

CoCoRaHS Snow Measurements



Fall 2021
National Weather Service
Spokane, WA



NATIONAL WEATHER SERVICE
NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION

Spokane, WA

www.weather.gov/spokane



This is a Live Virtual Class

- Voice in Computer - no phone needed - headphones helpful
- All are in listen mode until the end

New to GoToWebinar? Here's the basics

the Menu bar

- Audio – tests your volume
- Attendees – all in attendance
- **Poll** – answer poll questions
- **Questions** – type in a question for the speaker to answer
- **Handouts** – download & print
- Chat – speaker's comments
- Click on the **Hand** to raise
- Click orange arrow to collapse window



Objectives



- Understand the importance of the Precipitation Observations
- Learn how to take accurate rain and snow reports
- Learn how to prepare and be safe during hazardous weather
- Receive the Winter Outlook 2021-2022

Now let's look back at last year.....



October 23-24, 2020 - Early Snowfall



A few snow reports:

8.0" Malo

7.0" Colville

6.9" Spokane

5.0" Newport

5.0" Dover

3.0" Spirit Lake

2.0" Palouse



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November 13-14, 2020 - Snow



A few snow reports:

12" Colburn

11.5" Elmira

9" Careywood

7.5" Dover

7" Newport

6" Mazama

3.9" NWS Spokane



Newport, WA



January 11-13 - Snow



A few snow reports:

13.9" Lucerne

7.5" Leavenworth

7" Entiat

5.1" Republic

4.5" Boyds

2.5" Clayton



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To our current CoCoRaHS observers..



**THANK
YOU!**



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Community Collaborative Rain Hail and Snow Network

- NWS Partner
- Fort Collins, Colorado
- Manages sites all over North America
- Began in WA/ID 2008 - 13 year!!!

What is CoCoRaHS?

CoCoRaHS is a national grassroots, non-profit, community-based, high-density precipitation network ...

... made up of volunteers of all ages and backgrounds



... who take daily measurements of precipitation right in their own backyards



National Weather Service (NWS)



- Part of the Federal Government – Dept of Commerce
- Responsible for all weather/water Watches & Warnings
- 126 offices across the country
- Works with local agencies
- Observe & Forecast
- “Behind the Scenes”
- Decision Support
- Preparedness & Education

Issue Weather and Water watches/warnings for the protection of life and property.



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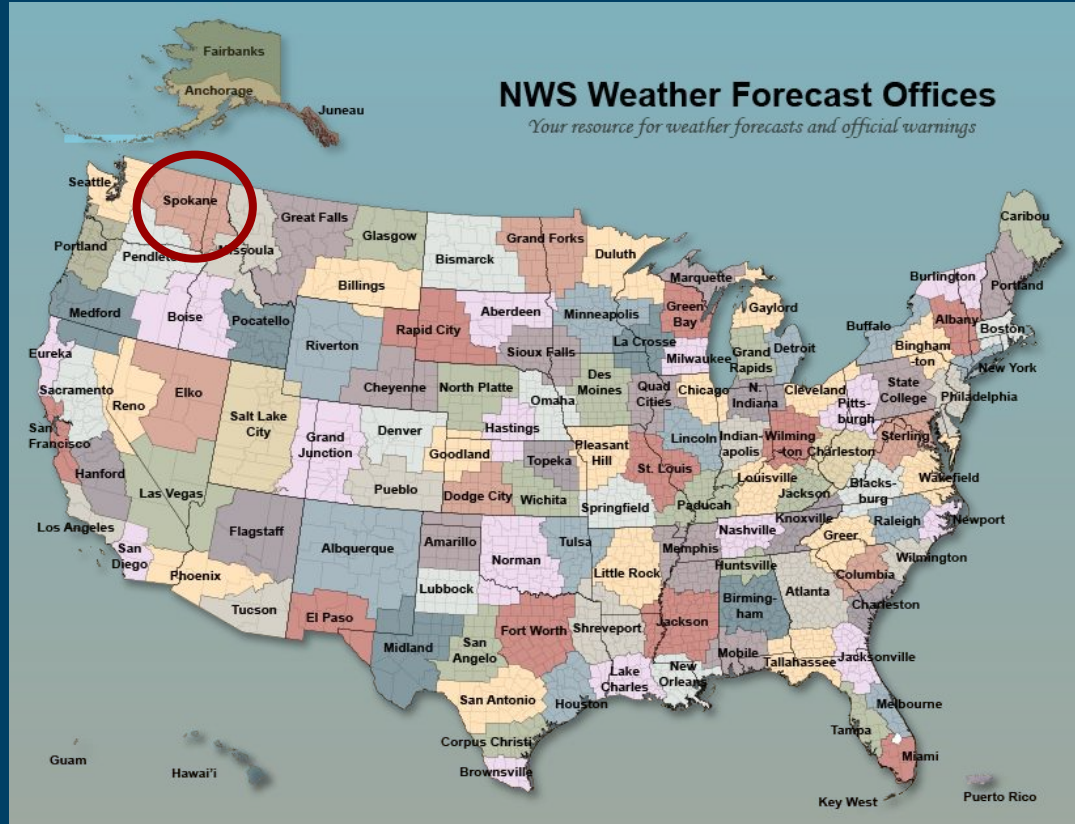


NWS Spokane Forecast and Warning Area



NWS Weather Forecast Offices

Your resource for weather forecasts and official warnings

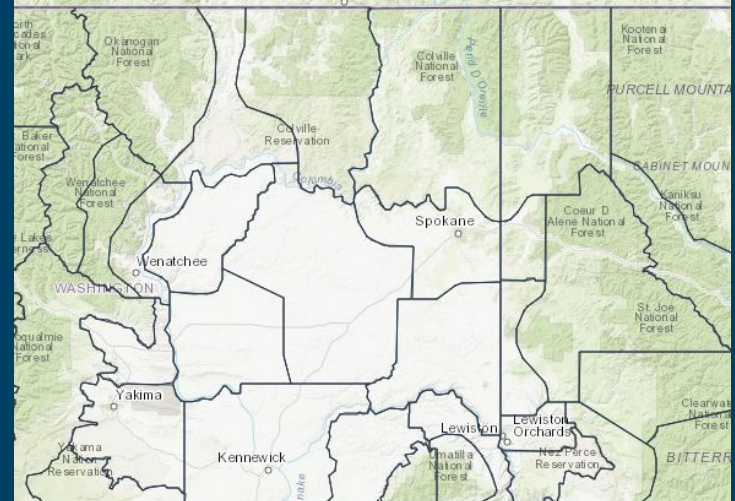


Includes 2 states

- 13 counties in eastern WA
- 8 counties in north Idaho

Elevations range

- 9500+ ft in the north Cascades
- 170 ft along the mid Columbia River

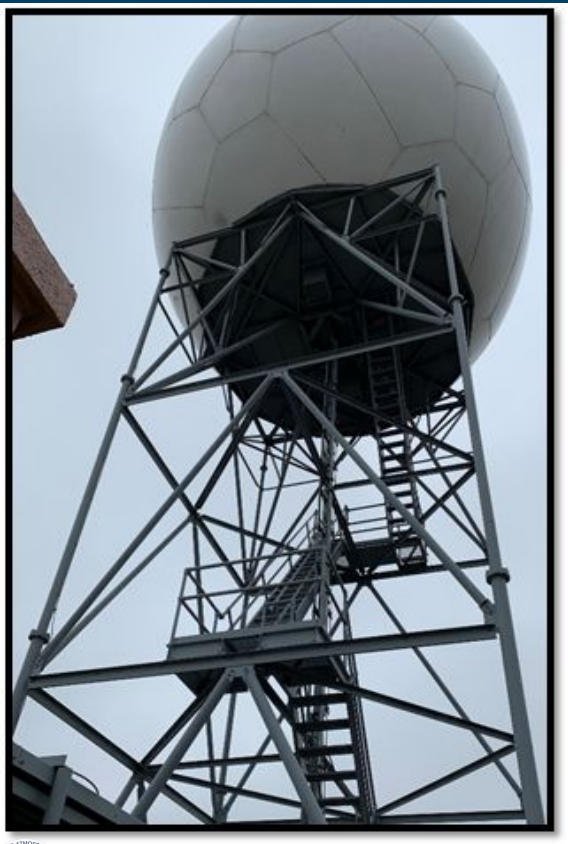


Public Forecast Zones

www.weather.gov/spokane



NWS Tools



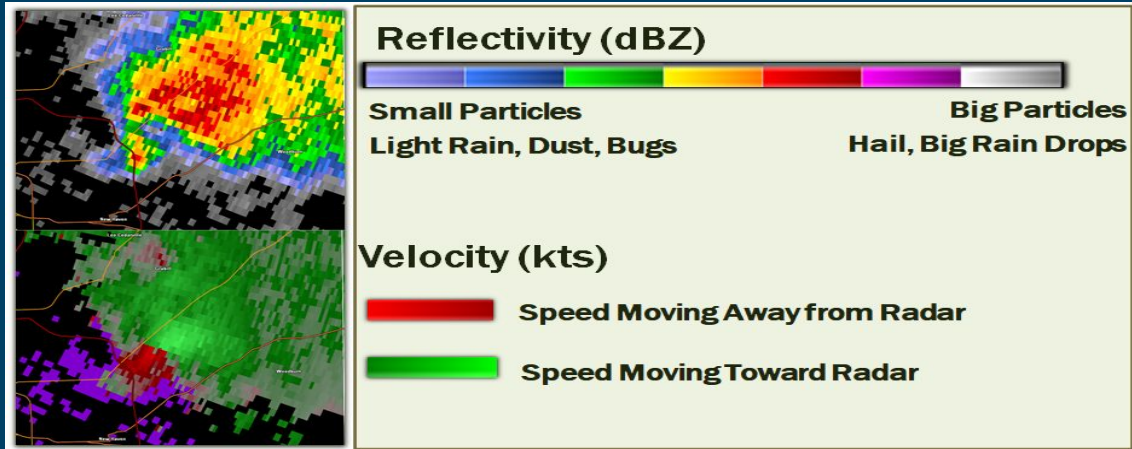
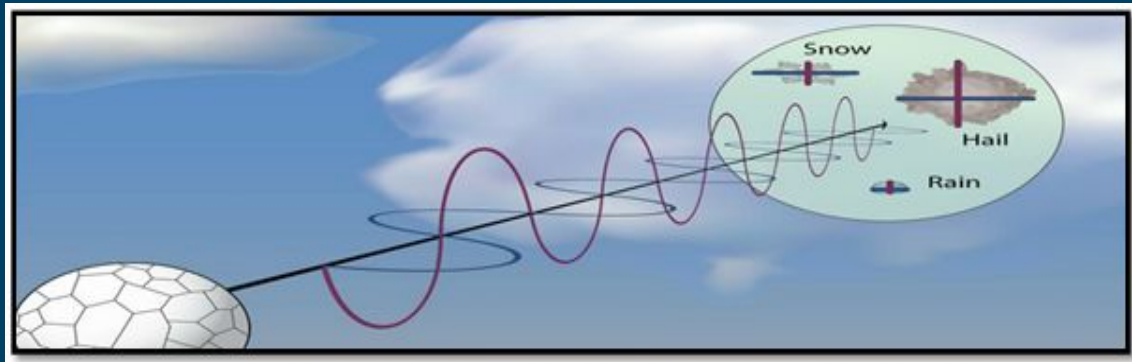
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Doppler Weather Radar



Reflectivity (dBZ)



Small Particles

Light Rain, Dust, Bugs

Big Particles

Hail, Big Rain Drops

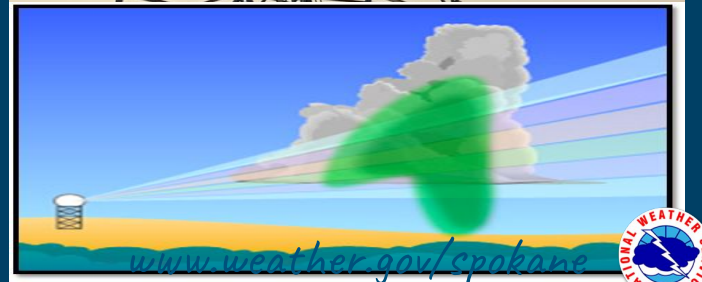
Velocity (kts)



Speed Moving Away from Radar



Speed Moving Toward Radar



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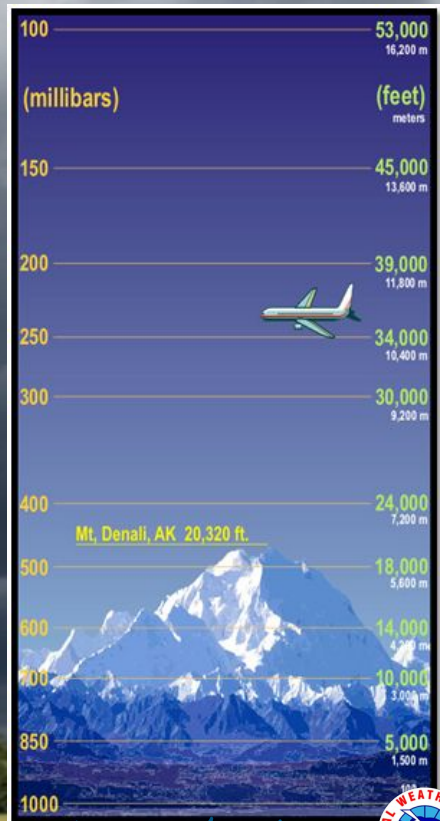
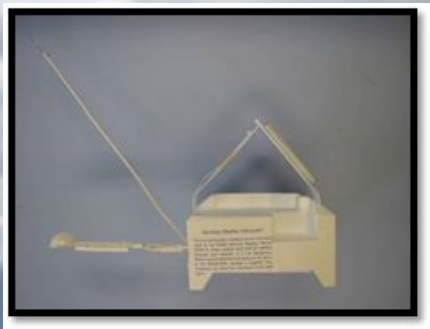
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Weather Balloon - Radiosonde



Twice a day - every day
92 Upper Air sites across the U.S.
Flight time ~ 1 hour 45 min



