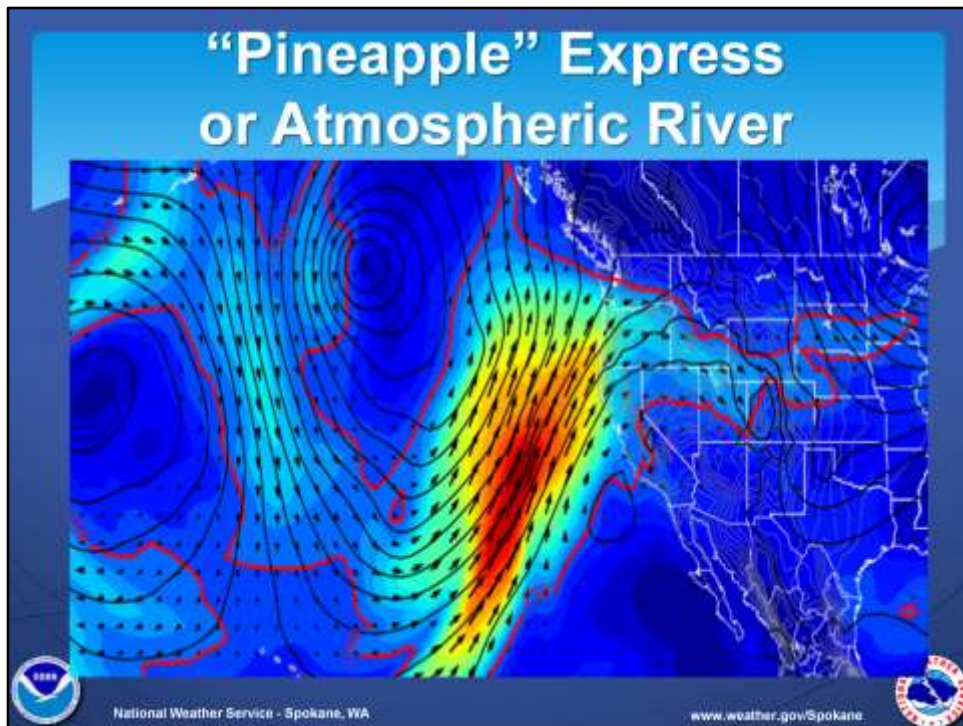
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Here is a typical winter storm scenario. Cold air is in place over the Inland NW. Mild Pacific air rides over the cold air. Precipitation begins as snow, gradually changes to rain with possible freezing rain.



Knowing the freezing level and warm layers in the atmosphere is important to understanding the precipitation type.



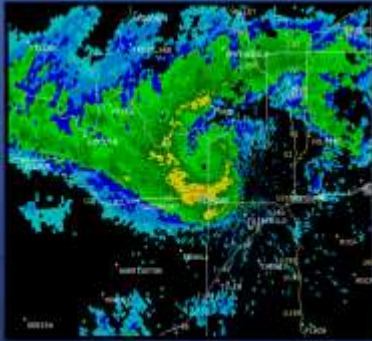
A Pineapple Express or Atmospheric River is a stream of mild moist Pacific air that moves into the region.



Atmospheric rivers bring an abundance of precipitation, mainly rain and high mountain snow, along with wind, breezy winds, and possible flooding.

Small Scale Unstable Low

- Form Behind Strong Cold Fronts
- Not well forecast by models
- Potential for ~1 ft of snow in a short time
- Spotter play a BIG role with reports



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Cold small scale low pressure system can form behind strong cold front. They are not well forecast by the weather models and can give localized heavy snow to a region.



Thunderstorm hazards can occur in every season.

Thunderstorms



3 Ingredients

- Moisture
- Instability
- Lift



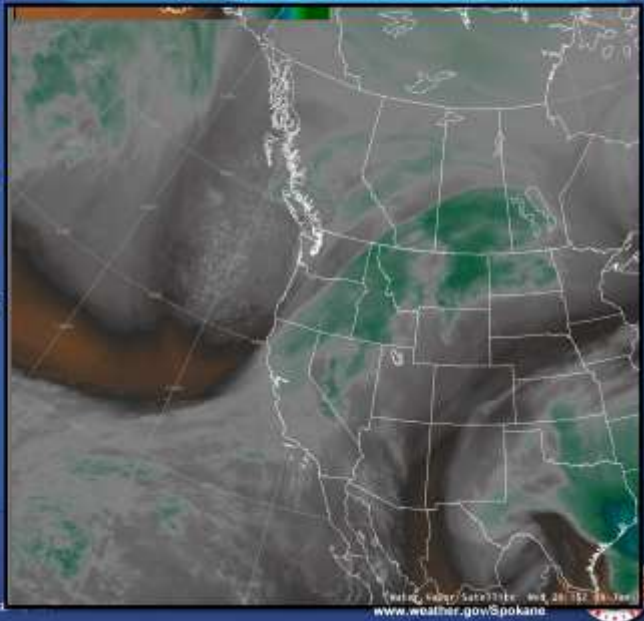
There are three ingredients needs for thunderstorms: moisture, instability and lift.

Ingredient 1: Moisture

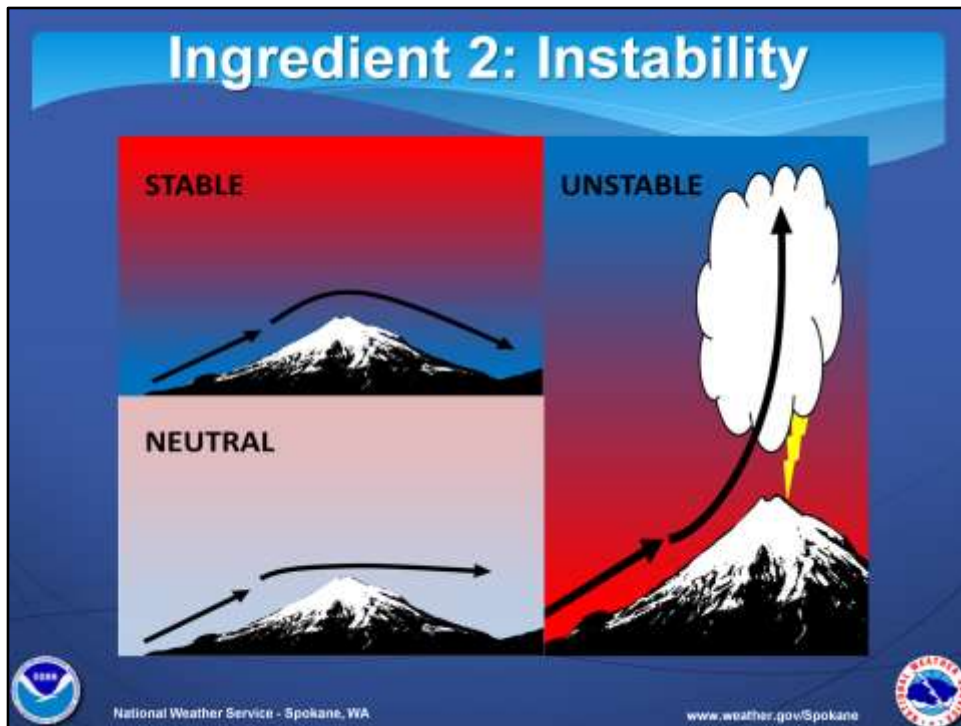
Most often
our moisture
comes from
the Pacific



National Weather Service - Spok



Moisture typically come from the west southwest – the Pacific ocean.

