



**DEPARTMENT OF
NATURAL RESOURCES**

**OFFICE OF THE COMMISSIONER OF PUBLIC
LANDS**

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December 1st, 2023

The Honorable Bernard Dean
Chief Clerk of the House
338B Legislative Building
Olympia, WA 98504

The Honorable Sarah Bannister
Secretary of the Senate
312 Legislative Building
Olympia, WA 98504

Dear Chief Clerk Dean and Secretary Bannister:

Please accept the enclosed report, submitted on behalf of Department of Natural Resources (DNR), as directed by the Legislature in the Sec. 310 (7) of the 2023-2025 Operating Budget (C 475, L 23). The bill as passed directed the DNR to report to the Governor and Legislature on the on the previous wildfire season as recommended by the Wildfire Suppression Funding and Costs (18-02) report of the joint legislative audit and review committee. The first report is due December 1, 2023, and the second report due December 1, 2024.

An addition to the 2023 Wildfire Season report is the inclusion of reporting requirements under ESHB 1498 (RCW 76.04.192) which addresses aviation assurance funding in response to wildland fires. The new law added a few reporting requirements within the annual Wildfire Season report.

Should you have any questions, please contact me at 360-486-3469 or Brian.Considine@dnr.wa.gov

Sincerely,

Brian Considine
Legislative Director
Office of the Commissioner of Public Lands

Enclosure: Legislative Report – Wildfire Season 2023

cc: Members of the Senate Agriculture, Water, Natural Resources & Parks Committee
Members of the House Agriculture and Natural Resources Committee
Members of the House Appropriations Committee

Members of the House Capital Budget Committee
Members of the House Environment & Energy Committee
Members of the Senate Environment, Energy, & Technology Committee
Members of the Senate Ways & Means Committee
Ruth Musgrave – Senior Policy Advisor, Natural Resources, Office of the Governor
Jim Cahill – Senior Budget Assistant, Natural Resources, Office of Financial Management
Lisa Borkowski – Budget Assistant, Natural Resources, Office of Financial Management

Wildfire Season 2023

Washington Department of Natural Resources
Wildland Fire Management Division

Prepared by
Washington State Department of Natural Resources
Wildland Fire Management Division
December 1, 2023



WASHINGTON STATE DEPARTMENT OF
NATURAL RESOURCES

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Please note that these statistics are derived from regional input of data into the Fire Incident Reporting System, an internal DNR system. Statistics may vary throughout the season until finalized at the end of the calendar year. Statistics presented here are the most up-to-date and accurate information provided through Sept. 30, 2023. The large fires described in this report are those fires that started on DNR protection or are otherwise of interest to DNR. This report does not include details or statistics for all agency fires, except in those instances where DNR was directly involved in supporting those fires.

Executive Summary

Introduction:

Preparedness for the 2023 Fire Year was dominated by normal seasonal readiness preparations with continued HB 1168 implementation. DNR Wildland Fire Management program neared full implementation of HB 1168, with new aircraft, crews and heavy equipment all coming online in time for Washington's spring and summer fires. Those resources made meaningful and significant contributions to suppression efforts across the state.

Washington experienced a "typical" fire year during 2023. Early season activity was driven by long-term drought, notably on the Olympic Peninsula and in NW Washington. Across the state, numbers of ignitions and acres burned on DNR-protected lands were both at 10-year lows. As of the writing of this report, DNR had 1042 fires statewide, and statewide acres burned for DNR fires was 102,942.

Despite the success in initial attack and extended attack, there were acute impacts during a cold front passage wind event on Aug. 18. The Gray and Oregon Road¹ Fires in Spokane County established a new "event of record," which was previously the 1991 Firestorm. Gray and Oregon Road fires burned 366 primary residences and tragically resulted in two civilian fatalities. DNR and our Fire Service partners are working to capture lessons learned from those incidents, while continuing to support community recovery.

Highlights you will see in this report:

- Fire Season Summary describing key events and actions throughout the 2023 Wildland Fire Year.
- Fuels, Weather and Fire Danger, with an analysis of factors that drove fire activity in 2023.
- Statistical overview, including Large Fire data and Ownership Acres burned and forested vs. - non-forested acres.
- The DNR Aviation Program report, including fire response statistics.
- Year-to-Date Financial detail from 2023 incidents.
- Additional specific detail on HB 1168 acquisitions and activities.
- Aviation assurance activities under HB 1498 (2023 Session).
- A map of large fires referenced in this report.

The most important objective throughout the 2023 Fire Year has been firefighter and public safety. As noted above, there were two reported civilian fatalities associated with Gray and Oregon Road Fires. During the 2023 wildland fire season there were no firefighter fatalities in Washington state. Minimizing the public health impacts of wildfire smoke is an ongoing challenge for fire managers. The adverse effects of smoke were constantly factored into the development of incident strategies, consistent with firefighter safety. During the remainder of 2023 and into 2024, DNR will implement HB 1578 to incorporate wildfire smoke mitigation, along with expansion of the Wildfire Ready Neighbors community resilience efforts into western Washington.

¹ For the purposes of this report only, the Oregon Fire will be called Oregon Road Fire. This is to limit confusion for the reader, so they don't interpret Oregon as the State of Oregon.

Fire Season Overview

Washington's 2023 fire season started off with moderate conditions in the high elevations and eastern Washington due to high snowpack and persistent precipitation. Late winter and early spring were wet across the state, but conditions changed and both weather and fuels dried west of the Cascade crest in May. In fact, some of the largest western Washington fires of the year were in May and June due to the lack of spring rain. Conditions eventually turned hot and dry across the whole state and eastern Washington fuels became supportive of large fire growth. Aggressive initial attack response with ground and air resources proved to be successful for much of the fire starts. However, even with effective pre-suppression planning and aggressive initial attack, Spokane County experienced two of the most catastrophic wildfires in history, fanned by a dry cold front in late August. The July and August lightning events were thankfully accompanied with considerable rainfall. Overall, for lands protected by DNR, Washington fared well in 2023 with less acres burned than the previous 10-year average and less fire occurrences.

Unlike the 2022 season, there was not much fire activity in Canada, Alaska, the Southwest, or Southern Geographic Areas in the early season. This allowed for expanded use of DNR wildland firefighters to implement planned prescribed burning in Northeast and Southeast Washington. Additionally, the rather slow start to the season allowed for a focus on readiness activities and more formalized crew preparedness reviews across the state.

On May 27, the western Washington summer fire season kicked off with the Shannon Lake Fire north of Concrete in Skagit County. This fire burned 85 acres of logging slash and reproduction timber. This was an indicator of how little late spring precipitation there had been leading up to this point. On June 27, the Sutherland Fire started just outside of Port Angeles in Clallam County, burning 108 acres of timberland. On



Photo 1: Shannon Lake Fire, file photo.



Photo 2: Infrared imagery from DNR multi-mission aircraft on Sutherland Fire, Kodiak N216KQ.

July 4, the McEwan Fire started just outside of Shelton in Mason County, ultimately burning 250 acres. All these western Washington fires had a considerable ground and aerial response including multiple helicopters, super-scoopers, air tankers, and use of newly purchased heavy equipment. While the Shannon Lake Fire and the Sutherland Fire had less Wildland Urban Interface (WUI) complexity, the McEwan fire directly threatened 700 primary residences.

The first Type 2 complexity fire in Washington was the Tunnel Five Fire that burned next to the town of White Salmon in Klickitat County. The fire started on July 2 and burned 546 acres of WUI and in the cliff bands above the Columbia River Gorge. This fire was complex due to being located on very steep terrain with the immediate threat to densely populated areas, ultimately destroying five residences. On July 21, Newell Road Fire, another large complex incident, burned 60,551 acres of grass, shrubs and some timber in east Klickitat County. The fire burned across

vast, difficult terrain between Bickleton and the Columbia River, threatening solar farms, wind turbines, Roosevelt Landfill methane facility, agricultural lands, and 173 homes.

On July 29, Eagle Bluff Fire started just four miles outside of Oroville in Okanogan County. The fire quickly forced evacuations of the Oroville area and raced north across the U.S.-Canada border. Most of this fire burned through lighter fuel types of grass and brush, but there was also a timber component. A Type 2 Incident Management Team (IMT) assumed command after the initial attack efforts of the Northeast Type 3 Team. Because the fire burned into Canada, DNR, BLM, and BC Wildfire Agencies were able to utilize the “Hands Across the Border Agreement” to coordinate firefighting objectives and aircraft utilization, and because of the agreement a DNR 20-person hand crew was able to operate across the border to continue with an important firing operation that held the northwest portion of the fire to a Canadian highway.



Photo 4: Oregon Road Fire, photo by Air Attack on Aug. 18.

The most impactful incidents in Washington, both in Spokane County, started on Aug. 18 and were driven out of control by a strong dry cold front. The Gray Fire was located outside of Cheney in the Medical Lake community and the Oregon Road Fire was located outside of Deer Park in the community of Elk. Together these fires destroyed more primary residences than any other wildfire in recent history. The Gray Fire burned 240 residences and 86 other structures. The Oregon Road Fire burned 126 residences and 258 other structures. These two fires burned through both wildland urban interface areas with dispersed homes and densely populated neighborhoods. The rapid growth of the fire initially overwhelmed state and local response entities that were concentrating on evacuating the public and protecting homes and infrastructure.



Photo 3: Gray Fire, photo by Air Attack on Aug. 18.

A case study, known as Facilitated Learning Analysis (FLA), is being conducted by fire professionals from the DNR and Washington Fire Service. The analysis will focus on lessons learned from this extraordinary event. . The FLA should be available for review in the spring of 2024.