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Weather Satellites

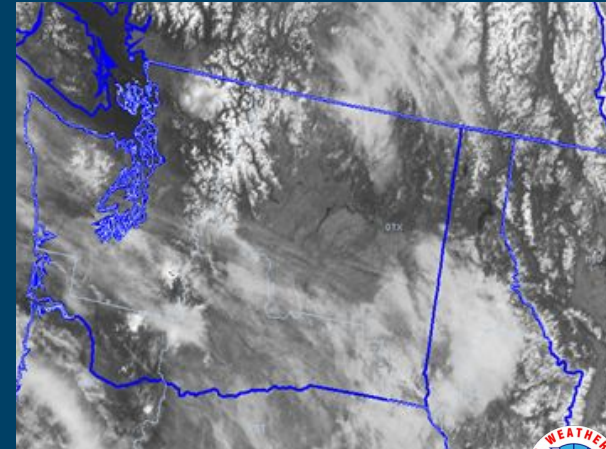
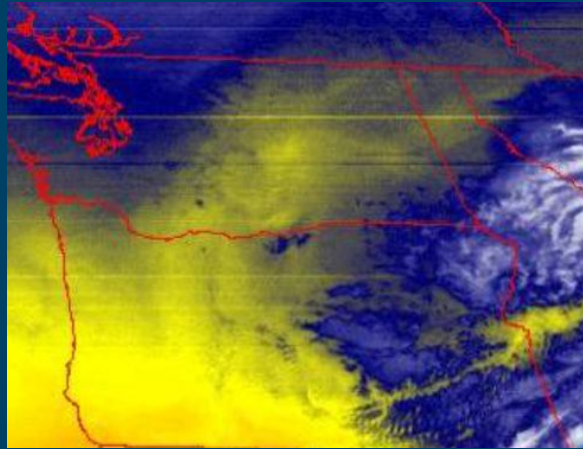
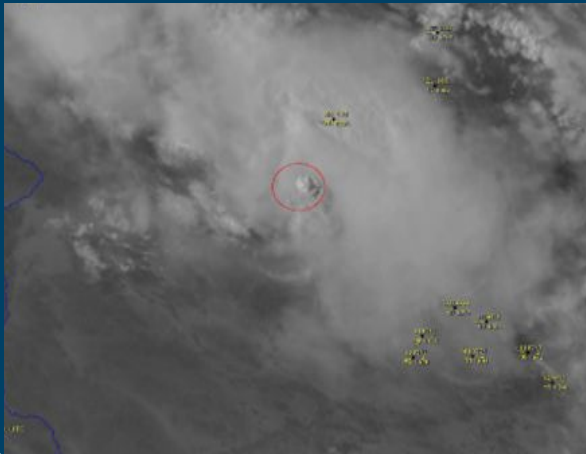
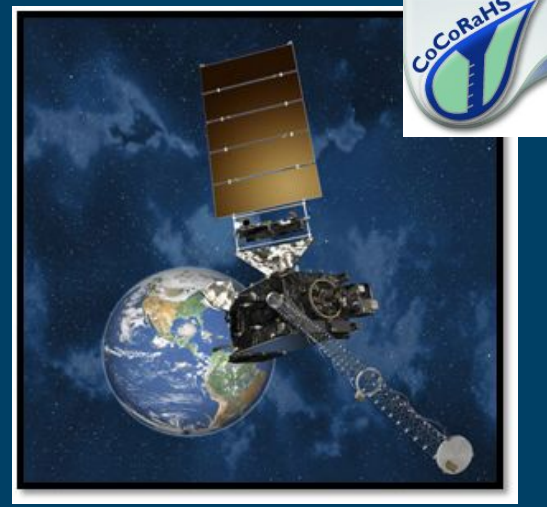
GOES 17 - 16 different channels

IR, Water Vapor & Visible

New images every 5 minutes

Aids in early detection

Thunderstorms & Wildfires



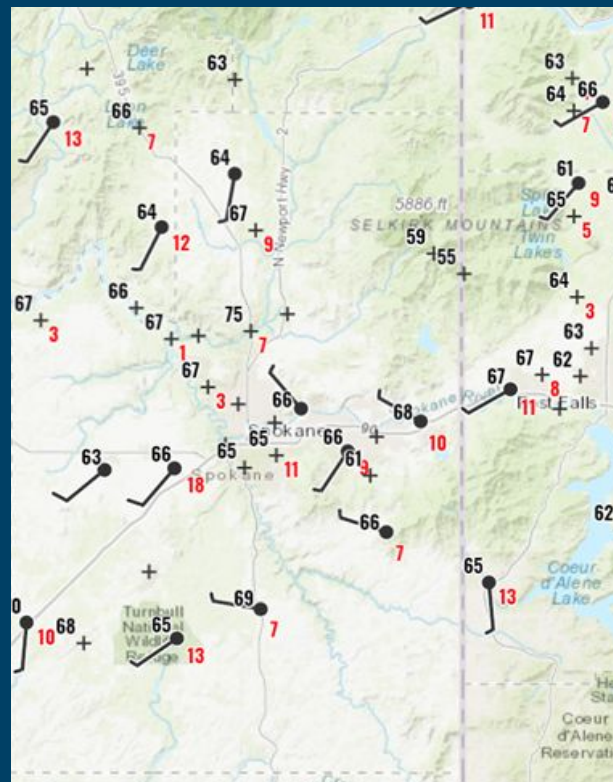
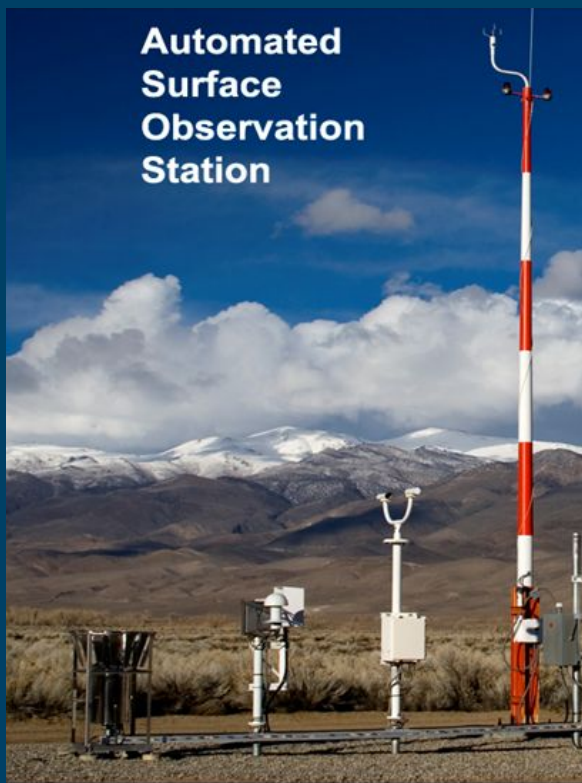
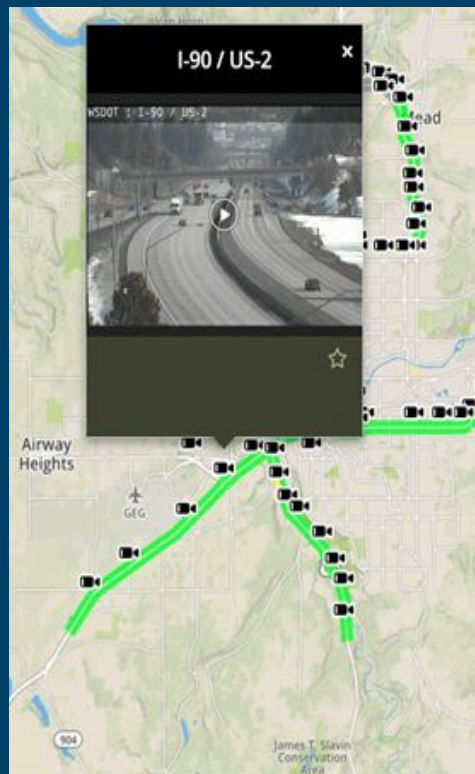
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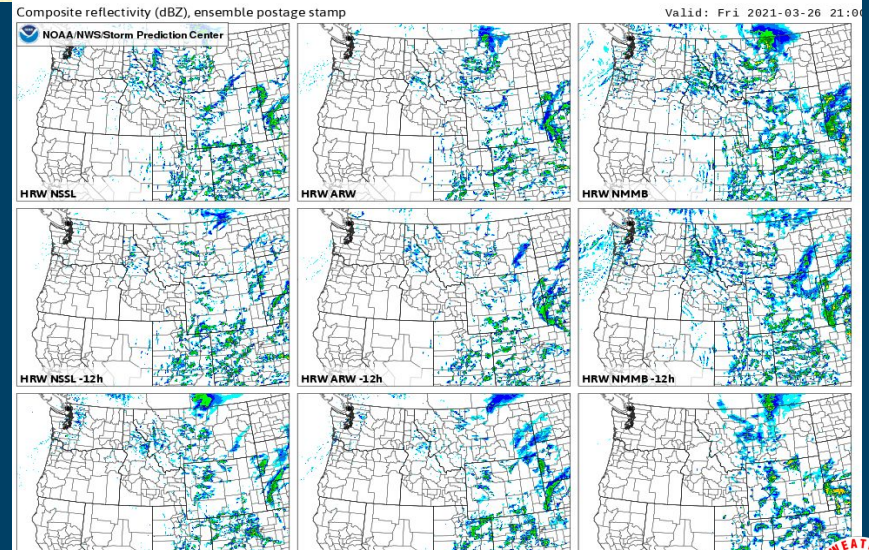
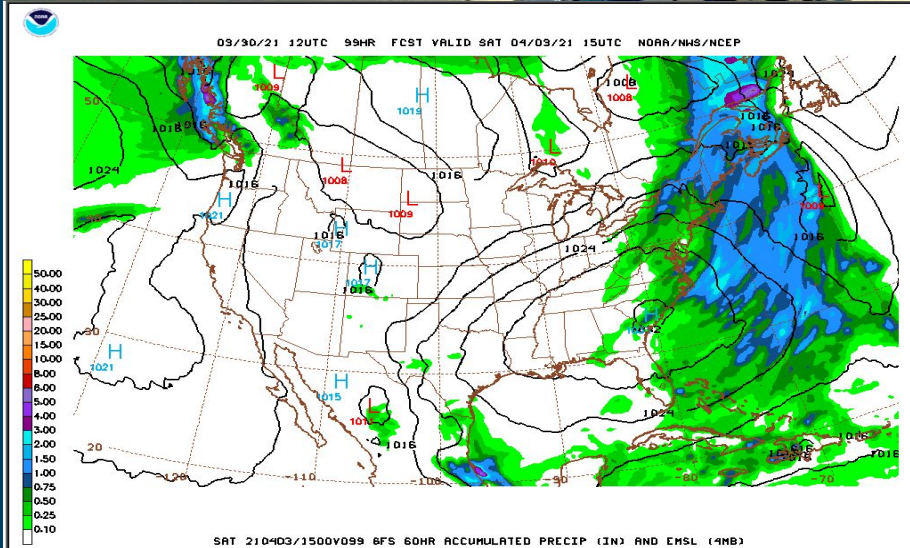
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Surface Observations & Web Cams



High Resolution Weather Models



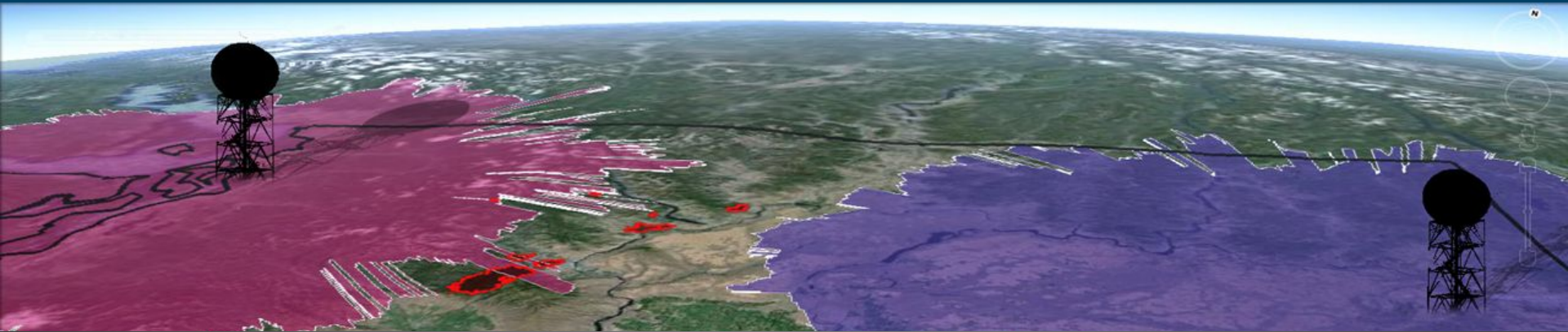
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We need observers! Why?



- Limitations to radar, satellite, and surface observations
- Receive Ground Truth on events
- Fill in the “holes” not seen by observations
- Understand the many micro-climates in the region
- Maximize Warning effectiveness and Lead Times
- Add Credibility to NWS Warnings - Leads to Public Action!



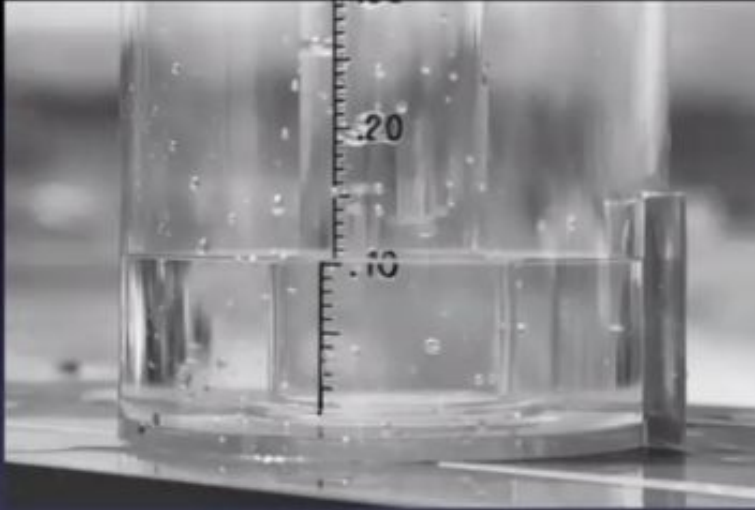
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Who else uses CoCoRaHS observations?



1. Weather Forecasters
2. Hydrologists
3. Water management
4. Researchers
5. Agriculture
6. Climatologists
7. Insurance Industry
8. Engineering
9. Recreation
10. Many others

"CoCoRaHS is CRITICAL (my emphasis) to hazardous weather operations at the NWS Austin-San Antonio Weather Forecast Office. We utilize the daily precipitation reports to produce maps such as the one attached, which are used extensively by the media (directly shown on TV broadcasts), our emergency management partners (for briefing officials and planning search and recovery operations), and the general public."

