2022 FIRE WEATHER REPORT – WFO PQR

2017 EAGLE CREEK FIRE – PHOTO BY SHAWN WEAGLE

2022 Fire Weather Summary

The 2022 fire season was not as severe as 2020 or 2021, but persisted longer than usual. The worst overall fuel conditions occurred in mid-October. This is highly unusual due to shorter days and slightly lower sun angle. Despite those factors, some fire weather zones experienced the highest seasonal average ERC values during the period October 11-20, 2022. Recall in 2020, the forecast area experienced several catastrophic and deadly wildfires in early September. Communities were devastated and several lives lost. These deadly wildfires were not confined to the Cascades. The Echo Mountain Complex, just a few miles east of Lincoln City devastated the coastal community of Otis. It is extremely rare to have a 100,000 acre fire within the forecast area. In 2020 the Beachie Creek and

Riverside Fires each scorched over 175,000 acres. The Holiday Farm fire ravaged the McKenzie River corridor, burning over 173,000 acres and destroying over 400 structures, including the entire community of Blue River. The Echo Mountain Complex, although much smaller at around 2500 acres, destroyed hundreds of homes in the community of Otis. The most significant wildfire in the 2022 fire season was the Cedar Creek Fire, in the Willamette NF. The fire started approximately 15 miles east of Oakridge and ended up burning a little over 127, 000 acres. Several late-season wildfires occurred in the southwest Washington interior, on Department of Natural Resources (DNR) and USFS land. Spot forecast requests were well above average, with a yearly total of 291. There were 127 wildfire spot requests and 138 prescribed burn requests. The majority of wildfire spots occurred in September and October. There were seven Red Flag events during the 2022 season. Overall, national IMET support was considerably less than the previous couple of years. The Portland office fulfilled four IMET dispatch requests, one in California, one in Western Washington and two in central Oregon. Firefighting efforts, incident management and forecast operations in 2022 generally reverted back to pre-pandemic conditions.

Contents

Lightning Days

Table one shows the lightning frequency, by area, for the 2022 season.

TABLE 1 - 2022 LIGHTNING DATA

(MAY THROUGH OCTOBER)

AREA	# LIGHTNING DAYS 2022	AVE. # DAYS (LAST 27 YEARS)	PERCENT AVE.
ZONES 601/612/664	3	5.44	55.1%
ZONES 602/603/665	2	6.74	29.7%
ZONES 604/667	3	7.97**	37.6%
ZONES 605/607/660/663	7	11.33	61.8%
ZONES 606/608	12	12.81	93.7%

*** Average over 29-year period.*

DATA OBTAINED FROM NATIONAL WEATHER SERVICE AND NORTHWEST COORDINATION CENTER

Examination of the above lightning table shows a general pattern of below-normal lightning frequency for the Portland Fire Weather area. This has been the trend for the past few seasons. The primary lightning period occurred August 1-10. August 1st lightning sparked at least 30 starts on the Willamette NF, including the 127,000 acre Cedar Creek Fire. A lightning event occurred around the same time in 2021. Overall fuel conditions, based on zone-average Energy Release Component (ERC), were at or near critical levels at the end of July and continued through August 10th. Unlike 2021, fuel conditions exhibited a slight downward trend in mid to late August and then returned to critical levels in early September. It was fortunate that below-normal lightning frequency occurred during the peak portion of fire season. Spring precipitation (March-May) was generally above normal, especially April and May 2022. All areas received above to well-above normal precipitation in April (see figure 1 next page), with some locations receiving 150-200 percent of normal. The wet trend continued through May and June. Figure 2 (page 5) shows the precipitation anomaly for the period April through June. Note that nearly all areas had 150 to 200

percent of normal. June 2022 alone saw precipitation anomalies of 200 to 300 percent of normal. The wet spring certainly delayed the onset of fire season. Nearly all fire weather zones recorded single-digit to zero ERC values through June 20th. A late-June heat wave brought average ERC values closer to normal, but nothing exceedingly alarming. Another way to analyze the abundant spring precipitation is to use the Standardized Precipitation Index (SPI). Figure 3 (page 6) shows the SPI for the April through June period. The entire fire weather forecast area exhibited SPI values of at least 1.5 to 2.0 standard deviations above normal. The south Washington and far north Oregon coast had SPI values generally 1.0 to 1.5 standard deviations above normal.

The wet period through the first three weeks of June, including a significant atmospheric river event, helped to ease fire danger concerns. There were multiple heat events during the 2022 fire season. The first occurred in late June. A much longer event took place in late July through early August. October 2022 was an anomaly. Typically, fall rain returns to the Pacific Northwest by mid-October. October 2022 was highly unusual due the extreme warm conditions. In fact, the Portland airport recorded 12 days of high temperatures at or above 80 degrees. Average ERC values for many fire weather zones reached peak values during the October 10-20 period.

Figure 1 – April 2022 Percent of Normal Precipitation

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Percent of Normal Precipitation (%)
4/1/2022 − 6/30/2022

Figure 2 – April-June 2022 Percent of Normal Precipitation

APRIL AND MAY 2022 PRECIPITATION TOTALS

SITE	APRIL	NORMAL	MAY	NORMAL
ASTORIA	6.75	5.20	6.24	3.32
PORTLAND	5.73	2.73	3.78	2.47
ALSEA	15.08	6.98	12.10	4.18
OAKRIDGE	6.54	4.16	6.78	3.18

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3-Month SPI
4/1/2022 – 6/30/2022
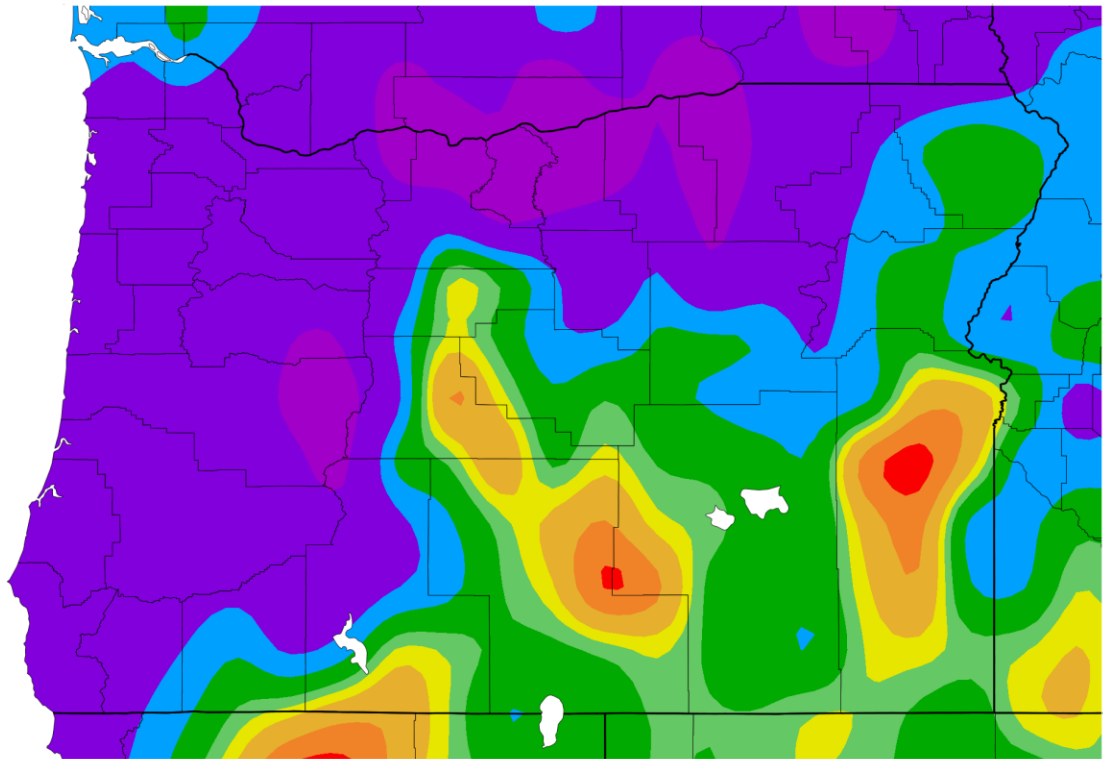
Generated 7/20/2022 at PRCC using provisional data   NOAA Regional Climate Centers

-3   -2.5   -2   -1.5   -1   -0.5   0   0.5   1   1.5   2   2.5   3

Figure 3 – April-June Standardized Precipitation Index (SPI)

Cascade Snow Depth and Pre-Season Precipitation

GOVERNMENT CAMP SNOW DEPTH: The 2021-22 North Oregon Cascade snowfall season got off to a slow start. The first day of measured snow depth at Government Camp was November 6th with one inch. Snow depth reached three inches by the 10th, bu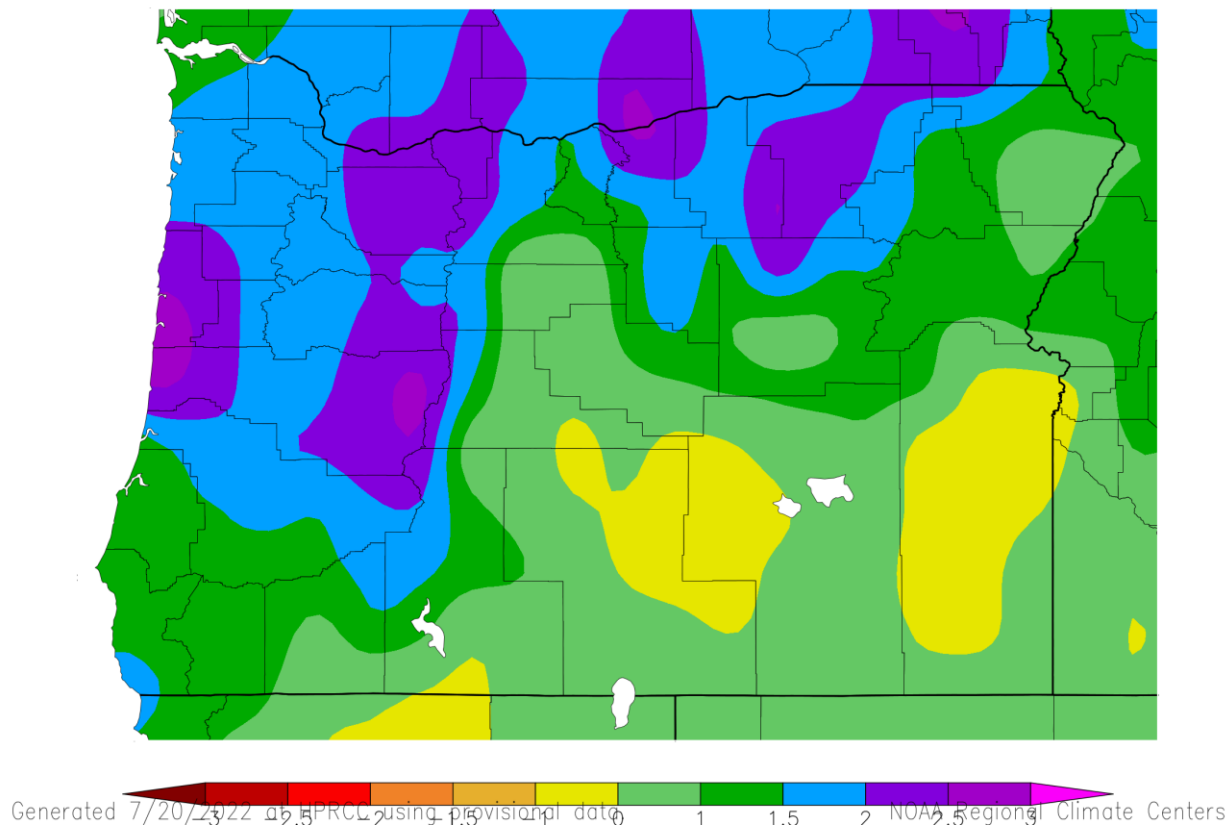t fell to zero on the 12th. A few inches occurred around Thanksgiving, but by the 30th snow depth was back to zero. Unfortunately, Government Camp snow depth measurements were missing during December and January. Measurements resumed in February. Snow depth was 32 inches on February 1st, hovered around 25 inches through mid-month and then increased to a seasonal maximum of 52 inches February 22nd. Typically, in any given snow season, Government Camp reaches a peak snow depth of 75-100 inches. Snow depth usually peaks between mid-February and mid-March. This was not the case for 2022. There were 39 inches on the ground March 1st. Snow depth dwindled to just six inches by March 31st. The cool and wet April resulted in a brief snowfall resurgence. Measured snow depth April 13th was 33 inches. There were 15 inches on the ground