Washington received multiple heavy lightning storms throughout the summer of 2023, but most storms brought plenty of rain with them. Most notable of the lightning-caused fires in western Washington that impacted DNR protected lands occurred late in August and included the Cowlitz Complex on the Gifford Pinchot National Forest (a complex of 30 individual fires within a 20-mile radius), the Chandler and Harmony fires (totaling over 47 acres) in rugged terrain of Lewis County, and the Lake Whatcom Fire (40 acres) which burned immediately off the shores of Lake Whatcom on very steep forested terrain. Eastern Washington received its fair share of lightning-caused fires as well, but most were kept small other than those that were started on June 27; the Roza Creek Fire, which burned 486 acres along the Yakima River Canyon in Kittitas County, and the Silver Start Fire that burned 572 acres outside of Tonasket in Okanogan County.

During periods of slower fire activity, DNR was able to export several important state and local fire service resources to partner states, and through the Northwest Fire Protection Agreement (NW Compact) the agency was able to mobilize resources to Canada as well to assist Canadian Provinces struggling with a record-setting destructive fire year.

UNITED STATES DEPLOYMENTS	DNR	FIRE SERVICE
ALABAMA	1	
ALASKA	3	
ARIZONA	2	
CALIFORNIA	5	1
COLORADO	2	
FLORIDA	1	
IDAHO	6	
MISSOURI	1	
MONTANA	1	2
NEW MEXICO	3	
OREGON	371	198
WEST VIRGINIA	2	
UNITED STATES TOTAL	398	201
CANADA DEPLOYMENTS	DNR	FIRE SERVICE
ALBERTA	92	8
BRITISH COLUMBIA	25	
NORTHWEST TERRITORIES	1	
QUEBEC	1	
CANADA TOTAL	119	8
TOTAL PERSONNEL	490	209

Table 1: 2023 Out of State dispatches to support other partner states and Canada.

During the height of fire danger and fire activity in Washington, the DNR was also able to import needed expertise to fill gaps in coverage of their own. Table 2 below is a summary of the resources the DNR brought into WA to help staff fire engines, dozers, and other critical functions.

STATE	ENGINE CREW PERSONNEL	HEAVY EQUIPMENT BOSSES	DOZER OPERATORS	AVIATION PERSONNEL	LEADERS SUPERVISORS	DISPATCHERS	STATEWIDE SUPPORT
ALASKA	7			2			
ARIZONA				2			
CALIFORNIA				4		1	
COLORADO				1		1	
FLORIDA	3	6	4	1		1	
GEORGIA	6	2	1				2
IDAHO				4		1	
MAINE	4			2			
MINNESOTA				6			
MISSISSIPPI		2					
MONTANA				3		1	
NEVADA							1
MONTANA				2			
NORTH CAROLINA	30	1	7	4	4		3
OKLAHOMA			1				
OREGON				14		5	1
SOUTH DAKOTA	3						
TENNESSEE	9		1				
UTAH				4			
VIRGINIA	29				1		
WISCONSIN	1						
WYOMING						1	
TOTAL	92	11	14	49	5	10	7
TOTAL OF ALL IMPORTED OVERHEAD RESOURCES 188							

Table 2: Critical imported resources for Washington.

In some ways, Washington's 2023 fire year was slower relative to other years. Most incidents were of short duration due to burning of lighter fuel types. However, a few significant fires that did occur posed serious threats and destructive impacts to improved property. The interagency response framework in Washington provides for good coordination on these highly technical and complex fires in the WUI. DNR's improved logistical support, ground resources, and aerial response to initial attack fires is proving to be successful in minimizing the impact the wildland fires have on all Washington residents.

Aviation

Aviation operations were an area of emphasis in 2023 due to the large fire potential across Washington and the need to expand the air asset coverage area, thus reducing response times to incidents. DNR responded more than 300 times via aerial support to initial attack incidents, flying more than 3,500 hours and delivering over 9 million gallons of water/retardant to wildland fires. DNR committed to heavy aircraft utilization to decrease response times and reduce the risk to communities by keeping fires



Photo 5: Helicopter H-343 delivers water to the Margarita Fire on the Quinault Reservation. Photo provided by the Aviation section.

small. Key actions included procurement of three UH-60 heavy helicopters on 89-day exclusive use contracts, two CL-415 large air tanker (scoopers) on 89-day contracts, two large Type II air tankers, and several other medium and light helicopters, and 7 single engine air tankers (SEAT). This was in addition to the aviation assets DNR owns.

Ultimately, the UH-60s delivered 3,200 buckets/tanks of water totaling over 2.48 million gallons. The DNR-owned helicopters were the most cost-effective resource in terms of cost per gallon, which delivered at \$1.06/gallon (see Table 3 for more details). The scoopers by far delivered the most water to fires (1,984,000 gallons). In addition, the DNR Aviation section supported incidents in Oregon, Idaho, and Canada which reduced overall financial commitment to contracted aircraft by over \$2 million dollars.

DNR ended the 2023 season with nine UH-1H helicopters, one B206L4 light helicopter, plus one helicopter leased from Chelan County Fire District 1. DNR-owned aircraft provided 1,700 aircraft days of coverage, transporting aerially-delivered firefighters and more than 1,000,000 gallons of water to the incidents. Aircraft response time averaged 14 minutes, from the time of alert to the arrival on incident.

With the agency increasing aircraft usage to respond to incidents, additional challenges (drought conditions, extreme temperatures) caused DNR to contract an additional air attack aircraft to assist. This improved safety and effectiveness of aircraft operations by having aerial supervision readily available. An air attack platform serves as “eyes in the sky” over any fire and is required when flying multiple aircraft, or flying a mix of aircraft type.

During the Governor’s Declaration of Emergency on August 19th, the DNR mobilized and employed 2 UH-60 Blackhawks and 2 CH-47 Chinooks from the Washington Army National Guard (WAARNG) to multiple incidents including the Oregon Road Fire and the Cowlitz Complex.

DNR contracted with private vendors for the seven amphibious SEAT aircraft. These aircraft delivered 1,720 loads totaling 1.7 million gallons. Their cost per gallon was \$1.58. Several other call-when-needed (CWN) aircraft from private contractors were brought on for specific incidents or weather events, including two UH-1, one K-MAX K1200, three more SEATs, and one B407 helicopter.



Photo 6: WAARNG staging at Deer Park Airport, preparing for takeoff to the Oregon Road Fire. Photo provided by Aviation section.

DNR continued to assist in staffing the Moses Lake Air Tanker Base, which is a federal tanker base. This action allowed DNR and its personnel to deploy the portable air tanker base (PAB) procured under HB 1168 and greatly increased interagency partner cooperation. DNR also established its Unmanned Aerial System (UAS) program over the last year. DNR crews supported multiple incidents with UAS operations to include the Newell Road, Gray, and Oregon Road Fires. DNR trained over 16 personnel for UAS operations for future growth of the program. The UAS modules were used for reconnaissance and gathering other important intelligence.



Photo 7: Unmanned Aerial System (UAS). File Photo.

DNR Aviation assets protected more than 500 structures from wildfires this year at a value greater than \$270,000,000.

Aircraft Type	Owner	Flight Time	Water Delivered (gal)	Remarks
Light Fixed Wing (Kodiak) HB 1168	DNR	315	NA	First year
Light Fixed Wing – Air Attack – EUC	Contractor	501	NA	3 aircraft
Single Engine Air Tankers – EUC	Contractor	451	1.2m	5 aircraft
Single Engine Air Tankers – 1498/CWN	Contractor	280	680k	2/3 aircraft
Type II Large Air Tankers – EUC	Contractor	267	248k	2 aircraft
Type III CL-415 Scoopers – EUC	Contractor	388	2m	2 aircraft
Type III – B206L4 – DNR – Civil	DNR	100+	2.4k	1 aircraft. Primary use recon, detection, aerial supervision
Type II – UH-1H – FEPP helicopters	DNR	1000+	1.5m	10 aircraft
Type I – UH-60s – EUC	Contractor	390	2.4m	3 aircraft
Type I – Kmax – CWN	Contractor	70	500k	1 aircraft – Surge
Type I – UH-60	WAARNG	28	17.5K	2 aircraft
Type I – CH-47	WAARNG	17.5	20K	2 aircraft
Type III – B407 – CWN	Contract	25	NA	1 aircraft – Surge
Type II – UH-1H	Contract	150	440k	2 aircraft – Surge

Table 3: EUC – Exclusive Use Contract; CWN – Call When Needed (Surge Aircraft); FEPP – Federal Excess Personnel Property; WAARNG – Washington Army National Guard.

Fuels, Fire Danger, and Weather

Fuels and Fire Danger

Fuel conditions at the start of the 2023 fire year looked problematic. Snowpack at the beginning of May was mostly normal across the state, with snow water equivalents (SWE) in all the basins in Washington between 94% and 148% of normal. By the end of May, snowpack had dwindled across the northern half of the state with SWE between 26% and 45% of normal. The southern tier fared better with SWE between 91% and 109% of normal. This was brought about by prolonged warm and dry weather through May that had mean temperatures 2-9 degrees above normal and significant precipitation deficits. This warm and dry weather also started green-up (that springtime period where there is lots of green growth) early, with most fire danger rating areas (FDRAs) reaching green-up conditions by the first week of May. When climate conditions are normal, an early green-up tends to lead to early availability of fuels and thus an early start to the fire season. Compounding on the low snowpack and early green-up, the lack of precipitation caused the dead and down woody fuels to dry out sooner than is typical.

Fire danger conditions in the first week of June were trending a month ahead of schedule, with areas like the Methow, Blue Mountains, and the entire west side of the state pushing new daily maximum energy release components (ERC; see Figure 1² below). Lush live vegetation had kept fire activity mostly in check with no large fires having yet occurred. At the end of that first full week of June though, a long duration rain lasting around 48 hours covered most of the state and sent fire danger plummeting. This precipitation had long lasting effects in some areas of the state, but in the Columbia Basin, the effect was short lived.

