

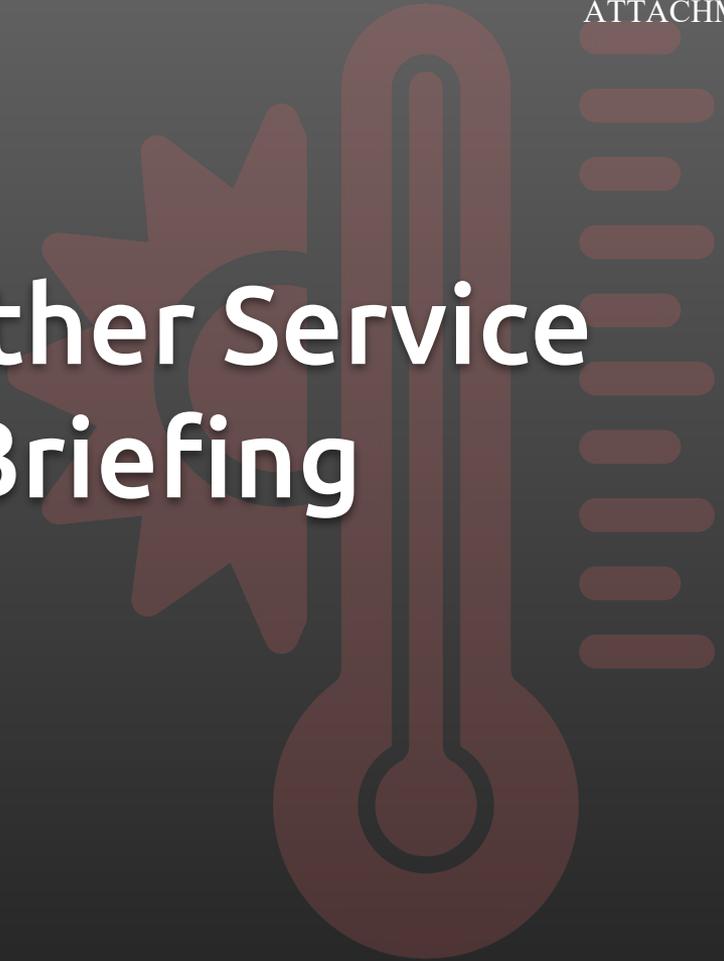


NATIONAL WEATHER SERVICE

*Seattle*

# National Weather Service Pre-Summer Briefing

Spring 2022





NATIONAL WEATHER SERVICE

*Seattle*

# Extreme Heat





# Hazard Description

## EXTREME HEAT

Heat is the leading weather-related cause of fatalities in the United States.

- This is especially true in the urban centers, where population density, the urban heat island, and building construction exacerbate the effects of excessive heat.
- Poor air quality can occur during periods of extreme heat (ozone and particulates). Poor AQ amplifies the health impacts during heat events
- Heat can lead to heat-related illness, including heat cramps, heat exhaustion, and heat stroke.
- Heat can also result in significant impacts to infrastructure, including roadways, railways, power/telecommunications lines, and cause increased strain on power systems.
- Heat can also increase the rate at which fire danger increases (through fuel drying)



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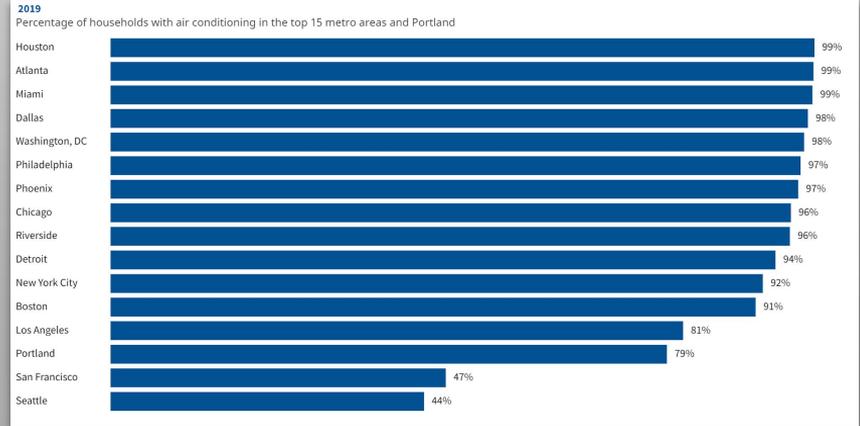
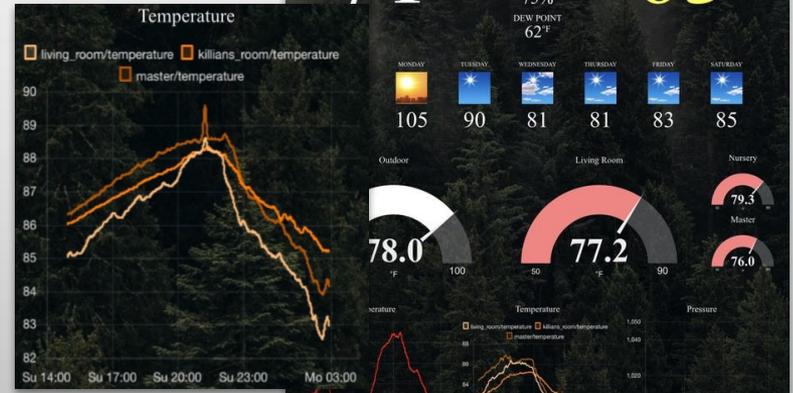
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# Hazard Description

## Indoor Temperatures & Low Temperatures

- PNW homes are designed to let in and retain heat (south facing windows, insulation, etc.)
- For locations without A/C (the majority of Western WA homes), indoor temperatures don't typically peak until the outdoor temperature is cooler than the indoor temperature
- **The hotter the event, the later this crossover occurs**
- June 2021 heat wave example: indoor temperatures didn't peak until between 10pm - 11pm
- Once windows are opened, the indoor temperature will only cool as fast as the outdoor temperature, and only as low as the morning low - making **overnight low temperatures critically important.**
- These factors should be taken into account when considering cooling center hours





Seattle

# Climate Change - Washington State

[See NOAA NCEI State Climate Summary 2022 for more information](#)

1. Temperatures in Washington have **risen almost 2°F** since the beginning of the 20th century. Winter warming has been evident in the below average number of freezing days and very cold nights since 1990. Under a higher emissions pathway, historically **unprecedented warming is projected to continue** through this century.
2. Rising temperatures will lead to **earlier melting of the snowpack**, which plays a critical role in spring and summer water supplies. The combination of this earlier melting and more precipitation falling as rain instead of snow may lead to an increase in springtime flooding.
3. Wildfires during the dry summer months are a particular concern for Washington, and the **frequency and severity of wildfires are projected to increase**.



# NWS HeatRisk

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## Purpose

To put heat into an actionable, impacts-based context and to provide support in decision-making at a local level.