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April 30th. Government Camp snowpack usually persists through May. Snow depth was 14 inches May 1st, but fell to zero by the 16th. The last day of recorded snow depth was May 22nd. January 2022 Snow Water Equivalent (SWE) values for the Mt. Hood Basin were 110 to 125 percent of normal. Figure 4 (below) shows the SWE on January 31, 2022. Note that SWE values across the Northwest were near to slightly above normal. The primary exceptions were south-central and southeast Oregon. By the end of March 2022, SWE values had fallen to around 60 percent of normal across much of Oregon, with 20-40 percent of normal in south-Central and southeast Oregon. SWE conditions showed dramatic improvement during April 2022. Washington and northern Oregon basins were at 100 to 150 percent of normal SWE. South-central Oregon continued to lag, with just 35-65 percent of normal.
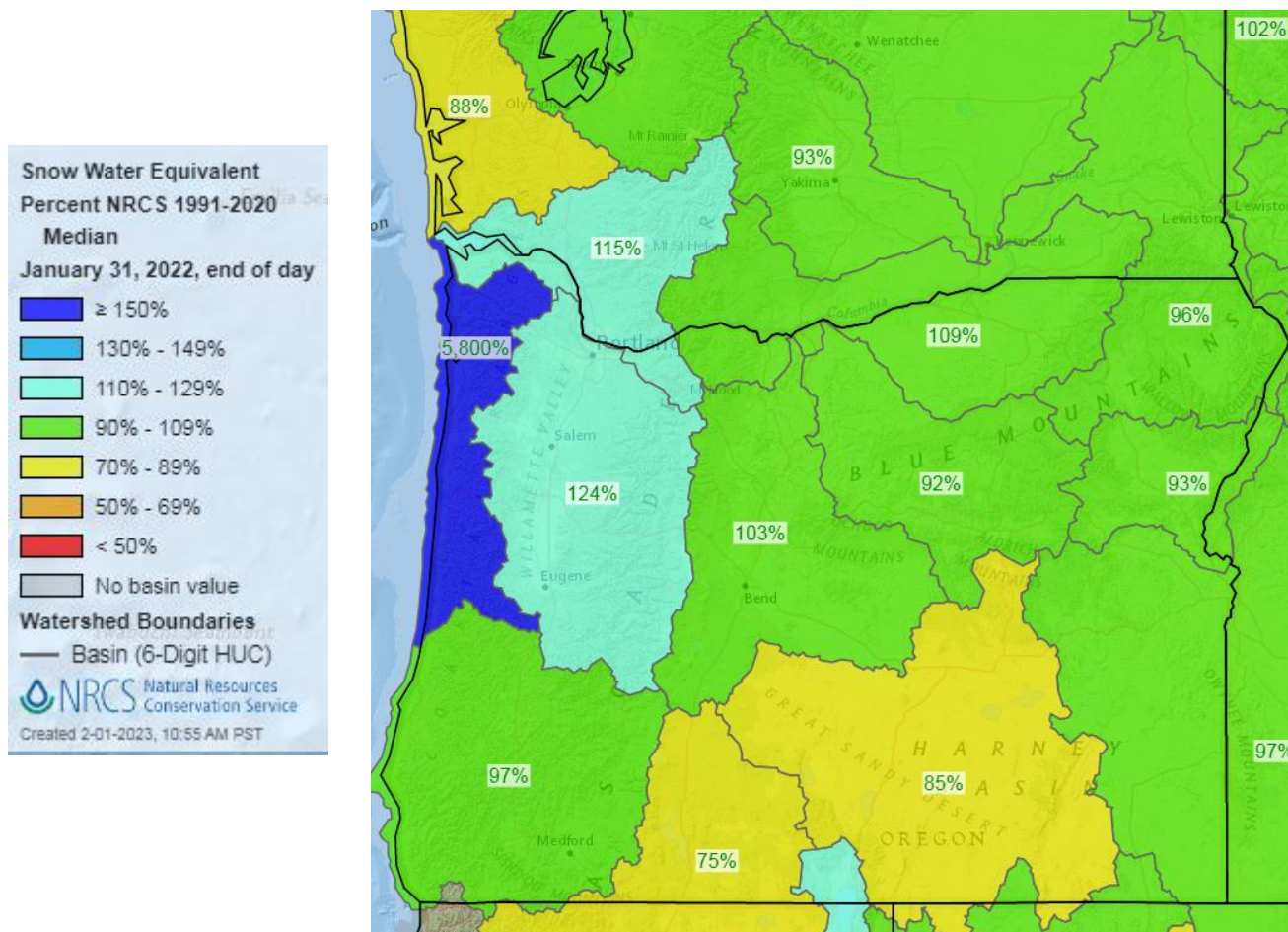

Figure 4 – January 2022 Snow Water Equivalent Percent of Normal

GOVERNMENT CAMP PRECIPITATION: The overall pre-season precipitation (November through May) was likely above average. December 2021 and January 2022 data were not available.

However, based on other locations, it can be assumed Government Camp had well above-normal December precipitation and near-average January precipitation. Oakridge, in the central Cascade foothills, recorded 93% of average for the period November 2021 through May 2022. February and March 2022 were generally dry. March 2022 precipitation for the Cascades was generally 50 to 70 percent of normal. The lower values were focused south of Mt. Jefferson. February 2022 precipitation across the forecast area was well below normal, generally 25 to 70 percent of normal. Lowest values occurred primarily south of a Newport to Mt. Jefferson line.

The improved SWE during April and the continued wet May and June provided hope that fire season 2022 would start on time or even be slightly delayed. This was especially true after such a wet first three weeks of June, which included a significant atmospheric river event. Figure 5 (below) shows the 2021-22 precipitation summary for Oakridge.

2021-2022 WET SEASON OAKRIDGE
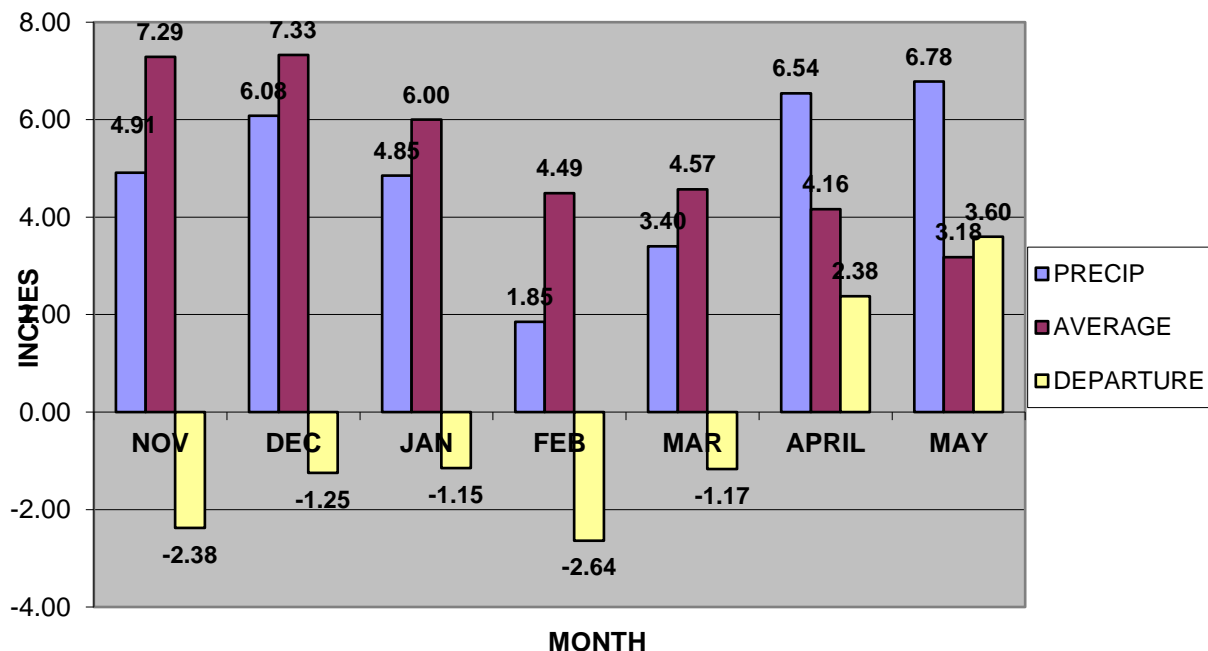
Figure 5 – Oakridge Precipitation Nov 2021 through May 2022

OTHER NOTES: The Astoria and Portland reporting sites recorded at or just below 120 percent of average winter and spring precipitation. February and March were the only two months with below normal precipitation. The Eugene airport received 83.5 percent of normal winter and spring precipitation. The new 30-year Eugene normal values continue to be suspect, i.e. too high. February 2022 was an abnormally dry month. This was especially notable at Eugene, with just under one inch of precipitation, or slightly below 20 percent of normal. The north Willamette Valley was not as dry. Portland received 2.77 inches, or around 75 percent of normal.

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2022 FUEL CONDITIONS NOTES

FUELS DISCLAIMER: The 2022 fire season was the first year under the new NFDRS program. There were significant changes from the original 1972 version. Minor modifications were made in 1978 and 1988. The main changes from previous versions to the new NFDRS2016 included: 1) Vast reduction in the number of fuel models. The new version utilizes four primary models. 2) 24-hour weather input instead of the 1300 LST weather observation. 3) Vast improvements in the live fuel moisture component. 4) Advent of the Growing Season Index (GSI). The automated GSI eliminates the need for climate classes, green-up dates and season codes and 5) Adoption of the Nelson fuel model. This model uses 24-hour weather observations and eliminates the need for the State-of-the-Weather (SOW) manual input. The Northwest Coordination Center (NWCC) created distinct Predictive Service Areas (PSAs) for Region 6 based on the 1978 NFDRS version. Fuel model G was used as the baseline for all PSAs. Land and fire managers determined Energy Release Component (ERC) breakpoints for their respective areas. The 80th, 90th and 97th percentile breakpoints were important to determine overall fuel severity. The advent of NFDRS2016 necessitated the need for land and fire managers to make some adjustments to these thresholds. The new Fuel Model Y became the old Model G. Unfortunately, not all land and fire managers took the time to re-evaluate their respective RAWS stations to determine new Fuel Model Y ERC breakpoints. Thus, in 2022, some areas were using old Model G thresholds while others had determined new Fuel Model Y thresholds. The end result was a mixed bag of ERC breakpoints, or comparing apples and oranges. The discontinuity made it difficult to assess fuel severity. The differences are apparent in the 2022 fuels summary (Appendix 1).