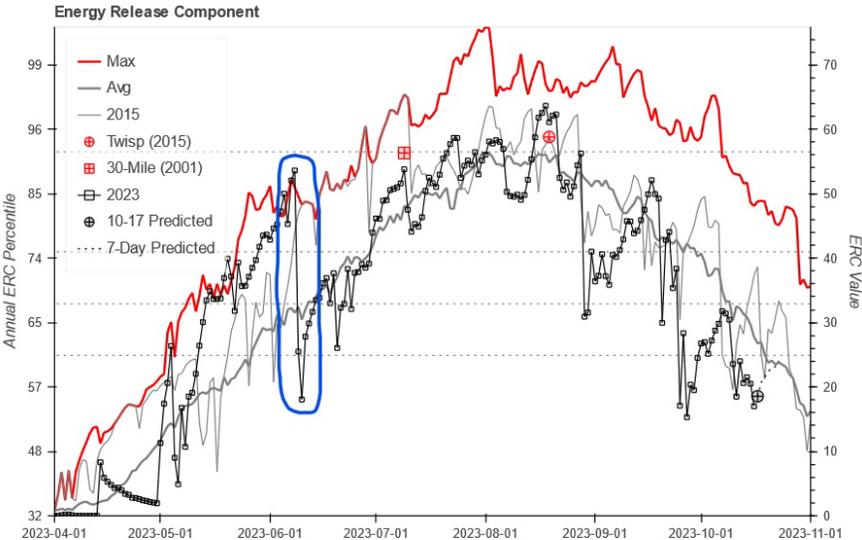


Figure 1: ERC chart for the Methow FDRA. The blue-lined oval highlights the drop in ERC that occurred due to the precipitation between June 8th and June 10th.

² <http://pnwwildfireplanning.pythonanywhere.com/nfdrs/wacwc/methow/>

The grass and shrub fuels in the Columbia Basin, particularly cheat grass, started curing in mid-June around the same time that the first large fires of the season ignited around the Tri-Cities area. The Oasis and Hansen Road Fires started on the Washington side of the Columbia River, with the Hat Rock Fire on the Oregon side. The first large fire of the year on the west side also occurred in the mid-June heat, with the Sutherland Fire in Olympic Region. Another round of precipitation followed the mid-June fires, and then was followed immediately by another heat wave leading into the July 4 holiday. This heat wave during the transition of June into July pushed west side fire danger values into near-record territory for the Lowlands North and Central FDRAs and well into extreme fire danger across the western half of the state. The departure from normal did not extend east of the Cascade crest though, where the effects of the earlier June precipitation continued to linger well into July except in the Columbia Basin.

July was warmer and dryer than average, just as May and June had been. A low-intensity offshore event leading into the July 4 holiday provided the conditions for the Tunnel Five Fire in the Columbia River Gorge and the McEwan Fire near Shelton. Once again, as fire danger and fire activity were starting to look ominous, conditions changed. Onshore flow came to the west side, and monsoonal moisture to the east side. This influx of moist air accomplished two things: 1. It kept fine fuel moistures high, and 2. it provided a shot of rain to the east side, suppressing fire activity and fire danger indicators for about a week before things could bounce back. Cheatgrass had steadily cured for the month and was essentially fully cured by the time the Newell Road fire started on July 21. Conditions in the Lower Basin FDRA on the 21st and 22nd showed ERC values at the 98th and 99th percentiles respectively, with live woody fuel moistures around 65% (see Figure 2³ below). That proved to be the most severe combination of conditions for the entire season in the Lower Basin. The grasses had cured in the Okanogan valley as well, and the Eagle Bluff Fire took off eight days later, on July 29. Conditions in the Valley FDRA were at the 99th percentile for Burning Index (BI) and 95th percentile for ERC.



Figure 2: Modeled live fuel moisture for the Lower Basin FDRA. Live herbaceous fuels showed as fully cured on July 22. Live woody fuels also hit their season minimum around the same time.

³ <http://pnwildfireplanning.pythonanywhere.com/nfdrs/wacwc/lowerbasin>

The end of the first week of August again saw the arrival of a cold front that took a significant bite out of the fire danger for Washington. West side indices had been well above normal through most of July even with onshore flow mitigating the immediate fire threat, while the east side areas that had been clawing back to normal fire danger throughout the month, were again knocked back. By about Aug. 15, as the fire danger was cresting again, fires like Sourdough and others deep within the wilderness along the Cascade Crest began to make moves. New Daily ERC records were set each day between the 15th and 22nd of August in the Central Cascades FDRA as these fires found ample growing space. The 18th also saw the start of the Oregon Road and Gray fires in Spokane County (see Figure 3⁴ below). The recovery from rain early in the month was complete at this point, with 99th percentile ERC's and BI's in the Upper Basin FDRA on the 18th. As happened all season, the extreme high fire danger associated with the event was driven by an approaching front that would effectively end the large fire potential for the season. Between the 21st and 31st of August, over two inches of rain fell in Deer Park.

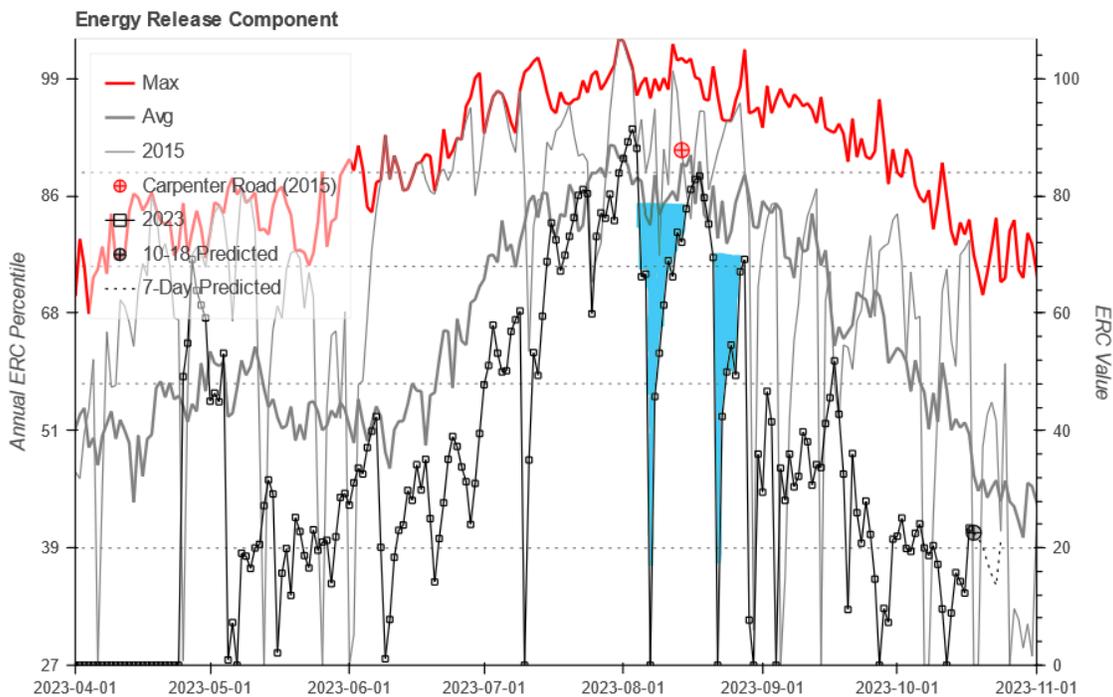


Figure 3: ERC chart for the Foothills FDRA, highlighting the rain events in early and mid-August. The peak between the two rain events was Aug. 18 and 19 when the Oregon Road and the Gray Fires started.

There was one last gasp of the fire year as warm and dry weather returned one more time in the middle part of September to provide life to several fires deep in the wilderness. Fires like Airplane Lake and Sourdough were able to find available fuel, and several new fires in the middle of Olympic National Park responded to extremely low relative humidity (RH) values. Likely ignited by the storms arriving in the end of August, the fires in the Olympics had a period of single digit RH values that allowed several thousand acres of growth, becoming the largest fires on the Olympic Peninsula since the Forks fire in 1951. The final blow to the fire year arrived on Sept. 22, as several storms passed over the region between that date and the end of the month bringing over five inches of rain to the west side, and between three-tenths and two inches of rain to the east side.

⁴ <http://pnwildfireplanning.pythonanywhere.com/nfdrs/wanec/foothills>

Overall, the 2023 fire year was most heavily influenced by three long-duration precipitation events. The rainfall at the end of June, while not enough to dig out of the precipitation deficits that had developed, was of sufficient intensity and duration to force fuel conditions into normal, or below normal fire danger. Fire danger had been trending up to a month ahead in the eastern Cascade foothills prior to this event. The two August precipitation events also had enough duration and intensity to convert what would normally be the most volatile portion of the season, into relatively benign conditions. That the Oregon Road and Grayfires occurred in between these two weather events speaks to how volatile conditions can be, and how timely these two sets of storms were.

Weather

The 2023 fire year highlighted the growing volatility of eastern Washington’s shrub and grasslands in the face of an otherwise average fire season in Washington’s forestland. Critical fire weather events were predominantly characterized by strong westerly winds ahead of frontal systems, which are of most concern for the Columbia Gorge, the Columbia Basin, and the east slopes of the Cascades. Despite temperatures running several degrees above average through the summer and most areas of Washington receiving below average precipitation, there were no significant east wind events prior to the season ending. Lightning events were typically accompanied by rainfall that limited initial fire growth.

A key feature in the general weather pattern this summer was a persistent upper-level low pressure system off the coast of California which delivered consistent moisture into central California and the Great Basin in May and June. The California low developed in response to the record-breaking heat in northern British Columbia and Alberta, which fueled a fire year in Canada that more than doubled any previous year for acres burned. Washington was caught in-between the two extremes and saw warmer than average temperatures statewide with elevated atmospheric moisture levels in eastern Washington to start the fire year. (See Figure 4 below.)