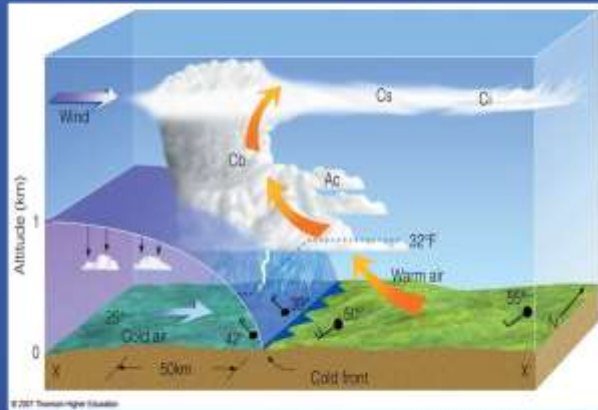


The greater the temperature difference, the greater the instability. Remember from last class the greater the environmental lapse rate the more a parcel will accelerate upward.

Ingredient 3: Lift

Lift from a Cold Front

- Colder, more dense air pushes under warmer, moist air – forms clouds
- Air converges along the boundary – forces it to rise



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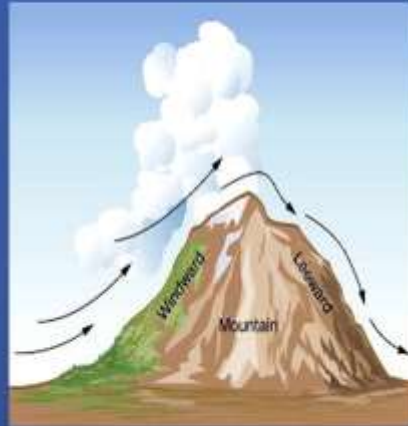


Cold fronts have a steeper and a round blunt end along the leading edge of the front, which helps push the surface air farther up and faster compared to a warm front.

Ingredient 3: Lift

Lift from Mountains

- Air rises on the WINDWARD side of a mountain – forming clouds
- Air descends on LEEWARD side of a mountain – drying & warming the air.
- Wind direction determines precipitation

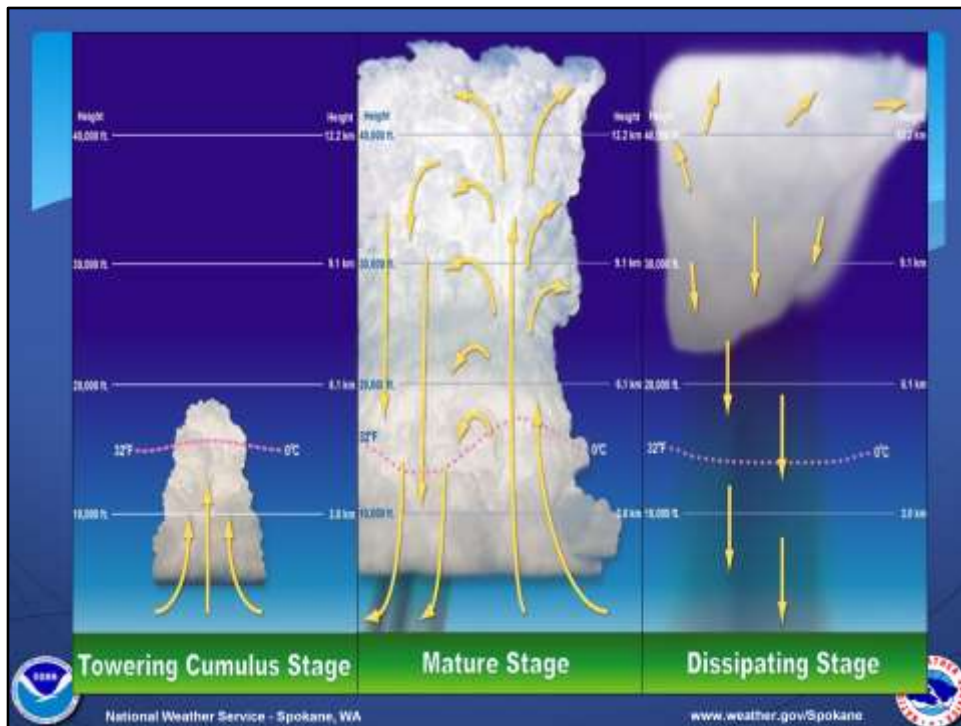


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Stable air being pushed up a mountain range will precipitate along the windward side, due to cooling as the air parcel expands. On the leeward side the air parcel sinks and warms due to compression. That is why Lowell Idaho gets around 40 inches of rain per year and Hamilton only gets about 14 inches. But with the environment is unstable, the terrain helps lift the air parcel and it will continue to rise.



There are three stages with a typical thunderstorm. In the beginning, the towering cumulus stage is made up of an updraft. The mature stage contains both the updraft and downdraft and produces the heavy rain, hail and gusty winds at its peak. The dissipating stage is dominated by a downdraft and has gusty winds and rain.

What is a Severe Thunderstorm?



WIND
≥58 mph



Or



HAIL
≥1" in diameter



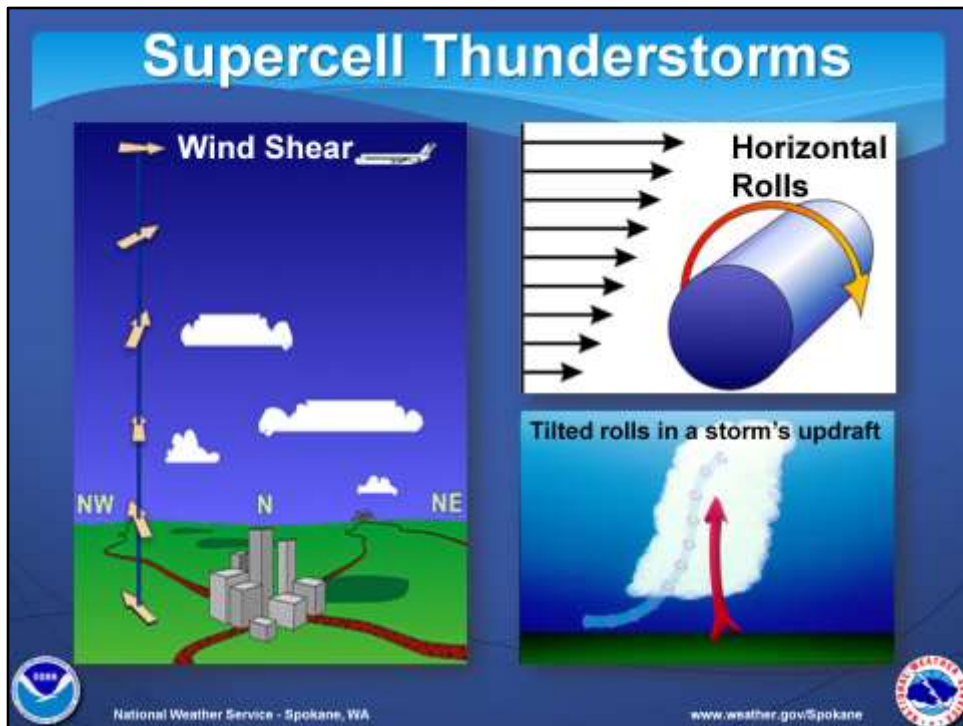
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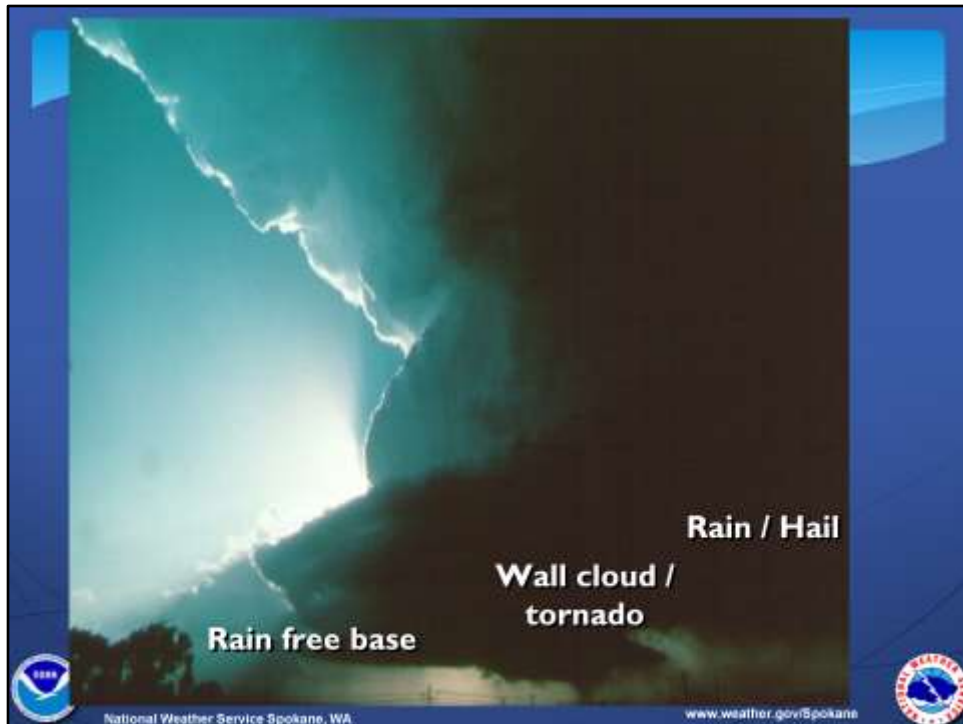
A severe thunderstorm is described as one that produces winds in excess of 58 mph and/or hail 1" in diameter.