The highest ERC values generally occurred in early September. A secondary peak happened in late-July through early August, during an extended hot spell. The most unusual fuels aspect for the 2022 season was the late-season fuel conditions. Some fire weather zones exhibited the highest seasonal zone-average ERC values in mid-October. For instance, zone 608, the Willamette NF, recorded a 10-day zone average ERC of 45.7 during the period October 11-20. This was the highest 10-day average for the 2022 season. The Willamette NF continued to use old Model G ERC breakpoints. The Mt. Hood/Gifford Pinchot adopted new ERC breakpoints for their RAWS stations. The Willamette NF zone had 28 days with average ERC values at or above the 80th percentile. The Mt. Hood NF zone recorded 48 such days. This is a fairly substantial difference. Fire zone 603, the Central Coast Range, was an enigma. In the 2021 season, zone-average ERC values exceeded the 80th percentile on 58 days. The 2022 season had just 4 days. This was another case of using Model G breakpoints with new Model Y. Village Creek RAWS had 60 days with an ERC value at or above the 80th percentile in 2021. There were only 8 such days in 2022. Rockhouse RAWS was another extreme example. In 2021, Rockhouse exceeded its 80th percentile on 64 days, with a maximum ERC of 67.4. For the 2022 season, Rockhouse exceeded the 80 percentile on a mere 3 days, with a seasonal maximum of 55.5.

One would think neighboring fire zone 602, the North Oregon Coast Range, would show similar results to zone 603. This was not the case. Zone 602 recorded 65 days with a zone-average ERC at or above its 80th percentile, compared to 4 days for zone 603. ERC values exceeded the 90th

percentile on 31 days in zone 602, compared to just one day in zone 603. Oregon Department of Forestry (ODF) fire staff conducted fuels re-evaluation for RAWS sites in zone 602, resulting in new ERC breakpoints. Another case of comparing apples and oranges. Zone 663, the Mt. Adams district of the Gifford Pinchot NF, showed a significant difference in fuel conditions from 2021 to 2022 due to the adoption of new ERC breakpoints. In 2021, the 80th percentile for Buck Creek RAWS was 62. The 2022 fuel model Y 80th percentile value was 45. The maximum 2021 daily ERC was 73.4, compared to 55.9 in 2022. Finally, fire zone 665, the Lower Columbia and east Willapa Hills in southwest Washington, was another example of mismatched ERC thresholds. This zone contains the Castle Rock RAWS. Per a post-season discussion with Washington DNR, the Castle Rock RAWS is heavily weighted in the Pacific Cascade DNR district fuels assessment. However, this RAWS is situated on a cured lawn and is not representative of overall fuel conditions. Abernathy Mountain RAWS, the only other station in fire zone 665, exceeded its 80th percentile ERC on 56 days. Castle Rock RAWS never exceeded its 80th percentile value in 2022. The inclusion of Castle Rock resulted in a lower zone-average ERC than likely what actually occurred.

The fuels dilemma made it more difficult for fuels assessment during Red Flag events. The issuance of a Red Flag Warning is based on a combination of critical fire weather AND critical fuel conditions.   Fire and land managers were contacted on numerous occasions throughout the 2022 season to obtain a ground-truth fuels assessment.   It is hoped all units and districts will determine new ERC breakpoints based on the new Fuel Model Y.

Off-season Red Flag fuel criteria were established in 2019 and continued to be used for the 2022 season. Per user input, primarily NWCC, DNR and ODF, it was decided to use 100-hr fuel moisture values of 10% or less for off-season Red Flag criteria.

The overall 100-hour fuel moisture values for 2022 were not as extreme compared to 2021. The 100-hour fuel moisture values were not impacted by the switch to NFDRS2016.   During the 2021 season, nearly all zones recorded values below 10 percent. Zone 663 had 65 such days. This was not the case for the 2022 season. Only two fire zones, 607 and 663, recorded average 100-hour fuel moistures below 10 percent. In 2021, zone 663 had 65 days with 100-hour fuel moisture values below 10 percent. There were just two such days in 2022. ERC is a long-term measure of fuel potential, while 100-hour fuel moisture values exhibit greater shorter term variation.

 The 1000-hr fuel moisture values generally reach a minimum of 12-14% in late August or early September. It is rare to have 1000-hr values as low as 10%. The lowest 10-day 1000-hour fuel moisture value was 12.04 in zone 663 for the August 1-10 period. Overall, the 1000-hour fuel moisture values were not as extreme in 2022 compared to the 2021 season. Despite critical ERC values in mid-October, the corresponding 1000-hour fuel moisture values were 14-18 percent.

In summary, the 2022 fire season exhibited three ERC peaks. The highest ERC values occurred in mid-October, which is highly unusual.   As a result, there were 134 spot requests in October, which comprised 46 percent of the annual total.

Red Flag Warning Statistics for 2022

Table two shows the Red Flag verification statistics for the 2022 fire season.

TABLE 2 (ALL WARNINGS)

ZONE	# RFW	CORRECT RFW (A)	INCORRECT RFW (B)	MISSED EVENTS (C)	POD A/(A+C)	CSI A/(A+B+C)	FAR (1-[A/(A+B)])
601	1	1	0	0	1.000	1.000	0.000
664	1	1	0	0	1.000	1.000	0.000
612	1	1	0	0	1.000	1.000	0.000
602	2	2	0	0	1.000	1.000	0.000
665	1	1	0	0	1.000	1.000	0.000
603	2	2	0	0	1.000	1.000	0.000
604	3	2	1	0	1.000	0.667	0.333
667	2	1	1	0	1.000	0.500	0.500
605	4	3	1	1	0.750	0.600	0.250
606	2	2	0	1	0.667	0.667	0.000
607	4	3	1	0	1.000	0.750	0.250
608	6	6	0	0	1.000	1.000	0.000
660	3	2	1	0	1.000	0.667	0.333
663	1	1	0	0	1.000	1.000	0.000
TOTALS (ALL)	33	28	5	2	0.933	0.800	0.152
LIGHTNING	8	8	0	2	0.800	0.800	0.000
WIND/RH	23	18	5	0	1.000	0.783	0.217
HAINES 6	2	2	0	0	1.000	1.000	0.000

NUMBER OF WARNED EVENTS: 7

EVENTS PRECEEDED BY A WATCH: 4
MISSED EVENTS: 1

NOTE: Refer to the Annual Operating Plan for complete Red Flag criteria.

WARNING NOTES – The number of Red Flag events during the 2022 fire season was above average. There were a total of 7 events comprising 33 warnings. Each warned zone counts as an individual warning. There are usually 2-3 Red Flag events in any given fire season. In 2022, there were three wind/RH events, two Dry/Unstable events and two lightning events. One lightning event was confined to Zone 608, the Willamette NF. Both lightning events verified. However, for the August 8th event, warnings were issued for zones 605 and 606 AFTER the lightning was first detected. The last event, Wind/RH, occurred October 14-15, 2022. This was a rare late-season event. Typically, there is at least one September wind/RH event. The Labor Day 2020 Firestorm was a historic wind/RH episode, resulting in multiple mega-fires.

The Beachie Creek, Riverside and Holiday Farm fires of 2020 burned thousands of structures, resulted in several fatalities and caused tens of thousands evacuations. Entire communities, such as Blue River, Gates and Otis suffered complete devastation. There was one mega-fire during the 2022 season. The Cedar Creek Fire torched just over 127,000 acres in the Willamette NF. This lightning-caused fire began July 31st and was declared contained on November 30th. Fortunately, the fire did not threaten any communities. The September 9-10 east wind event caused concern for Oakridge, but the fire did not reach the community. The Nakia Creek Fire, in the Pacific Cascade region of Washington DNR, started on October 9th. The wind/RH Red Flag event October 14-15 resulted in significant growth on this fire. The human-caused fire, nine miles northeast of Camas, WA, burned 1918 acres and was declared contained October 31st. Another DNR fire of note was the Chinook Complex. This fire complex started on private land and quickly spread to state-protected land. The complex, a result of escaped slash burns, began on November 15th and was contained on November 23rd.

The September 9-10 Wind/RH event was the most prominent of the seven Red Flag events. Although not as extreme as the 2020 Labor Day firestorm, the timing of this event brought back memories of the 2020 catastrophe. This 2022 event was well forecast. Fire Weather Watch lead times were on the order of 60 to 70 hours. Warning lead times were 35 to 55 hours, but 67.5 hours for zone 664.

Dry/Unstable events are difficult to verify. The Salem and Medford upper air soundings are used to verify the Haines component. Data on incidents with IMET support and upper air capability is also used. There is a reasonable chance that stability conditions on incidents is vastly different from those at Salem and Medford. This results in a high degree of subjectivity when verifying Dry/Unstable events. The fuels component of Red Flag criteria is based on zone-average ERC. The full conversion to NFDRS2016 in 2022 resulted in some land and fire managers making adjustments to the zone-average 80th percentile ERC values, while others did not.

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Event Lead Times

Tables 3 and 4 show the respective warning and watch lead times for all events in 2022.

TABLE 3 – WARNING LEAD TIMES

EVENT	# ZONES WARNED	AVE. ZONE LEAD TIME
July 31 (Lightning)	1	10 HRS 32 MINS
August 6-7 (Wind/RH)	5	DID NOT VERIFY
August 9-10 (Lightning)	7	6 HRS 9 MINS
September 2 (Dry/Unstable)	1	4 HRS 29 MINS
September 6 (Dry/Unstable)	1	22 HRS 6 MINS
September 9-10 (Wind/RH)	14	42 HRS 27 MINS
October 14-15 (Wind/RH)	4	18 HRS 52 MINS
OVERALL AVE. LEAD TIME		26 HRS 47 MINS

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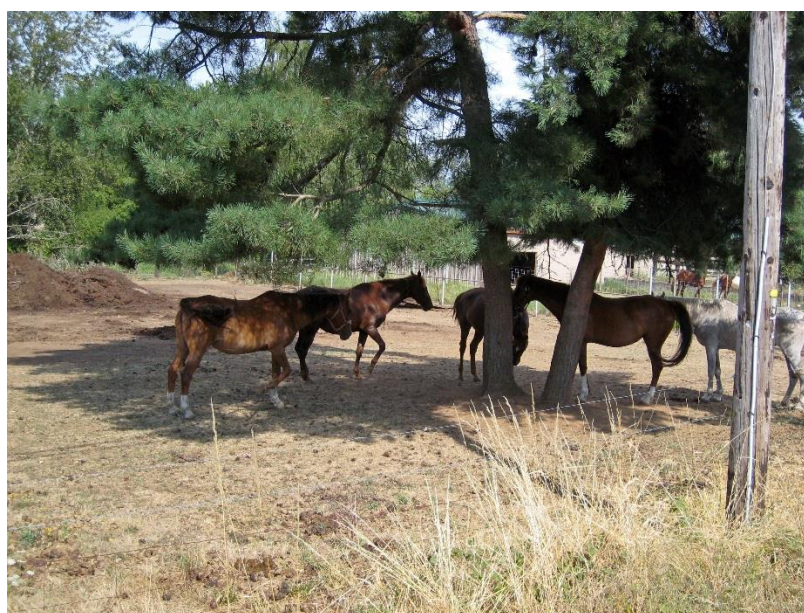
TABLE 4 – WATCH LEAD TIMES