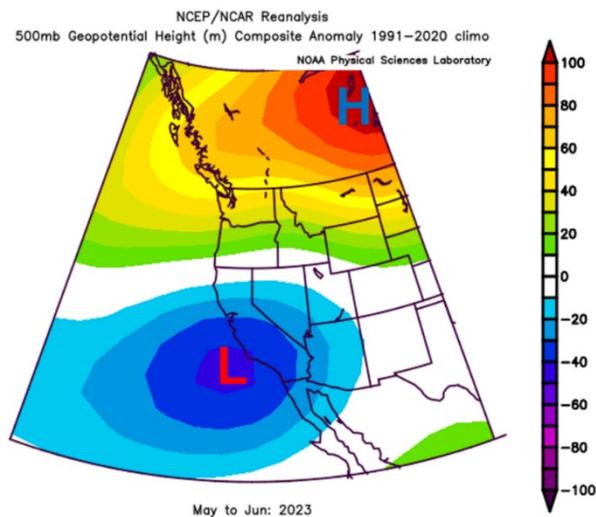


Figure 4: The position of the upper-level high- and low-pressure areas that dominated the weather pattern across western North America in May and June. (NOAA PSL, 2023)



Photo 8: The Sourdough Fire developed a Pyro cumulus cloud on Aug. 4th due to the arrival of moist and unstable air in Washington. Shared on Twitter/X by @NWSSeattle.

July and August are typically the hottest and driest months in Washington, and 2023 continued that trend. By the first week of July, the California low had broken down and Washington experienced the first widespread critical fire weather event of the season as a heatwave expanded across the state during the July 4 holiday. The McEwan Fire in western Washington, the Tunnel Five Fire in the Columbia Gorge, and the Airplane Lake Fire in the Okanogan-Wenatchee Forest were the most significant fires ignited during this event. Notably, the Airplane Lake Fire ignited in the general vicinity of the 2022 White River/Irving Peak Fires and continued to burn through the summer, causing intermittent air quality impacts to Leavenworth and Wenatchee. After the July 4 heatwave, the next critical fire weather period occurred at the end of July ahead of a strong frontal system that brought high winds to

eastern Washington and moisture to western Washington and the Cascades. The strong winds fanned the Newell Road Fire in southern Washington over the course of only a couple of days, and the Eagle Bluff Fire in the northern Okanogan Valley. The moisture that pushed into the Northern Cascades created thunderstorms that ignited the Sourdough Fire and numerous other small fires in the region. Following the heightened fire danger to end July, widespread rainfall returned to eastern Washington and limited fire concerns for the first two weeks of August. (See Figure 5 below).

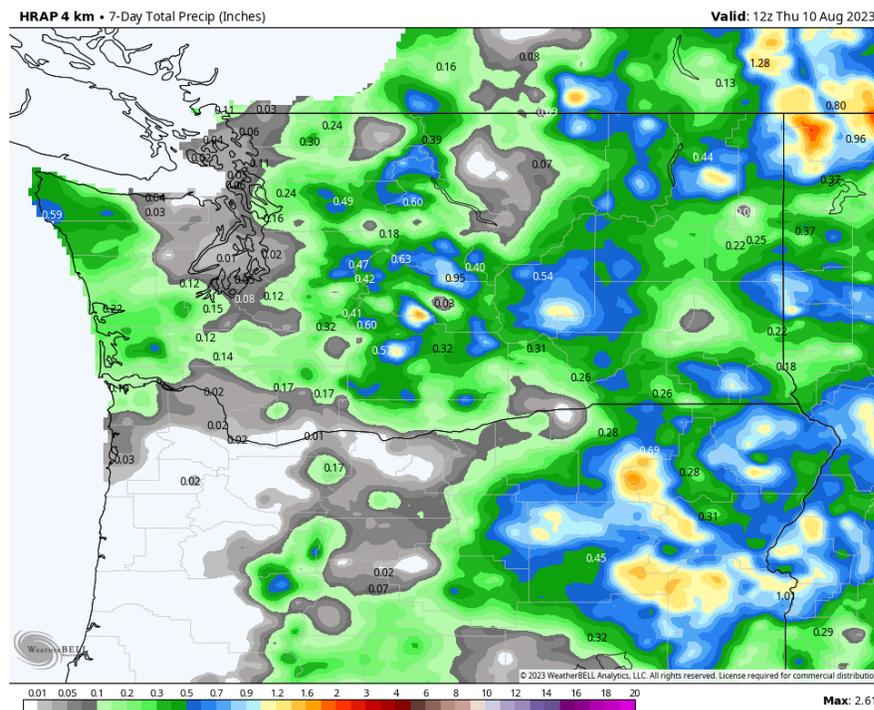


Figure 5: Total Precipitation 3-10 August. An unusual mid-summer wetting rainfall occurred across most of eastern Washington to start August. Used with license.

The defining critical fire weather event of 2023 was the mid-August heatwave followed by a very strong and dry frontal system that drove the Spokane County fires (Gray and Oregon Road) into the wildland-urban interface on Aug. 18 and 19. After the abnormally cool and wet period to start August, the hottest

weather of the year arrived in Washington between Aug. 14-18. Several daily temperature records were broken across the state, though prior to Aug. 18 the main fire activity was contained to the North Cascades where the Sourdough Fire made a significant run and the Blue Lake Fire ignited. The frontal system that would eventually drive the firestorm on Aug. 18-19 came into focus by Monday, Aug. 14, with DNR, the Northwest Coordination Center (NWCC), and the National Weather Service (NWS) all issuing high-confidence forecasts for critical fire weather later in the week. Unlike the previous frontal systems during the summer of 2023, this system originated near the Arctic and carried with it almost no moisture. Despite the cool and wet conditions of early August, the fine grass and shrubs of the Upper Columbia Basin dried out remarkably fast and reached critical levels by Aug. 17.

There are many ways to quantify the magnitude of a fire weather event, but according to the Hot-Dry-Windy Index (HDWI), the observations in Spokane County on Aug. 18 were among the most severe ever recorded at those locations, exceeding the 99.9th percentile of all summertime maximum values.

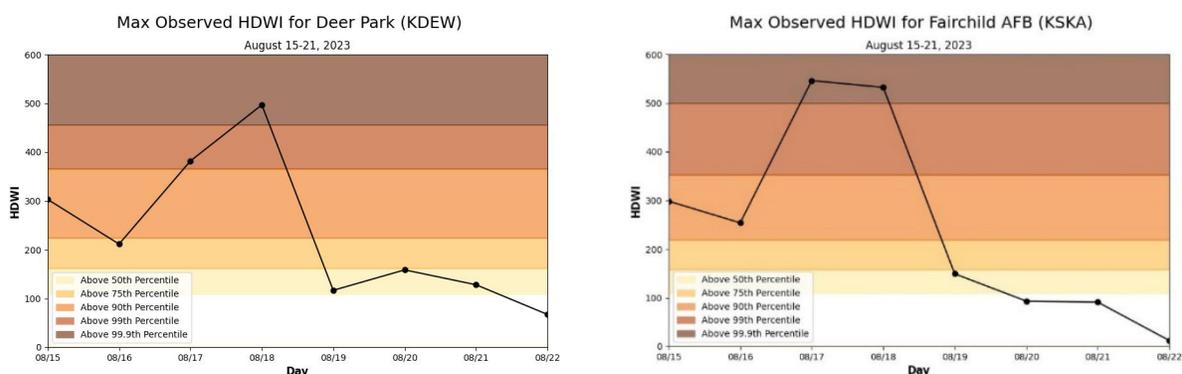


Figure 6: The Hot-Dry-Windy Index values for Deer Park and Fairchild AFB as a percentile of all daily summer-time maximum values. (Srock, Charney, & Potter, 2018).

Following the extreme fire weather in eastern Washington on Aug. 18, the remnants of Hurricane Hilary passed through the Great Basin and into the Pacific Northwest, bringing significant rainfall to eastern Washington. Fire weather concerns east of the Cascades diminished greatly through the rest of the season as more wetting rainfall arrived in September. The final critical fire weather event of 2023 was a widespread lightning storm that ignited numerous fires in the south-central Cascades and the Olympic Mountains, forming the Cowlitz Complex and the Delabarre Incident, respectively. The Cowlitz Complex received numerous rounds of wetting rain and high levels of staffing, ensuring that it never became a larger issue. The Delabarre Incident in the Olympic Mountains experienced a nocturnal thermal belt and hot and dry conditions in the middle of September, growing to more than 3,000 acres.

There was no shortage of critical fire weather events during the 2023 fire season. However, despite well-above average temperatures and below normal precipitation statewide, the above average atmospheric moisture in eastern Washington in May and June and the well-timed rainfall events in August and September greatly reduced the overall potential of each critical weather event. One measure of the number of critical fire weather events is the issuance of Red Flag Warnings by the National Weather Service. Red Flag Warnings are issued when region-specific critical fire weather thresholds (relative humidity, wind speed) are forecast to be met for several consecutive hours in addition to fuels being receptive to ignition.

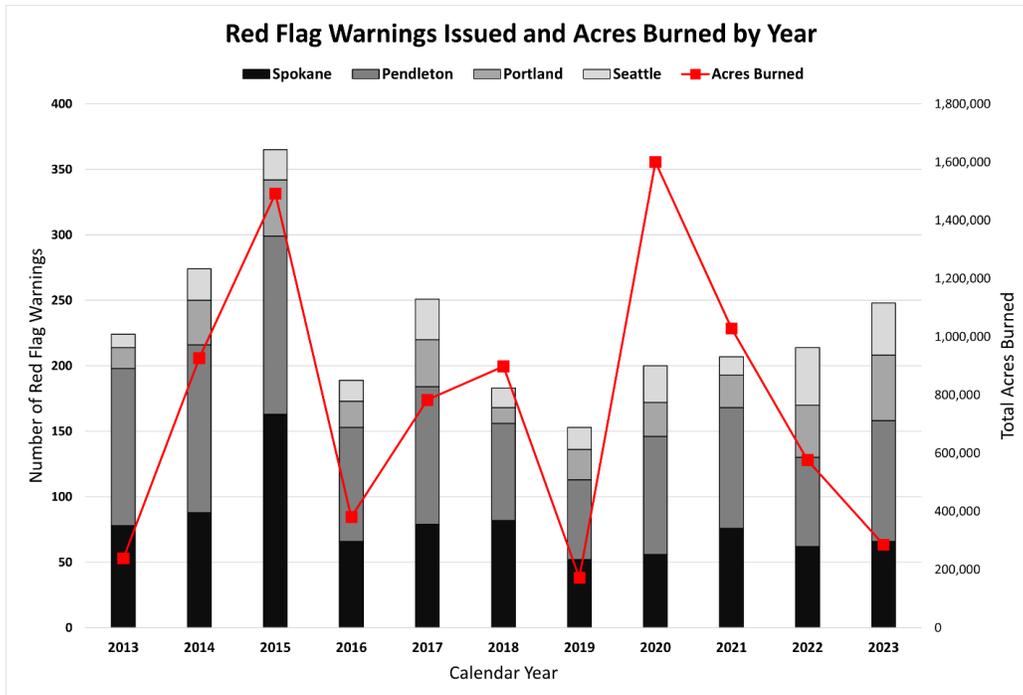


Figure 7: The number of Red Flag Warnings issued per office by year, along with total acres burned in each year. NWS Pendleton and Portland both cover significant portions of northern Oregon, so the warnings/acres burned are more representative of the general Pacific Northwest and not just Washington. (Herzmann, 2023; NIFC, 2023; Short, 2022).