Jon Zeitler – NWS Austin-San Antonio Weather Forecast Office

CoCoRaHS - easy to report



Help Observe Precipitation in your Community

www.cocorahs.org

Volunteer take readings once a day - transmit online or on a mobile device

The screenshot shows the CoCoRaHS website homepage. At the top, it says "COMMUNITY COLLABORATIVE RAIN, HAIL & SNOW NETWORK" with the tagline "Because every drop counts". Below this is a navigation bar with links like Home, Countries, States, View Data, Maps, My Data, My Account, Admin, and Logout. A welcome message reads: "Welcome to CoCoRaHS! 'Volunteers working together to measure precipitation across the nations.'" A section titled "Who uses CoCoRaHS Observations?" is highlighted with a red box. Below it, a table shows "Reports received today 4/22/2020 as of 6:26 PM EDT" with columns for Daily, Multi-day, SigWx, Hail, Condition, and ET. The values are: Daily 10,433, Multi-day 63, SigWx 5, Hail 7, Condition 9, and ET 51. To the right of the table is a map of the United States showing precipitation data. Below the map is a color-coded legend for "Daily Precipitation (inches x.xx) USA 4/22/2020" with ranges from 0.00 to 2.17. On the left side, there is a "Main Menu" with links like Home, About Us, Join CoCoRaHS, Contact Us, and Donate. Below that is a "Resources" section with links like FAQ / Help, Education, Training Slide Shows, Videos, Condition Monitoring, Evapotranspiration, Soil Moisture, Volunteer Coordinators, Mail Pad, Distribution/Drop-off, Help Needed, and Printable Forms. At the bottom, there are links for "The Gallon", "Message of the Day", "Publications", "CoCoRaHS Blog", "Web Groups", "State Newsletters", "Master Gardener Guide", "State Climate Series", "March Madness", and "Webinars". On the right side, there are buttons for "JOIN COCORAHs", "TRAINING SLIDE SHOW", "Things to know about..." (with links for Rain, Hail, and Snow), and "Download on the App Store" and "ANDROID APP ON Google Play".

Daily	Multi-day	SigWx	Hail	Condition	ET
10,433	63	5	7	9	51



The screenshot shows the CoCoRaHS mobile app interface. At the top, there are links for "Logout", "Precip Report", and "Details". Below this is the CoCoRaHS logo and the text "CO-LR-610 Fort Collins 3.5 SW". The main section is titled "Precipitation Report" and contains fields for "Observation Date" (2015-05-13), "Observation Time" (07:00), and "Rain/Melted Snow" (0.00). There are also toggle switches for "Trace Precip." and "Metric Units (mm/cm)". A "Submit" button is at the bottom. The app is running on a Verizon phone at 2:23 PM with 87% battery.



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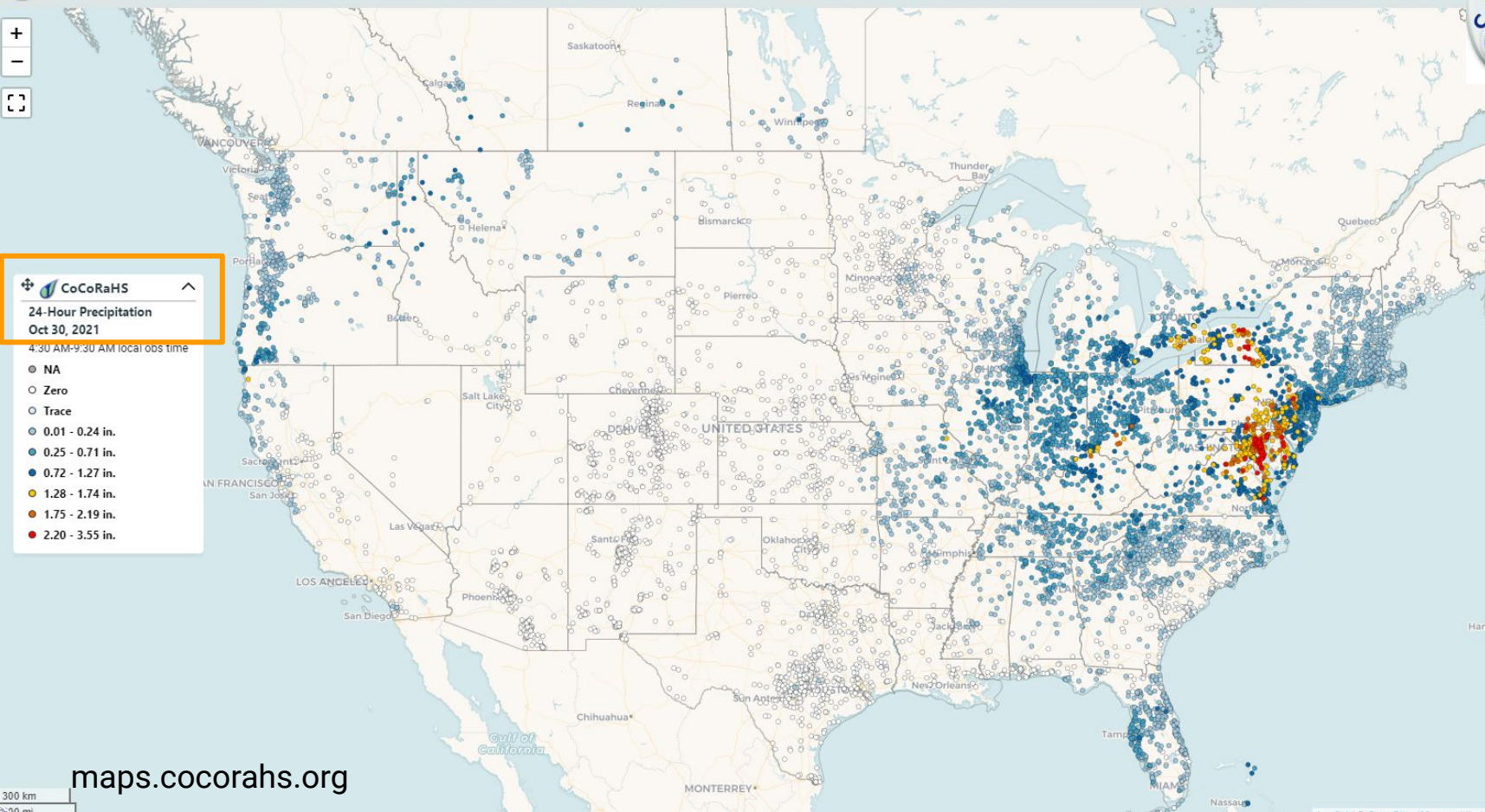


CoCoRaHS

24-Hour Precipitation
Oct 30, 2021

4:30 AM-9:30 AM local obs time

- NA
- Zero
- Trace
- 0.01 - 0.24 in.
- 0.25 - 0.71 in.
- 0.72 - 1.27 in.
- 1.28 - 1.74 in.
- 1.75 - 2.19 in.
- 2.20 - 3.55 in.



maps.cocorahs.org





CoCoRaHS

Total Snow on Ground Depth
Oct 30, 2021

4:30 AM-9:30 AM local obs time

- NA
- Zero
- Trace
- 0.1 - 0.1 in.
- 0.1 - 3.3 in.
- 3.4 - 10.1 in.
- 10.2 - 12.1 in.
- 12.2 - 13.8 in.

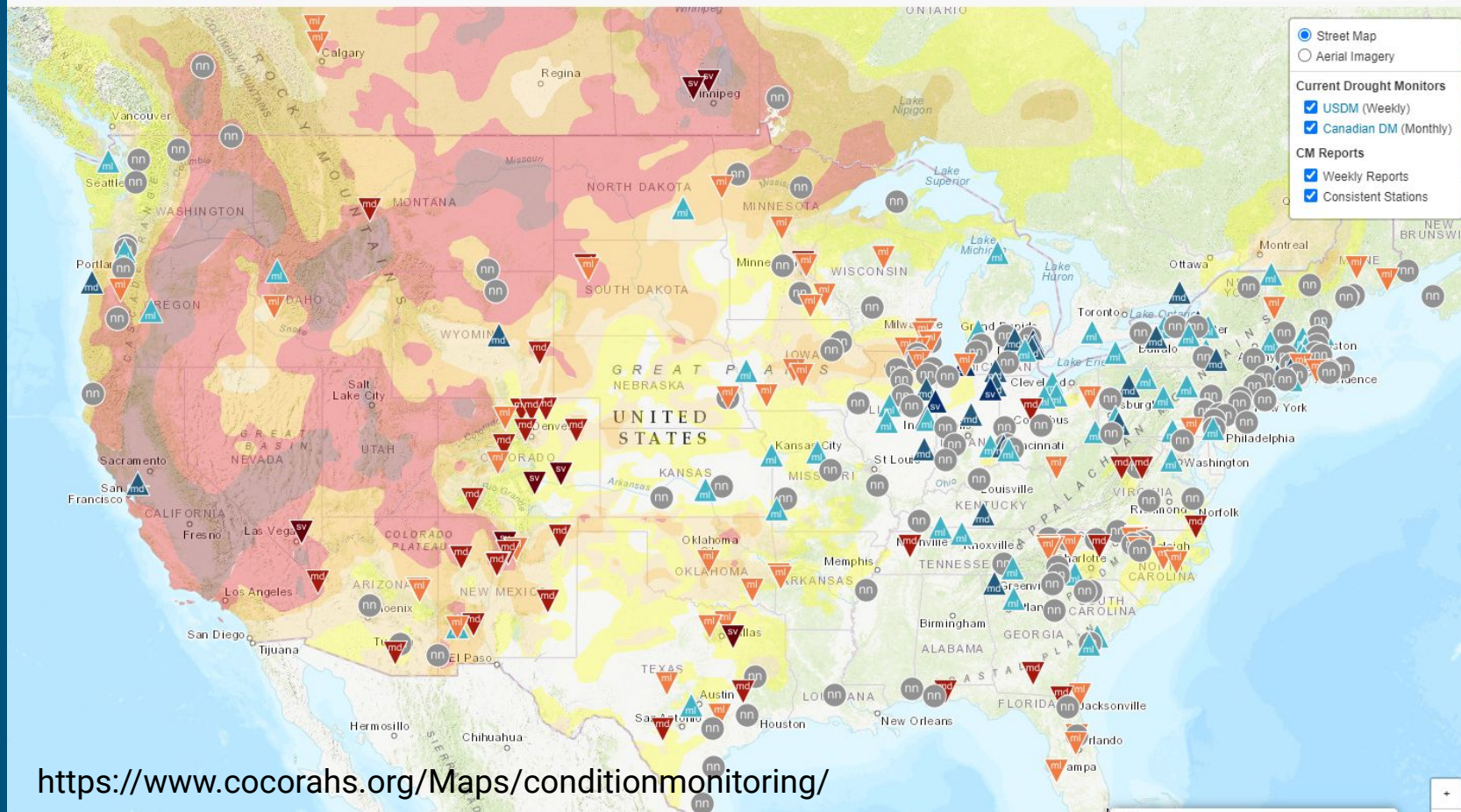
300 km

Condition Monitoring



Jump to...

Go!



<https://www.cocorahs.org/Maps/conditionmonitoring/>



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The Catch

NOLAN DOESKEN'S MONTHLY COCORAHs E-MAIL MESSAGE



CoCoRaHS -- Reflections by the Cottage about our Past, Present and Future

Cedarville, Michigan -- October 18, 2021

Some reflections by the lakeside cottage about our past, our present and our future

I have truly enjoyed the month we've just spent at our family cottage on the shore of Lake Huron in Upper Michigan – nearly free from internet and phone connectivity. I was able to send my last message to all of you on October 4th, ringing in the New Water Year by driving a few short miles to the lovely Les Cheneaux Community Library in Cedarville MI where they provide 24/7 internet access on "The Bench" of their cottage-style covered porch.



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Spokane, WA

YOUR NATIONAL WEATHER SERVICE SPOKANE QUARTERLY REPORT

VOL. XXVI, ISSUE 3
SEPTEMBER 2021

The Weather Watcher of the Inland Northwest

www.weather.gov/Spokane



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Editor's Notes

September marks National Preparedness Month. It's the time to get yourself, your family and household prepared for the change of seasons and any natural disasters. After a busy fire season, many of us have heard or even experienced the sudden alerts for evacuations. Having a Go-Bag or an Emergency kit prepared is important. Also knowing what to do when the power goes out is also a good idea and worth planning.

The Autumn Equinox arrives on Wednesday, September 22 at 12:20 PDT. This marks the equal time between day and night. After this date, expect shorter day hours and longer nights for the rest of the calendar year.

We're always looking for new ideas and stories for our publication. Please send to nws.spokane@noaa.gov.

Newsletters are available on the NWS Spokane web page.

The main purpose of this publication is to keep our readers informed about NWS

Drought and Fires

Current Fire Conditions: Active Wildfires



Active Wildfires

Active Fire

U.S. Drought Monitor

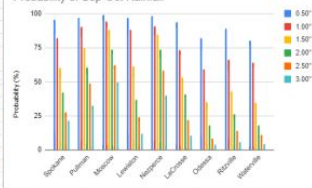


NOAA/NWS/National Weather Service/National Oceanic and Atmospheric Administration
Source: National Weather Service/National Oceanic and Atmospheric Administration
Updated Daily - 09/10/21

Drought.gov

The [Seasonal Drought Outlook](#) does not show much change in the coming months with drought likely to persist through the calendar year. This may impact agriculture into the next growing season. We're all looking forward to the fall rains. Based on past events, there are better odds of seeing light amounts of rain in September and October across the region. Chances of significant rainfall amounts of 2 to 3 inches look less likely as seen in the following graph. ✨ Robin Fox & Ron Miller

Probability of Sep-Oct Rainfall



Seasonal Outlook

The NWS [Climate Prediction Center](#) is favoring a better chance for above normal precipitation and equal chance of at, below and above normal temperatures for October through December 2021. ✨

Three-Month Temperature Outlook



Three-Month Precipitation Outlook



www.weather.gov/spokane

Emails



It's important to keep emails current. You may receive notifications on:

- Upcoming WIDESPREAD Severe Weather or Winter Storm events.
- Requests for SWE reports
- Training updates



Interested in CoCoRaHS? How to Start!



Five easy steps

1. Sign-up at on the CoCoRaHS web site www.cocorahs.org
2. Obtain a 4" plastic rain gauge
3. View the online "training slide show"
4. Set up the gauge in a "good" location in your yard - away from trees
5. Start observing precipitation and report online daily



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.



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Snow

NWS Spokane
appreciates the many
snow reports each year!

Yes, It can be challenging!

Before the snow flies,
make sure you remove
the inner tube and funnel.

MEASURING SNOW



- **Snowfall measurement is typically more difficult than rainfall**
- **Snowfall measurement takes a little more time**

Accurate and timely snowfall measurements can be extremely important to your local National Weather Service office, public works departments, media outlets, climatologists, and other scientists.



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Setting up for Measuring Snow



Video Courtesy
of CoCoRaHS

Snow Tools



- **4" Diameter CoCoRaHS Rain Gauge**
 - Outer Cylinder for winter weather

Snow Board



Snow Swatter



Ruler or yard stick,



Snow Measurements - 4 part observation



1. The depth of new snow (new snowfall)
2. Liquid water equivalent of new snow (either in the gauge or on the snowboard)
3. The total depth of new snow and old snow and ice at observation time
4. Snow Water Equivalent (SWE) of total snow on the ground (optional)



Snow Measurements - 4 part observation



1. The depth of new snow (new snowfall)
2. Liquid water equivalent of new snow (either in the gauge or on the snowboard)
3. The total depth of new snow and old snow and ice at observation time
4. Snow Water Equivalent (SWE) of total snow on the ground (optional)



Snow Measurements - Depth of new Snowfall



- Snowfall is the accumulation of new snow (and ice) in the past 24 hours prior to melting or settling.
- Use a ruler and measure on the snow board or a level spot in your yard. Do not use a ruler in your gauge to measure snowfall.
- You can measure snowfall soon as it has stops snowing, it does not need to be at the observation time.
- Report snowfall to the nearest tenth of an inch.