Supercells are not your ordinary thunderstorms. They are complex thunderstorms that rotate, last for a long period time and can produce tornadoes.



Supercell thunderstorms contain wind shear. This is the change of wind speed and direction with height in the atmosphere. This difference in winds causes horizontal rolls in the atmosphere, which can be tilted in the vertical in a storm's updraft.



These highly organized thunderstorms are able to sustain an updraft and downdraft for a long period of time because both are tilted in the vertical. They will have a well defined rain free base for the updraft and a rain shaft behind. At the interface of the two, there will be a lowering cloud that rotates. This would be the mesocyclone which would be the location of a wall cloud and possible tornado.

How are tornadoes measured?

The Enhanced Fujita Scale

EF-Scale	Speed
EF0	65-85 mph
EF1	86-110 mph
EF2	111-135 mph
EF3	136-165 mph
EF4	166-200 mph
EF5	>200 mph



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Tornadoes are measured and classified by the EF scale based on their destruction.

Tornadoes

Typical Inland Northwest Tornado

- Less than 5 minutes on the ground
- 100 yards in diameter
- ¼ mile track
- Wind speeds of 85-115 mph



Yes, tornadoes do occur across the Inland NW. They are small, typically EF0 to EF1. Roughly 3 to 5 tornadoes occur across the region each year.

Are Funnel Clouds tornadoes?

- Funnel clouds stay aloft
- Tornadoes reach the ground

In doubt, check the ground for debris



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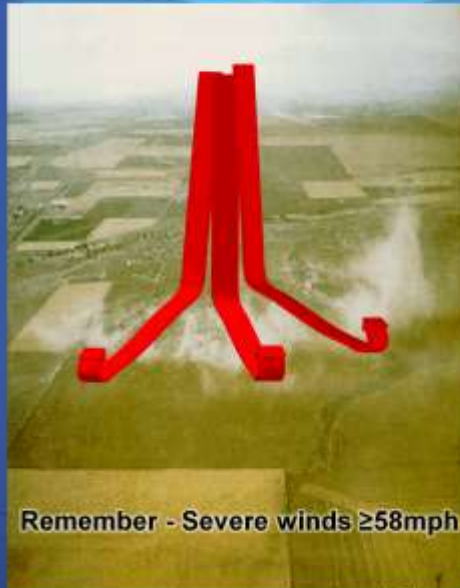
www.weather.gov/Spokane



Funnels clouds stay aloft and tornadoes touch in the ground. When in doubt, check the ground for debris.

Microbursts & Straight Line Winds

- A downdraft or rain can drag strong winds down
- Evaporation can cool a parcel of air causing it to become heavier (more dense)
- Accelerates at the speed of gravity



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Microbursts produce strong outflow winds and the cooler dense air falls to the surface.

Hail

- Strong updraft keeps large chunks of ice aloft
- Circulated within a thunderstorm
- Collects layers of water and freezes
- Can fall to the ground at >100 mph

Hail Formation

Hail now too large to hold in cloud: falling to earth causing strong cold downdraught

Hail growing in circulating convection currents

Freezing Level

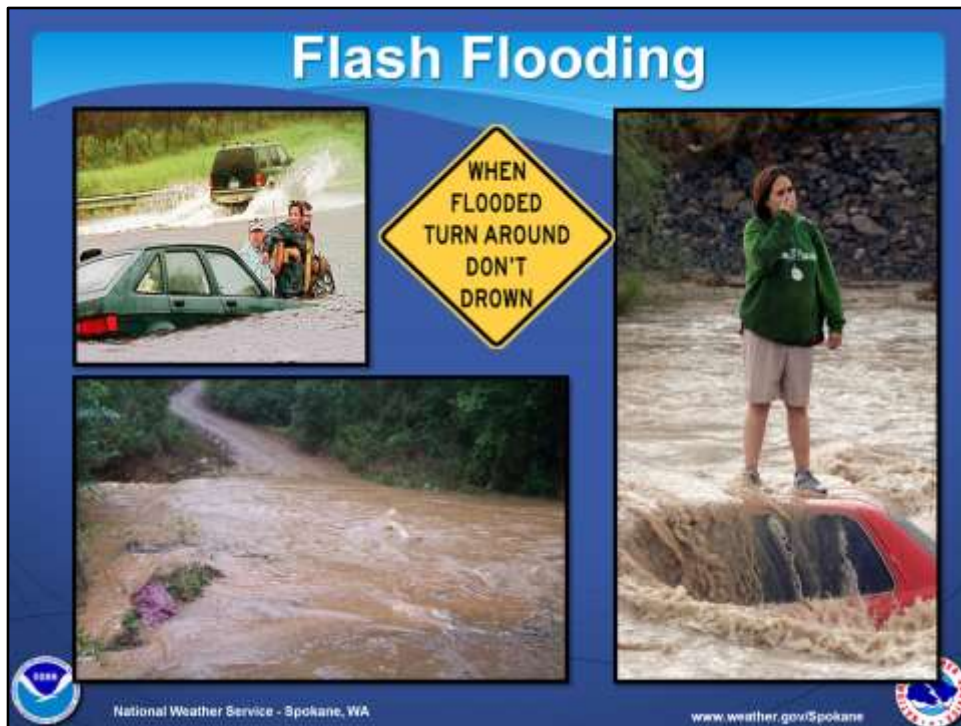
Rain drops being sucked into the updraft