Air Quality

During the 2023 fire year, there was only one smoke event that affected the entire state. Most people in Washington experienced degraded air quality between Aug. 19-21 as smoke from the fires in Spokane County combined with a significant smoke plume moving southwesterly from the Canadian wildfires. Despite this, the air quality index remained in the good and moderate range for most of the year for every county in the state. Throughout the state, only one monitor, located on Monroe Street in Spokane, reached a daily average value indicative of hazardous air conditions at 349 micrograms of PM 2.5 (a measurement of particulate matter in the air). This occurred on Aug. 20, aligning with high fire activity in the area.

No AirNow monitors in any Washington county showed more than nine days of daily average values reaching Unhealthy for Sensitive Groups or above (defined as “poor air quality”). Okanogan County experienced nine days of poor air quality, followed by Stevens County with seven days, and Grant County with six days. Some counties, mostly on the western coast of the state, showed no full days of poor air quality, including Grays Harbor, Skagit, Thurston, and Jefferson counties. Overall, 2023 saw much better air quality than previous fire years statewide, but Okanogan County and Grant County once again experienced the worst average air quality in the state due solely to wildfire smoke.

Large Fire Summary

By Sept. 30, 2023, there were 17 large, significant fires considered DNR jurisdiction only, or saw DNR involvement because of a threat to DNR jurisdiction. Large fires are typically those fires that are greater than 100 acres in timber or 300 acres in grass. For a location of the fires displayed in the table below, please see the Map of 2023 Large Fires in the Appendix of this report.

LARGE DNR FIRE NAME	Federal	Private	State	Tribal	Other	Total Acres Burned	Forested Acres Burned	Non-Forested Acres Burned
ARBUCKLE	0	90	0	0	35	125	0	125
CRATER CREEK	5,093	0	32	0	0	5,125	3,978	1,147
EAGLE BLUFF	7,347	7,876	1,195	0	10	16,428	1,511	14,917
GRAY	0	8,913	1,144	0	28	10,085	1,667	8,418
KNIGHT	0	34	94	0	0	128	0	128
MCEWAN	0	235	0	0	15	250	90	160
MORAN CREEK	0	61	0	0	0	61	14	47
NEWELL ROAD	1,506	55,781	3,263	0	1	60,551	2,204	58,347
OLD NACHES	0	544	101	0	0	645	0	645
OREGON ROAD	0	10,243	574	0	0	10,817	7,721	3,096
ROZA CREEK	59	0	427	0	0	486	0	486
SHANNON LAKE	0	85	0	0	0	85	18	67
SILVER STAR	0	536	36	0	106	678	0	678
SNIDER ROAD	0	200	0	0	0	200	0	200
SUTHERLAND	0	95	0	0	13	108	44	64
TUNNEL FIVE	21	506	0	0	19	546	128	418
WEST HALLETT	0	120	0	0	0	120	12	108
TOTALS	14,026	85,319	6,866	0	227	106,438	17,387	89,051

Table 4: Large, significant fires for DNR in 2023, as of Sept. 30.

The number of large fires is more than the number for last year (14 fires were noted in 2022). For the 17 fires noted in Table 4, total acres burned is 106,438, and of that, over half of the acres are private, state, and other jurisdiction (94,412). Less than half of the acres burned were on federal land (14,026). Any expenditures that DNR incurred for wildland fire response are described in the Financial Highlights section of this report. If expenditures were incurred while assisting a federal or tribal entity that were not part of mutual assistance during initial attack, those expenditures will be reimbursed. DNR incurs cost associated with DNR protection. DNR protects state, private and other non-federal forestlands within Forest Protection Zones defined in RCW 76.04.165. Any response outside of these zones is considered an “other agency assist” fire.

Also included in Table 4 is a breakdown of forested vs. non-forested acres burned for each fire. The Oregon Road Fire burned the most forested acres (7,721), and the Newell Road Fire burned the most non-forested acres (58,347). For the 17 large fires, over half of the acres burned were non-forested (89,051) and less than half the acres burned were forested (17,387).

Fire Season Statistics for DNR Fires

Between Jan. 1 and Sept. 30, 2023, the number of DNR fires was 535 on the west side of the state and 507 on the east side, bringing the statewide total to 1,042 DNR fires. This is lower than average for the eastside regions, but higher than average for the westside regions (see Figure 9 below and Table 6 in the Appendix).

Most of the fires were contained before they had the chance to become large, complex fires. The year-to-date number of DNR fires contained at 10 acres or less was 95.2% (the performance measure to strive for is 95%, set by the Office of Finance and Budget).

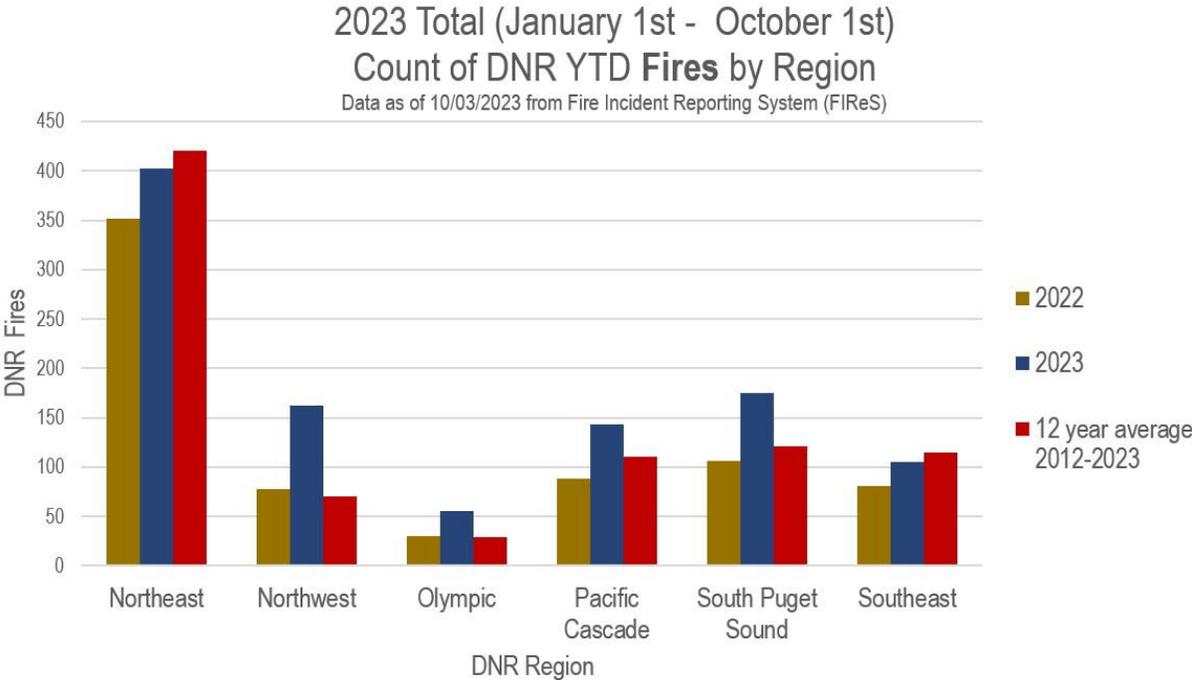


Figure 8: Count of DNR Fires by Region; YTD through Sept. 30, and gathered on Oct. 3.

2023 Total (January 1st - October 1st) Count of DNR Fires by Eastside/Westside

Data as of 10/03/2023 from Fire Incident Reporting System (FIReS)

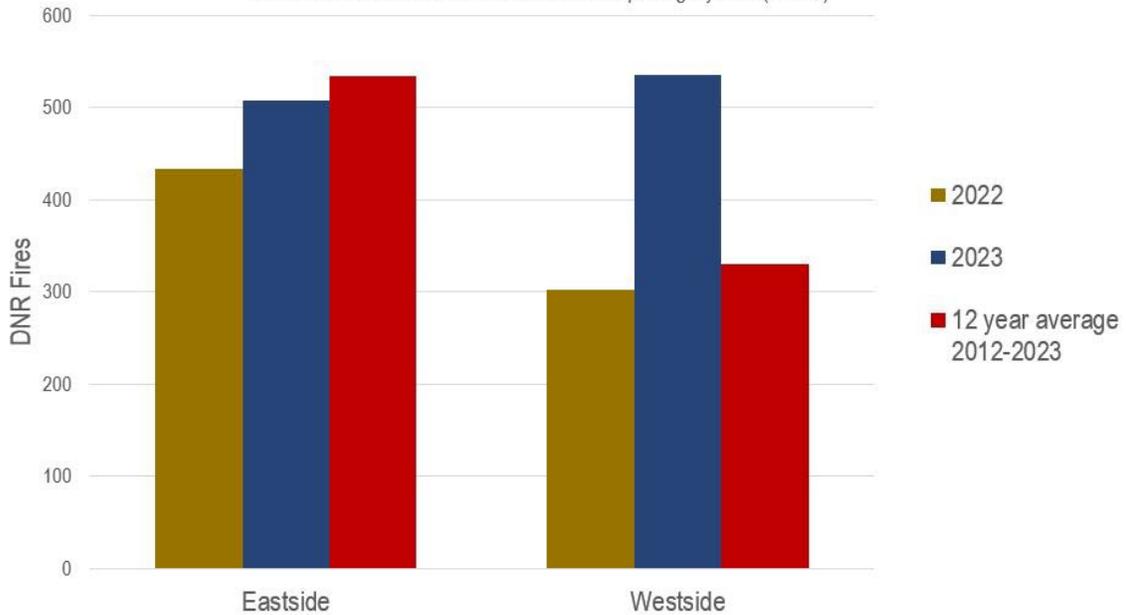


Figure 9: Count of DNR Fires for Eastside Regions (Northeast and Southeast) and Westside Regions (Northwest, Olympic, South Puget Sound, and Pacific Cascade) for the period of Jan. 1 to Sept. 30.