How to Measure New Snow Depth

Snowfall: The accumulation
of snow and ice in the last 24 hours-
PRIOR to melting or settling.

Video Courtesy of
CoCoRaHS

Precipitation Report Form

[Submit Data](#)

Station Number : CO-LR-610

Station Name : Fort Collins 3.5 SW

* Denotes Required Field

11/9/2011

* Observation Date ?

7:00

AM

* Observation Time ?

0.59

* Rain and Melted Snow to the nearest hundredth inch that has fallen in the gauge during the past 24 hours ?

☒ Yes ☐ No

Report was taken at registered location?

Observation Notes: (This will be available to the public) ?

Snow began at 10 am and ended at 5:30 pm.

New Snowfall

6.5

Accumulation of new snow in inches to the nearest **tenth** ?

0.59

Melted value from core to the nearest **hundredth** ?

Total Snow and Ice on Ground at Observation Time

7.0

Depth of total snow and ice (new and old) in inches to the nearest **half inch** ?

0.63

Melted value from core to the nearest **hundredth** ?

Report your measurement of new snowfall to the nearest tenth of an inch

Snow Measurements - 4 part observation



1. The depth of new snow (new snowfall)
2. Liquid water equivalent of new snow (either in the gauge or on the snowboard)
3. The total depth of new snow and old snow and ice at observation time
4. Snow Water Equivalent (SWE) of total snow on the ground (optional)



Daily Precipitation When It Snows



Video Courtesy of
CoCoRaHS



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Spokane, WA

www.weather.gov/spokane



Snow Measurements - Liquid Water Equivalent



1. Swat excess snow from gauge
2. Bring outer gauge inside.
3. Fill inner gauge with warmer water
4. Pour a measured amount of warm water into the tube to melt the snow.
5. Once melted, pour contents of the snowmelt and warm water into the inner measuring tube.
6. Read the measurement, remember to subtract what you added!



Precipitation Report Form

[Submit Data](#)

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Snow began at 10 am and ended at 5:30 pm.

New Snowfall

6.5

Accumulation of new snow in inches to the nearest **tenth** ?

0.59

Melted value from core to the nearest **hundredth** ?

Total Snow and Ice on Ground at Observation Time

7.0

Depth of total snow and ice (new and old) in inches to the nearest **half inch** ?

0.63

Melted value from core to the nearest **hundredth** ?

Water melted from core is reported as the daily precipitation

Remember to add notes in the Comments section if needed.

Snow Measurements - 4 part observation



1. The depth of new snow (new snowfall)
2. Liquid water equivalent of new snow (either in the gauge or on the snowboard)
3. The total depth of new snow and old snow and ice at observation time
4. Snow Water Equivalent (SWE) of total snow on the ground (optional)



Snow Measurements - Total Depth



- The Total Snow = Old snow + New Snow
- The average depth of snow (including old snow and ice and new snow) that remains on the ground at observation time.
- Total depth of snow can be done in a flat portion of your yard, away from drifts or snow piles.
- Take several measurements and average them
- Report Total Snow Depth to nearest half inch





Precipitation Report Form

[Submit Data](#)[Re](#)

Station Number : CO-LR-610

Station Name : Fort Collins 3.5 SW

* Denotes Required Field

11/9/2011

* Observation Date ?

7:00 AM

* Observation Time ?

0.59

* Rain and Melted Snow to the nearest hundredth inch that has fallen in the gauge during the past 24 hours ?

☒ Yes ☐ No

Report was taken at registered location?

Observation Notes: (This will be available to the public) ?

Snow began at 10 am and ended at 5:30 pm.

New Snowfall

6.5

Accumulation of new snow in inches to the nearest tenth ?

0.59

Melted value from core to the nearest hundredth ?

Total Snow and Ice on Ground at Observation Time

7.0

Depth of total snow and ice (new and old) in inches to the nearest half inch ?

0.63

Melted value from core to the nearest hundredth ?

Report the total depth to the nearest half inch



Measuring Total Depth and SWE



Video Courtesy
of CoCoRaHS

Snow Measurements - 4 part observation



1. The depth of new snow (new snowfall)
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3. The total depth of new snow and old snow and ice at observation time
4. Snow Water Equivalent (SWE) of total snow on the ground (optional)



Snow Measurements - Snow Water Equivalen



Light snow events

Once you have a core sample, melt it down with warm water and measure the liquid. Remember to subtract what you added!



Deeper snow events

SWE is important to know how much water is in the snow pack. It is usually done weekly (SWE Mondays) or when the snowpack is deep in an area.



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Precipitation Report Form

[Submit Data](#)

Station Number : CO-LR-610

Station Name : Fort Collins 3.5 SW

* Denotes Required Field

11/9/2011

* Observation Date ?

7:00 AM

* Observation Time ?

0.59

* Rain and Melted Snow to the nearest hundredth inch that has fallen in the gauge during the past 24 hours ?

☒ Yes ☐ No

Report was taken at registered location?

Observation Notes: (This will be available to the public) ?

Precipitation is amount from snow core. Poor gauge catch - not representative of what fell. Amount melted from gauge 0.29"

New Snowfall

6.5

Accumulation of new snow in inches to the nearest **tenth** ?

0.59

Melted value from core to the nearest **hundredth** ?

Total Snow and Ice on Ground at Observation Time

7.0

Depth of total snow and ice (new and old) in inches to the nearest **half inch** ?

0.63

Melted value from core to the nearest **hundredth** ?

Report the melted value to the nearest hundredth



CoCoRaHS Post It Notes

Even if there is **No New precipitation**, please send a report. Even zeros are important!

Windy conditions may lead to increased blowing and drifting. May need to take a core sample in a location more representative in your yard and not your gauge.

If snow melts as it lands, report a **Trace (T)** of snow for the day and add it to comments

If **Heavy Snow** is falling, you can send in a Significant Weather Report (available through the web page only)





CoCoRaHS Post It Notes

What if you are **gone for a few days**? Send in a multi-day report

Freezing Rain This is a liquid that freezes. Do not report it as snow. Meltdown what is frozen in the gage and report it as rain. Leave a note in comments section. New snowfall = 0. Total Snow Depth = ice thickness.

What if you **run out of time** to finish your snow report? Put NA in the Rain and Melted snow box and leave a note in the comments box and then send in your report. You can return to the report to edit it later in the day.



Different programs - All useful to the NWS



Spotter

Severe Weather

No instruments
required

Event driven

Weather.gov

CoCoRaHS

Precipitation
only

Rain gauge
required

Daily
commitment

Cocorahs.org

CWOP

Weather data

Weather station

Daily
commitment

Wxqa.com



Weather Spotter



Weather enthusiast who volunteers time to report severe or hazardous weather

- As needed basis
- No weather equipment is necessary
- Simply call, email or send a report online
- Checklist provided on weather to report

Register:
nws.spokane@noaa.gov



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www.weather.gov/spokane



Citizen Weather Observers Program CWOP



Register: 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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Additional Training



Cocorahs.org

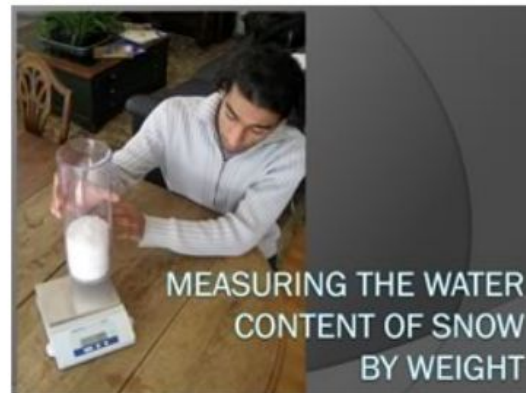
Slideshows

Notes

Videos



← Click here



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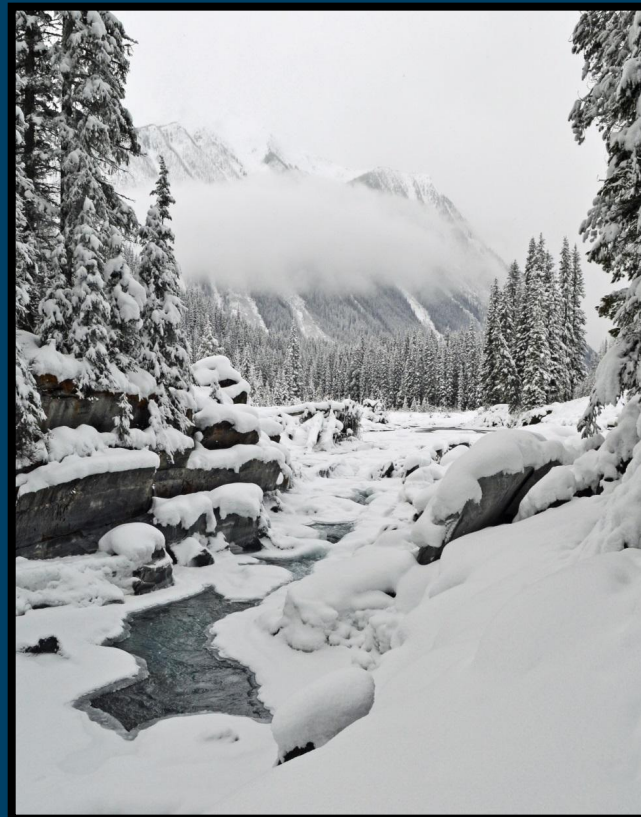
www.weather.gov/spokane



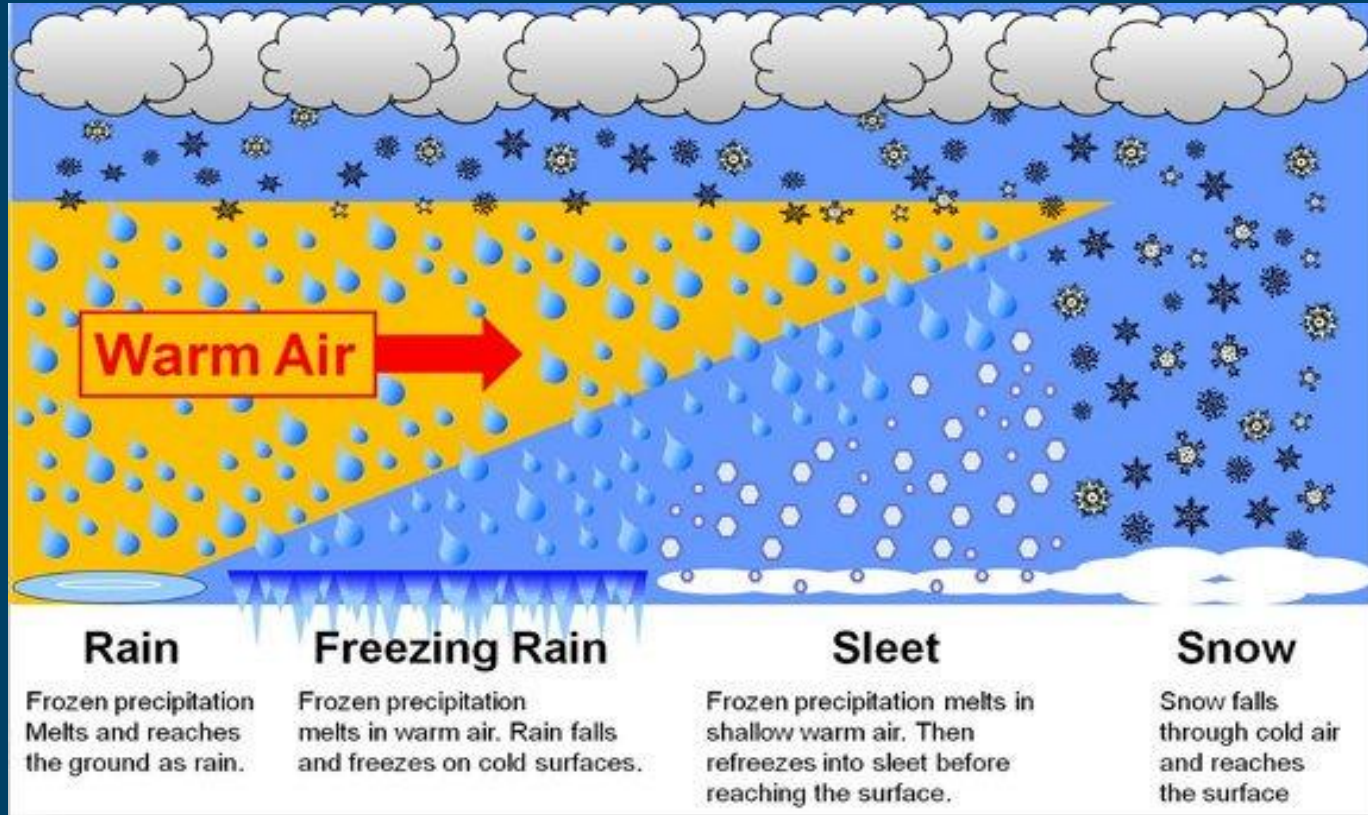
Typical Winter Storm Scenario



- Cold air in place over the Inland Northwest, especially in the valleys
- Warm Pacific Air rides over the cold air
- Precipitation begins as snow, occasionally changes to rain with possible freezing rain



Vertical Temperature Profile is Critical!