Remember- severe hail $\geq 1''$ diameter

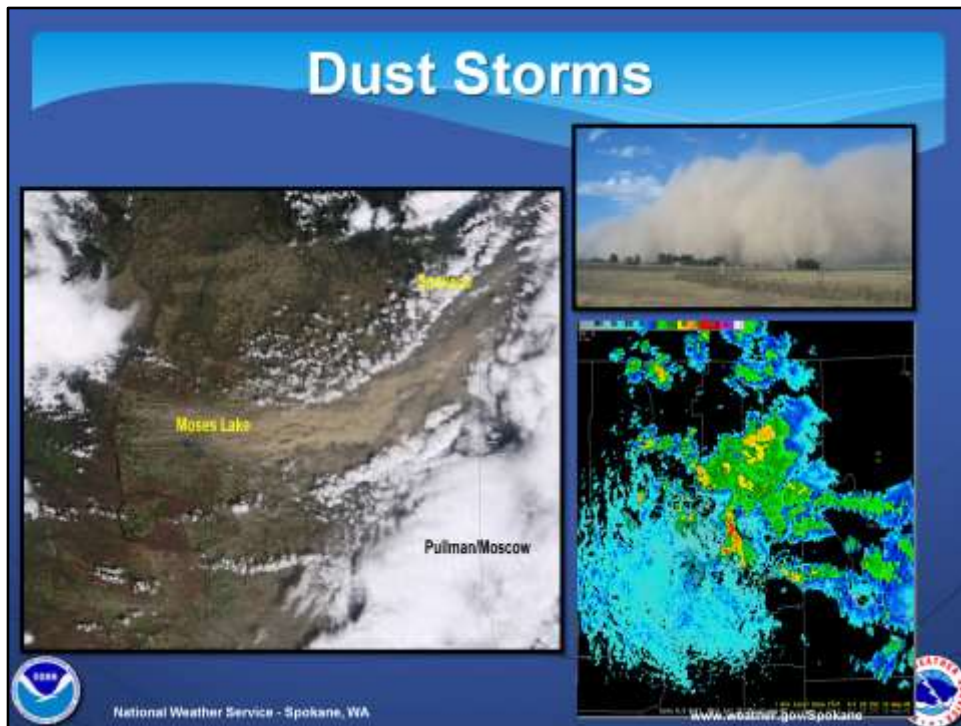
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Hail grows in a thunderstorm as it rotates through the updraft and downdraft of a thunderstorm. The stronger the updraft, the larger the hail.



Flash flooding is deadly and occurs during heavy thunderstorm rains. When you encounter water covered roadways, turn around – don't drown.



Strong thunderstorm outflows can produce clouds of dust or dust storms that lower visibilities to less than a mile.



Lightning forms from electric charge separation in a growing thunderstorm. The more frequent the lightning, the stronger the thunderstorm. You can estimate how far away a thunderstorm is by counting the seconds between the flash and the bang.



Lighting can be deadly. Go indoors when lightning is observed. If outdoors, seek shelter away from trees, tall objects and water. If you feel your hair stand on end, cover your head and drop immediately to the ground.

Weather Spotter Safety

- **Personal Safety - #1 priority**
- **Adhere to ACES concept**
 - Awareness, Comms, Escape Route, & Safe Zone
- **Be extra careful at night**
- **Never put yourself in harm's way.**
 - Don't drive through flooded roadways
 - Don't travel through downed power lines
 - Don't be too near fallen objects or structures
- **Stay current on the weather**



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Remember to be safe when observing severe or hazardous weather. Your personal safety is the #1 priority.



The National Weather Service has many ways to get the word out on severe or hazardous weather.

Weather Warnings

- Tornadoes
- Severe Thunderstorms
- Flooding
- Snow, Ice, & Cold
- Wind
- Fire
- Freeze



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Weather warnings are issued for different types of weather. They are used with severe or hazardous weather is likely to occur and pose a threat to life and property.

NWS Terminology

National Weather Service
Outlook / Watch / Warning Terminology

Increasing confidence that event will occur

Time To Onset of Event (Hours)

96 48 24 0

National Weather Service - Spokane, WA

- **Watch:** Weather conditions are favorable, but not imminent, for severe weather or flooding
- **Warning:** Severe weather or flooding is imminent or already occurring
- **Advisory:** Inconvenient weather or minor nuisance flooding is expected, but in most cases not anticipated to adversely affect plans.

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The NWS uses different terms to express the confidence, timing and threat with severe or hazardous weather.

Staying Informed NOAA Weather Radio

- Continuous operation.
- Battery backup capable.
- Handheld device great for outdoor activities.
- Can drive across the country and get info anywhere along path.

An illustration of a white NOAA Weather Radio with a blue antenna and a large blue speaker. A white speech bubble with the word "Danger!" in red text is coming from the speaker. The radio is set against a dark blue background.

National Weather Service - Spokane, WA

www.weather.gov/Spokane

The NWS issues forecasts and warning on the NOAA Weather Radio. You will need a special weather band radio to receive this broadcast or a special smartphone app. Special radios can alert when a weather warning is issued for your area.

Staying Informed NWS Spokane Web Page

NATIONAL WEATHER SERVICE
NWS Forecast Office Spokane, WA

27°F
-1°C

Dry & cool work week

Click a location below for detailed forecast

Detailed Forecast	
Tuesday	Partly freezing fog after 10pm; mostly cloudy with a low around 21; calm wind.
Wednesday	Partly freezing fog before 11am; partly sunny; then gradually becoming sunny with a high near 34; northeast wind 3 to 8 mph.
Wednesday Night	Clear with a low around 30; northeast wind 3 to 5 mph.
Thursday	Sunny with a high near 32; northeast wind 3 to 5 mph.
Thursday Night	Mostly clear with a low around 17; light northeast wind.
Friday	Sunny with a high near 33.
Friday Night	Partly cloudy with a low around 21.
Saturday	A chance of flurries after 11am; mostly cloudy with a high near 34.
Saturday Night	Mostly cloudy with a low around 20.
Sunday	A slight chance of snow before 2pm, then a slight chance of rain and snow between 2pm and 5pm, then a slight chance of rain after 5pm; mostly cloudy with a high near 36; chance of precipitation is 20%.
Sunday Night	A chance of rain and snow; cloudy with a low around 20; chance of precipitation is 30%.
Monday	A chance of rain and snow; cloudy with a high near 37; chance of precipitation is 30%.
Monday Night	A chance of rain and snow; cloudy with a low around 20; chance of precipitation is 30%.
Tuesday	A chance of rain and snow; cloudy with a high near 37; chance of precipitation is 30%.

Learn More Spokane Tue, Dec 4, 2013 at 4:52:28 pm PST

National Weather Service - Spokane, WA www.weather.gov/Spokane

The NWS Spokane web page is a good source for weather and water information.

Staying Informed On Your Phone!





Mobile.Weather.gov
Smart Phone Enabled



Type in desired
location
Hit 'Go'



Up pops current
conditions, hazards,
and forecast



Can add this website
to your 'Home' screen
for quick access



Home Screen



National Weather Service - Spokane, WA


www.weather.gov/spokane



You can get a NWS forecast app for your smartphone. Simply go to mobile.weather.gov. Type in your location. Hit Go. The forecast appears. Add this website to your 'Home' screen for quick access. It puts a NWS widget on your phone.

Staying Informed

FEMA App



Receive alerts from the National Weather Service for up to five locations.

Get safety reminders, read tips to survive natural disasters, and customize your emergency checklist.

Locate open shelters and where to call to FEMA in person (or on the phone).

Upload and share your disaster photos to help first responders.

National Weather Service Spokane, WA

www.weather.gov/Spokane

FEMA has a great app that receives alerts for the NWS. It also provide safety reminders and can locate the nearest shelters when an emergency strikes your area.

Other Ways to Get Involved

- Weather Spotter
- Join the Community Collaborative Rain, Hail, and Snow Network
- Join the Citizens Weather Observers Program
- Visit the NWS Office



National Weather Service - Spokane, WA

www.weather.gov/spokane



Besides being a weather spotter, there are other volunteer opportunities through the National Weather Service.