EVENT	# ZONES IN WATCH	AVE. ZONE LEAD TIME
July 31 (Lightning)	1	25 HRS 13 MINS
August 6-7 (Wind/RH)	5	DID NOT VERIFY
August 9-10 (Lightning)	NO WATCH ISSUED	NA
September 2 (Dry/Unstable)	NO WATCH ISSUED	NA
September 6 (Dry/Unstable)	1	32 HRS 52 MINS
September 9-10 (Wind/RH)	14	64 HRS 14 MINS
October 14-15 (Wind/RH)	NO WATCH ISSUED	NA
OVERALL AVE. LEAD TIME		59 HRS 50 MINS
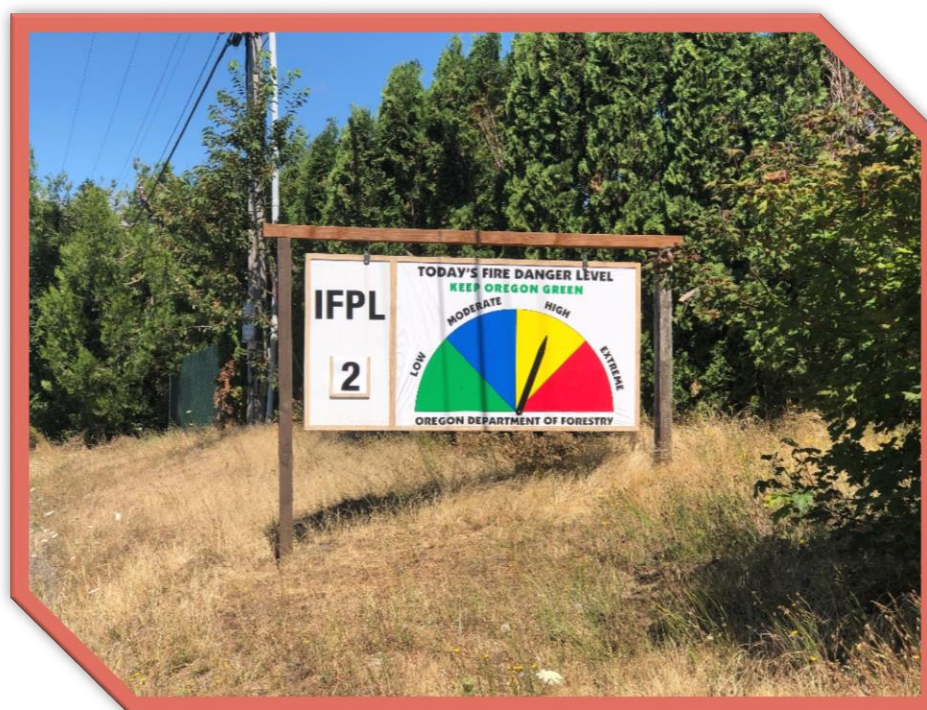
Drake's Crossing ODF Rural Fire Station (photo by Scott Weishaar)

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2022 Red Flag Chronology

July 31 Event: LIGHTNING

- **1512 PDT July 30 – Watch issued for zone 608. Valid July 31 afternoon through late night.**
- **0553 PDT July 31 – Watch upgraded to Warning. Valid July 31 from 1400 to 2400 PDT.**
- *Lightning strikes first detected 1625 PDT July 31. Numerous strikes/flashes through 1900 PDT. At least 3 starts between 1700 and 1930.*

August 6-7 Event: WIND/RH

- **1446 PDT August 5 – Watch issued zones 605, 607 and 660. Valid August 6 late morning through August 7 late evening.**
- **1446 PDT August 5 – Watch issued zones 604 and 667. Valid August 6 late morning through evening.**
- **0618 PDT August 6 – Watch upgraded to Warning zones 605, 607 and 660. Valid 1400 PDT August 6 through 2000 PDT August 7.**
- **0618 PDT August 6 – Watch upgraded to Warning zones 604 and 667. Valid 1400 PDT August 6 through 2100 PDT.**
- **0857 PDT August 7 – Warning extended zones 605, 607 and 660. New end time 1500 PDT August 7.**
- *None of the warnings verified. Three Corner Rock and Wanderer's Peak recorded 5 hours and 2 hours of Wind/RH criteria, respectively, but wind subsided the afternoon of August 6.*

August 9-10 Event: LIGHTNING

- **1350 PDT August 8 – Warning issued zones 607 and 608. Valid time 1400 PDT August 9 through 0600 PDT August 10.**
- **1950 PDT August 9 – Warning issued zones 602, 604, 605 and 606. Valid time 1950 PDT August 9 through 0600 PDT August 10.**
- **2123 PDT August 9 – Warning issued zone 603. Valid time 2123 PDT August 9 through 0600 PDT August 10.**
- *Lightning occurred in all warned zones. However, lightning occurred in zones 605 and 606 BEFORE Warning issuance. Both zones counted as a correct warning and a missed event.*

September 2 Event: DRY/UNSTABLE

- **0335 PDT September 2 – Warning issued zone 608 above 3500 feet. Valid time 0335 PDT September 2 through 2300 PDT.**
- *0500 PDT Salem sounding showed mid-level Haines 6 AND high-level Haines 5. IRAWS 58 Waldo Lake recorded RH 23% at 0800 PDT. Visible satellite imagery showed impressive plume and active fire behavior. VIIRS/MODIS showed considerable growth on Cedar Creek Fire September 2.*

September 6 Event: DRY/UNSTABLE

- **0308 PDT September 5 – Watch issued zone 608. Valid time September 6 afternoon through evening.**
- **1354 PDT September 5 – Watch upgraded to Warning. Valid time September 6 1300 PDT to 2400 PDT.**
- *At 0934 PDT September 6 Waldo Lake IRAWS recorded RH 25%.   KRXT radar showed tops to 20,000 feet. Pyrocumulus development on Cedar Creek Fire. Rapid plume development 1200 PDT September 6.*

September 8:   WIND/RH

- **Mid-afternoon through early evening September 8 Willow Creek RAWS and the Eugene airport met wind/RH criteria. Did NOT count this as a missed event for zone 604.   The two sites are within 7 miles of each other. No other surrounding stations met criteria.**

September 9-10 Event: WIND/RH

- **1456 PDT September 6 – Watch issued zone 608. Valid time September 9 in the morning through evening of September 10.**
- **1456 PDT September 6 – Watch issued zones 602, 603, 604, 605, 606, 607, 660, 665 and 667. Valid time September 9 in the morning through evening of September 10.**
- **1456 PDT September 6 – Warning issued zones 601, 612 and 664 (minus coastal strip). Valid time September 9 in the morning through the morning of September 10.**
- **1502 PDT September 7 – Warning issued zones 605, 606, 607 and 608. Valid time 1100 PDT September 9 through 1700 PDT September 10.   Watch continues for remaining zones.**
- **2137 PDT September 7 – Warning issued zones 602, 603, 604, 665 and 667. Valid time 1100 PDT September 9 through 2300 PDT September 10.**
- **2137 PDT September 7 – Warning issued zones 601, 612 and 664 (minus coastal strip). Valid time 1100 PDT September 9 through 2000 PDT September 10.**
- **2137 PDT September 7 – Warning issued zone 663. Valid time 1100 PDT September 9 through 2300 PDT September 10.**
- **2137 PDT September 7 – Warning valid time changed zones 605, 606, 607 and 608. New valid time 0000 PDT September 9 through 2300 PDT September 10.**
- **2137 PDT September 7 – Warning issued zone 660. Valid time 1100 PDT September 9 through 2300 PDT September 10.**
- *All warned zones verified. Event start time for zone 664 was outside Watch valid time.*

October 14-15 Event: WIND/RH

- **1002 PDT October 14 – Warning issued zones 605, 607, 608 and 660. Valid time 0200 PDT October 14 through 0600 PDT October 15.**

- **1650 PDT October 15 – Warning extended zone 660. New valid ending time 1800 PDT October 16.**
- **0450 PDT October 16 – Warning extended zones 605 and 607. New valid ending time 1200 PDT October 16.**
- **0450 PDT October 16 – Warning ended zone 608. Warning continues zone 660 through 1800 October 16.**
- **1215 PDT October 16 – Warnings ended zones 605 and 607.   Warning continues zone 660 through 1800 PDT.**
- *All warned zones verified. Technically, zone 660 had only one station, Larch Mountain that met wind/RH criteria. Three Corner Rock had the wind, but RH was too high. The Annual Operating Plan (AOP) clearly states that if wind/RH criteria are met in zone 605 and/or zone 607, then criteria is assumed to have been met in zone 660. Zones 605, 607 and 660 are grouped for wind/RH events. If criteria is met in one zone, it is assumed to have been met in ALL zones.*

NFDRS Verification

The Portland office switched to all-points NFDRS forecast in 2009, instead of zone trend forecasts. It was shown by neighboring forecast offices that individual point forecasts yielded higher verification scores versus zone trend forecasts. Prior to 2009, the Portland office provided individual NFDRS forecasts for eight sites: Village Creek, Pebble, Fields, South Fork, Wanderer's Peak, Horse Creek, Yellowstone, and Canyon Creek. Table five (next page) shows the 2022 NFDRS verification statistics for the above listed sites. The values in red indicate improvement over the 2021 scores.

NFDRS has undergone a significant change and version NFDRS2016 was fully operational for the 2022 season. The majority of the program, including many algorithms were changed. One of the most significant changes was a vast reduction in the number of fuel models. Another major change in 2021 was the production of 7-day NFDRS forecasts. The Portland office provided forecaster input into the day-one NFDRS forecast, similar to the legacy NFDRS forecasts. No forecaster manipulation was provided for the automated days 2-7 output. Some agency Fire staff made NFDRS modifications in WIMS for their RAWS stations to re-examine and establish new ERC break points. These new break points had an impact on the fuels portion of Red Flag Warning criteria.   The NFDRS2016 Fuel model Y will be the primary choice, replacing the legacy fuel model G.

NFDRS verification continues to be based on persistence. Locally-established performance goals are 40 percent improvement over persistence for temperature, 30 percent for RH and 10 percent for wind. The 10 percent wind goal is difficult to achieve for the Portland fire weather area. There are many RAWS sites that have an average 1300 LST wind speed of 3 mph or less, which makes persistence difficult to beat. Huckleberry, which was one of the poorer wind sites, has shown much more wind during the past two seasons. Significant logging was done around the site, per Washington DNR.

TABLE 5 – 2022 SITE-SPECIFIC NFDRS VERIFICATION

SITE	TEMPERATURE			HUMIDITY			WIND		
	FCST MAE	PERS. MAE	SCORE	FCST MAE	PERS. MAE	SCORE	FCST MAE	PERS. MAE	SCORE
Village Creek	*3.40*	*5.77*	*41.07%*	*7.78*	*11.42*	*31.87%*	*1.15*	*1.12*	*-2.68%*
Pebble	*3.16*	*6.02*	*47.51%*	*9.25*	*13.38*	*30.87%*	*1.32*	*1.34*	*1.49%*
Fields	*3.51*	*6.08*	*42.27%*	*9.26*	*13.06*	*29.10%*	*1.41*	*1.49*	*5.37%*
South Fork*	*4.01*	*6.09*	*34.15%*	*10.17*	*14.38*	*29.28%*	*NA*	*NA*	*NA*
Wanderer's Peak	*3.87*	*6.52*	*40.64%*	*9.80*	*14.41*	*31.99%*	*2.13*	*2.35*	*9.36%*
Horse Creek	*3.17*	*6.22*	*49.04%*	*8.40*	*12.32*	*31.82%*	*0.86*	*0.88*	*2.27%*
Yellowstone	*3.60*	*6.31*	*42.95%*	*8.87*	*12.55*	*29.32%*	*1.15*	*1.22*	*5.74%*
Canyon Creek	*4.53*	*7.55*	*40.00%*	*11.48*	*16.57*	*30.72%*	*1.60*	*1.66*	*3.61%*

NOTES: South Fork wind data was unavailable throughout the 2022 season.