Winter Precipitation



Sleet



Graupel



Hail

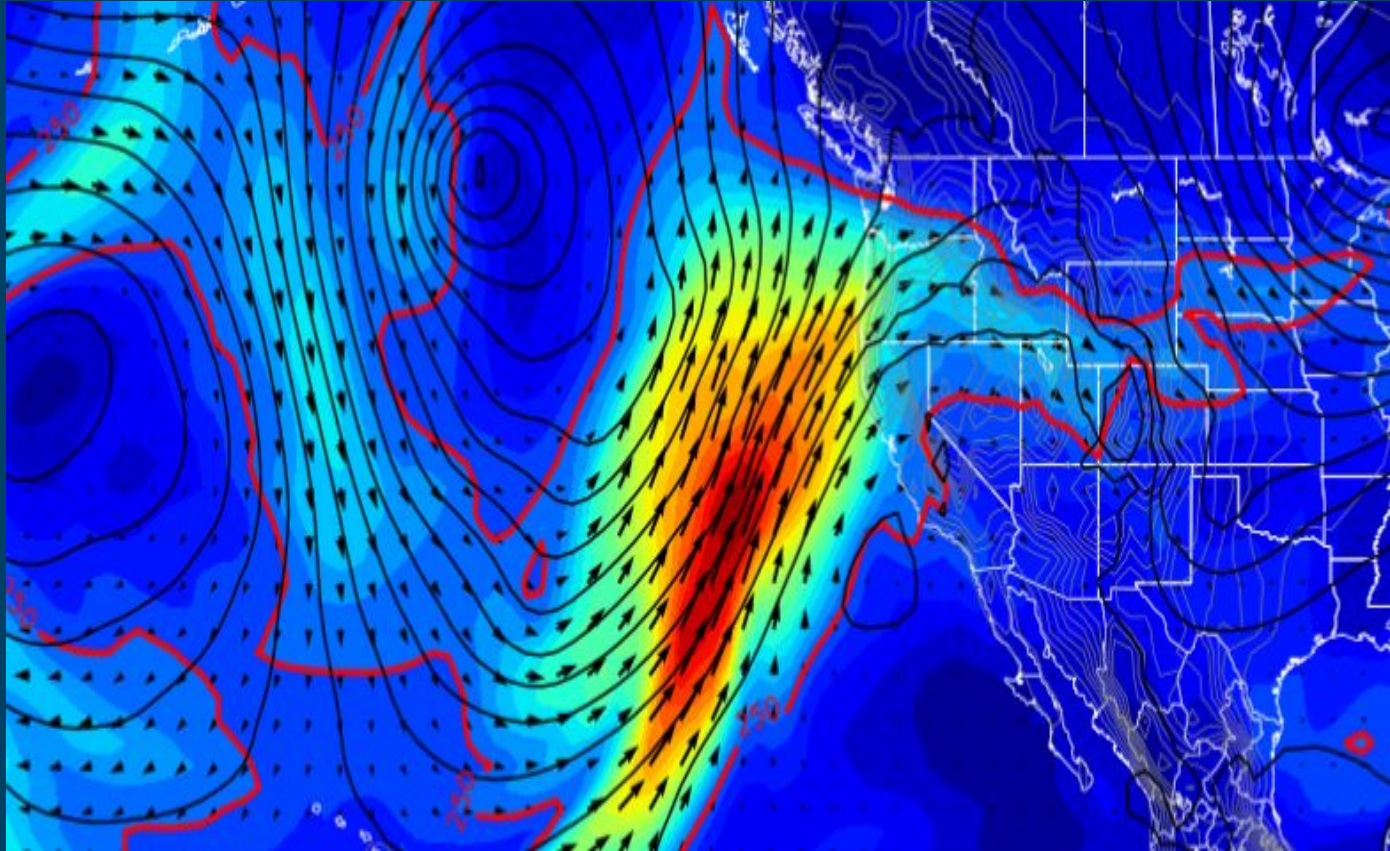


Atmospheric Rivers



Plumes of
atmospheric
moisture

Mild & Wet
Weather



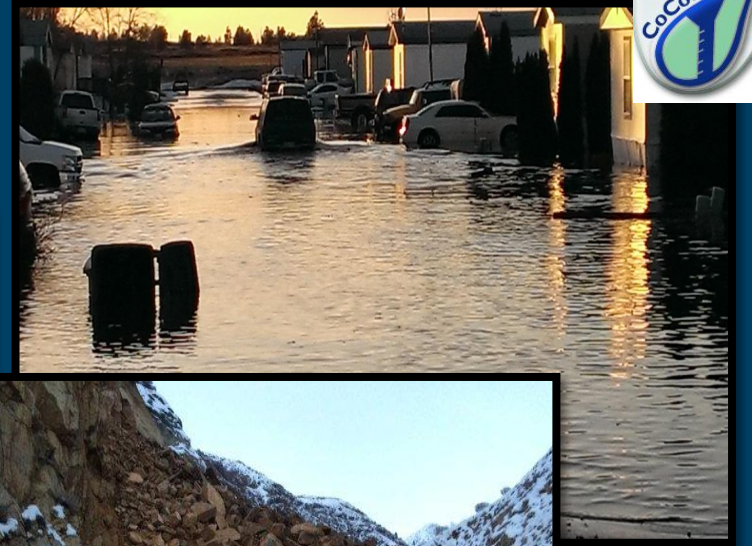
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Atmospheric River Events



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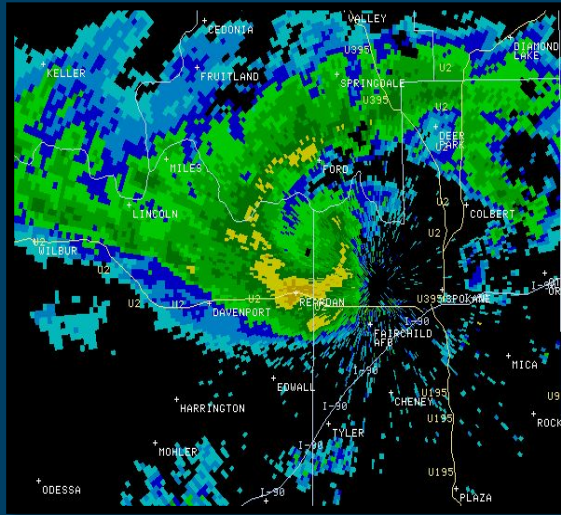
Spokane, WA

www.weather.gov/spokane



Small Scale Unstable Lows

- Develop Behind Strong Cold Fronts
- May not be well forecast by models
- Potential for ~1 ft of snow in a short time



Safety



- Personal Safety is the Primary Objective of every observer
- — Protect You and Your Family First
- Do NOT put yourself in harm's way
 - Don't walk or drive over obstructions as flooded roads or downed power lines
 - Don't put yourself under objects that have the potential to fall or be blown over
- **ACES - Awareness, Communication, Escape Route and Safe Zones**



Pullman, May 2020



Spokane, Jan 2021



Moscow, April 2019



Stay Informed

NWS Spokane Web Page www.weather.gov/Spokane



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HOME FORECAST PAST WEATHER SAFETY INFORMATION EDUCATION NEWS SEARCH ABOUT

Local forecast by City, ZIP or ZIP code

[Location Help](#)

News Headlines

- [Spring 2021 Virtual Weather Spotter Training - Register Here!](#)
- [NOAA Weather Radio Technical Issues - Degraded service at Mt Spokane transmitter](#)
- [Weather Watcher Quarterly Newsletter - Spring 2021](#)

MY FORECAST

Spokane WA

Clear

46°F
8°C [Get Detailed info](#)

Today

 Sunny
 High: 59°F

Tonight

 Mostly Clear
 Low: 33°F [change location](#)

NWS Forecast Office Spokane, WA

[Weather.gov](#) > Spokane, WA

Spokane, WA
 Weather Forecast Office

Current Hazards Current Conditions Radar Forecasts Rivers and Lakes Climate and Past Weather Local Programs

Weather this week

Seasonal & Settled Before Mid-Week Change

MON TUE WED THU FRI

50°s - low 60°s High 50°s - 60°s 60°s 50°s - low 60°s High 40°s - 50°s

[Show Caption](#)

Click a location below for detailed forecast.

Watches, Warnings & Advisories
 There are no watches, warnings, or advisories at this time.

Last Map Update: Mon, Apr. 5, 2021 at 10:44:15 am PDT

Text Product Selector (Selected product opens in current window)

Latest Text Products Issued by OTX

Social Media	Forecast Discussion	Local Radar	Satellite Images	Weather Maps	Graphical Forecasts
Weather Table Forecasts	Climate Graphics	Rivers and Lakes	Observations & Hazards	Fire Weather	Aviation Weather
Weekly Briefing	Hourly Forecasts	Drought Information	Climate	Submit a Storm Report	View Storm Reports



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Stay Informed On your Smartphone

mobile.weather.gov



mobile.weather.gov
National Weather Service
Zip, City or Place Go!

- Owings Mills MD
- Spring City PA
- Corpus Christi TX
- 5 Miles WSW Corpus Christi, Naval Air S...
- Edit List

Full Site FAQ Site Info Feedback

mobile.weather.gov
National Weather Service
Victoria tx Go!

- Owings Mills MD
- Spring City PA
- Corpus Christi TX
- 5 Miles WSW Corpus Christi, Naval Air S...
- Edit List

Full Site FAQ Site Info Feedback

mobile.weather.gov
National Weather Service
2 Miles SW Victoria TX

Outlook/Statement in Effect
Issued 3:46 PM CST

Current Conditions
Victoria, Victoria Regional Airport
Updated 3:46 PM CST
70 °F
Partly Cloudy

Forecast
This Afternoon Mostly Sunny
Tonight 20%
Sunday 20% Slight Chance

mobile.weather.gov
National Weather Service
2 Miles SW Victoria TX

Outlook/Statement in Effect
Issued 3:46 PM CST

Message Mail Reminders Add to Notes Twitter

Copy Open in News Add to Home Screen Print HP ePrint

Cancel

Weather

Smart Weather RadarScope CoCoRaHS
CoCoRaHS Clear Day mPING
MetaWeather Wind Meter WindAlert

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



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Staying Informed On Your Phone!



Weather Warnings

- Tornado Warnings
- Flash Flooding Warnings
- Extreme Wind Warnings
- Dust Storm Warnings
- Snow Squall Warnings

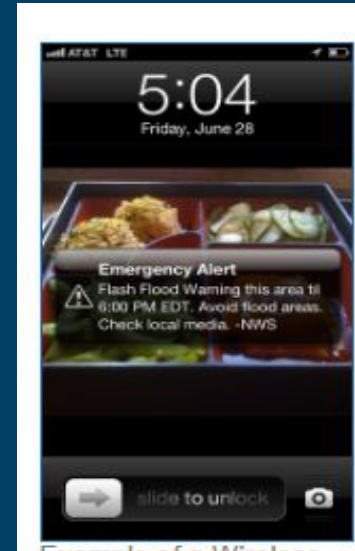
Alert Categories

Extreme Weather & Water Warnings

Local emergencies & Evacuations

AMBER Alerts

Presidential Alerts – National emergency



Stay Informed

Be Prepared - Disaster Kits and Disaster Plans



- **Water**, one gallon of water per person per day for at least three days
- **Food & medicine/prescriptions**, at least a three-day supply
- **Radio**, battery-powered or hand crank radio and a NOAA Weather Radio with tone alert and extra batteries for both
- **Flashlight and extra batteries**
- **First aid kit**
- **Whistle** to signal for help
- **Dust mask** to help filter contaminated air and plastic sheeting and duct tape to shelter-in-place
- **Moist towelettes, garbage bags and plastic ties** for personal sanitation
- **Wrench or pliers** to turn off utilities
- **Manual can opener** for food
- **Local maps**
- **Cell phone with chargers, inverter or solar charger**



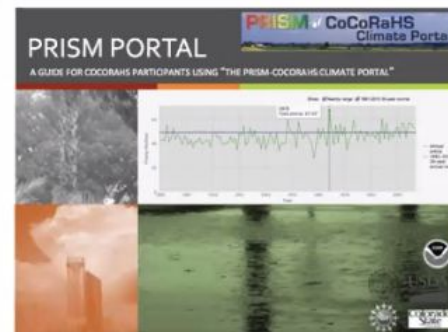
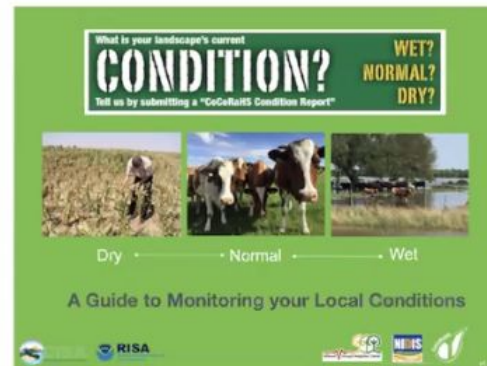
<http://www.ready.gov/kit>



Introduce your observers to our wealth of learning products



Training Animations



Climate Records



After 100 reports, your site becomes a climate site!

Water Year reports are available each year

First time, CoCoRaHS stations have been incorporated into the new Climate normals. - NCEI Normals (5448 CoCoRaHS stations)

2008 Water Year Report	2009 Water Year Report	2010 Water Year Report	2011 Water Year Report
2012 Water Year Report	2013 Water Year Report	2014 Water Year Report	2015 Water Year Report
2016 Water Year Report Certificate	2017 Water Year Report Certificate	2018 Water Year Report Certificate	2019 Water Year Report Certificate
2020 Water Year Report Certificate	2021 Water Year Report Coming Soon	Current Water Year Report	

***National Centers for
Environmental Information
(NCEI)***





Love the snowy & rainy days?
Want to join a team of volunteer
precipitation observers?

Join CoCoRaHS Today!

(Community Collaborative Rain Hail and Snow Network)

It takes four easy steps!

1. Register



2. View online training



3. Purchase rain gauge
& snow ruler



4. Record and report
observations



Learn more and register at cocoahs.org



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Test your knowledge



What is included in the Total Snow Depth measurement?

What is SWE?

When there is no precipitation, a CoCoRaHS report is not needed?

What is your main source of weather information?





Winter Outlook 2021-2022



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So far in 2021...

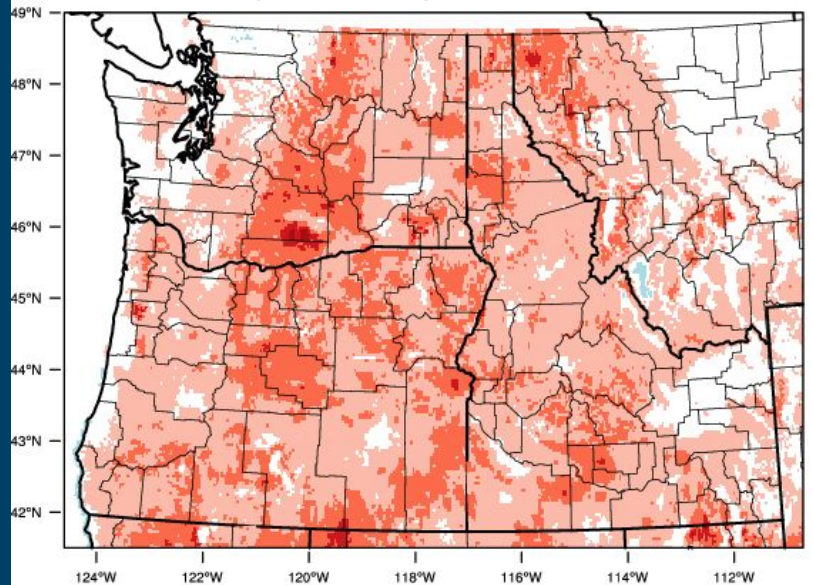
wrcc.dri.edu/

Water Year 2021, temperatures were above normal and precipitation below normal, and this includes a Record HOT & DRY Summer.