Volunteers report their daily observations on
our interactive website:
www.cocorahs.org

Once trained, our volunteers collect data using low-cost measurement tools

4-inch diameter high capacity rain gauges

Community Collaborative Rain, Hail, & Snow Network

Reports received today 6/18/2017 as of 4:05 PM EDT

Units	North	Mid	South	East	West	ST
0.229	112	9	1	1	1	1

www.weather.gov/Spokane

National Weather Service - Spokane, WA

The Community Collaborative Rain, Hail and Snow network is a program where you can report precipitation daily. You will need to acquire a rain gauge. Use the web site www.cocorahs.org to register, receive extra training and acquire a rain gauge.

Rain Measurements

- Getting a Rain Gauge – www.weatheryourway.com
- Set it up in an open area, preferably away from trees
- Reading a Rain Gauge



National weather service logo

The surface of the water in the gauge looks curved. How do I know where to read?

As water fills up the measuring tube, a curved surface is formed called a **meniscus**. This meniscus is formed by the surface tension of a liquid in contact with the sides of the tube.



Always read the bottom of the **meniscus** when the making your daily rain measurements.

Once you get a rain gauge, you set it up in your yard and give daily reports on the web page. Measuring rain is easy.

Snow Measurements

- **Snowfall:**
New snow in tenths of an inch
- **Snow water equivalent (SWE):**
Melted snow from the gauge
- **Snow depth:**
Total of new & old snow on the ground



National Weather Service Spokane



Winter time can be tricky with snow. There at least 3 different measurements to take, including: snowfall, snow water equivalent and snow depth.

Citizen Weather Observers Program CWOP



www.wxqa.com

- Have a weather station and want to share data online
- Has a PC and Internet access
- Register Online & Receive a weather station ID
- Transmits data every 15 mins

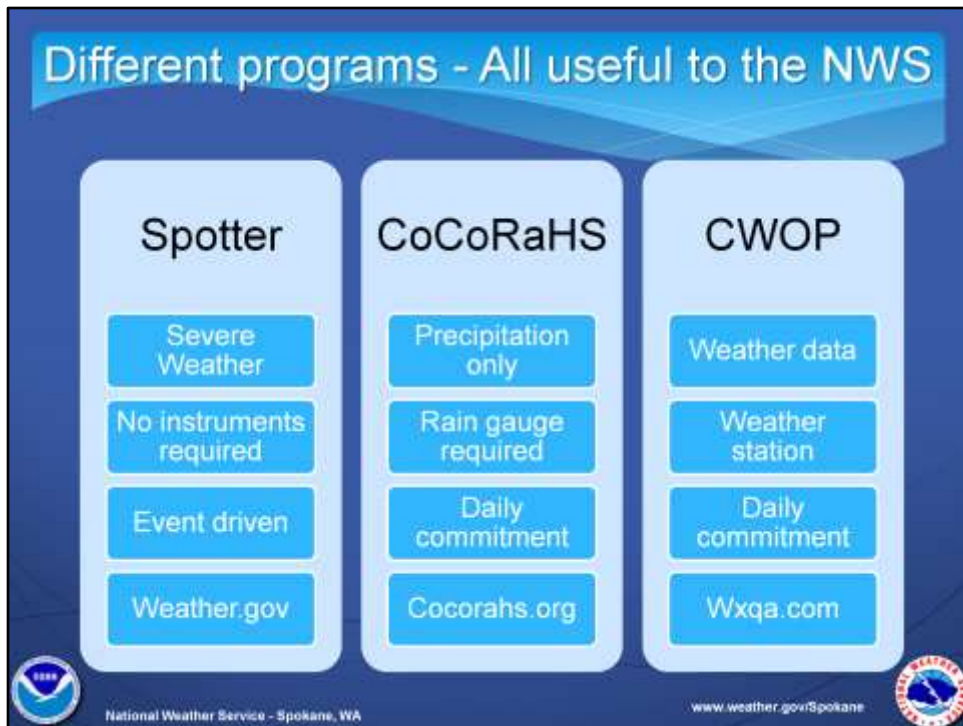


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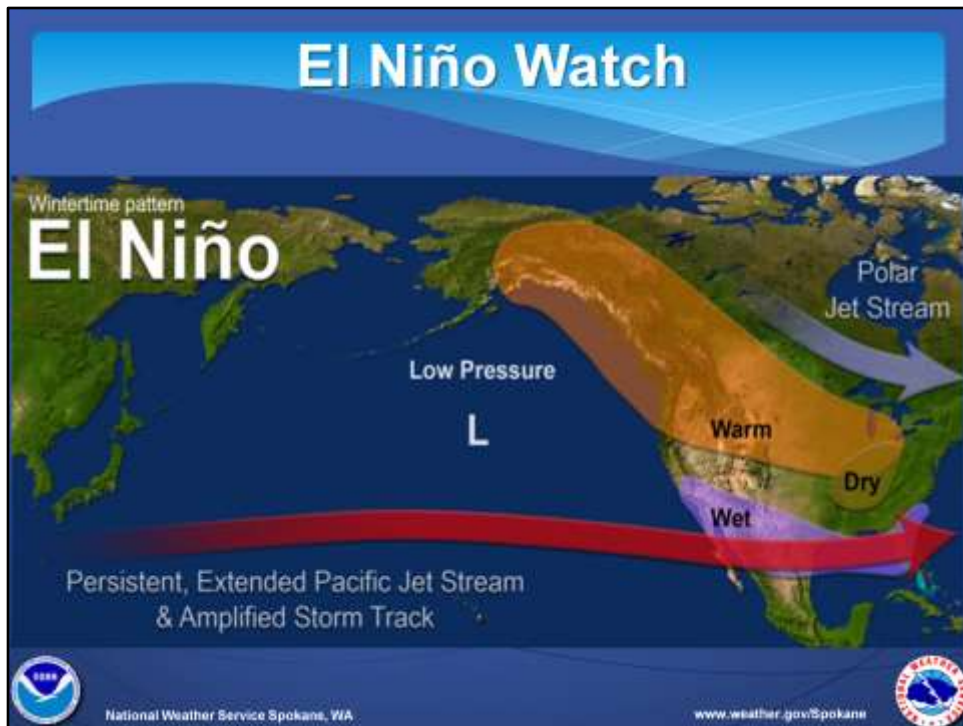
If you are a weather enthusiast and have a weather station, you can hook it up online and share your weather data on the internet. The NWS can access private weather data through www.wxqa.com



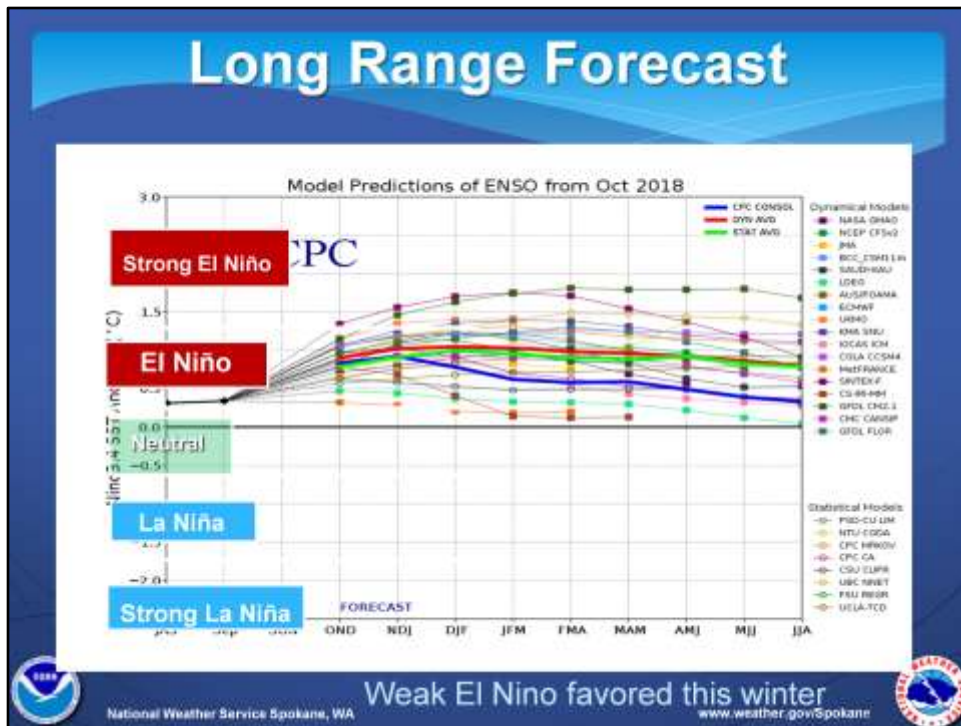
Each of these programs are different but important to the National Weather Service.