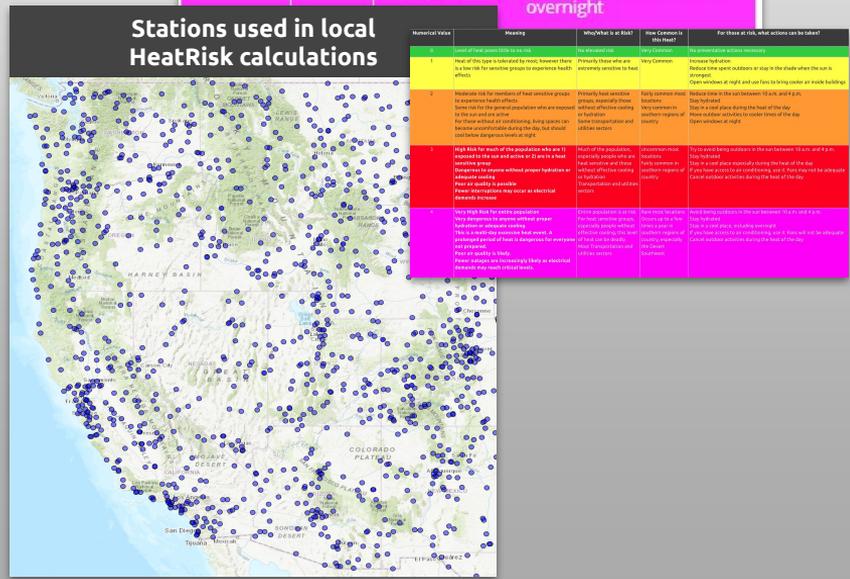
## HeatRisk takes into account:

- **Local climatology** - including the time of year, and temperature climatology.
- **Forecast** - Including the daily max & min temperatures as well as the event duration.
- **Impacts** - including identifying groups potentially most at risk for the given level of heat. CDC heat health data is used in this calculation.

*Note: infrastructure impacts are not connected to HeatRisk*

HeatRisk is used to influence the issuance of and add value to NWS watches, warnings, and advisories.

Category	Level	Meaning
Green	0	No Elevated Risk
Yellow	1	Low Risk for those extremely sensitive to heat, especially those without effective cooling and/or adequate hydration
Orange	2	Moderate Risk for those who are sensitive to heat, especially those without effective cooling and/or adequate hydration
Red	3	High Risk for much of the population, especially those who are heat sensitive and those without effective cooling and/or adequate hydration
Magenta	4	Very High Risk for entire population due to long duration heat, with little to no relief overnight





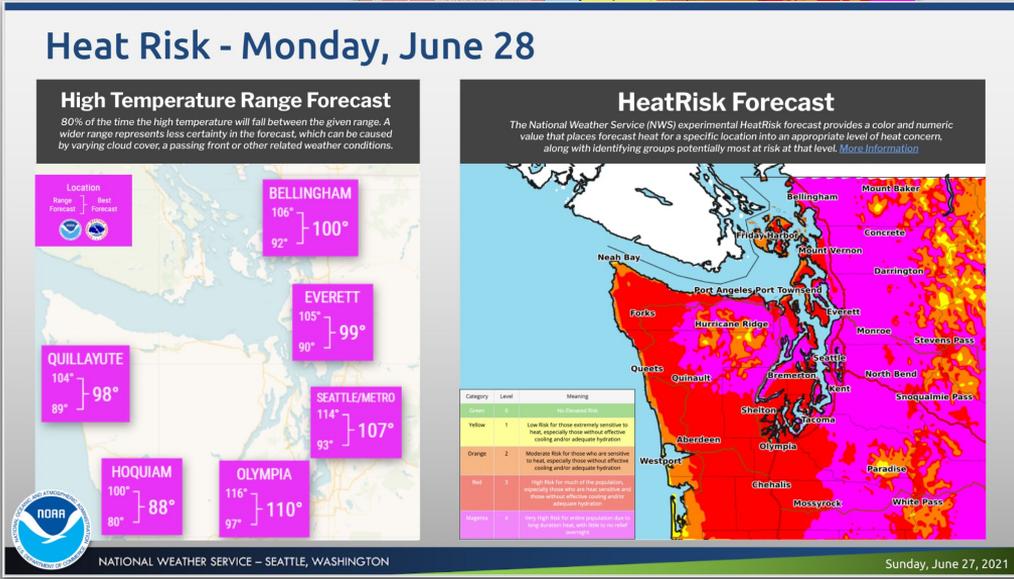
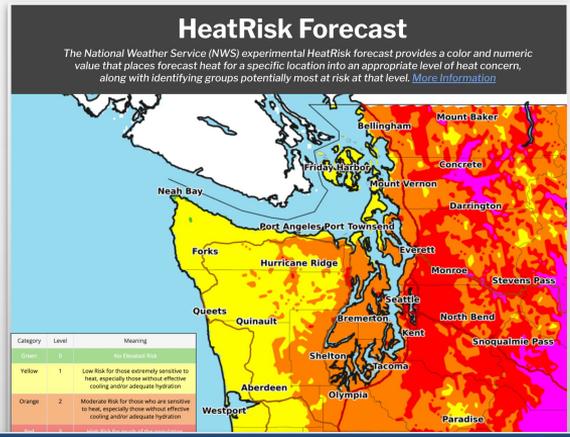
# NWS HeatRisk

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HeatRisk is used extensively in both public and partner messaging.

Often paired with high or low temperature forecast information.



Sunday, June 27, 2021



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# HeatRisk Updates

By Summer 2022 we expect HeatRisk version 2 to be implemented. Expected changes:

- CDC heat health thresholds are now more strongly weighted
- Updated thresholds with new 1991-2020 climate data
- Better logic for near-record and/or long-duration events

Overall effect is a lowering of the HeatRisk thresholds, especially early/late in the summer.

This will result in more conservative messaging.



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# NWS HeatRisk Resources

- [Current HeatRisk Forecasts](#)
- [Statewide HeatRisk Maps](#)
- [Historical HeatRisk Data](#)
- [About HeatRisk](#)



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# Wildfire Smoke & Summer Air Quality