Table six (next page) shows the 2022 NFDRS verification statistics by zone. Improvement in temperature, RH and wind are shown in blue. Red values indicate lower scores. Overall, temperature scores were slightly lower compared to 2021. The 2022 overall humidity score ended up around four percent lower than 2021 and below the 30 percent benchmark. Wind scores showed significant improvement over 2021.

Most of the big-change days occurred early in the fire season. Generally, persistence fares better during July and August with high pressure and fewer big-change days. Wind scores were higher for most zones when compared to 2021. The 2022 overall wind score reversed a declining trend that began in 2019. Table seven (page 20) shows prior year's overall scores. Considerable forecaster effort has been taken to improve wind scores. Roughly one-third of the Portland fire weather area RAWS sites exhibit minimal daily wind speed variation at NFDRS observation time, with 10-minute average wind speeds 3 mph or less. This makes persistence difficult to beat. Prior to 2014, the average overall wind score was at or slightly above 0 percent. Forecasters have achieved a wind score of 10 percent or better 5 times since 2013. Zone 664 showed substantial improvement for wind (10.48%). Most of the improvement can be attributed to Huckleberry RAWS. The seasonal NFDRS average wind speed persistence error at Huckleberry was typically below 1 mph. In 2022 the average persistence wind speed error was 2.10, which showed there was considerably more wind speed variability. Data for zone 667 was not available. Vancouver RAWS, a manual site, is the only station within zone 667. Vancouver data was not available in WIMS. Buck Creek RAWS is the only NFDRS site within zone 663. The overall humidity score in 2021 was 33.72 percent. The 2022 score dipped to 17.85 percent. October 2022 was a difficult

month for NFDRS humidity forecasts. Most zones had an improvement over persistence under 20 percent.

TABLE 6 – 2022 NFDRS VERIFICATION

ZONE	TEMPERATURE	HUMIDITY	WIND
601	30.93%	20.84%	1.55%
664	37.46%	27.44%	10.48%
602	38.95%	29.89%	2.11%
665	37.37%	22.69%	4.96%
603	36.19%	28.03%	2.98%
604	35.46%	22.11%	4.28%
667	NA	NA	NA
605	47.63%	33.36%	4.11%
606	39.86%	27.08%	4.05%
607	41.32%	31.25%	6.76%
608	43.71%	29.64%	0.70%
612	37.15%	34.66%	0.00%
660	41.08%	29.69%	8.21%
663	37.22%	17.85%	3.31%
ALL	39.70%	29.10%	4.32%
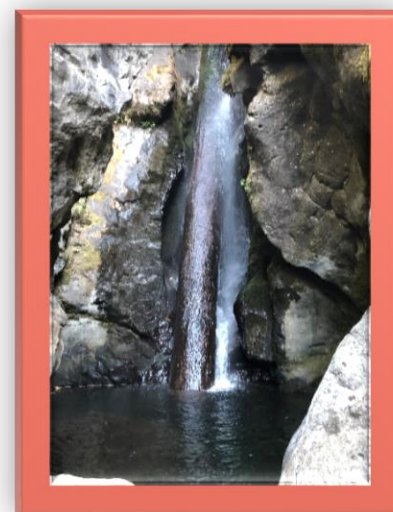
MISC RAWS NOTES FOR 2022: Trout Creek RAWS (zone 606) and Miller RAWS (zone 602) exhibited much more wind variability in 2022 compared to past years. Logging operations in the north Oregon Coast Range resulted in much more exposure for Miller. Trout Creek RAWS was burned over in the 2020 Holiday Farm Fire. A new station was erected fairly close to the original site. The added exposure due to the fire likely attributed to the higher wind speed variability. This site has shown to be quite sensitive to east and west wind events.

Another oddity involved Devils Graveyard RAWS. This station is located at the extreme south end of zone 603, very close the Medford forecast boundary. It was discovered that Medford and Portland were providing NFDRS forecasts for Devils Graveyard, which threw off the NFDRS

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scores. The Portland data would be overwritten by Medford's input. This glitch was rectified before primary fire season.

TABLE 7 – OVERALL NFDRS VERIFICATION PRIOR YEARS

2021 ALL	**41.28%**	**33.31%**	**-0.57%**
2020 ALL	**38.04%**	**35.43%**	**7.61%**
2019 ALL	**33.22%**	**28.64%**	**12.50%**
2018 ALL	**36.61%**	**29.56%**	**15.20%**
2017 ALL	**40.26%**	**31.99%**	**13.83%**
2016 ALL	**44.29%**	**35.33%**	**14.06%**
2015 ALL	**37.95%**	**31.42%**	**7.37%**
2014 ALL	**39.43%**	**34.64%**	**10.66%**
2013 ALL	**32.92%**	**31.07%**	**1.00%**
2012 ALL	**36.2%**	**30.2%**	**-2.2%**
2011 ALL	**37.4%**	**32.2%**	**7.5%**
2010 ALL	**38.5%**	**28.1%**	**5.5%**
2009 ALL	**40.5%**	**33.7%**	**4.0%**

Forecasts and Services

SPOT FORECASTS

There was one mega-fire during the 2022 fire season (over 100,000 acres), but several other smaller, but notable, fires. The start of fire season was delayed until mid to late July due to an abnormally wet June. However, fire season extended well into October. A majority of fire weather zones had the highest zone-average ERC values in the third week of October. COVID-19 became something more tolerated. Fire-fighting, public interaction and Incident Command Posts generally returned to pre-pandemic status.

Spot forecast activity was most prevalent in September and October. There were 200 spot forecast requests in the two-month period, which comprised over 50 percent of the annual total. October alone had 135 spot forecast requests, 59 of which were for wildfire. There were 138 prescribed burn spot forecasts in 2022 compared to 71 in 2021.   Just over 50 percent of the prescribed spot forecasts (73) were from the Fish and Wildlife Service (USFWS). The agency had extensive burn projects in the Finley Wildfire Refuge south of Corvallis, OR and in the Ankeny

Wildlife Refuge south of Salem, OR.   The 127 wildfire spot forecast requests equaled the 2021 total, but was nowhere near the 240 requests in 2017. Nearly 75 percent of the total wildfire spot requests occurred in the September-October period. The USFS continued to be a major user of the spot forecast service.   The USFS accounted for 88 of the 127 wildfire spot forecast requests. The Gifford Pinchot NF tallied 71 of the 88 USFS requests. Despite the 127,000 acre Cedar Creek Fire in the Willamette NF, the forest only had 15 wildfire spot requests. Incident Meteorologist support was provided on the Cedar Creek Fire throughout much of its existence. The Mt. Hood NF had just two wildfire spot requests and zero prescribed burn submissions. The Bureau of Land Management (BLM) typically does not make many spot forecast requests. In 2022, the BLM submitted 29 prescribed burn requests. The Nature Conservancy, another entity that does not have a history of substantial spot forecast usage, had 16 prescribed burn requests. The wet May and June resulted in limited spot forecast activity. There were eight total spot requests for the two-month period, only one of which was for prescribed burning. The remaining seven were equally distributed for search-and-rescue (SAR), spray projects, public safety and training purposes. There was one wildfire spot request in June.

The earliest prescribed burn spot request was February 23rd, for the Tualatin NWR Piles prescribed burn project from the USFWS. The latest, December 19th, was from the USFWS for the Ankeny Piles burn. The earliest wildfire spot request was June 28th, from the Clackamas County Fire Department for the Marmot Road Fire. The latest wildfire request occurred November 21st, from Washington DNR for the Pullan Creek Fire.

Just under one-half of the total spot requests occurred in September through October. There were 65 spot forecasts issued in September and 135 in September. The third highest monthly total was 24 in November. Surprisingly, the typical peak fire season months of July and August saw limited spot forecast activity. These months accounted for 25 spot requests, or less than 10 percent of the annual total. Every month had at least one spot forecast request.

The use of spot forecasts continues to become more diverse. There were 26 non-fire related spot requests in 2022, the same number as the 2021 season.   There were 11 requests entailing public safety, 5 for various spray projects, 3 for SAR missions and 7 for training purposes. There were no HAZMAT requests. Figure 5 (page 23) shows the 2022 spot breakdown by month.

As a review, the 2020 season saw several extremely large wildfires necessitating the need for several IMTs. The larger fires, Beachie Creek, Riverside, Holiday Farm and Lionshead, had Type 1 or Type 2 team coverage for several weeks. A NIMO team was assigned to Beachie Creek in late August, followed by a Pacific Northwest Type 2 team, Southwest Area Type 1 team and another Northwest Type 2 team, before transitioning back to the local unit. These large and deadly wildfires were not confined to just the Cascades. The Echo Mountain Complex, a few miles east of the coastal town of Lincoln City, burned around 2,500 acres and virtually destroyed the community of Otis.

Four fires necessitated the need for IMT support in 2022.   The Kalama Fire, in the Gifford Pinchot NF, started August 31st, southeast of the Kalama Horse Camp on the south side of Mt. St. Helens. The fire exhibited minimal growth through September. The fire size was 108 acres on September

10th then 432 acres on September 27th. The fire was just under 500 acres on October 17th. A Type 3 Incident Management Team (IMT) was assigned in mid-October to manage the Kalama Fire, Siouxon Fire, Sunset Fire and Black Hole Fire. The Siouxon, Sunset and Black Hole fires were southeast of the Kalama Fire, near Yacolt, WA. The Nakia Creek Fire, 1918 acres, started October 9th and was declared 100 percent contained on October 31st. An east wind event October 15-16 caused the fire to expand from 156 acres on October 13 to 1565 acres at 1843 PDT October 16th. ODF Team 2 assumed command of the fire at 1900 PDT October 17th. The team was brought in under the Northwest Wildland Fire Protection Agreement.   This agreement allows the sharing of resources between Alaska, Washington, Oregon, Idaho, Montana and five Canadian provinces. The Siouxon Fire was detected the evening of September 22nd and was unofficially 100 percent contained around the end of November. This 2359 acre fire was due to an abandoned campfire. The fire was mainly within the Big Hollow burn scar. As of October 12th, fire staff decided to monitor the fire and not assign resources. This decision was due to time of year, location, topographical challenges and lack of safety mitigations. An infra-red flight the evening of October 16th determined the fire size to be just under 1800 acres. A Type 3 IMT assumed command shortly thereafter. Rocky Mountain IMT Team 3 took over the fire October 20th. The Goat Rocks Fire, north of the Siouxon Fire, was assigned to the Rocky Mountain team on October 23rd. A Type 4 IMT took over responsibility for all fires in by the end of October.