Total acres burned for DNR fires was a mixed bag when looking at the average. Some regions were below or at average, and some were under. Overall, however, DNR was below average for those fires that burned during the period Jan. 1 to Sept. 30. In those nine months, 102,942 acres burned were reported, which was less than the 12-year average of 104,285 acres statewide. The number of DNR acres burned in all fires across the state will be calculated at the end of the year, when reports and perimeters are finalized in January 2023, and will be available as a supplemental report in mid-February 2023.

2023 Total (January 1st - October 1st) Acres Burned in DNR Fires by East Side Region

Data as of 10/03/2023 from Fire Incident Reporting System (FIReS)

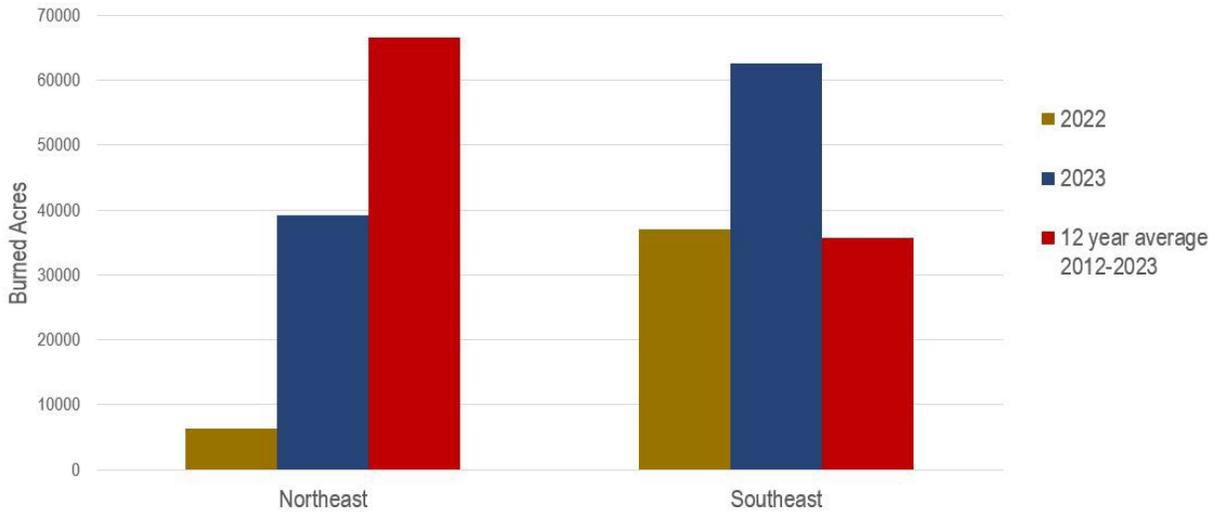


Figure 10: Total acres burned for DNR on the east side of the state.

2023 Total (January 1st - October 1st) Acres Burned in DNR Fires by West Side Region

Data as of 10/03/2023 from Fire Incident Reporting System (FIReS)

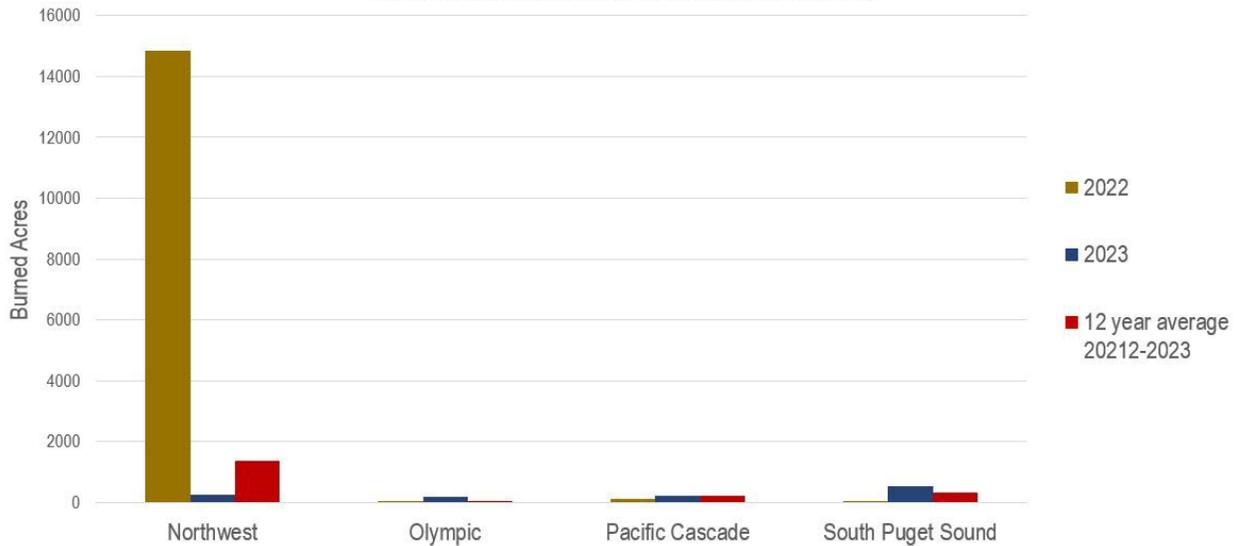


Figure 11: Total acres burned for DNR on the west side of the state.

As of Sept. 30, debris and open burning attributed to 22% of the human-caused ignitions (up from 2022 by 2 percentage points); Recreation and Ceremony (where escaped campfires would exist) were 7% of the human-caused ignitions (up from 2022 by 2 percentage points); and Equipment and Vehicle use were 6% of the human ignition sources (down from 2022 by 4 percentage points). Natural ignition (lightning) decreased this year by half from 2022 and represented 9% of the fire starts.

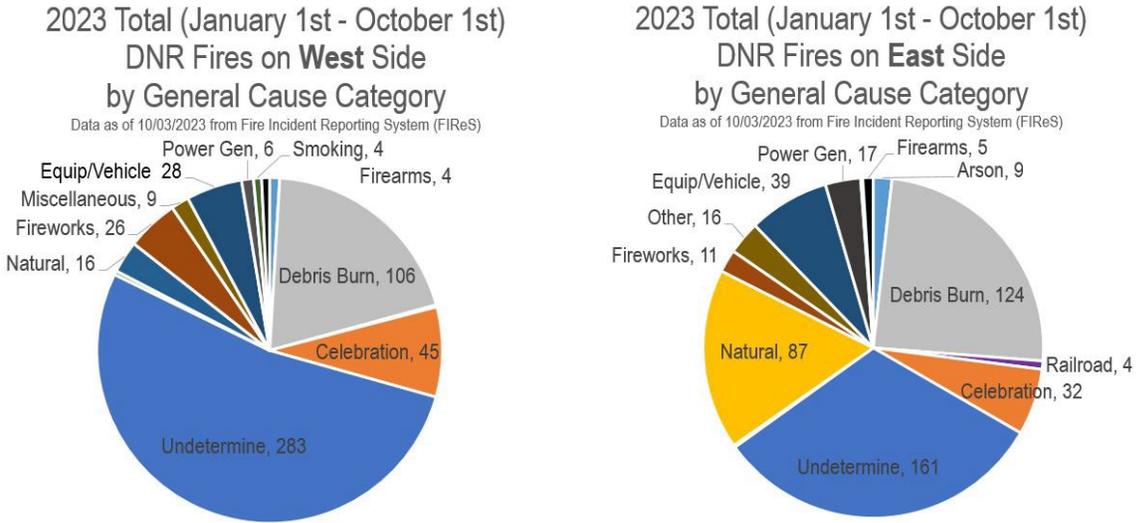


Figure 12: DNR fires by General Cause Category, by west side regions and east side regions.

As a side note, specific causes associated with the Undetermined general-cause category includes fires that weren't investigated, fires where the origin or cause could not be identified, fires where the origin was destroyed, and fires that are still under investigation.

Financial Highlights

In 2023, the Washington State Department of Natural Resources (DNR) had 12 incidents that resulted in suppression costs of \$1 million or greater. As of Sept. 30th, the DNR estimates cost of \$2.5 million for Sutherland, \$1.5 million for Roza Creek, \$7.8 million for Eagle Bluff, \$4.2 million for Tunnel Five, \$4.6 million for Newell Road, \$2.1 million for McEwan, \$1 million for West Hallett, \$2.6 million for Crater Creek, \$1.7 million for Chandler, \$5.2 million for Gray, \$12.2 million for Oregon Road, and \$1 million for Moran Creek.

As of Sept. 30th, DNR estimates costs associated with Type 4 and 5 incidents at \$12 million.

DNR had 12 incidents that involved cost share with other agencies. See Table 5 for all incidents that involved cost shares and the jurisdictional agencies involved.