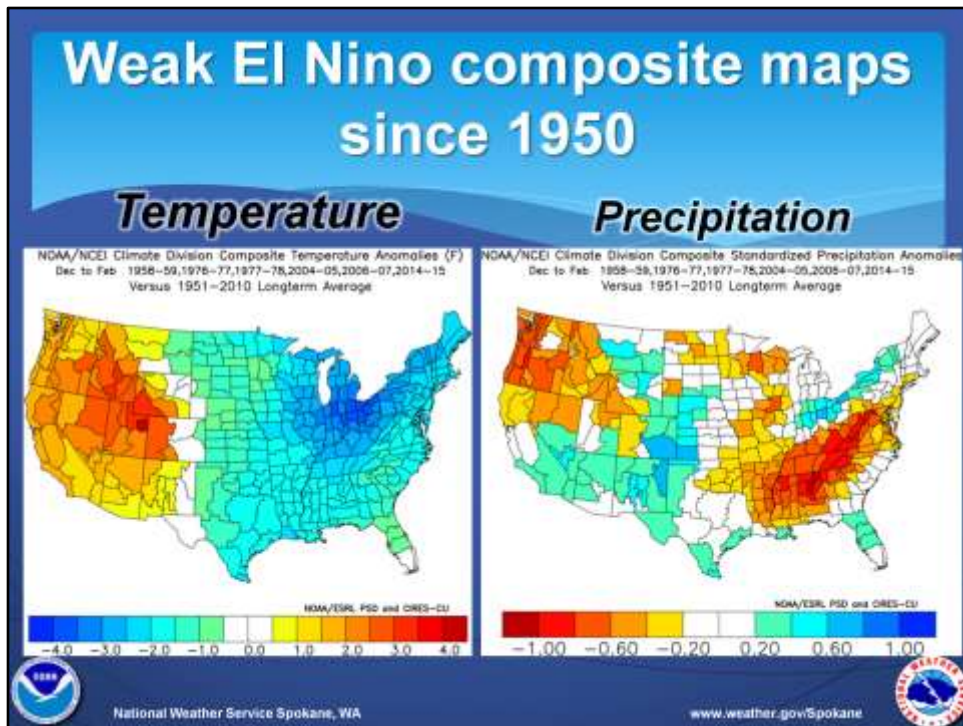
Now it's time for the Winter Outlook for 2018-19.



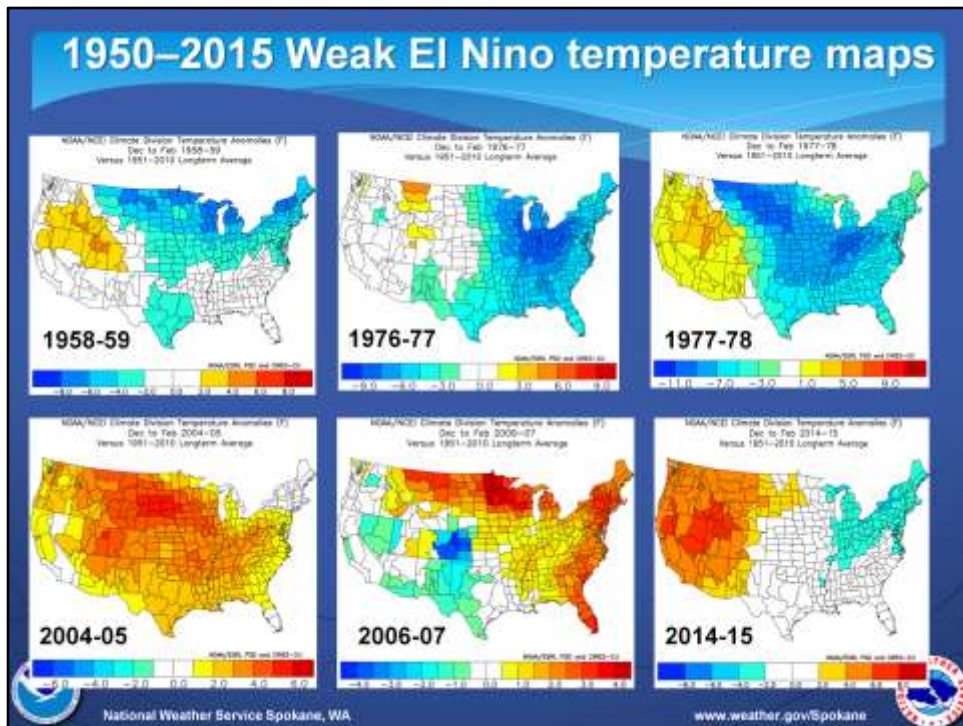
An El Niño Watch has been issued for this winter and spring. El Niño tends to bring a strong westerly jet into California and southern states, while the Inland NW remains mild and drier.



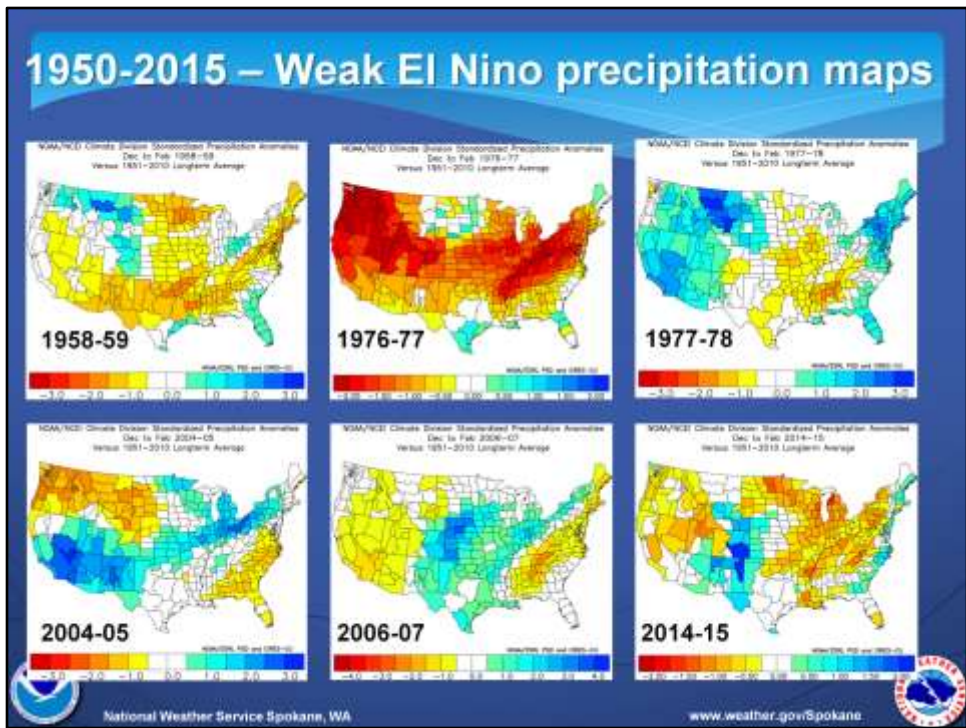
The majority of the seasonal weather models indicate a weak El Niño is favored for this winter.