The largest wildfire was the Cedar Creek Fire. The lightning-caused 127,311 acre fire was detected late-evening July 31st and was unofficially 100 percent contained at the end of November. Pacific Northwest Type 1 IMT Team 2 assumed command at 2000 PDT August 5th. Pacific Northwest Type 1 Team 3 took over August 19th. Pacific Northwest Type 2 Team 6 assumed responsibility at 1800 PDT August 31st. The fire was divided into west and east zones around September 10th, with separate Incident Management teams managing each zone. This division occurred after a Red Flag event.   Several subsequent IMTs managed the fire through the end of October.

Large wildfires typically do not occur after mid-October. However, the Chinook Complex of fires occurred in mid-November. Per Inciweb information: ***The Chinook and Brix Fires made up the Chinook Complex, which was located near Chinook WA in Pacific County. The fires were burning in slash on private land under the Washington DNR fire response area. The Chinook Fire started on Tuesday November 15, 2022 at approximately 11:00am and the Brix Fire started late Thursday evening on November 17, 2022. Due to the increased size and complexity of the Chinook Fire a Washington DNR Type III Incident Management Team was put in place. Due to better mapping the Chinook Fire was being reported to be approximately 120 acres in size, and was currently 100 percent contained. The Brix Fire was 8.5 acres and was currently in patrol status.***

Strong east wind the night of November 18th allowed the Chinook Fire to expand from 35 acres to 100 acres by the morning of the 19th. Another smaller fire of note was the Potter Fire, in the Willamette NF. The 632-acre fire was detected late-evening July 30th and was one of several new lightning starts. Other fires in the vicinity included the Windigo and Big Swamp Fires. These three fires were burning in the Willamette and Umpqua NF and in close proximity to the Deschutes NF boundary. Pacific Northwest Type 2 Team 6 assumed command of all three fires at 0600 PDT

August 2nd.   The Windigo Fire ended up burning 1007 acres, while the Big Swamp Fire scorched 110 acres.
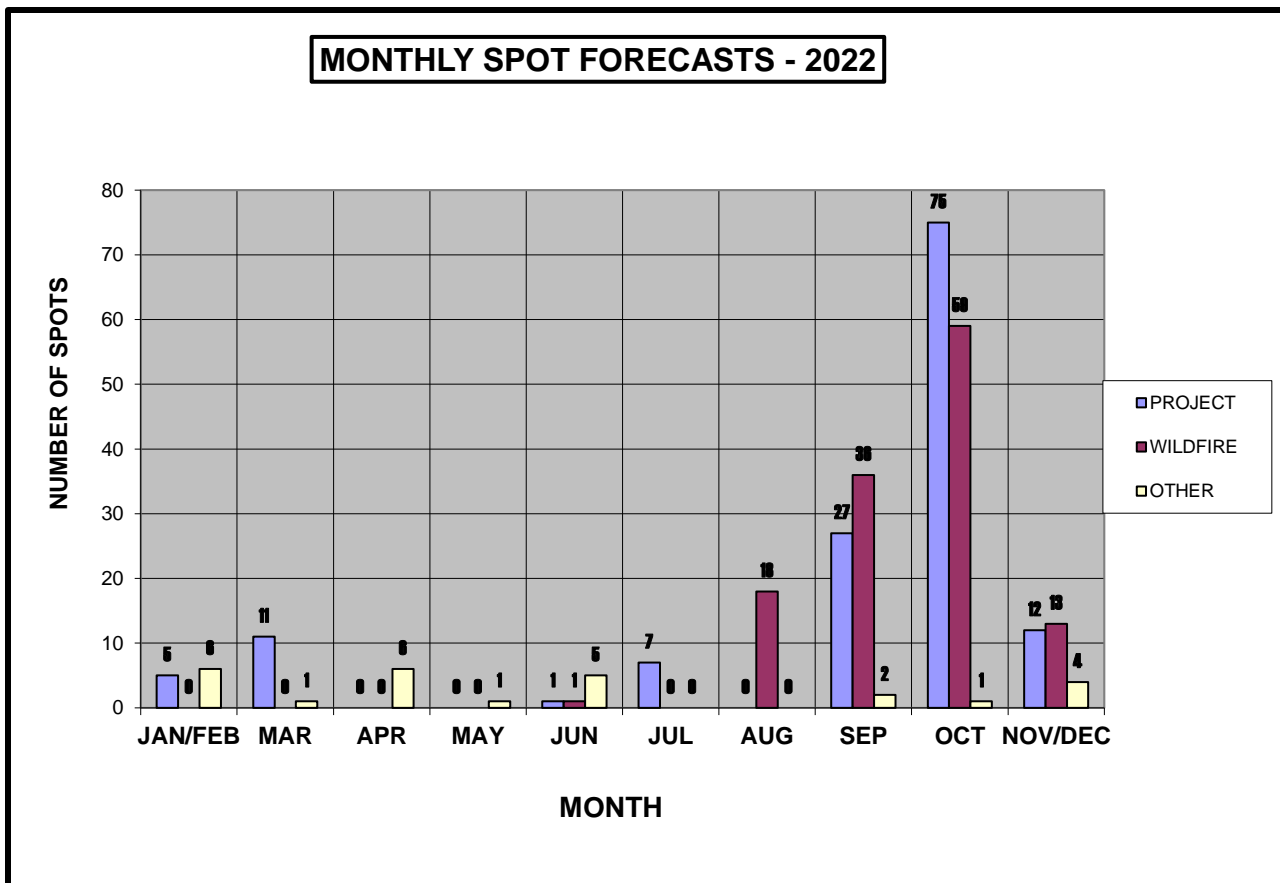
Figure 6 - 2022 SPOT FORECASTS (BY MONTH)

Table 8 (page 24) shows the annual spot forecast data from 1995 to 2022. Spot frequency showed a dramatic increase from 2000 to 2003, but due to the change in forecast area responsibility and agency requirements for prescribed burns, 2004 spot totals were much lower. Also, some units/districts curtailed prescribed burn activities starting in 2004 due to budget constraints, staffing concerns, or a number of other reasons. The number of prescribed burn spot requests in 2022 was slightly above average. The COVID-19 pandemic had a large role in reduced prescribed burn efforts in 2020 and 2021, but did not appear to have much impact on 2022 project activities. Fall burning tends to be more frequent compared to the spring. Prescribed burn spot requests in 2022 were heavily concentrated in September and October. There are normally two annual BLM spray operations conducted in early spring. These are the Tyrell Seed Orchard and Horning Seed Orchard units. There were five forecast requests for these operations in 2022.

Most spots in one day – 11 on October 4th. 9 on October 2nd and 3rd.

Non-fire spot requests: 11 Public Safety   7 Training   5 Spray Projects

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3 SAR Requests   0 HAZMAT

First prescribed spot request: Feb 23, 2022   Tualatin Piles   USFWS
Last prescribed spot request: Dec 19, 2022   Ankeny Piles   USFWS

First wildfire spot request: Jun 28, 2022   Marmot Road Fire Clackamas FD
Last wildfire spot request: Nov 21, 2022   Pullan Creek   WA DNR

Most Requests Single Incident/Project: Kalama Fire   43 Spot Requests
Siouxon Fire   22 Spot Requests

TABLE 8 – ANNUAL SPOT FORECAST DATA

YEAR	PROJECT*	WILDFIRE	TOTAL
1995	104	15	119
1996	64	51	115
1997	58	9	67
1998	52	31	83
1999	58	54	112
2000	89	20	109
2001	125	70	195
2002	123	147	270
2003	117	132	249
2004	71	21	92
2005	55	29	84
2006	120	96	216
2007	70	25	95
2008	61	73	134
2009	57	58	115
2010	69	51	120
2011	128	93	221
2012	106	51	157
2013	128	25	153
2014	103	96	199
2015	87	84	171
2016	157	35	192
2017	126	240	366
2018	145	68	213
2019	117	40	157
2020	110	98	208
2021	97	127	224
2022	164	127	291

* = INCLUDES TRAINING SPOTS, SEARCH AND RESCUE, AND OTHER MISC. REQUESTS.

Figure 7 (below), shows the yearly spot forecast totals since 1995. Seasonal spot totals exhibited a consistent trend from 2008 to 2010, with an average of about 125 spots per season. The 2011 spot season was the busiest since the 2003 transfer of fire weather zones 609, 610, and 611 to the Pendleton office. The 2013 spot tally was a little unusual due to the low number of wildfire spots, but 2014 more than made up for the previous year's low number. The 2017 spot forecast distribution showed one primary peak period, from August through October. There were 258 spot requests during the 3-month period, which is nearly twice the normal seasonal average. Several large, lengthy and costly wildfires in 2017 resulted in a multitude of spot forecast requests. Three to four spot requests constitute a typical busy spot forecast day for the Portland Forecast Office. There were 13 spot requests on September 8th, 2020 and 12 more on the 9th. In 2022, there were 11 requests on October 4th. This is late in the year to have such a high number. The annual average for spot requests since 2008 is 185. The 2022 total was about 60 percent above the 12-year average.
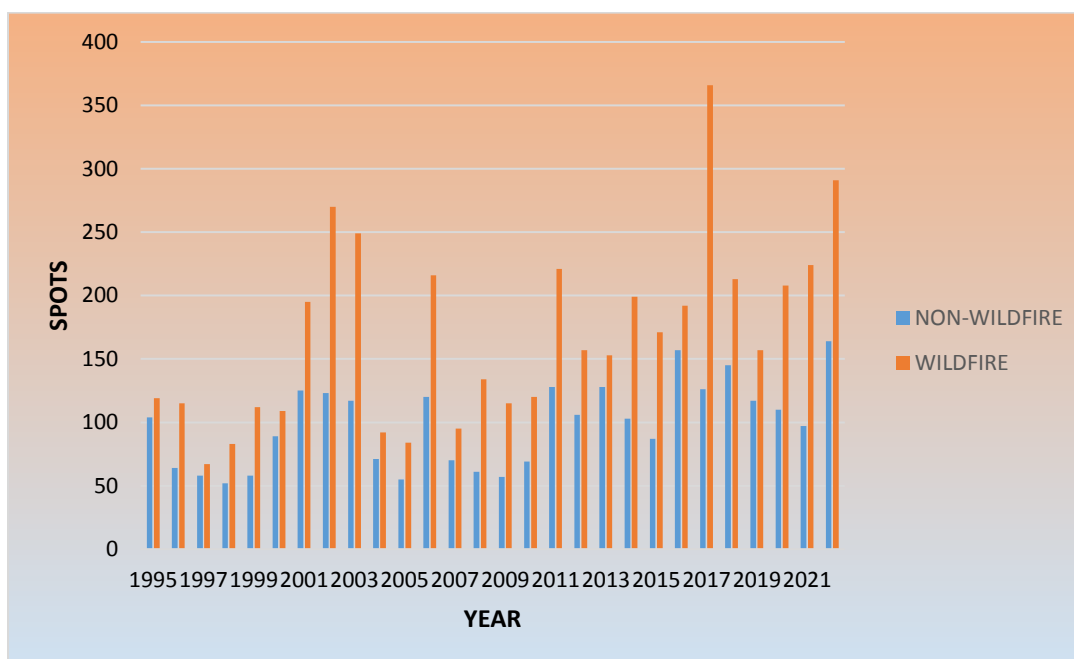
Figure 7 – Annual Spot Forecast Totals

TURN-AROUND TIME

Turn-around times (figure 8 page 26) have been fairly consistent over the past several years. Wildfire spot request turn-around time in 2022 was about seven minutes shorter compared to 2021. Prescribed burn request turn-around time for 2022 was just under four minutes shorter compared to 2021. Shorter turn-around times were noted for SAR, Public Safety and Training spot requests. Turn-around time for spray forecast requests was 46.5 minutes, much longer than

prescribed burn and wildfire requests. Spray spot requests were usually submitted a day prior to the actual operation and not needed until 0500 PDT the following morning. Turn-around time was not counted for next-day spots. Average turn-around time for all spots was just under 31 minutes.