All incidents involving cost share agreements with other agencies. Note: The first agency listed was the payment agency for the incident.	
FIRE NAME	JURISDICTIONAL AGENCIES
Crater Creek	DNR/USFS/BLM
Delfeld	BIA/DNR
Dry Coulee	DNR/BLM
Eagle Bluff	DNR/BLM/WSP
Gray	DNR/WSP
Moran Creek	DNR/WSP
Mullinix	USFW/DNR
Newell	DNR/BLM/BIA/WSP
Oregon	DNR/WSP
Roza	DNR/BLM
West Hallett	DNR/WSP
Margarita Fire	BIA/DNR

Table 5: Incidents involving cost share agreements.

All direct costs associated with sending resources to other states and Canada is reimbursable through agreements. There are two primary agreement types utilized: the Northwest Compact agreement between state and Canadian forestry/natural resource agencies, and the master agreement between Washington and the federal agencies, which DNR is signatory. If a state or Canadian Province is a signatory to the Northwest Compact agreement, they may order that assistance from the agency directly and DNR will invoice them directly. If DNR does not have an agreement with that state, the United States Department of Agriculture Forest Service (USDA-FS) will order resources, DNR will invoice USDA-FS, and then the USDA-FS will recover the funds from the state. Washington Fire Service resources that are sent out of state are dispatched from their agreement with DNR and are considered DNR resources for billing purposes.

In 2023, DNR had six incidents declared eligible for Fire Management Assistance Grants (FMAG). These incidents were the Tunnel Five, McEwan, Newell Road, Eagle Bluff, Gray, and Oregon Road fires. When an FMAG is declared, Washington State will recover 75 percent of eligible cost from FEMA during the declaration period.

FMAG is a federally funded program administered through FEMA that aids state, local, and federally recognized tribal governments for the mitigation, management, and control of fires on publicly or privately owned forests or grasslands. An FMAG declaration may be requested and issued for an uncontrolled fire when the threat of a major disaster exists. The declaration process is initiated once the state submits a request for assistance to the FEMA Regional Director. FEMA will review the claim and will decide on whether the claim will be approved based on criteria in place for disaster declaration.

The distribution of cost for the large fires can be found in Table 9 in the Appendix. The cost distribution tables include costs for all the incidents that were significant and costly, or large in size. The costs are estimates as of Sept. 30th and are based on the actuals in DNR financial systems, and any estimated encumbrances for costs not currently reflected in the actuals.

HB 1168 Highlights

With the ongoing implementation of House Bill 1168, DNR increased its response capabilities ranging from more ground resources to artificial intelligence-controlled long-range detection cameras, to state-of-the-art aerial reconnaissance and mapping. Finding qualified year-round fire personnel to operate the new heavy equipment and lead the fire crews continues to be a challenge, but gaps in staffing are continuing to improve, thus making DNR even more prepared to react safely and quickly when fires occur.

Operations

The hiring of more than 60 permanent firefighters across eight new crew modules in five regions and the procurement of crew vehicles strengthened the firefighting workforce, ensuring timely response and containment of wildfires. To manage the new crew modules, 15 middle leadership (overhead) staff were also hired to manage span-of-control to ensure crews were operating safely, efficiently, and effectively. These 15 overhead staff were deployed across the regions.

The purchase of specialized equipment – such as bulldozers, firefighting excavators, and transport – empowers firefighting teams with the necessary tools to efficiently suppress wildfires and protect lives and property. DNR purchased 16 dozers and 4 firefighting excavators, plus transports for each piece of equipment. DNR also hired 11 heavy equipment operators for the machinery for wildland firefighting and other forest management tasks.



Photo 9: DNR dozer on Newell Road, July 25, 2023.

Aviation



Photo 10: Front view of a Daher Kodiak 100 light fixed-wing aircraft. Photo by Aviation Section.

DNR procured two Daher Kodiak 100 light fixed-wing aircraft with Electro-Optical cameras which greatly contributed to the rapid detection and intelligence collection on emerging and established fires, considered multi-mission operations. These two aircraft flew more than 300 hours on both local, state, and federal incidents. In addition, the Kodiak aircraft found over 30 new fire starts which would have gone undetected for hours or days due to their remote locations. This enabled DNR to rapidly respond and keep fire manageable, extinguishing them quickly and keeping loss and overall cost down.

DNR successfully built, tested, and deployed the Portable Air Tanker Base (PATB) that was in place for three months at the Olympia Airport. DNR provided over 20 deployments out of the Olympia Tanker Base which reduced response times and cost to westside incidents which in turn reduced the amount of responses required with the usual longer turns to the Federal Moses Lake Tanker Base.



Photo 11: Airtanker 543 awaits loading at DNR's Olympia Airtanker Base, which is new for 2023 as part of HB 1168.

DNR increased its nighttime capabilities with the Kodiak aircraft by outfitting them with night operation and mapping and detection capability and completed modifications of three existing UH-1H helicopter with night vision goggle operations. DNR currently has two fully trained crews for nighttime helicopter operations.

Detection

DNR employs many resources and other technological tools to meet the data collection and reporting standards, but DNR has determined that a lack of adequate wildfire detection exists across the state, leaving a gap in early response. To fill the gap, DNR has deployed 16 of 21 wildland fire detection cameras in areas where fire occurrence is highest, based on historical research; other high-risk metrics considered included weather, fuels, topography, location of communities and other values at risk within the viewshed of the camera location.



Photo 12: Pano File Photo

DNR will utilize Pano AI 360-degree cameras and software, and alerting services, as part of a pilot detection system project to detect fires early. Each camera will rotate 360 degrees, and with satellite information and other data feeds, using artificial intelligence, provide active wildfire detection and real-time situational awareness. The cameras will identify smoke and fire as it appears on the landscape and pinpoint latitude and longitude or bearing, which will be used to deploy resources early. The installation of the cameras is almost complete. The full deployment of the pilot system is scheduled for completion no later than June 30, 2024.

HB 1498 Implementation

House Bill 1498, Aviation Assurance Funding, passed the 2023 Legislature. HB 1498 had four main requirements:

- The Department of Natural Resources (DNR) must prepare and submit an appendix on aviation usage by local fire departments for initial attack as a part of its annual wildfire report to the standing committees of the Legislature with jurisdiction over wildland firefighting.
- The DNR must consult with the State Fire Defense Committee, fire service representatives, and the State Fire Marshal's Office annually to review aviation program performance and determine aviation needs for the following fire year.
- The DNR must use suppression funding to assist local fire departments with initial attacks.
- The DNR must convene a work group composed of wildfire aviation subject matter experts; fire service representatives from the Washington Fire Chiefs Association, the Washington House Bill Report - 2 - ESHB 1498 State Council of Firefighters, the Washington State Fire Fighters' Association, and the Washington Fire Commissioners Association; wildland fire management staff, and other partners to evaluate the costs and benefits of a state certification program for aircraft and pilots used in wildfire suppression.

This year was a transition year for 1498 implementation. The law took effect on July 23, 2023. Because of this, many of the initial requirements, such as pre-season consultation on aircraft needs, could not be met. Also, the positions authorized to implement the law could not be hired mid-season. The focus for 2023 has been to support initial attack in fire districts outside of DNR jurisdiction.

HB 1498 provided additional funding for the DNR to contract additional aircraft to support Fire Districts. DNR brought on 2 additional Single Engine Tankers and 1 additional Air Attack, located in the Columbia Basin. These aircraft flew more than 300 hours and delivered 674,525 gallons of water to our Fire District partners, County, State, and federal partners. In addition, this reduced response times by an overall 6 minutes on average per mission which kept the need for additional aircraft or ground personnel to a minimum.

Due to the mid-year implementation and the nature of 2023 incidents, many emerging fires in eastern Washington were quickly approved for State Mobilization funding, obviating the need for DNR Suppression expenditures under HB 1498. As implementation processes are further refined during the coming winter, DNR will be able to report in more detail on responses and fiscal impacts of HB 1498.

Appendices

Definitions⁵

Air Attack: The deployment of a fixed-wing or rotary aircraft on a wildland fire, to drop retardant or extinguishing agents, shuttle and deploy crews and supplies, or perform aerial reconnaissance of the overall fire situation.

Burn acreage on DNR protected lands: the total sum of acres burned for fires listed as: "DNR protection-FFPA," "DNR protection non-FFPA under agreement," "Threat to DNR protection FFPA," and "Threat to DNR protection, non-FFPA under agreement" and instances where this field is null. This excludes fires labeled "DNR Assist Other Agency."

Classified fire: an uncontrolled fire requiring suppression action by the DNR or its partnering federal and/or local fire suppression agencies to prevent the fire from spreading to or burning on any lands for which DNR has protection responsibility. This excludes "false alarms," but includes "Unclassified" fires, a now-discontinued classification type used prior to 2019, for the 10-year average calculations.

DNR Fires: classified fires on DNR protected lands.

DNR Protection: any response in EIRS that is not considered "DNR Assist Other Agency." This includes "DNR protection-FFPA," "DNR protection non-FFPA under agreement," "Threat to DNR protection FFPA," and "Threat to DNR protection, non-FFPA under agreement" and instances where the field is null.

DNR Responses: any incident or false alarm to which DNR resources were dispatched, regardless of jurisdiction.

Eastside/Westside: refers to east or west of the Cascades based on region boundaries. Northeast and Southeast regions comprise east side while the remaining four regions comprise the west side.

Green-up: Green-up for the 1978 version of NFDRS model is defined as the beginning of a new cycle of plant growth. Green-up usually occurs once a year, except in desert areas where rainy periods can produce a flush of new growth more than once a year. Green-up may be signaled at different dates for different fuel models. Green-up should not be started when the first flush of green occurs in the area. Instead, the vegetation that will be the fire problem (represented by

⁵ Standard wildland fire terminology is governed by the National Wildfire Coordinating Group. The glossary can be found at [NWCG Glossary of Wildland Fire, PMS 205 | NWCG](#). DNR specific terminology is also listed here and has been agreed to by the Fire Intelligence Committee assembled by the Wildland Fire Management Division.

the NFDRS fuel model associated with the weather station) when it matures and cures should be identified. Green-up should start when the majority of this vegetation starts to grow.