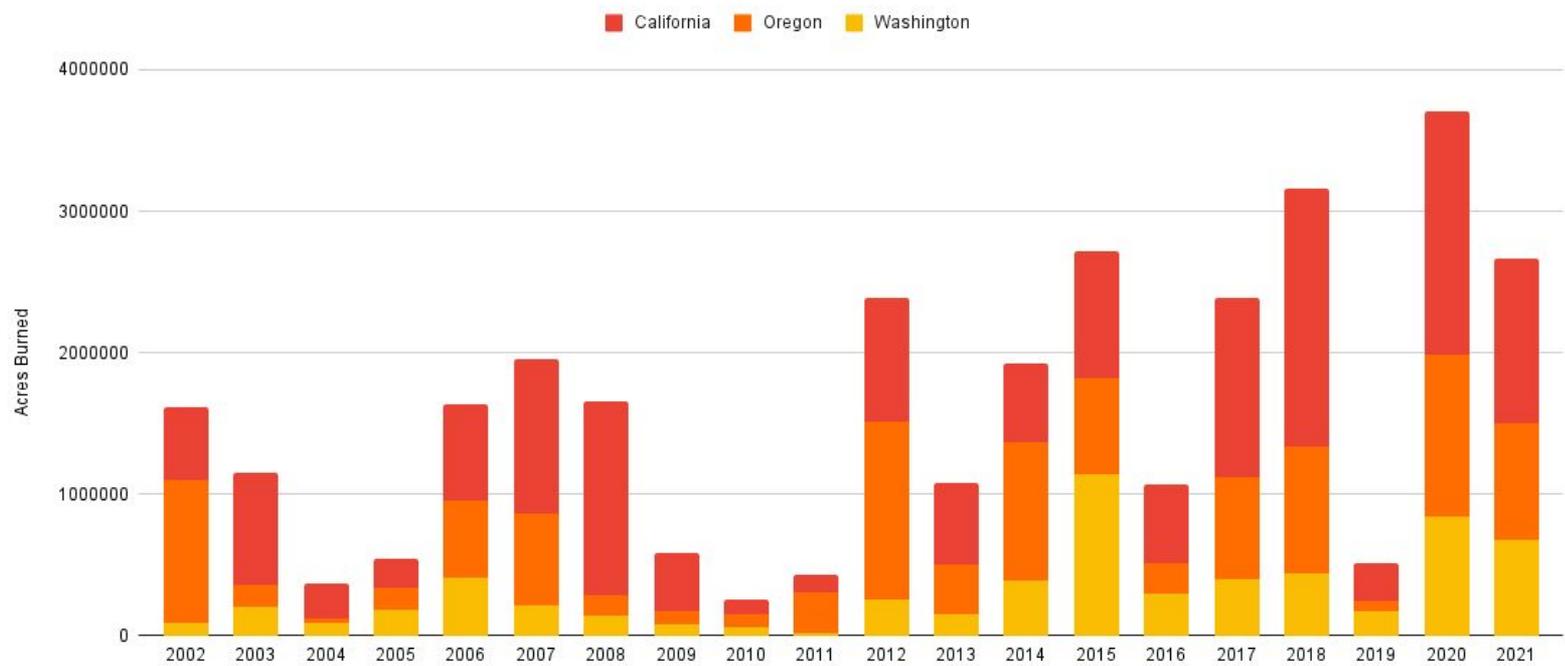


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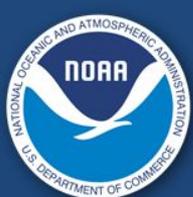
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# Wildfire Trends - West Coast

Wildfire - Acres Burned by Year



Data Courtesy NIFC

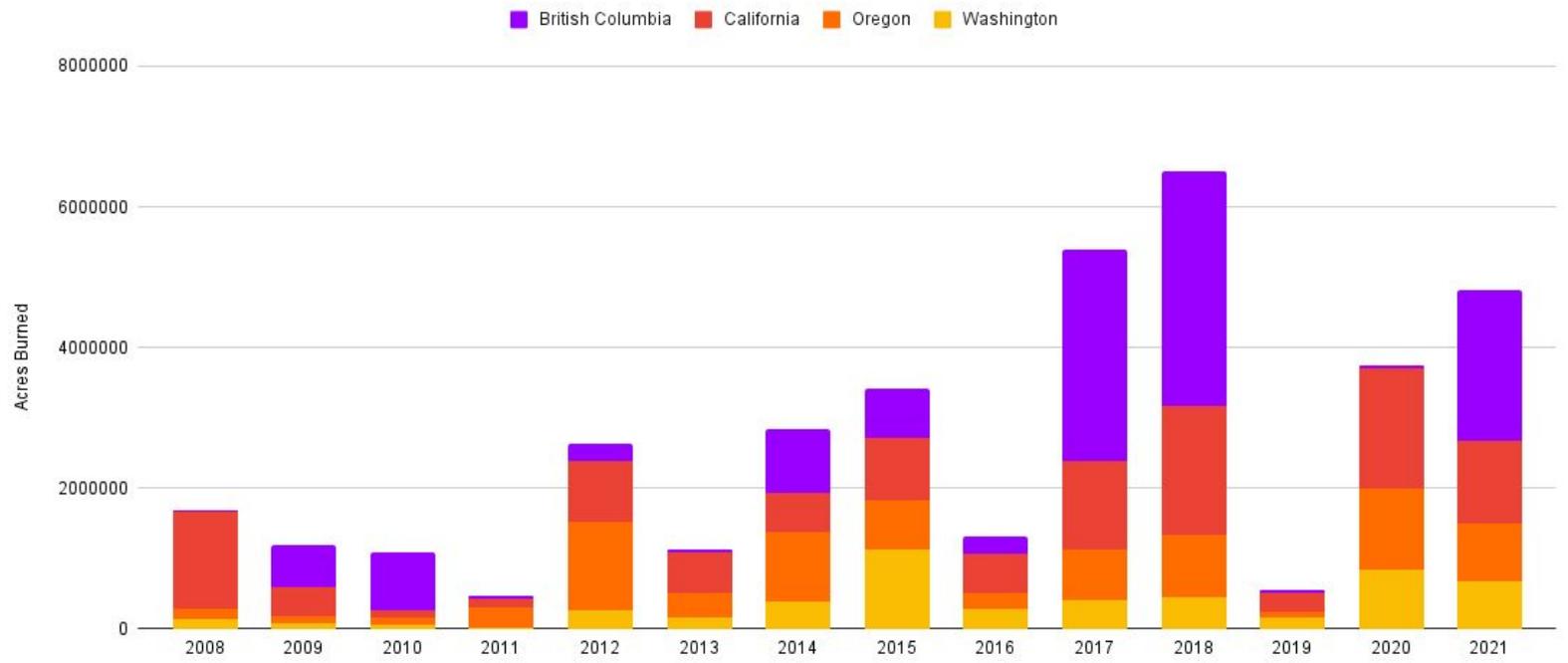


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# Wildfire Trends - West Coast & B.C.

Wildfire - Acres Burned by Year



Data Courtesy NIFC & Govt of British Columbia

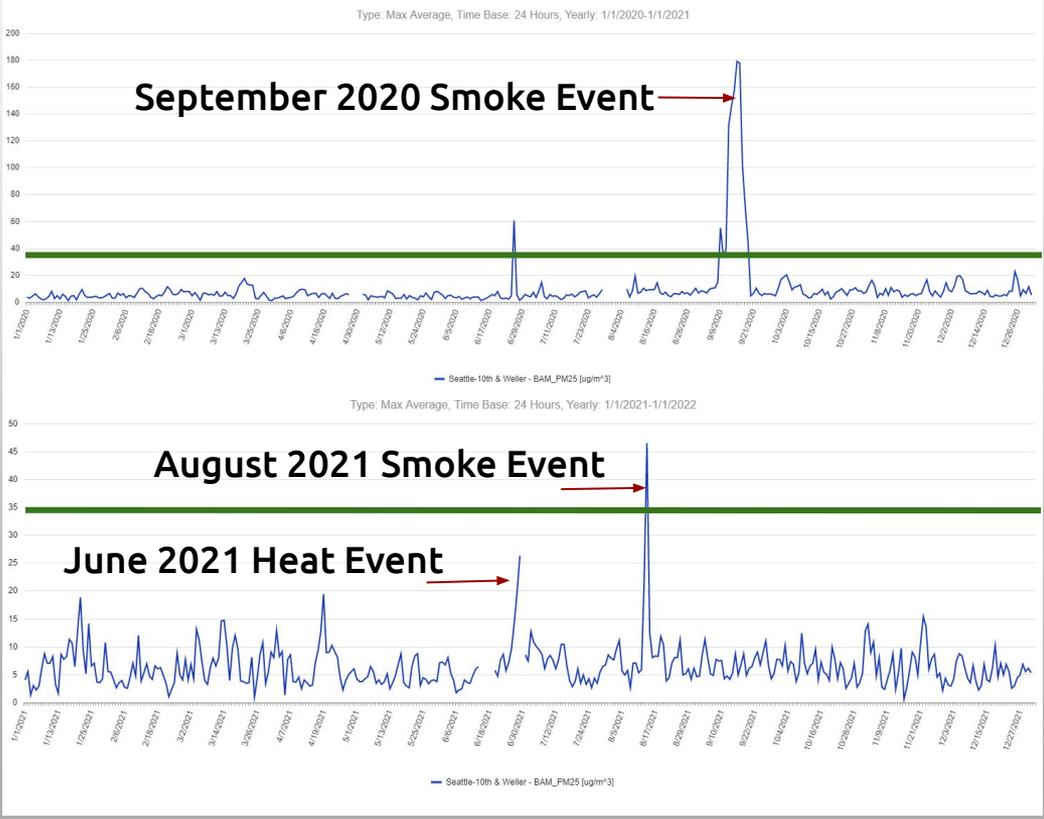


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# Yearly Particulate Matter Trends

- Wildfire smoke is the typical reason for poor AQ during the summer months in Western Washington.
- While AQ can decrease during extreme heat it is often more localized and is typically due to increased concentrations of both PM and ozone.