Pacific Northwest - Mean Temperature

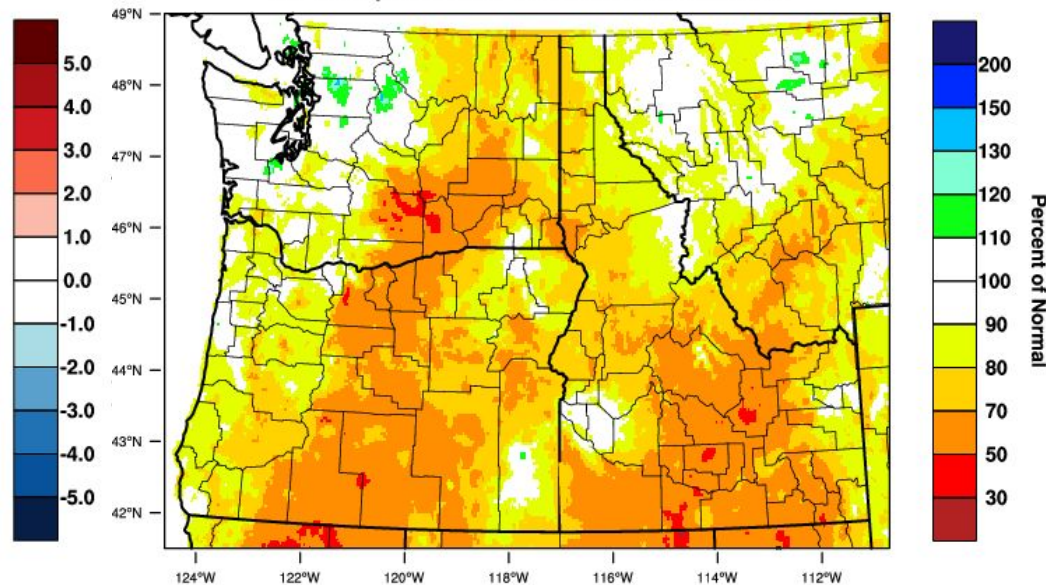
October-September 2021 Departure from 1981-2010 Normal



WestWide Drought Tracker - U Idaho/WRCC Data Source - PRISM (Prelim), created 2 OCT 2021

Pacific Northwest - Precipitation

October-September 2021 Percent of 1981-2010 Normal



WestWide Drought Tracker - U Idaho/WRCC Data Source - PRISM (Prelim), created 2 OCT 2021



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Fall 2021...

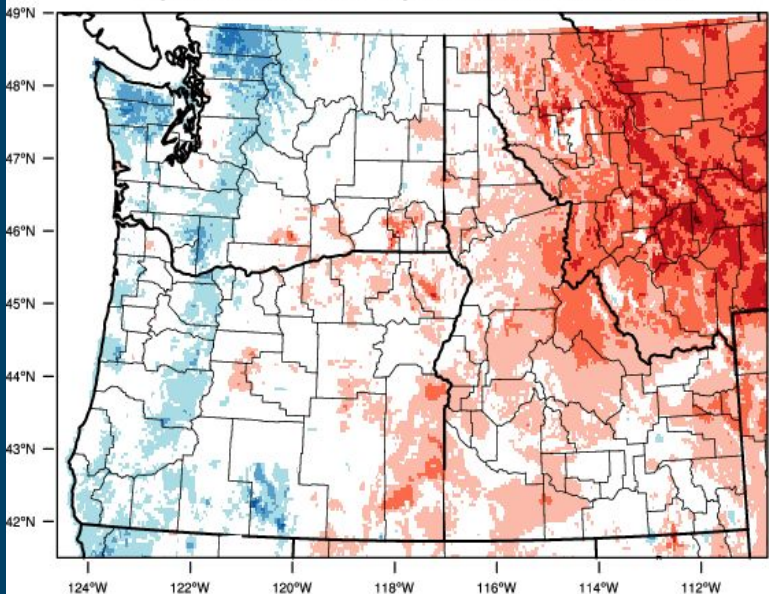
wrcc.dri.edu/

Now in Water Year 2022, temperatures trending cooler to near normal and Precipitation trending wetter than normal!



Pacific Northwest - Mean Temperature

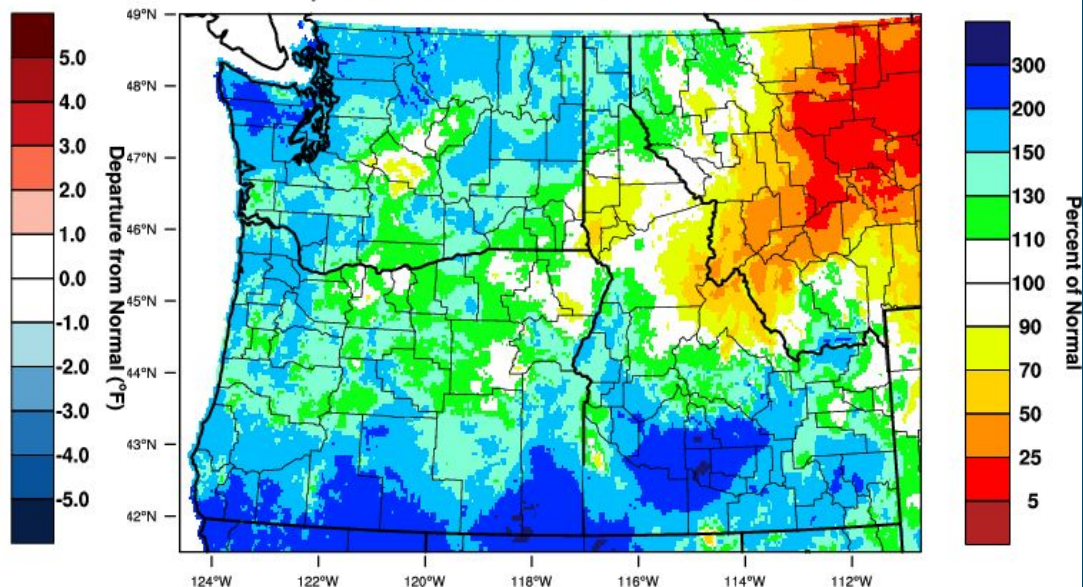
September-October 2021 Departure from 1981-2010 Normal



WestWide Drought Tracker - U Idaho/WRCC Data Source - PRISM (Prelim), created 2 NOV 2021

Pacific Northwest - Precipitation

September-October 2021 Percent of 1981-2010 Normal



WestWide Drought Tracker - U Idaho/WRCC Data Source - PRISM (Prelim), created 2 NOV 2021



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Drought Update

US Drought Monitor & Seasonal Outlook

www.cpc.noaa.gov



U.S. Drought Monitor Pacific Northwest DEWS

November 16, 2021
(Released Thursday, Nov. 18, 2021)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	9.09	90.91	89.14	76.01	41.00	11.74
Last Week 11-09-2021	8.96	91.04	89.36	81.10	44.62	13.88
3 Months Ago 08-17-2021	0.00	100.00	94.19	85.61	59.70	25.20
Start of Calendar Year 12-29-2020	38.14	61.86	40.77	27.90	10.74	0.00
Start of Water Year 09-28-2021	0.00	100.00	93.35	84.83	57.49	24.06
One Year Ago 11-17-2020	34.05	65.95	40.40	28.22	12.75	0.00

Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

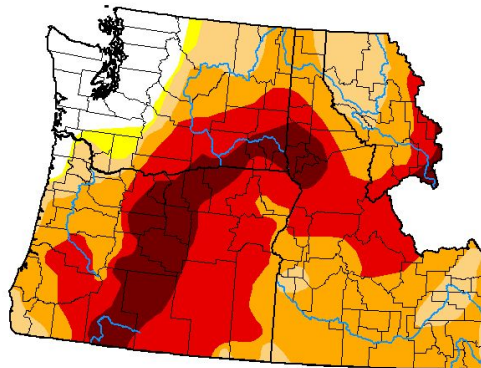
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Curtis Riganti
National Drought Mitigation Center

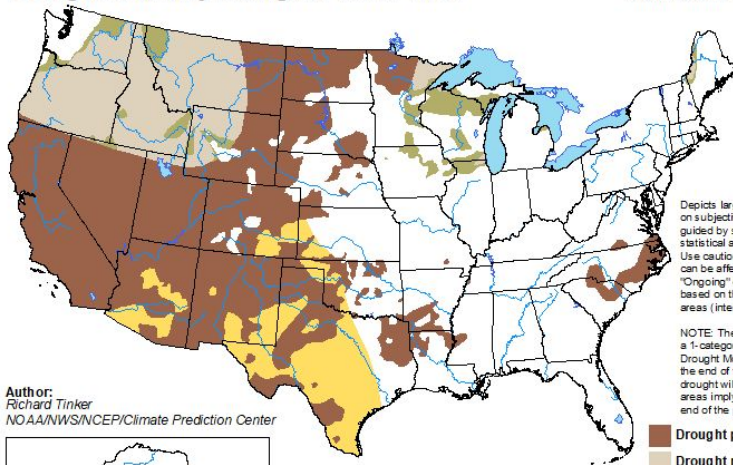


droughtmonitor.unl.edu

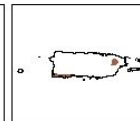
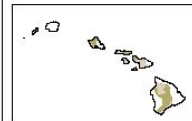
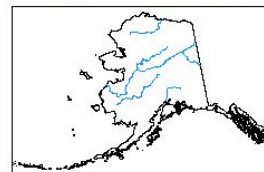


U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

Valid for November 18, 2021 - February 28, 2022
Released November 18, 2021



Author:
Richard Tinker
NOAA/NWS/NCEP/Climate Prediction Center



Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

- Drought persists
- Drought remains but improves
- Drought removal likely
- Drought development likely



<http://go.usa.gov/3eZ73>



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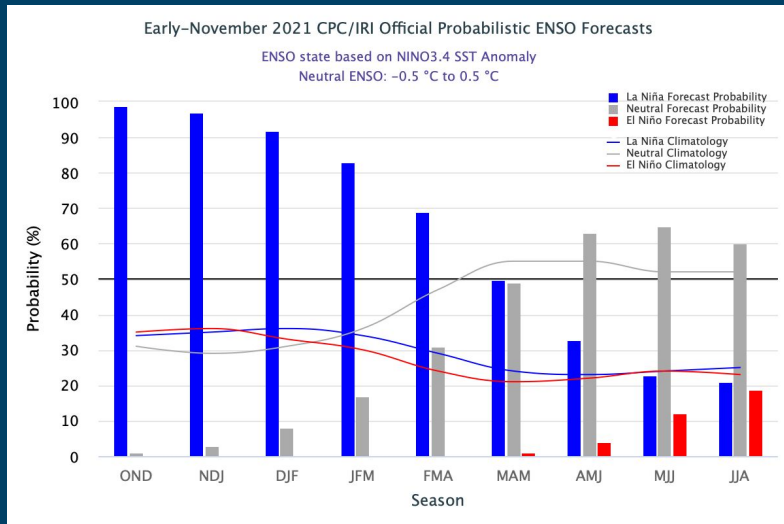
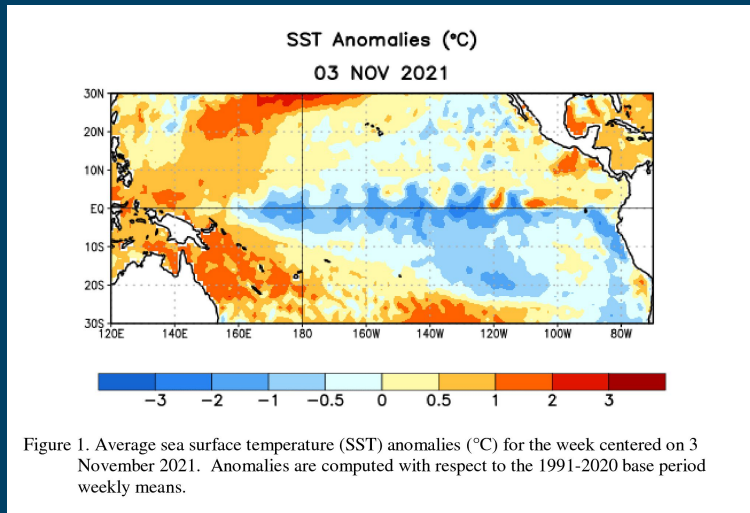


La Nina Status

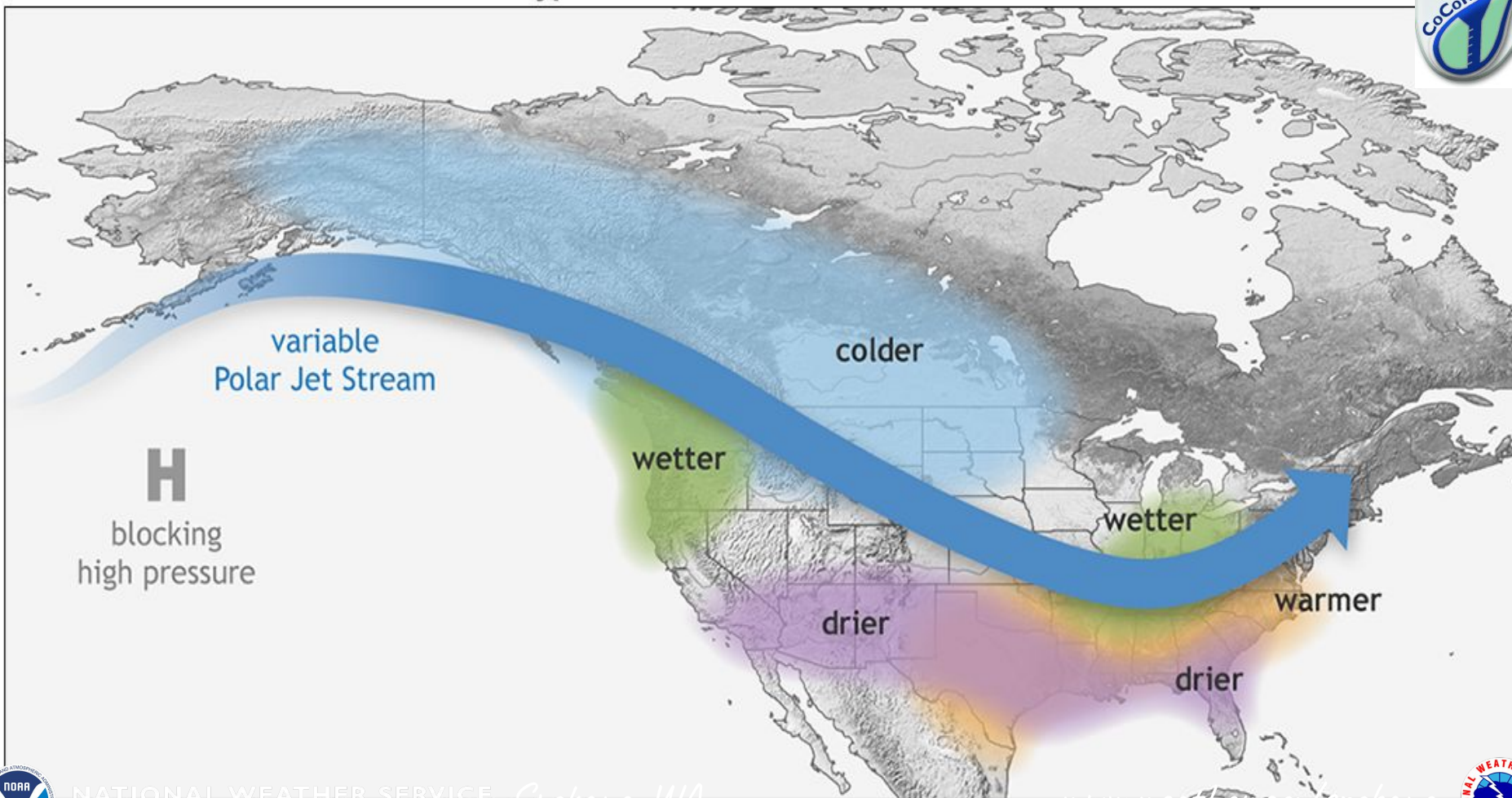
ENSO Alert System Status: La Niña Advisory



- Equatorial sea surface temperatures (SSTs) are near-to-below average across most of the Pacific Ocean.
- La Niña conditions have developed and are expected to persist especially from December 2021 to February 2022 in the Northern Hemisphere.