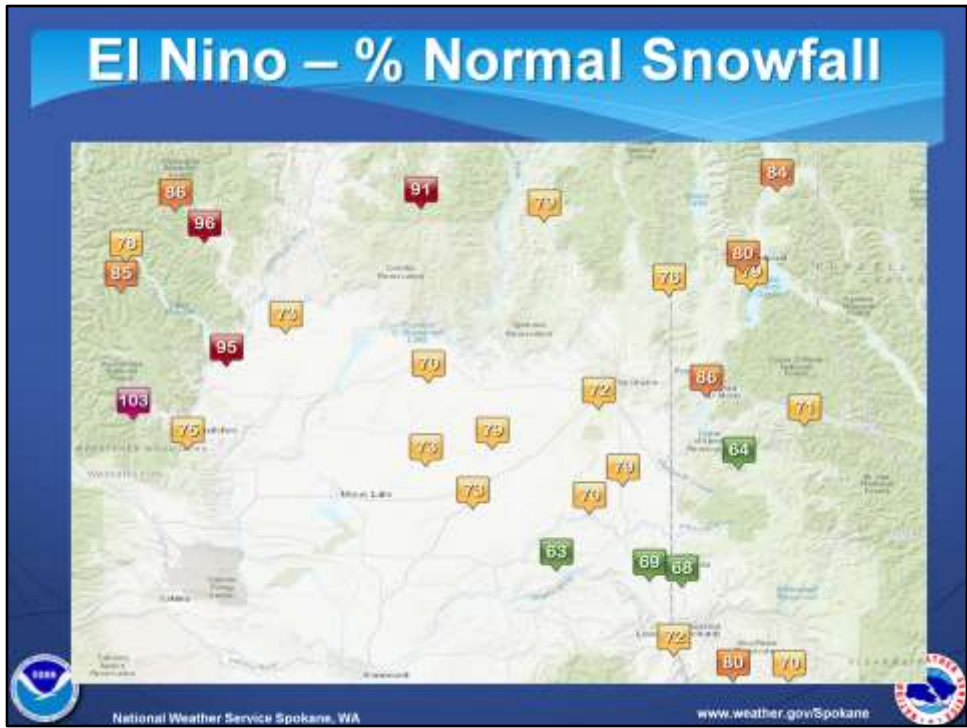
Several weak El Nino winters have occurred since 1950, and they tend to average above normal temperatures and below normal precipitation.



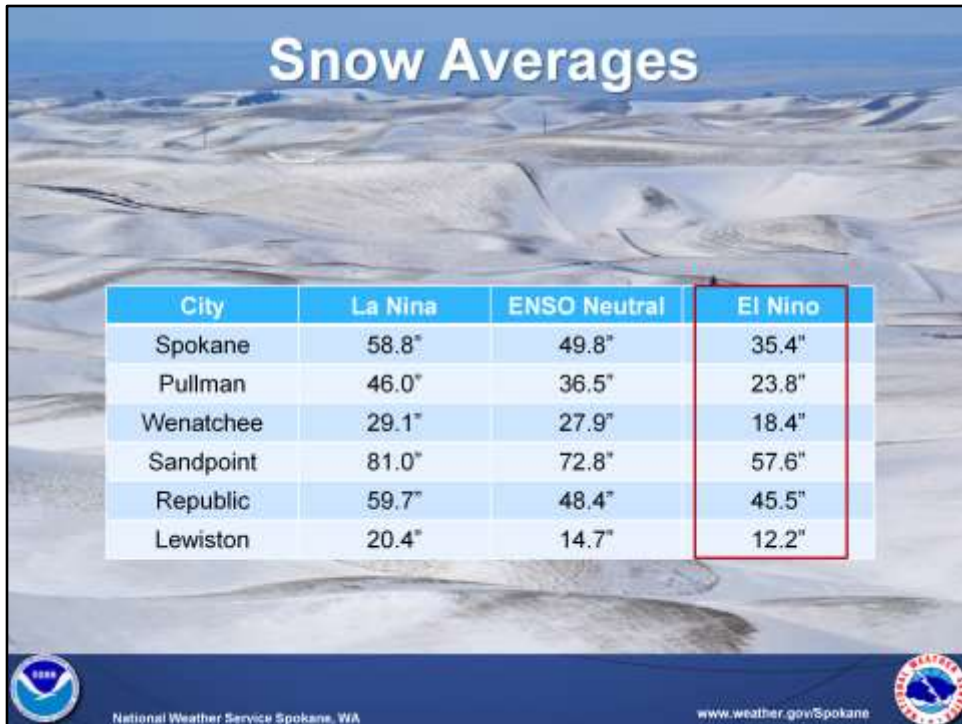
Here is a list of weak El Nino winters through the years and how the trended temperatures during each one with near to above normal temperatures.



Precipitation trends have not been so clear during the past weak El Niño winters. In the late 50s and 70s, there was above normal precipitation. Although since 2000, weak El Niño have had below normal precipitation.



Here is a map that shows the percentage of normal snowfall for El Niño winters across the Inland NW>



Here are snow averages at many locations across the region, comparing amounts from La Nina to ENSO Neutral and El Nino.

El Nino 2004-05 significant weather events

January 2005 – Entiat Ice Jam, Stehekin Flooding



Entiat Ice Jam



National Weather Service Spokane, WA



Stehekin Flooding



National Weather Service Spokane, WA

Keep in mind that hazardous weather is possible during El Nino winters, as in the winter of 2004-05.

El Nino 2006-07 significant weather events

Dec 14-15 2006 – **Windstorm**

Downed trees and powerlines across region. Priest Rapids Dam 82 MPH wind gust, 56 MPH Spokane



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In the winter of 2006-07, there was a strong wind storm.