Per regional and national agreements, expected turn-around times for wildfire and prescribed burn requests are 45 and 60 minutes, respectively. Turn-around times exceeded 100 minutes on one occasion.   Turn time for the Coburg Hills prescribed burn September 25th was 131 minutes. This was another case of submission several hours before delivery time.   Pre-arrangements were normally made with users when turn times exceeded the 45 or 60 minute thresholds. Typically, the user would submit the spot request early in the morning, but not need the forecast until late morning.   Lengthy turn-around times on a few wildfire spots was usually the result of the requesting official, FBAN or Plans Section Chief, submitting the spot request in the late-morning or early afternoon, but not needing the forecast until the late-afternoon or early-evening planning meeting.
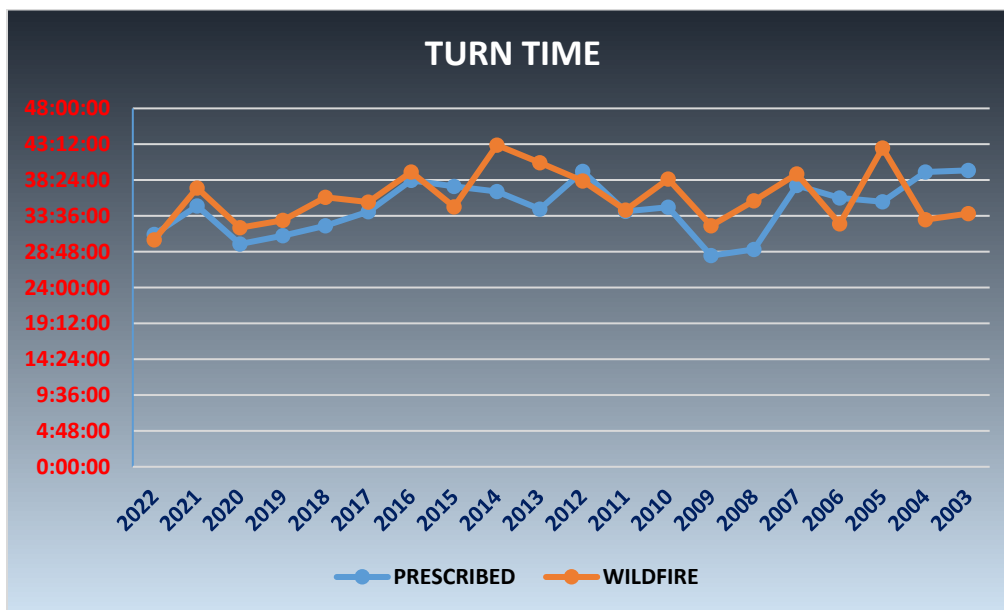
Figure 8- Annual Spot Forecast Turn-Around Time

Table 9 (next page) shows the average spot forecast turn-around time for prescribed burn and wildfire spot forecast requests since 2003.

SPOT TURN-AROUND TIDBITS:

19 of the 138 prescribed burn spots had a turn time of less than 44 minutes.

20 of the 127 wildfire spots had a turn time of less than 44 minutes.

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TABLE 9 – TURN-AROUND TIMES

YEAR	PROJECT	WILDFIRE
2022	31:07	30:24
2021	34:56	37:20
2020	29:51	32:02
2019	30:57	33:00
2018	32:16	36:05
2017	34:11	35:26
2016	38:23	39:30
2015	37:32	34:48
2014	36:52	43:05
2013	34:30	40:43
2012	39:35	38:17
2011	34:13	34:24
2010	34:47	38:33
2009	28:17	32:16
2008	29:07	35:38
2007	37:41	39:14
2006	36:01	32:33
2005	35:30	42:42
2004	39:30	33:06
2003	39:42	33:54

*   *PROJECT TIMES ONLY INCLUDE PRESCRIBED BURN SPOTS*

Tyrell Seed Orchard BLM – Photo by Scott Weishaar

LARGE FIRES AND IMET DISPATCHES

The 2022 wildfire season in the Portland Fire Weather Forecast area was far less catastrophic compared to the 2020 season. There were multiple large, costly and deadly wildfires during 2020. Nearly all of these large fires happened during the Labor Day Firestorm. The 2017 Eagle Creek Fire was the most recent significant large wildfire, which scorched nearly 50,000 acres. In 2020 there were three fires in excess of 120,000 acres. Overall critical to extremely critical fuel conditions occurred in late July through early August and again from mid-August through early September. A third peak occurred in mid-October. Fortunately, below-normal lightning activity, especially during the peak portion of fire season, prevented the 2022 season from being even worse.

A significant atmospheric river rainfall event occurred in mid-June. This delayed the onset of primary fire season well into July. Rainfall amounts of 2-4 inches were common across the forecast area, especially southwest Washington and the north Oregon coast and Coast Range. The 10-day zone-average ERC ending June 20th was generally below 5 throughout the forecast area. The first significant heat wave took place in late June. The 10-day zone-average ERC values ending June 30th climbed to between the 60th and 70th percentile values in most zones. Interestingly, some zones recorded the lowest 100-hour fuel moisture values of the season at the end of June.

Table 10 (page 29) shows the major fires for the 2022 season. A major fire is defined as 100 acres in timber and/or the need for a Type 1 or Type 2 IMT. The most prominent fire was the 127,311 acre Cedar Creek Fire in the Willamette NF. A number of smaller fires occurred in the southern part of the Gifford Pinchot NF and neighboring Washington DNR lands. These areas have not had significant wildfire activity for many years. A majority of those fires were human-caused.

Wildfires typically do not occur in October, but 2022 was a notable exception. One fire of note was the Fishhawk Lake Fire. The fire started the evening of October 14th on ODF-protected land in the Clatsop State Forest northwest of Fishhawk Lake near the small community of Mist. The fire quickly grew to 80 acres by the morning of the 15th and was 120 acres by the 17th. A Type 3 IMT was assigned to manage the fire. The fire was at 95 percent containment as of 1230 PM October 20th, with expected full containment later that evening.

A rash of relatively small wildfires occurred in mid-November. A number of escaped slash burns in Clatsop County burned around 140 acres of private and state-protected land. These fires were fanned by 50 mph and greater east wind gusts. A Type 3 IMT was assigned to manage these fires. The largest fire, the Delta 98 Fire, burned 10 miles west of Gearhart. This fire grew to 250 acres by November 21st. The 110-acre Park Fire, in the Saddle Mountain State Natural Area, necessitated Level 3 evacuation notices at the end of Saddle Mountain Road. Evacuation notices were lifted November 21st. Another fire, at Tillamook Head 3 miles south of Seaside, was contained at 20 acres.

TABLE 10 – MAJOR FIRES

FIRE NAME	AGENCY	SIZE	START DATE	CONTAIN DATE	CAUSE
Cedar Creek Fire	USFS Willamette NF	127,311	July 31, 2022	November 30, 2022	Lightning
Kalama Fire	USFS Gifford Pinchot NF	500	August 31, 2022	October 28, 2022	Unknown
Siouxon and Sunset Fires	USFS Gifford Pinchot NF	2,636	September 22, 2022	November 3, 2022	Human
Nakia Creek Fire	WA DNR	1,918	October 9, 2022	October 31, 2022	Human
Chinook Complex	WA DNR	120	November 15, 2022	November 23, 2022	Human

Hills above Silverton, OR – Photo by Scott Weishaar

The Portland office filled **4** IMET requests.

1. **WINDIGO FIRE (15 DAYS)**

           IMET: JON BONK
           DATES: August 2nd through August 17th, 2022
           LOCATION: 20 SW LaPine, OR
                         Incident – OR-UPF-000234
           IMT: Pacific NW Type 2 Team 6 – IC Sheldon
           CAUSE: Lightning

2. **SRF LIGHTNING (13 DAYS)**

           IMET(T): REBECCA MUESSLE
           DATES: August 21st through September 2nd, 2022
           LOCATION: ICP – VFW Willow Creek, CA
                         Incident – CA-SRF-000620
                         WFO Eureka FWZ211
           IMT: California Type 2 Team 11 – IC Fogle
           CAUSE: Lightning

3. **CEDAR CREEK FIRE (14 DAYS)**

           IMET: JON BONK
           DATES: September 14th through September 28th, 2022
           LOCATION: ICP – Oakridge, OR
                           Incident – OR-WIF-220180
                         Willamette NF Middle Fork RD
           IMT: Pacific NW Type 1 Team 3 – IC Johnson Sep 12-25
                         Pacific NW Type 2 Team 9 – IC Albrecht Sep 25-28
           CAUSE: Lightning

4. **BOLT CREEK (15 DAYS)**

           IMET: LISA KRIEDERMAN
           DATES: October 6th through October 20th, 2022
           LOCATION: ICP – Evergreen State Fairgrounds, Monroe, WA
                           Incident – WA-NWS-000150
                         Fire began 1.5N Skykomish, WA
                         WFO Seattle FWZ656 and FWZ658
           IMT: NW Washington DNR Type 3 – IC Stanford Sep 21- Oct 6
                         SE Washington Type 3 – IC Johnson Oct 6-20
           CAUSE: Human

TRAINING AND OUTREACH ACTIVITIES

The COVID-19 pandemic virtually eliminated all fire weather outreach activities in 2020 and 2021. Outreach activity began a slow return to pre-pandemic conditions during the 2022 season. Wildland fire course instruction, fire weather refreshers and RT-130 sessions were mainly conducted in-person, although some activities were in virtual mode. Fire weather training was provided for newer forecasters, with assistance from NWCC. Table 11 (below) summarizes the few outreach accomplishments for 2022.

TABLE 11 – TRAINING AND EDUCATIONAL OUTREACH ACTIVITIES

DATES	ACTIVITY	AGENCY/USER	INSTRUCTOR
March 2-3, 2022	S-290	LANE COUNTY	KRIEDERMAN
March 7-11, 2022	IMET CEE BOISE, ID	NWS	KRIDERMAN, BONK, MUESSLE ATTENDING
April 2-3, 2022	S-290 SCAPPOOSE	ODF	WEISHAAR
April 14, 2022	NFDRS TRAINING #1	NWS/NWCC	SALTENBERGER
April 27, 2022	NFDRS TRAINING #2	NWS/NWCC	SALTENBERGER
May 2, 2022	S-290 REVIEW	OHA PORTLAND	KRIEDERMAN
May 11, 2022	RT-130 HOOD RIVER	CRGNSA	WEISHAAR ATTENDING
May 12, 2022	NFDRS TRAINING #3	NWS/NWCC	SALTENBERGER
May 19, 2022	FBAN/IMET WORKSHOP-VIRTUAL	VARIOUS	WEISHAAR/KRIEDERMAN ATTENDING
May 20, 2022	FIRE WX REFRESHER	CRGNSA	WEISHAAR
July 14-23, 2022	WORLD TRACK CHAMPIONSHIPS - EUGENE	EOC	WEISHAAR/BONK/MUESSLE

FORECAST SERVICES NOTES:

Dedicated Fire Weather Shifts begin: April 11, 2022

7-Day Coverage Begins: May 30, 2022

940 AM User Briefings Begin: May 31, 2022

1115 AM GACC Coordination Calls Begin: June 26, 2022

1115 AM GACC Coordination Calls End: October 1, 2022

Fall Land Management (5-day) Begins: October 17, 2022

Dedicated Fire Weather Shifts end: October 21, 2022

Fisher Covered Bridge – Central Coast Range of Oregon

Photo by Scott Weishaar

Appendix 1: 2022 Fuel Indices

The following tables (pages 34-45) show the 10-day average fuel indices from May 15 through October 20.