Typical Wintertime La Nina Pattern



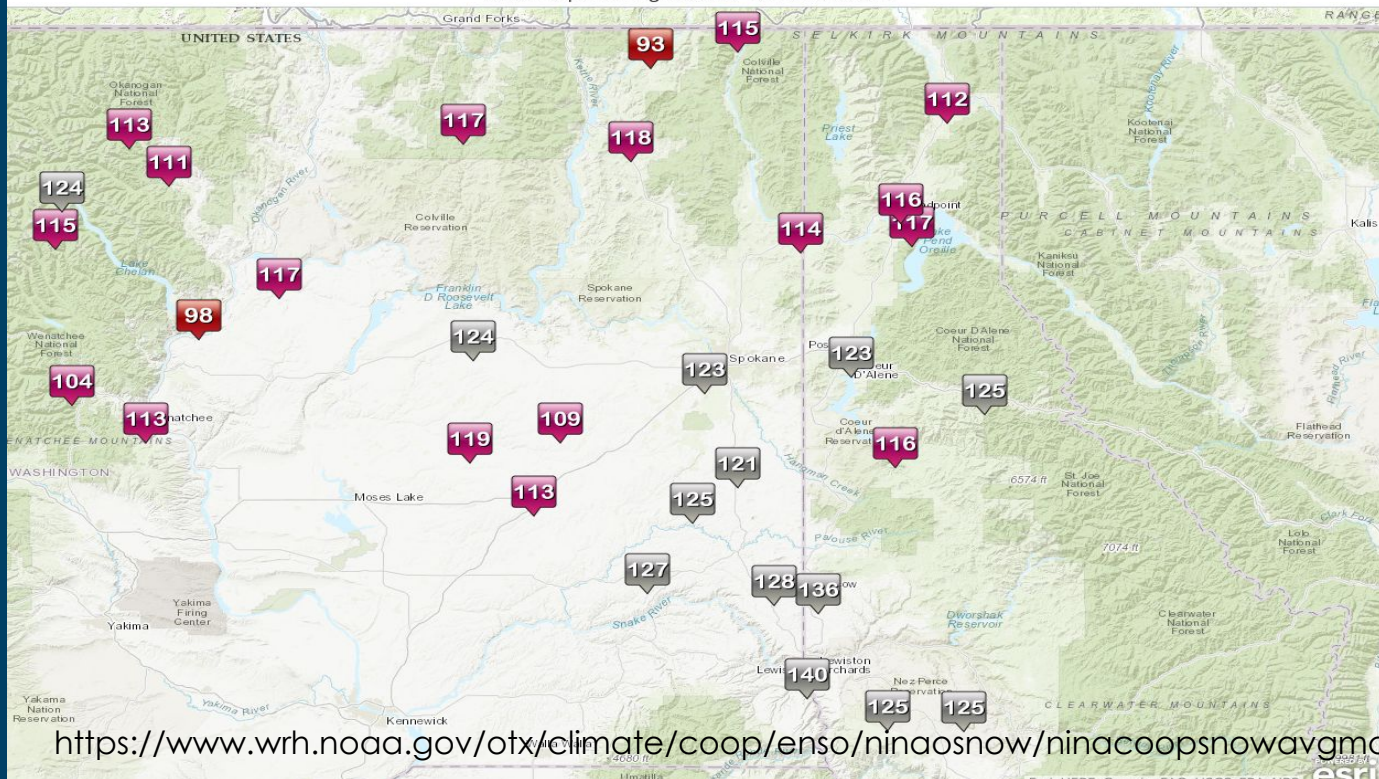
Interactive La Nina Snow Climatology



NWS Spokane Coop Observed, La Nina Snow Climatology

Percent of Normal Snowfall

Click on a point or right sidebar for the full details.



Bonnors Ferry - Avg. 71 in., Pct. Norm. 112%
Boundary Dam - Avg. 67 in., Pct. Norm. 115%
Chief Joseph Dam - Avg. 33 in., Pct. Norm. 117%
Chelan - Avg. 31 in., Pct. Norm. 98%
Coeur d'Alene - Avg. 63 in., Pct. Norm. 123%
Colville - Avg. 56 in., Pct. Norm. 118%
Harrington - Avg. 30 in., Pct. Norm. 109%
Holden Village - Avg. 316 in., Pct. Norm. 115%
Kellogg - Avg. 67 in., Pct. Norm. 125%
La Crosse - Avg. 22 in., Pct. Norm. 127%
Leavenworth - Avg. 94 in., Pct. Norm. 104%
Lewiston - Avg. 22 in., Pct. Norm. 140%
Moscow - Avg. 67 in., Pct. Norm. 136%
Mazama - Avg. 134 in., Pct. Norm. 113%
Newport - Avg. 72 in., Pct. Norm. 114%
Nez Perce - Avg. 52 in., Pct. Norm. 125%
Northport - Avg. 59 in., Pct. Norm. 93%
Odessa - Avg. 18 in., Pct. Norm. 119%
Priest River - Avg. 92 in., Pct. Norm. 117%
Pullman - Avg. 46 in., Pct. Norm. 128%
Republic - Avg. 60 in., Pct. Norm. 117%
Rosalia - Avg. 31 in., Pct. Norm. 121%
Ritzville - Avg. 22 in., Pct. Norm. 113%
Sandpoint - Avg. 81 in., Pct. Norm. 116%
Spokane - Avg. 59 in., Pct. Norm. 123%
St. John - Avg. 25 in., Pct. Norm. 125%
St. Maries - Avg. 65 in., Pct. Norm. 116%
Stehakin - Avg. 161 in., Pct. Norm. 124%
Wenatchee - Avg. 29 in., Pct. Norm. 113%
Wilbur - Avg. 31 in., Pct. Norm. 124%
Winchester - Avg. 113 in., Pct. Norm. 125%
Winthrop - Avg. 77 in., Pct. Norm. 111%

<https://www.wrh.noaa.gov/otx/climate/coop/enso/ninaosnow/ninacoopsnowavgmap.php>



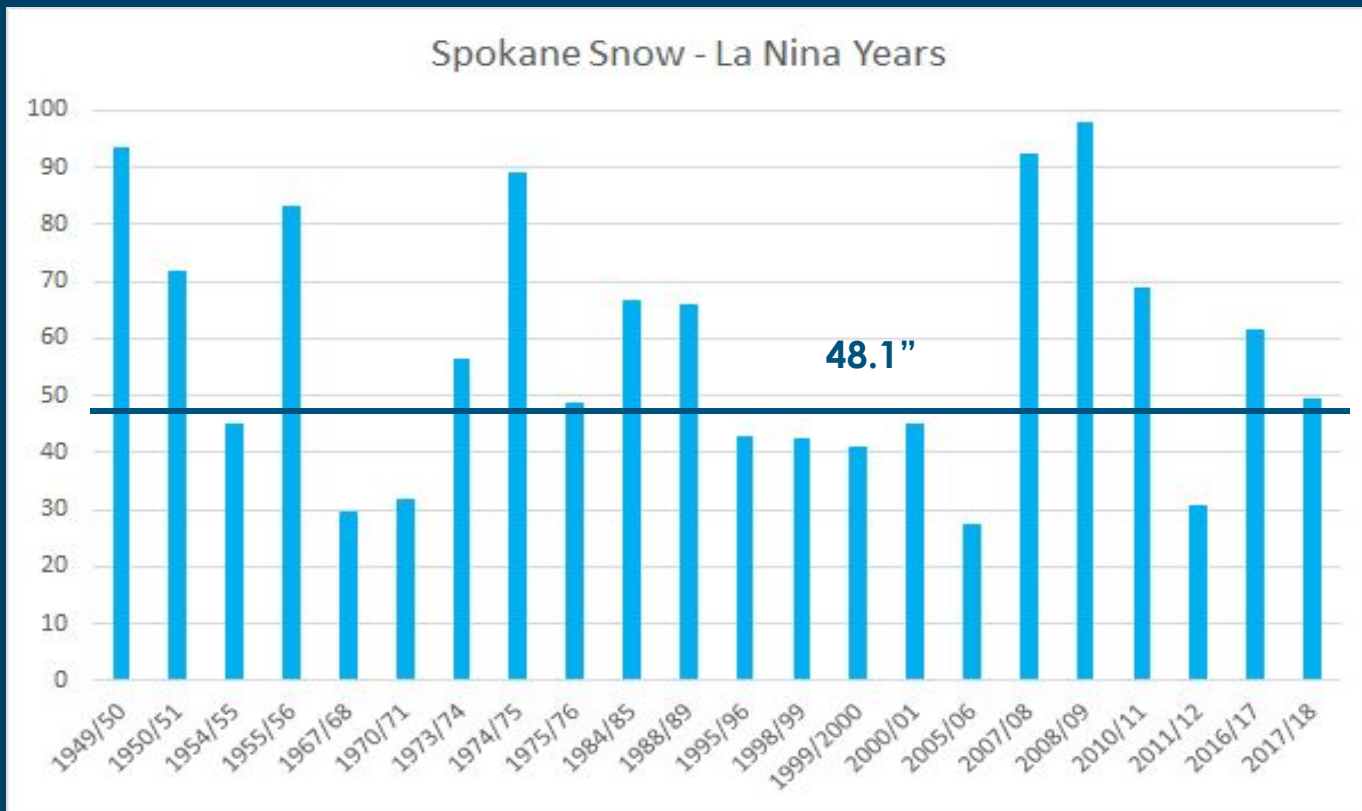
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Spokane La Nina Snowfall