Preparedness Level: Increments of planning and organizational readiness dictated by burning conditions, fire activity, and resource availability. Response and support to non-fire incidents requiring a significant commitment of resources may also affect Preparedness Levels. Preparedness levels are set at the National, Regional, and State level.

Regions: There are six DNR-specific regions across the state: Northeast, Northwest, Olympic, Pacific Cascades, South Puget Sound, and Southeast. See Figure 8.

Type: Refers to resource capability. A Type 1 resource provides a greater overall capability due to power, size, capacity, etc., than would be found in a Type 2 resource. Resource typing provides managers with additional information in selecting the best resource for the task.

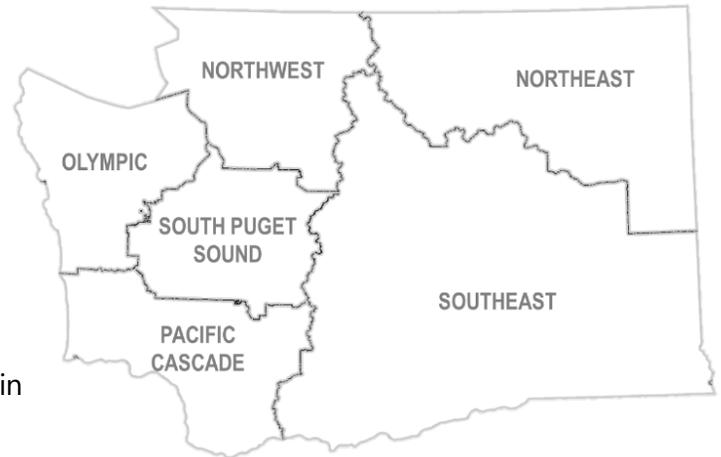


Figure 13: A map displaying the locations of the six regions of Washington DNR Wildland Fire Management

References

Herzmann, D. (2023). National Weather Service Raw Text Product. Iowa State University.
<https://mesonet.agron.iastate.edu/wx/afos/p.php?pil=RFWOTX&e=202308152112>

National Interagency Fire Center (NIFC). (2023). Wildland Fire Incident Locations. <https://data-nifc.opendata.arcgis.com/maps/wildland-fire-incident-locations>

NOAA PSL. (2023). Seasonal Climate Composites. <https://psl.noaa.gov/cgi-bin/data/composites/printpage.pl>

Short, K. (2022). Spatial wildfire occurrence data for the United States, 1992-2020. 6th Edition. Fort Collins, CO: Forest Service Research Data Archive. <https://doi.org/10.2737/RDS-2013-0009.6>

Srock, A., Charney, J., Potter, B., & Goodrick, S. (2018). The Hot-Dry-Windy Index: A New Fire Weather Index. *Atmosphere*, 9(7), 279. <https://doi.org/10.3390/atmos9070279>

Tables and Figures

Table 6: Year-to-date DNR Fires, 2012 to 2023.

DNR fires are classified fires on or threatening DNR protected lands. In 2023, there were 1,042 DNR fires, which is lower than the running average of 864 DNR fires.

2023 Year-To-Date (January 1 - October 1st)								
DNR Fires by Region and Year								
Data as of 10/03/2023 from Fire Incidents Reporting System (FIReS)								
		Pacific			Puget		<i>Total</i>	
		Northeast	Northwest	Olympic	Cascade	Sound		Southeast
Year	2012	307	42	33	99	52	126	659
	2013	357	44	13	113	33	120	680
	2014	428	24	24	90	78	143	787
	2015	467	63	25	131	136	123	945
	2016	365	43	16	98	124	108	754
	2017	332	73	22	91	120	94	732
	2018	480	59	32	121	190	118	1000
	2019	430	73	25	130	143	127	928
	2020	491	63	18	100	146	107	925
	2021	632	124	50	117	145	119	1187
	2022	352	78	30	88	106	81	735
	2023	402	162	55	143	175	105	1,042
	Total	5043	848	343	1321	1448	1371	10374
Twelve year average 2012-2023	420.25	70.7	28.6	110.0833	120.6666667	114.25	864.5	

Table 7: Year-to-date DNR Acres Burned, 2012 to 2023.

Acres burned for 2023 were 102,942 and is below the running average of 104,285.

2023 Year-To-Date (January 1st - October 1st)							
DNR Acres by Region and Year							
Data as of 10/03/2023 from Fire Incidents Reporting System (FIReS)							
	Pacific		South Puget				<i>Total</i>
	Northeast	Northwest	Olympic	Cascade	Sound	Southeast	
2012	1151.45	9.32	46.1	72.6	38.9	29189.31	30507.68
2013	2061.63	45.2	62.07	321.36	10.65	11517.79	14018.7
2014	253,452.97	65.12	12.06	304.63	300.68	48903.03	303038.5
2015	214676.64	107.89	57.87	593.93	245.31	3185.35	218867
2016	13244.07	416.33	9.36	50.56	78.75	950.51	14749.58
2017	2711.96	297.52	4.25	57.74	1622.79	3,963.18	8657.44
2018	11635.4	79.42	81.72	114.05	268.96	21192.49	33372.04
2019	1163.02	56	53.4	340.3	189.9	12,598.63	14401.25
2020	135380.69	198.24	23	268.73	474.89	84732.35	221077.9
2021	118862.84	72.19	180.82	97.58	190.88	112022.1	231426.4
2022	6283.62	14851.86	16.82	117.25	63.82	37033.16	58366.53
2023	2,583	61703.08	16584.8	524.32	21366.87	179.89	102,942
Total	763206.85	77902.17	17132.27	2863.05	24852.4	365467.8	1251425
Twelve year average 2012-2023	63600.571	6491.8	1427.7	238.5875	2071.033333	30455.65	104285.4

Table 8: Structures and residences damaged or destroyed.

Data are from the 17 significant fires with DNR involvement (Source: ICS-209 forms)

FIRE NAME	Start Date	Start Jurisdiction	Residences Damaged	Residences Destroyed	Other Structures Damaged	Other Structures Destroyed	Total Structures Damaged or Destroyed
ARBUCKLE	8/26/2023	WA-NES	0	0	0	0	0
CRATER CREEK	8/18/2023	WA-NES	0	0	0	0	0
EAGLE BLUFF	7/29/2023	WA-NES	0	3	0	4	7
GRAY	8/18/2023	WA-NES	40	240	11	86	377
KNIGHT	7/13/2023	WA-SES	0	0	0	0	0
MCEWAN	7/4/2023	WA-SPS	0	0	0	0	0
MORAN CREEK	6/29/2023	WA-NES	0	0	0	8	8
NEWELL ROAD	7/21/2023	WA-SES	0	0	0	0	0
OLD NACHES	6/7/2023	WA-SES	0	0	0	0	0
OREGON ROAD	8/18/2023	WA-NES	0	126	14	258	398
ROZA CREEK	6/27/2023	WA-SES	0	0	0	0	0
SHANNON LAKE	5/27/2023	WA-NWS	0	0	0	0	0
SILVER STAR	6/27/2023	WA-NES	0	0	0	0	0
SNIDER ROAD	7/17/2023	WA-NES	0	0	0	0	0
SUTHERLAND	6/17/2023	WA-OLS	0	0	0	0	0
TUNNEL FIVE	7/2/2023	WA-NES	2	5	0	3	10
WEST HALLETT	7/31/2023	WA-NES	0	0	0	0	0
TOTALS			42	374	25	359	800

Table 9: Estimated Cost by Incident

Data are for large and/or Significant Incidents with DNR Involvement.

FIRE NAME	REGION	COST SHARE	FMAG	TOTAL ESTIMATED COST	EST. AMOUNT BILLABLE OR RECEIVABLE THROUGH COST SHARE	DNR SALARIES & BENEFITS	DNR EQUIP.	AIR RESOURCES	MISC. EXPENSES	DOC	CONTRACTORS	COOPERATORS	FEDERAL RESOURCES
Sutherland	Olympic	NO	NO	2,568,034		515,667	50,715	815,157	133,518	71,743	708,160	273,074	0
Roza Creek	Southeast	YES	NO	1,566,686	-8,024	140,580	11,890	876,522	85,599	0	371,375	88,744	1)
Eagle Bluff	Northeast	YES	YES	7,860,505	-546,844	1,939,892	113,677	1,705,716	1,054,212	98,469	2,859,613	184,274	451,496
Tunnel Five	Southeast	YES	YES	4,260,908	-855,051	962,017	73,118	1,720,791	409,177	100,816	1,234,488	340,551	275,000
Newell Road	Southeast	YES	YES	4,617,994	394,352	799,309	80,600	2,295,499	615,916	0	263,937	93,381	75,000
McEwan	South Puget Sound	YES	YES	2,154,936	-499,409	402,393	24,483	459,930	287,972	32,788	823,111	305,787	317,880
Crater Creek	Northeast	YES	YES	2,634,984	438,529	429,903	20,733	9,990	512,047	0	1,044,078	58,166	121,538
Oregon	Northeast	YES	YES	12,215,120	-376,147	2,823,512	100,590	887,370	1,149,348	333,644	4,063,012	1,682,984	1,550,807
Gray	Northeast	YES	YES	5,288,772	-3,784,505	1,752,048	72,313	893,568	1,157,420	167,695	3,647,304	300,639	1,082,290
Chandler	Pacific Cascade	NO	NO	1,726,580		430,038	28,033	1,003,532	11,779	25,865	227,332	0	0
West Hallett	Northeast	YES	NO	1,038,655	-412,322	200,305	17,016	567,754	243,308	39,749	199,076	87,864	95,905
Moran Creek	Northeast	YES	NO	1,066,984	11,414	237,319	13,227	506,926	143,121	15,229	53,289	80,460	5,999

COMMENTS: All cost is our estimated cost through September 30, 2023 based on our actual expenditures currently reflected in our agency financial reports combined with estimated cost for resources that are not yet reflected in agency financial reports. 1) Cost Share with BLM, data was not available on federal resources that BLM provided.

Map of 2023 Fires

Large Fires of Concern