El Nino 2014-15 significant weather events

January 2015 – Leavenworth Ice Storm



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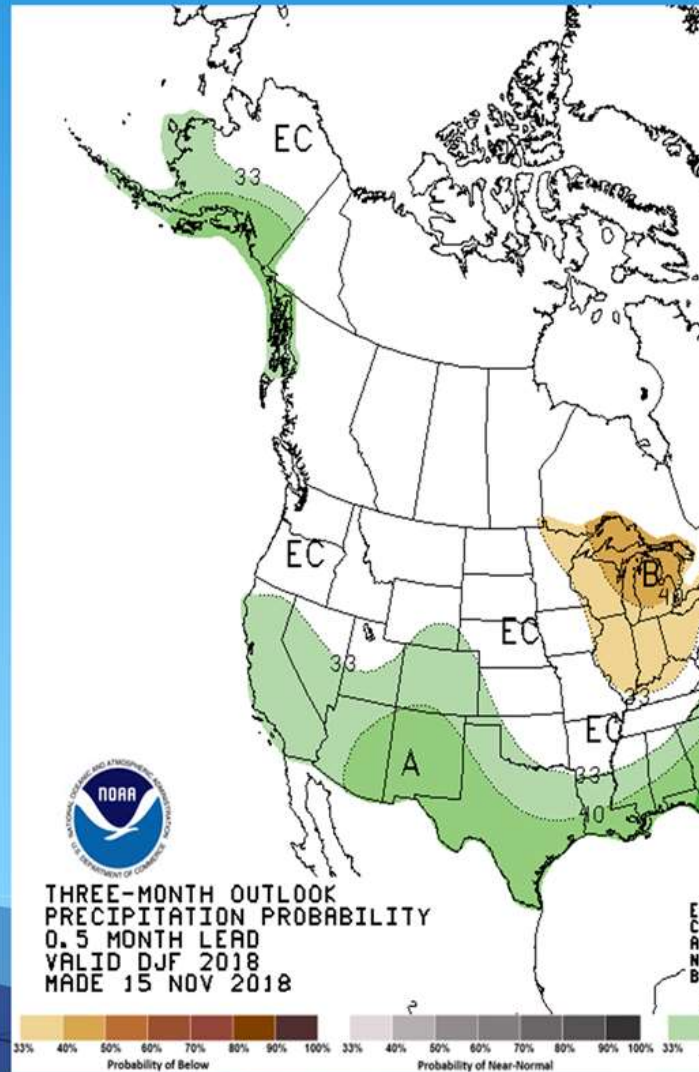
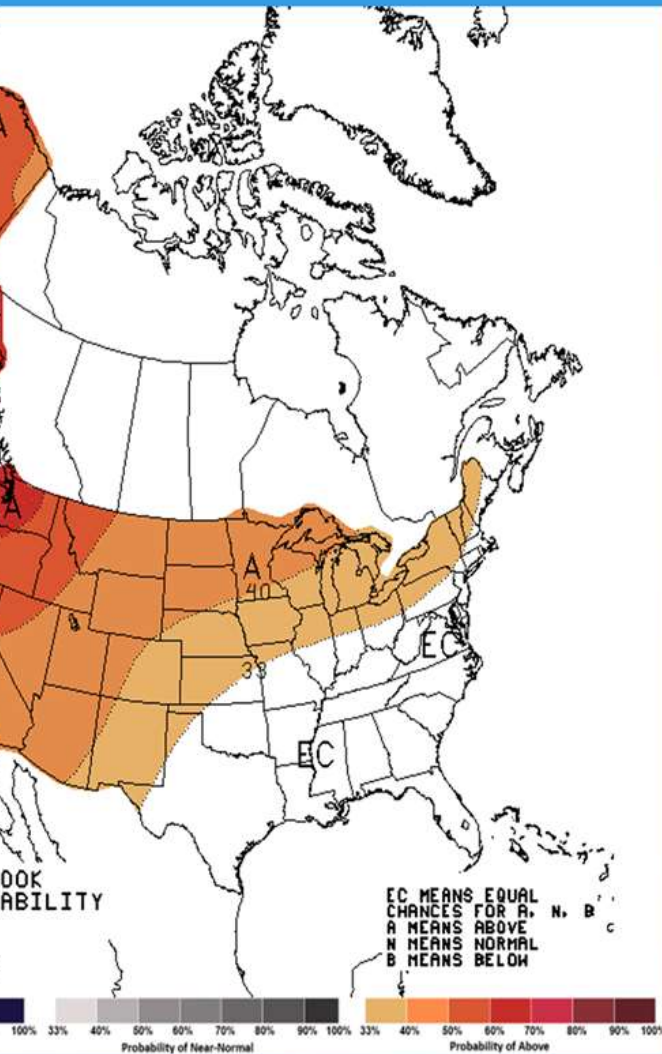
www.weather.gov/Spokane



In the winter of 2014-15, there was an ice storm.

Seasonal Outlook

December – January - February



WEATHER SERVICE SPOKANE, WA
SPHERIC ADMINISTRATION

<http://www.cpc.ncep.noaa.gov>

The 8-14 Day Outlook from the Climate Prediction Center calls for elevated odds of warmer and drier than normal for December through February.

Overview

- * Warmer than normal favored
- * Drier than normal slightly favored (low confidence)
- * Below normal snowfall favored

*****Significant events (short duration) such as flooding, wind storms, ice storms are possible even during El Nino years*****



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The Winter 2018-19 overview leans toward warmer than normal temperatures, drier than normal precipitation slightly favored and below normal snowfall. Keep in mind significant events such as flooding, wind storms, ice storms are possible during El Nino years, making weather spotting important.



If you have any questions, please email nws.spokane@noaa.gov

To Register as a weather spotter, the NWS Spokane will need your contact information.

Please email the information on this form to nws.spokane@noaa.gov

Once received, NWS Spokane will assign you a weather spotter ID based on your location. It will be emailed to you.



National Weather Service Spokane

Weather Spotter Sign-up Form

Please fill out the following form with as much information as possible. Pay particular attention to the hours we may call you as hazardous weather may occur at any time of day.

Date of Training: _____

Name: _____

Address: _____

City, State, Zip: _____

County: _____

Email: _____

1st phone# _____ (H/CW) 2nd phone # _____ (H/CW)

Amateur Radio License? If yes, your call sign: _____

Distance & direction from nearest town; detailed information of your location (Especially if you have a PO Box)

If the need arises, may we call you anytime day or night or only during certain hours?

Do you have any weather equipment?

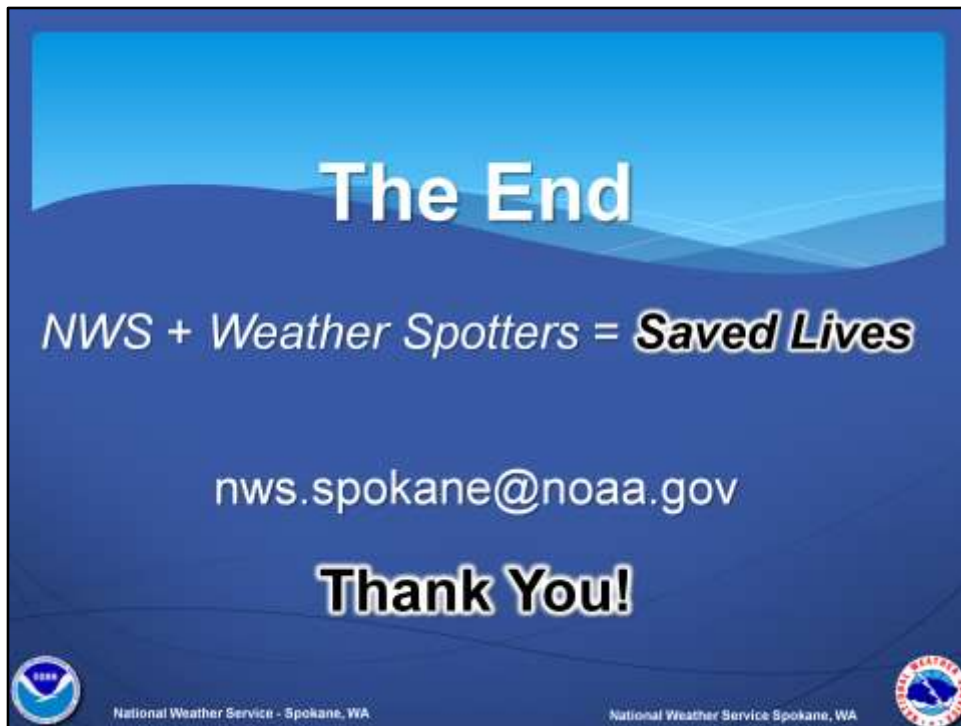
Thanks for your interest in the NWS weather spotter Program!
For additional information on weather spotters, please see our web page at https://www.weather.gov/otz/Spotter_Resource_Page



To Register as a weather spotter, the NWS Spokane will need your contact information. Please email the information on this form to [**nws.spokane@noaa.gov**](mailto:nws.spokane@noaa.gov) . Once received, NWS Spokane will assign you a weather spotter ID based on your location. It will be emailed to you.



Congratulations! You have completed the Basic Weather Spotter course at NWS Spokane.



Remember, NWS plus weather spotters equals saved lives. Please email any questions or information to nws.spokane@noaa.gov. Thank you!