CONSECUTIVE LA NINA WINTERS



Spokane Snowfall



Above Normal (A) = 5

Normal (N) = 4

Below Normal (B) = 1



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8-14 Day Outlook

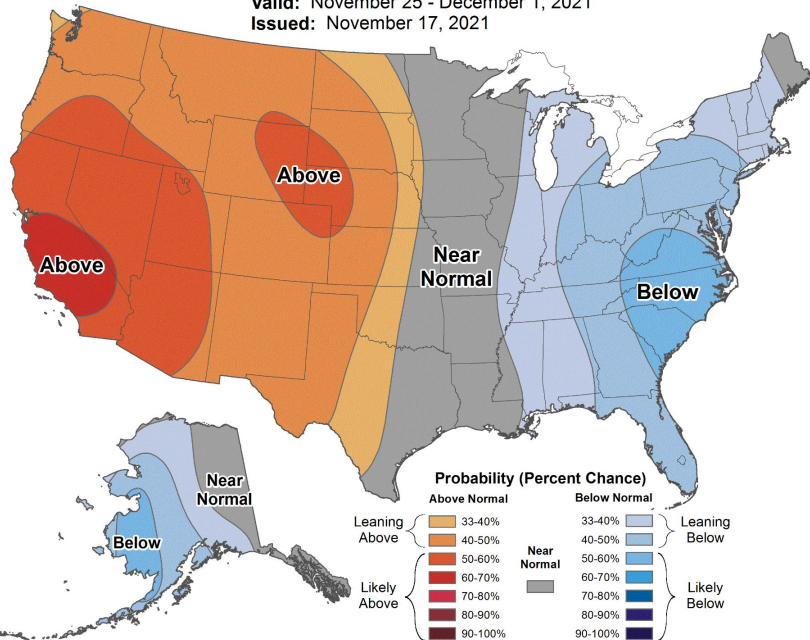
Rest of November

www.cpc.noaa.gov



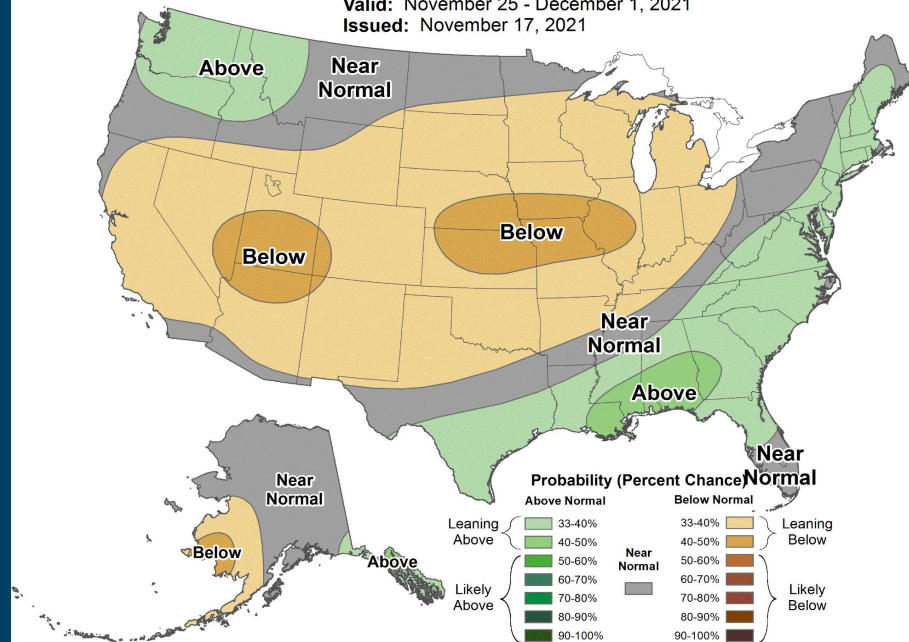
8-14 Day Temperature Outlook

Valid: November 25 - December 1, 2021
Issued: November 17, 2021



8-14 Day Precipitation Outlook

Valid: November 25 - December 1, 2021
Issued: November 17, 2021



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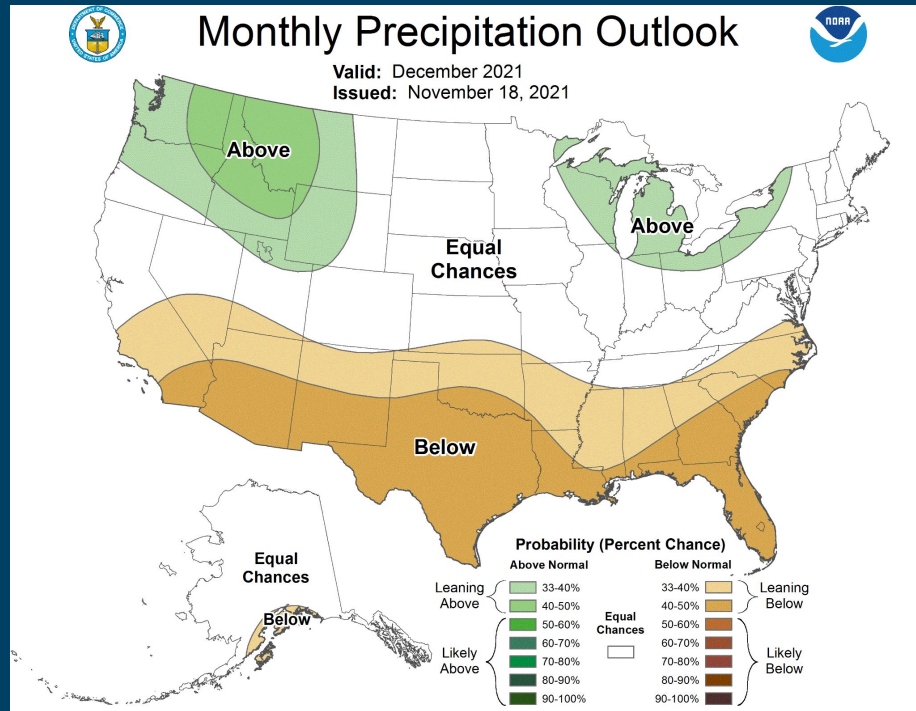
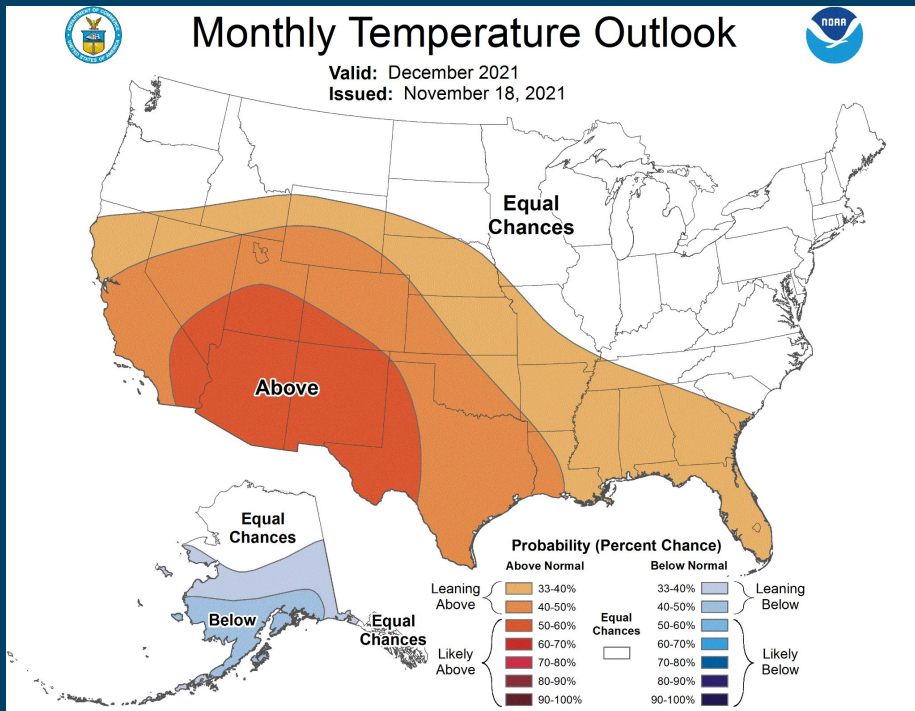
www.weather.gov/spokane



One Month Outlook

December

www.cpc.noaa.gov



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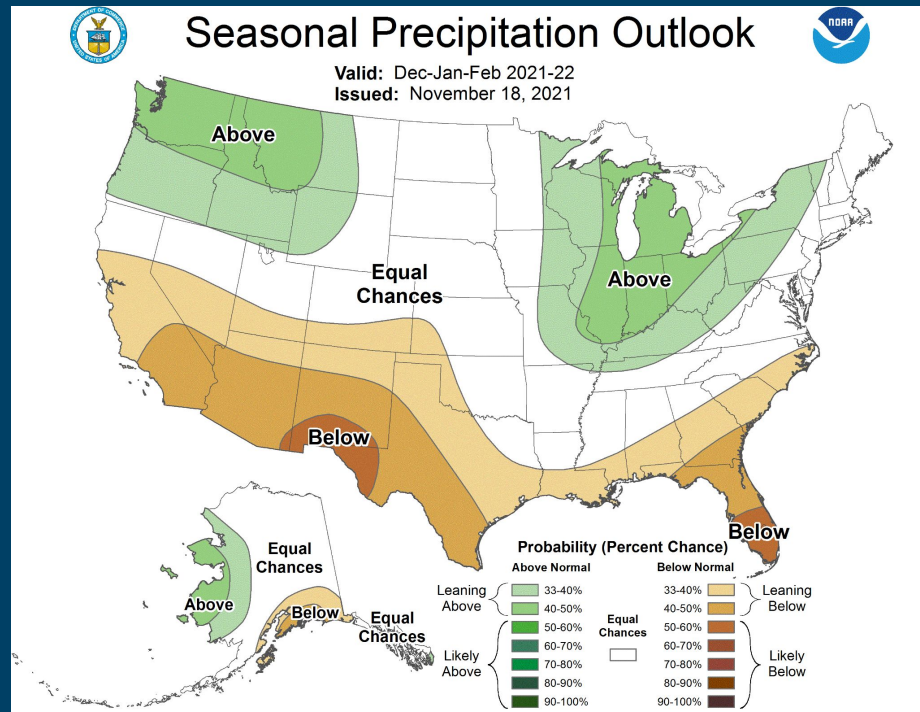
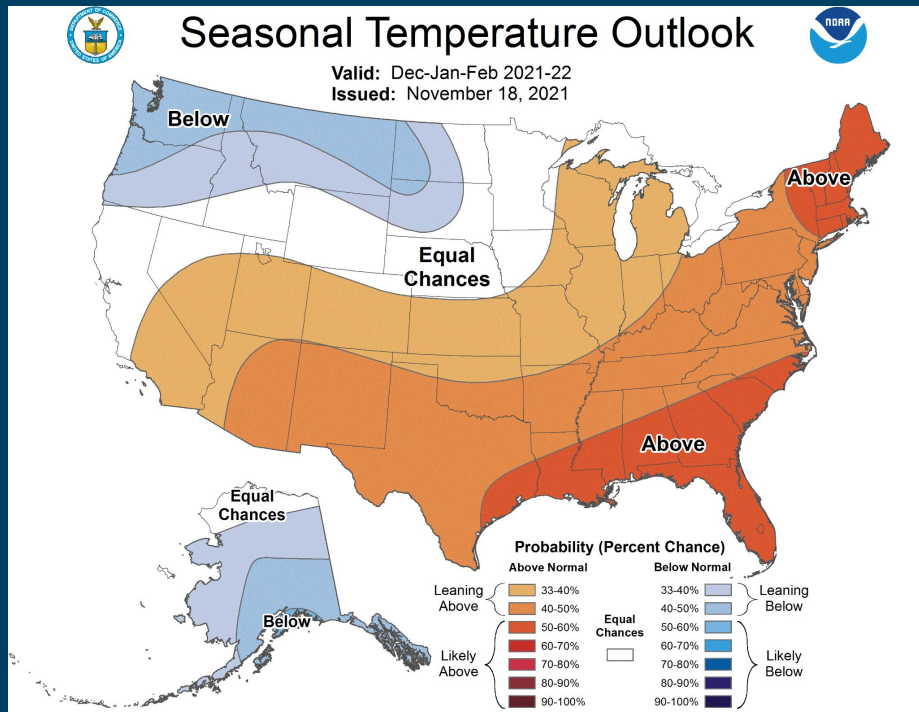
www.weather.gov/spokane



Three Month Outlook

December through February

www.cpc.noaa.gov



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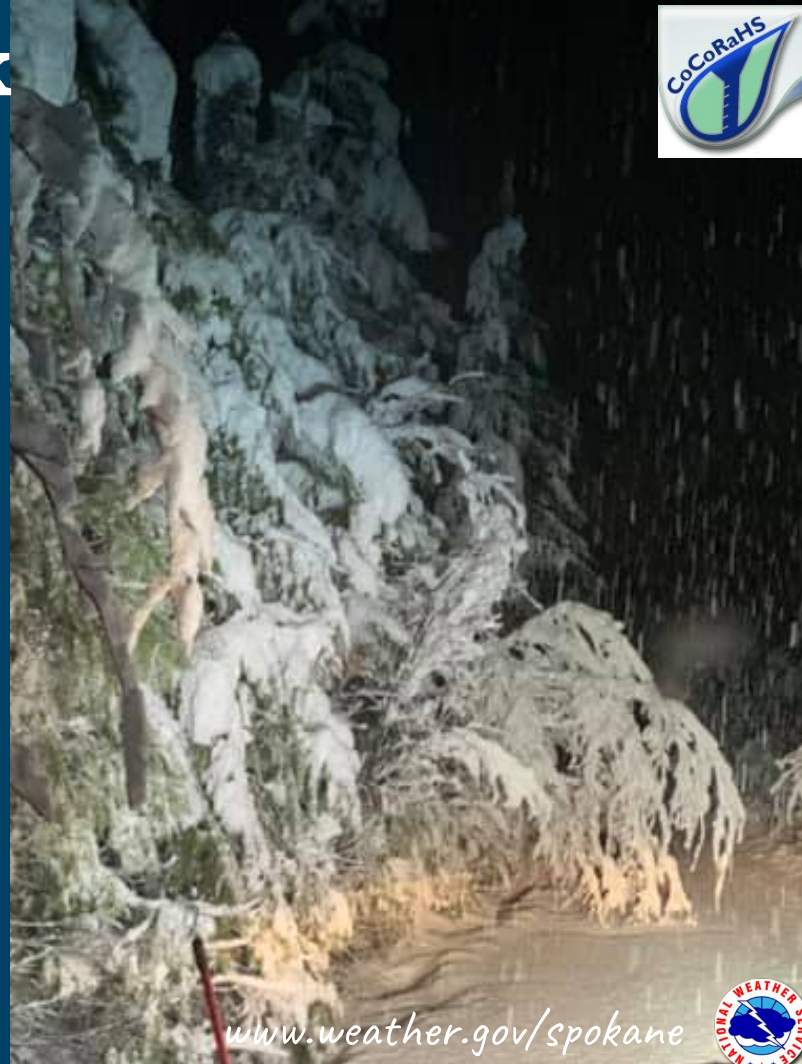
www.weather.gov/spokane





Key Points – Winter Outlook

- Drought continues, but may see a slow improvement through the winter.
- La Nina favored for the upcoming winter
 - Winter outlook - Slightly elevated odds of cooler, wetter & snowier than normal
- Winter is coming....Anticipate storms with snow, ice, rain and wind, but not one storm makes a season.
- We look forward to your reports!





nws.spokane@noaa.gov

THANK YOU!

What's Next?

Visit cocorahs.org

- Register if you want to join
- Review training videos and slides
- Check out the latest precipitation maps

Any Questions?

Unmute yourself to talk



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Observer appreciation certificates

Once a year send a certificate from your state

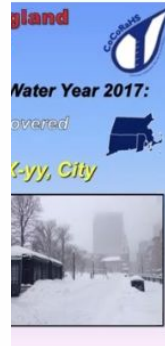
OR-CS-7	Coos Bay 1 NNW	4356
OR-JS-1	O'Brien 2 SW	4185
OR-CS-11	Bandon 7.1 NNE	4163
OR-CS-3	Coos Bay 2.1 ESE	4145
OR-DG-10	Glide 1.1 SE	4138
OR-DG-27	Oakland 0.1 NNE	4126
OR-DG-22	Oakland 4.5 W	4049
OR-JC-11	Jacksonville 10 S	4039
OR-JC-27	Jacksonville 8.9 WSW	4021
OR-DG-26	Glide 2.9 SSW	3985
OR-CS-14	Coos Bay 1.7 WNW	3963
OR-KL-5	Klamath Falls 3.4 ESE	3943
OR-CY-1	Brookings 4.2 ENE	3925
OR-JC-29	Gold Hill 0.2 WSW	3877
OR-DG-30	Roseburg 4.6 NNW	3794
OR-JC-8	Central Point 10 N	3760
OR-DG-12	Idleyld Park 4 ESE	3693
OR-CY-3	Bandon 11.4 S	3675
OR-JC-13	Ashland 1 WNW	3665
OR-DG-3	Days Creek 1 N	3642
OR-JC-16	Prospect 7 SW	3614
OR-JC-1	Williams 1 N	3608
OR-DG-33	Roseburg 1.2 WNW	3552
OR-DG-16	Tenmile 1.8 NE	3485
CA-SK-5	Yreka 0.9 WNW	3414
OR-JC-2	Ashland 1.4 ESE	3260
OR-JC-18	Shady Cove 0.2 S	3225
OR-JC-5	Ashland 1 SE	3222
CA-SK-3	Weed 5.4 N	3177
OR-JS-5	Cave Junction 3.7 E	3176
OR-KL-14	Bonanza 7.0 N	3083
OR-JC-38	Medford 5.0 SSW	2794
OR-KL-4	Klamath Falls 8 SE	2787

Stations with
over 3,000
CoCoRaHS
observations in
their CWA!

9 > 4,000 . . . TERRIFIC!
31 > 3,000
52 > 2,000

Celebrate their dedication!!

You can download this information from the Station History Report



Dr. David A. Robinson
NJ State Climatologist

Mr. Mathieu R. Gerbush
NJ Assistant State Climatologist







icates and celebrates it's COOP observers, for 5, 10, 20 years of service. S coordinators can do so as well . . . Observers really appreciate this!

Poll questions and answers

TYPE ☒ Multiple choice with one answer ▾

What is included in the Total Snow Depth measurement?

- ☐ Just the new snowfall 74 characters left 
- ☐ Optional - only done once a week 39 characters left 
- ☐ The total of old and new snow 28 characters left 
- ☐ The amount of snow caught in the gauge 31 characters left 

+ Add another answer

TYPE ☒ Multiple choice with one answer ▾





When there is no precipitation, a CoCoRaHS report is not needed?|

- ☐ True 63 characters left
- ☐ False 56 characters left

+ Add another answer

TYPE ☒ Multiple choice with one answer ▾





What is SWE?|

- ☐ Snow Water Equivalent 116 characters left 
- ☐ The amount of water in the total snow depth 39 characters left 
- ☐ Measured about once a week or when requested 17 characters left 
- ☐ All of the above 16 characters left 

+ Add another answer

TYPE ☒ Multiple choice with one answer ▾

What is your main source of weather information? |

- ☐ TV 79 characters left 
- ☐ Phone apps 58 characters left 
- ☐ NWS web page 50 characters left 
- ☐ other 48 characters left 

+ Add another answer