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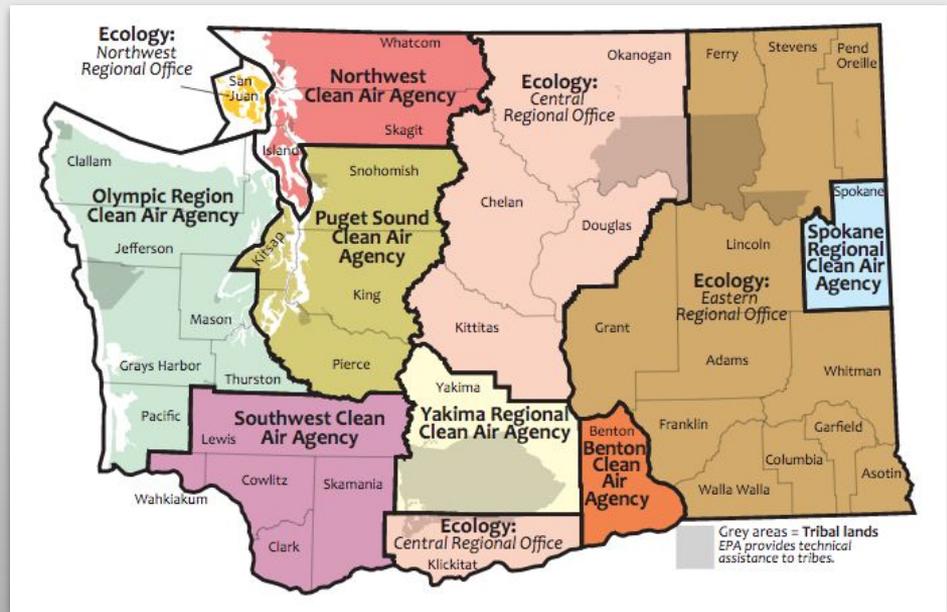
# Smoke & Air Quality Responsibilities

## Lead Agencies

- Local Clean Air Agencies
- WA State Department of Ecology
- Tribal Nations (EPA provides technical assistance)

## NWS Responsibility

- NWS is NOT the lead agency for alerts/messaging for air quality or smoke events.
- Air Quality Alerts may be disseminated through NWS pathways in coordination with lead agencies.
- NWS provides wildfire smoke modeling and may send messaging regarding potential smoke events and amplify information from partner agencies.
- NWS can trigger collaboration calls with lead agencies.





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# Fire Weather



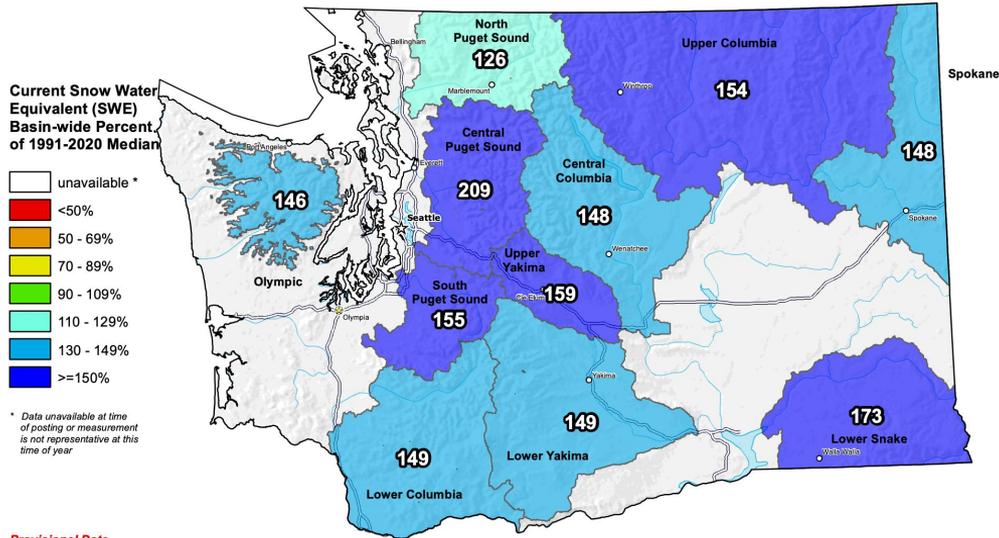
# What do we look at?

- **Pre-season**
  - Mountain snowpack (low correlation)
  - Long-term drought? (higher correlation)
- **June:** Important in gaging how soon fire season will begin
- **Most Important?** What happens during fire season (Jul-Sep)
  - Long-range Climate Outlooks

# PNW: Near/Above normal. Southwest: Below normal

## Washington SNOTEL Current Snow Water Equivalent (SWE) % of Normal

May 19, 2022



Provisional Data  
Subject to Revision



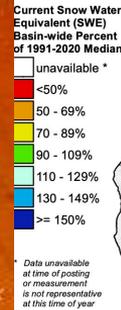
The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by:  
USDA/NRCS National Water and Climate Center  
Portland, Oregon  
<https://www.nrcs.usda.gov/wps/portal/wcc/home/>



## Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

May 19, 2022

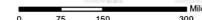


Provisional data  
subject to revision



The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

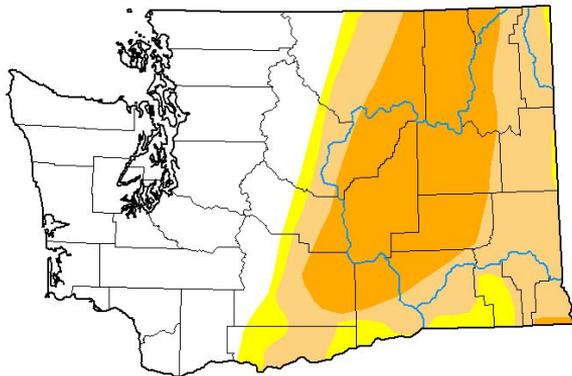
Prepared by:  
USDA/NRCS National Water and Climate Center  
Portland, Oregon  
<https://www.nrcs.usda.gov/wps/portal/wcc/home/>



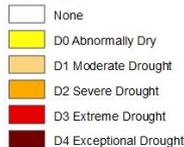
# Drought Conditions

## U.S. Drought Monitor Washington

May 17, 2022  
(Released Thursday, May 19, 2022)  
Valid 8 a.m. EDT



### Intensity:



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>

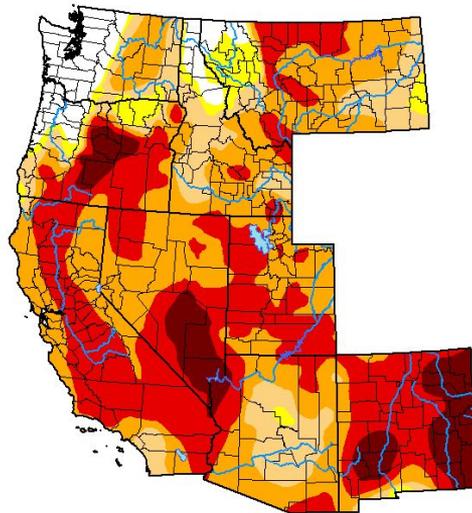
Author:  
Richard Heim  
NCEI/NOAA



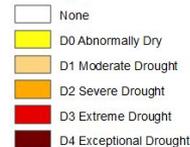
[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

## U.S. Drought Monitor West

May 17, 2022  
(Released Thursday, May 19, 2022)  
Valid 8 a.m. EDT



### Intensity:



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:  
Richard Heim  
NCEI/NOAA



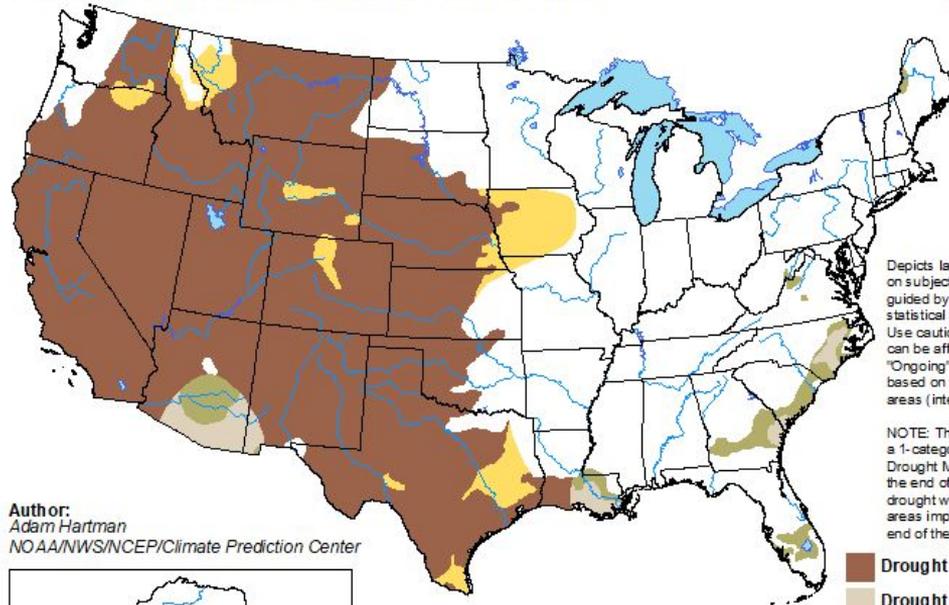
[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

- Stark contrast between W WA & E WA.
- Rest of the west in Moderate to Exceptional Drought

# U.S. Seasonal Drought Outlook

## Drought Tendency During the Valid Period

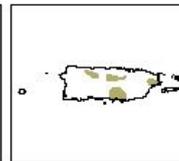
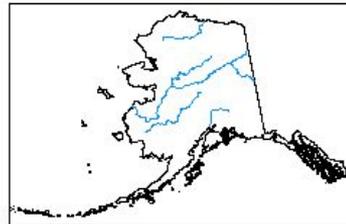
Valid for May 19 - August 31, 2022  
Released May 19



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).

Author:  
Adam Hartman  
NOAA/NWS/NCEP/Climate Prediction Center



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



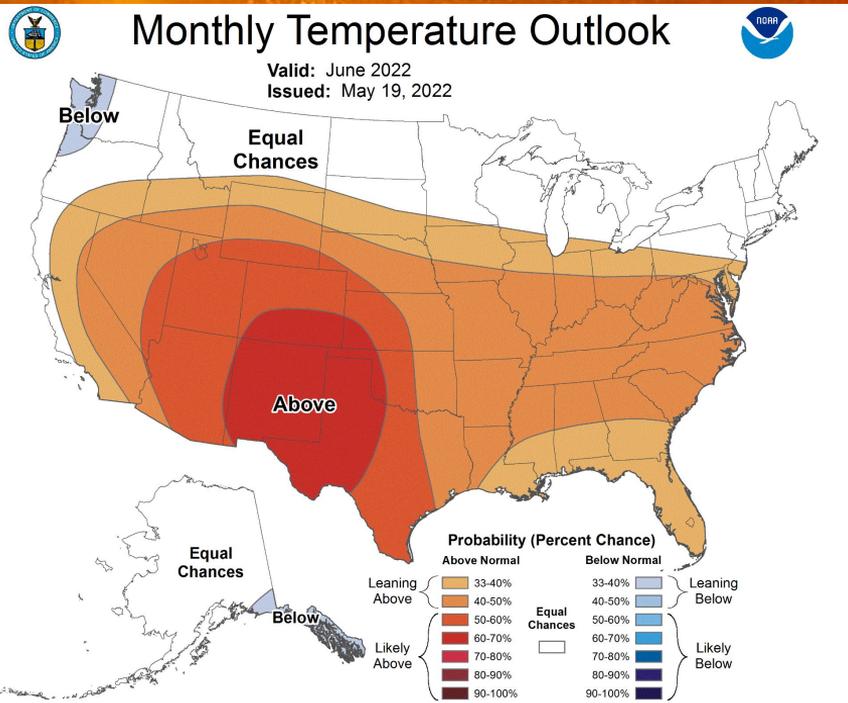
<http://go.usa.gov/3eZ73>

- Washington: East side persistence or increasing
- Rest of the West: Drought is likely to persist, slight improvement in southern AZ

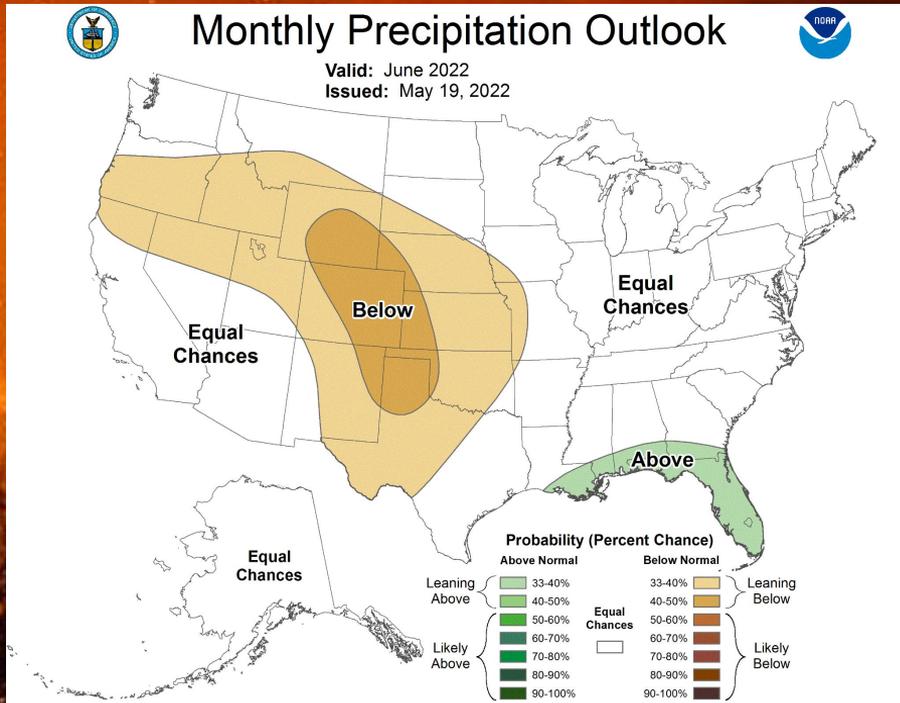
# Temperature and Precipitation Outlook

## June 2022

### Temperature



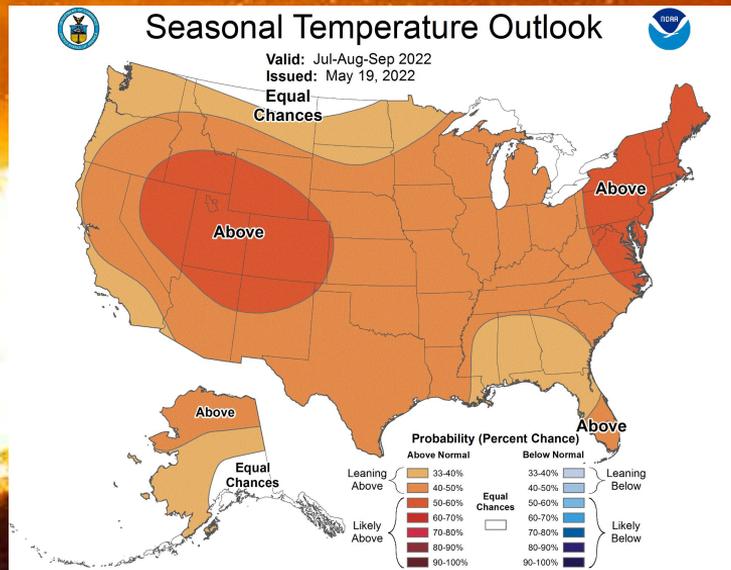
### Precipitation



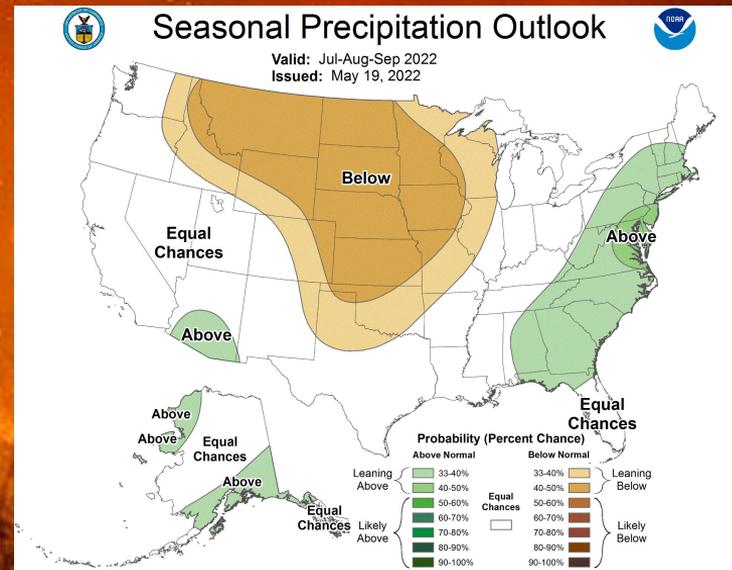
# Temperature and Precipitation Outlook

## July-Aug-Sep 2022

### Temperature



### Precipitation



For Washington, pattern suggests:

- Warm conditions with generally normal to below normal precip (which is low anyway)
- Some potential for lightning given normal chances for precip

# Bottom Line for 2022 PNW Fire Season

- **Season Starting Time –**
  - Likely later than usual start due to cool wet spring
- **Overall Fire Activity –**
  - Near normal
  - Near normal precipitation may allow for an increase in potential lightning strikes when compared to the past couple of years.
- **Season Ending Time –**
  - ENSO status and current Climate Outlooks suggest either a slightly early to on-time end to the season.



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# Public Information Resources



# Safety & Calls to Action Resources

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## Summer Safety Resources

- Social Media Plans - canned graphics as well as Twitter/Facebook captions
- Infographics
- Videos
- Presentations
- Spanish Content
- Deaf & Hard of Hearing Content

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

- Hazard-based safety resources

Washington 2-1-1

- NWS Seattle has developed an initiative to promote WA 2-1-1 in public products & services. *"For sheltering information and other human services in your area, dial 2-1-1 during business hours or visit wa211.org anytime."*

HEAT EXHAUSTION		OR	HEAT STROKE	
Faint or dizzy			Throbbing headache, confusion	
Excessive sweating			No sweating	
Cool, pale, clammy skin			Body temperature above 103° Red, hot, dry skin	
Nausea or vomiting			Nausea or vomiting	
Rapid, weak pulse			Rapid, strong pulse	
Muscle cramps			May lose consciousness	
<ul style="list-style-type: none"> <li>• Get to a cooler, air conditioned place</li> <li>• Drink water if fully conscious</li> <li>• Take a cool shower or use cold compresses</li> </ul>			<p><b>CALL 9-1-1</b></p> <ul style="list-style-type: none"> <li>• Move person to cooler place</li> <li>• Cool using cool cloths or bath</li> <li>• Do not give anything to drink</li> </ul>	
	@NWSSacramento weather.gov/Sacramento			@SacramentoOES SacramentoReady.org

AGOTAMIENTO DEBIDO AL CALOR		OR	INSOLACION	
Mareos			Dolor de cabeza	
Sudor excesivo			Piel no sudorosa	
Piel pegajosa, fresca y pálida			Temperatura corporal por encima de 103° Piel caliente, roja, y seca	
Náuseas y vómitos			Náuseas y vómitos	
Látidos del corazón rápidos y débiles			Látidos del corazón rápidos y fuertes	
Calambres			Pérdida del conocimiento	
<ul style="list-style-type: none"> <li>• Descanse en un lugar fresco y sombreado</li> <li>• Tome mucha agua y otros líquidos</li> <li>• Báñese con agua fría o utilice compresas frías</li> </ul>			<p><b>Llame al 9-1-1</b></p> <ul style="list-style-type: none"> <li>• Tome acción inmediatamente para enfriar su temperatura corporal hasta que llegue la ayuda necesaria</li> </ul>	
	@NWSSacramento weather.gov/Sacramento			@SacramentoOES SacramentoReady.org



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# Available Decision Support Services





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# Email Briefings & Webinars/Virtual Office Hours



## Initiation

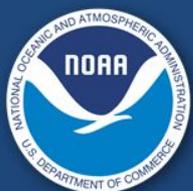
- Email Briefings: Usually for minor or higher risk for populated areas
- Webinars/Virtual Office Hours: Usually for moderate or higher risk for populated areas or when the event is expected to be complex

## Delivery

- Email Briefings: Usually overnight (usually by 7:00 AM)
- Webinars/Virtual Office Hours: Usually late morning (10:00 or 10:30 AM)

## Frequency

- Email Briefings: Daily within 3 days. Every other day or as the forecast changes 4+ days in advance.
- Webinars/Virtual Office Hours: As the forecast changes, up to and including the day of the event



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# Spot Forecasts

## [Spot Forecast Requests/Monitor Page](#)

Spot forecasts are generally designed for:

- Wildfires/Prescribed Burns
- Search & Rescue Operations
- HAZMAT Incidents

They may be used for other urgent, no-notice emergencies.

After submitting a Spot request, a NWS meteorologist may call to gather more information and recommend a different support mechanism.

Spot Forecast for Unknown UGA...Washington Department of Natural Resources  
National Weather Service Seattle WA  
808 AM PST Tue Feb 15 2022

Forecast is based on ignition time of 0900 PST on February 15.  
If conditions become unrepresentative, contact the National Weather Service.

Please contact our office at (206) 526-6095, if you have questions or concerns with this forecast.

.DISCUSSION...A few light showers remain in over the location this Tuesday morning, snow levels are expected to be above 2500 feet through Wednesday. Showers should taper off through the day, but conditions will remain damp through the forecast period. Westerly winds 5-10 knots will remain in place through the remainder of the forecast period.

.REST OF TODAY...

Sky/weather.....Mostly cloudy (70-80 percent). Slight chance of rain late in the morning. Chance of rain in the afternoon.

CWR......6 percent.  
 LAL......1.  
 Max temperature.....Around 43.  
 Min humidity......93 percent.  
 Wind (20 ft).....Northwest winds 5 to 7 mph.  
 Mixing height.....1700 ft AGL.  
 Transport winds.....West around 3 mph.  
 Haines Index......4 or low potential for large plume dominated fire growth.  
 Rainfall amount.....0.00 inches.

.TONIGHT...

Sky/weather.....Mostly cloudy (80-90 percent). Chance of rain.

CWR......6 percent.  
 LAL......1.  
 Min temperature.....Around 34.  
 Max humidity......100 percent.  
 Wind (20 ft).....Light winds becoming north around 5 mph overnight.  
 Mixing height......500 ft AGL.  
 Transport winds.....West around 2 mph.  
 Haines Index......2 or very low potential for large plume dominated fire growth.  
 Rainfall amount.....0.02 inches.

.WEDNESDAY...

Sky/weather.....Mostly cloudy (65-75 percent). Chance of rain in the morning.

CWR......0 percent.  
 LAL......1.  
 Max temperature.....Around 44.  
 Min humidity......90 percent.  
 Wind (20 ft).....West winds 5 to 9 mph.  
 Mixing height......1600 ft AGL.  
 Transport winds.....West around 2 mph.  
 Haines Index......4 or low potential for large plume dominated fire growth.  
 Rainfall amount.....0.00 inches.

\$\$



# Specialized Briefings

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Specialized briefings can be requested on an event- or incident-driven basis. Examples include:

- Support for a large, planned outdoor event (fairs, festivals, parades, etc.)
- Support for the unique needs of a HAZMAT incident or Search & Rescue
- Support for post-event recovery when significant damage occurred
- Exercises

**Exercise** - EXERCISE - EXERCISE - EXERCISE

**Forecast for Grey Fox Exercise Operations**  
 NOAA NWS Seattle, WA I KCCS Pacific Storm Prediction Centre, Vancouver, BC  
 Issued: 2:00 PM Wednesday, October 14, 2019  
 Next Update Scheduled: First Update for this exercise unless otherwise requested  
 Point of Contact: NWS Operations (247): 206-526-6857  
 KCCS Supporter Email (247): 604-664-9368

**FORECAST VALID FOR: Sumas Border Crossing - October 16-17, 2019**

**OVERVIEW**  
 Winds are expected to increase from the south this afternoon, with gusts 20-20 MPH with gusts to 30 MPH. Steady moderate to occasionally heavy rainfall is expected to arrive between 3 continue for 2-3 hours before diminishing this evening. Southerly winds will do precipitation diminish. A light rain and intermittent showers will remain overnight and may shift to the west at 2-3 MPH after midnight. Rain showers and will increase again Thursday morning after 0500 and continue through Thursday evening.

**WEATHER IMPACTS**  
 High Confidence: Rain and gusty winds could cause downed trees  
 Low Confidence: Gusty winds this evening could down trees  
 Shifting winds this overnight could result in the event of additional tests.

**FORECAST DETAILS**

Time	1500-1800	1800-2100
Weather	Moderate-Heavy Rain Increasing	Moderate-Heavy Rain Decreasing
Precipitation Amount	0.10 - 0.40 in. 2 - 10 mm	0.00-0.20 in. 1 - 5 mm
Temperatures	54-56°F 12.2-13.3°C	52-54°F 11.1-12.2°C
Winds	Southeast 10-20 MPH gusts to 20-30 MPH	South 6-10 MPH Southwest 10-18 km/h gusts to 32-48 km/h

**Forecast for Whatcom County - King Tide Operations**  
 National Weather Service - Seattle  
 Issued: 2:00 PM PT Monday, January 1, 2022  
 Next Update Scheduled: 2:00 PM PT Tuesday, January 4, 2022  
 Point of Contact: NWS Operations (247): 206-526-6857

**FORECAST VALID: 01/04/2022-01/06/2022**

**OVERVIEW**  
 Showery conditions are lingering behind last night's cold front. Winds this afternoon are generally out of the south at 10-15 mph. Weather conditions will generally improve Tuesday and Wednesday after the next storm that will be moving into the area. However, faster southerly winds beginning Tuesday morning could bring easterly to northeasterly winds between 20-35 mph with gusts over 50 mph. A Gale Watch has been posted for the Northern Inland waters for easterly winds beginning Tuesday morning.

**WEATHER IMPACTS**  
 High Confidence: East/Northeast winds Tuesday and Wednesday may be strong enough for significant waves to form during high tide.  
 Moderate Confidence: Weather conditions Tuesday and Wednesday may be strong enough for significant waves to form during high tide.  
 Low Confidence: Weather conditions Tuesday and Wednesday may be strong enough for significant waves to form during high tide.

**CURRENT LAND/MARINE HAZARDS IN EFFECT**  
**WARNINGS** Gale Watch (beginning Tuesday at 4 AM-1 PM)  
**ADVISORIES** Small Craft Advisories in effect until 4 AM Tuesday.

**Forecast for Everson and Sumas in Whatcom County All Response Operations**  
 National Weather Service - Seattle  
 Issued: 1:00 PM PT Thursday, December 30, 2021  
 Next Update Scheduled: 1:00 PM PT Friday, December 31, 2021  
 Point of Contact: NWS Operations (247): 206-526-6857

**OVERVIEW**  
 Cold weather trough at least Friday with warming into Sunday. Dry weather through Friday with a weather system bringing light snow to the area on Saturday. Temperatures will warm into Sunday with snow transitioning to rain Saturday night. Rain through Sunday with the potential for additional rain snow on or near Monday into early next week. The winds will be breezy through tonight with gusts of 20-40 MPH, with wind shifts near some expected tonight. Temperatures in the 20s for high through Saturday with lows of 10-15 in this area.

**WEATHER IMPACTS**  
 High Confidence: Very cold temperatures this week will impact vulnerable populations such as the homeless, pets, and those without adequate access to heating. Exposed pipes may be damaged by freezing conditions.  
 Low Confidence: The winds will be breezy through tonight.  
 Moderate Confidence: New Year Day system will start off with toward snow before transitioning to rain by that evening.

**Forecast for City of Tacoma Emergency Management - Trident Seafood Vessel Fire**  
 National Weather Service - Seattle  
 Issued: 1:00 AM PT Thursday, February 18, 2021  
 Next Update Scheduled: As Requested/Required  
 Point of Contact: NWS Operations (247): 206-526-6857

**Dispersion Impacts**  
**AEGL-3: Disabling/Inventoriable Effects**  
 Assumptions: This model demonstrates the dispersion if the animals were to be released instantaneously and completely within 1 minute. Assumed direct release of all material, 15 feet above ground.  
**AEGL-1: Temporary Effects**

**Tuesday 1/4/2022**

Surface Pressure (at ground level)	1010 mb	Cherry Point Highest Tide	10:36 @ 7:43 AM
Estimated 24hr Rainfall	0.10-0.30"	Cherry Point Storm Tide	11:20 @ 7:43 AM
<b>0500-0900</b>	Winds: E 2-10 MPH Gusts to 35	Blowing: E 2-10 MPH Gusts to 30	Brisk Breeze: NE 15-25 MPH Gusts to 30
<b>0900-1100</b>	Waves: 4-5 ft Gusts to 40	Waves: E 2-5 MPH Gusts to 35	Sandy Point: NE 20-25 MPH Gusts to 30

**Forecast Details**

Day: 02/18/2021	0900-1100	1100-1300	1300-1500	1500-1700
Weather	Rain Increasing	Rain	Rain	Rain
Temperatures	40-41°F	40-41°F	41-42°F	42-43°F
Relative Humidity	85-90%	85-90%	90-95%	90-95%
Winds	SE 3-7 MPH	E/SE 3-7 MPH	ENE 3-7 MPH	ENE becoming NW 3-7 MPH



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# Remote/On-site Support

NWS Seattle has a cadre of Deployment-Ready meteorologists that can provide continuous, direct support to an EOC/ICP in person or virtually.

- Available for
  - Planned events
  - Major incidents
  - Exercises
  - Exercise development
- Training
  - 7 Professional Competency Units
  - IS-100, 120, 200, 300, 700, 800, & 2200
  - Most also have IS-400.
  - Task Book
  - Deployment Boot Camp
- Equipment
  - Laptops with specialized software
  - Working to train on deployable weather station





# Reporting Damages, Injuries, Fatalities

## The Ask

1. Include [nws.seattle@noaa.gov](mailto:nws.seattle@noaa.gov) on situation reports for your jurisdiction  
or
2. Call/email NWS Seattle when damages/injuries/fatalities become known  
or
3. Send damages/injuries/fatalities in via the AAR form for large events

## Fatality Information

It is important that the NWS receive accurate cause of death and ER visit information from healthcare providers, coroner offices, etc. as it relates to extreme temperatures.

**If fatality information has not been released to the public, the NWS will keep the data internal until it is made public information.**

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# Vulnerable Populations



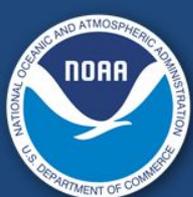


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# NWS Actions

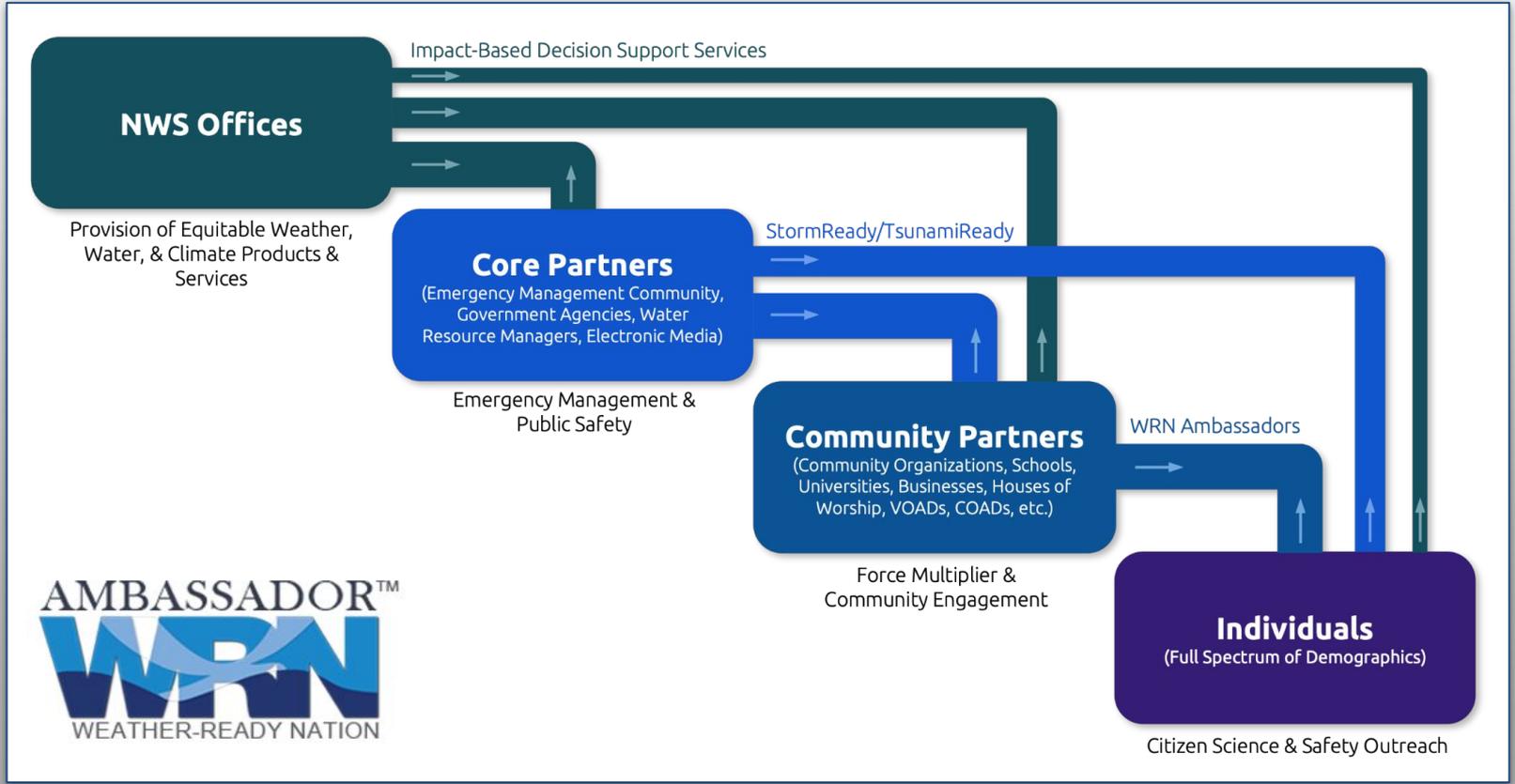
1. Developing New & Enhanced Partnerships
2. Providing Targeted Messaging & Resources
3. Integrating Into Core Partner Planning & Response
4. Supporting Long-Term Climate Justice Efforts



# Whole Community Engagement Model

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# Thank You

## 24/7 Weather Support

- 206-526-6857
- [nws.seattle@noaa.gov](mailto:nws.seattle@noaa.gov)

## Non-Emergency Coordination

- Reid Wolcott  
206-526-6095 x223  
[reid.wolcott@noaa.gov](mailto:reid.wolcott@noaa.gov)