Cascade Creek Fire 2012 Gifford Pinchot NF
Photo by Scott Weishaar

2022 FUELS SUMMARY ZONES 601/664

DATE	ERC AVE	F100 AVE	F1000 AVE		
	Red ERC values indicate 90th percentile or greater (26.5)				
May 15-20	0.48	27.45	36.50		
May 21-31	5.28	21.55	31.13		
Jun 1-10	2.31	24.23	31.95		
Jun 11-20	0.17	26.06	33.11	**HUCKLEBERRY STATS:** *# DAYS ERC >22: 82*	
Jun 21-30	14.03	16.27	25.93		
Jul 1-10	11.44	19.06	23.20		
Jul 11-20	22.58	16.32	20.16	*45.8 – OCT 16* *44.1 – SEP 10* *43.1 – SEP 21*	
Jul 21-31	**30.36**	14.76	18.03		
Aug 1-10	**34.06**	14.30	15.76		
Aug 11-20	**26.87**	17.09	17.35	**CEDAR STATS:** *# DAYS ERC >25: 72*	
Aug 21-31	**29.28**	16.75	17.42		
Sep 1-10	**34.83**	15.05	16.49	*51.6 – SEP 10* *48.8 – JUL 31* *48.4 – JUL 28*	
Sep 11-20	26.38	17.99	17.22		
Sep 21-30	24.06	18.36	18.09		
Oct 1-10	23.26	17.79	19.45	# DAYS ERC > 22	# DAYS ERC >26.5
Oct 11-20	**31.91**	15.53	17.05		
ERC 22 – 80TH PCTL ERC 26.5 – 90TH PCTL				87	56

PEAK ERC DAYS: 47.04 SEP 10, 2022   **# DAYS F100 </= 10:**   0

42.00 SEP 9, 2022   **LOWEST AVE F100:**   10.63 JUN 27, 2022

41.64 OCT 15, 2022   11.28 SEP 10, 2022

Feb 11, 2023

2022 FUELS SUMMARY ZONE 602

DATE	ERC AVE	F100 AVE	F1000 AVE		
	Red ERC values indicate 90th percentile or greater (32.5)				
May 15-20	2.09	24.11	25.60	**MILLER STATS:** *# DAYS ERC >30: 20*	
May 21-31	9.20	20.67	22.47		
Jun 1-10	6.08	22.24	23.05	*41.6 – JUL 31* *40.2 – SEP 10* *35.1 – JUL 30*	
Jun 11-20	4.22	23.23	23.63		
Jun 21-30	23.27	15.90	18.69		
Jul 1-10	17.93	19.16	18.67	**SOUTH FORK STATS:** *# DAYS ERC >29: 79*	
Jul 11-20	26.66	16.62	17.64		
Jul 21-31	**33.61**	15.47	16.30	*60.4 – JUL 31* *54.6 – JUL 30* *51.6 – SEP 10*	
Aug 1-10	**33.43**	15.69	15.56		
Aug 11-20	27.18	17.97	17.64	**RYE MT. STATS:** *# DAYS ERC >29: 48*	
Aug 21-31	27.73	17.73	17.90		
Sep 1-10	**33.96**	15.89	16.93	*47.4 – SEP 10* *43.7 – JUL 31* *42.7 – OCT 15*	
Sep 11-20	24.89	19.00	17.98		
Sep 21-30	22.81	18.59	18.63		
Oct 1-10	22.41	18.76	19.89	# DAYS ERC > 26.5	# DAYS ERC >32.5
Oct 11-20	30.67	16.30	17.22		
ERC 26.5 – 80TH PCTL **ERC 32.5 – 90TH PCTL**				**65**	**31**

PEAK ERC DAYS: 45.73   SEP 10, 2022   **# DAYS F100 </= 10:**   0

45.55   JUL 31, 2022   **LOWEST AVE F100:**   11.29   JUN 27, 2022

40.87   AUG 7, 2022   11.84   JUN 26, 2022

Feb 11, 2023

2022 FUELS SUMMARY ZONE 603				
	ERC AVE	F100 AVE	F1000 AVE	
DATE	*Red ERC values indicate 90th percentile or greater (45.0)*			
May 15-20	5.23	22.05	24.70	**VILLAGE STATS:** *# DAYS ERC >42: 8*
May 21-31	14.44	18.62	20.39	
Jun 1-10	11.24	20.56	21.05	*53.8 – SEP 10* *48.2 – SEP 9* *46.0 – SEP 8*
Jun 11-20	5.17	23.06	23.11	
Jun 21-30	26.88	14.69	17.69	**ROCKHOUSE STATS:** *# DAYS ERC >51: 3*
Jul 1-10	19.85	18.51	17.66	
Jul 11-20	28.41	15.94	16.75	
Jul 21-31	32.10	15.58	15.96	*55.5 – JUL 31* *54.8 – SEP 10* *51.3 – JUL 30*
Aug 1-10	32.40	15.72	15.93	
Aug 11-20	29.78	16.63	16.80	**DEVILS GYARD STATS:** *# DAYS ERC >36: 11*
Aug 21-31	29.68	16.95	17.09	
Sep 1-10	34.53	15.44	16.68	
Sep 11-20	25.15	18.58	17.35	*50.9 – SEP 10* *43.5 – JUN 27* *43.1 – SEP 9*
Sep 21-30	16.97	20.34	19.83	
Oct 1-10	16.05	20.21	21.12	**# DAYS ERC > 39.4** ‖ **# DAYS ERC >45.0**
Oct 11-20	25.07	17.46	18.63	
ERC 39.4 – 80TH PCTL ERC 45.0 – 90TH PCTL				**4** ‖ **1**

PEAK ERC DAYS: 48.63 SEP 10, 2022   **# DAYS F100 </= 10:**   0

41.76 SEP 9, 2022   **LOWEST AVE F100:**   10.55 JUN 27, 2022

39.64 AUG 7, 2022   11.47 JUN 26, 2022

Feb 11, 2023

2022 FUELS SUMMARY ZONE 604				
	ERC AVE	F100 AVE	F1000 AVE	
DATE	*Red ERC values indicate 90th percentile or greater (44.0)*			
May 15-20	12.63	19.21	21.98	
May 21-31	19.58	17.45	18.52	**FINLEY STATS:** *# DAYS ERC >38: 6*
Jun 1-10	13.23	20.55	20.61	
Jun 11-20	8.51	22.36	22.71	
Jun 21-30	26.52	15.28	17.27	*45.3 – SEP 10* *42.7 – SEP 11* *39.8 – AUG 7*
Jul 1-10	22.84	17.49	17.37	
Jul 11-20	30.12	15.39	16.23	
Jul 21-31	32.33	15.52	15.80	**WILLOW CK. STATS:** *# DAYS ERC >41: 1*
Aug 1-10	33.19	15.68	15.86	
Aug 11-20	29.57	16.83	16.63	
Aug 21-31	30.77	16.50	16.86	*44.1 – SEP 10* *39.9 – SEP 11* *39.6 – SEP 9*
Sep 1-10	33.55	15.72	16.78	
Sep 11-20	25.67	18.38	17.77	
Sep 21-30	18.77	19.85	19.97	
Oct 1-10	17.12	20.01	20.63	# DAYS ERC > 40.0 / # DAYS ERC >44.0
Oct 11-20	20.83	18.63	19.94	
ERC 40.0 – 80TH PCTL ERC 44.0 – 90TH PCTL				**1** / **0**

PEAK ERC DAYS: 42.82 SEP 10, 2022   **# DAYS F100 </= 10:**   0

37.82 SEP 9, 2022   **LOWEST AVE F100:**   12.91 SEP 10, 2022

37.67 SEP 11, 2022   13.42 SEP 11, 2022

Feb 11, 2023

2022 FUELS SUMMARY ZONE 605

DATE	ERC AVE	F100 AVE	F1000 AVE		
	Red ERC values indicate 90th percentile or greater (41.5)				
May 15-20	4.57	22.30	24.82		
May 21-31	12.55	19.12	20.98		
Jun 1-10	9.79	20.93	21.46	**HORSE CK. STATS:** *# DAYS ERC >38: 51*	
Jun 11-20	2.76	24.88	23.91		
Jun 21-30	27.04	14.33	18.29	*55.8 – JUL 31* *53.8 – JUL 30* *53.5 – AUG 7*	
Jul 1-10	20.99	18.24	16.22		
Jul 11-20	31.36	14.81	16.22		
Jul 21-31	39.50	13.73	14.64	**EAGLE CK. STATS:** *# DAYS ERC >36: 7*	
Aug 1-10	**42.11**	13.94	13.57		
Aug 11-20	35.40	15.73	15.71	*43.5 – SEP 10* *41.3 – SEP 11* *39.4 – OCT 16*	
Aug 21-31	33.60	16.48	16.36		
Sep 1-10	38.51	14.56	15.56		
Sep 11-20	28.24	18.27	16.95		
Sep 21-30	28.05	16.68	17.38		
Oct 1-10	31.61	16.54	17.71	**# DAYS ERC > 37.0**	**# DAYS ERC >41.5**
Oct 11-20	40.54	14.19	15.34		
ERC 37.0 – 80TH PCTL ERC 41.5 – 90TH PCTL				**42**	**22**

PEAK ERC DAYS: 48.73 AUG 7, 2022   # DAYS F100 </= 10:   0

48.23 JUL 31, 2022   LOWEST AVE F100:   10.46 JUN 28, 2022

47.73 OCT 16, 2022   10.89 JUN 27, 2022

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2022 FUELS SUMMARY ZONE 606				
	ERC AVE	**F100 AVE**	**F1000 AVE**	
DATE	*Red ERC values indicate 90th percentile or greater (43.0)*			
May 15-20	3.83	22.37	24.78	**YELLOWSTONE STATS:** *# DAYS ERC >38: 61*
May 21-31	11.86	19.77	21.36	
Jun 1-10	8.23	21.33	22.42	*56.0 – SEP 10 54.2 – JUL 27 53.6 – SEP 11*
Jun 11-20	2.64	24.65	24.75	
Jun 21-30	27.56	14.08	17.86	
Jul 1-10	21.66	17.76	17.02	**BRUSH CK. STATS:** *# DAYS ERC >39: 5*
Jul 11-20	30.62	15.16	16.24	
Jul 21-31	36.16	14.52	15.01	*50.6 – SEP 10 45.5 – SEP 11 44.0 – SEP 9*
Aug 1-10	36.33	14.75	14.93	
Aug 11-20	34.13	15.45	15.66	
Aug 21-31	33.85	16.06	16.12	**GREEN MTN STATS:** *# DAYS ERC >41: 13*
Sep 1-10	40.49	13.94	15.11	
Sep 11-20	27.89	18.01	16.45	*54.3 – SEP 10 50.8 – OCT 15 50.1 – SEP 11*
Sep 21-30	22.55	18.23	18.34	
Oct 1-10	28.38	17.15	18.32	**# DAYS ERC > 36.8** ⎪ **# DAYS ERC >43.0**
Oct 11-20	35.84	15.04	16.23	
ERC 36.8 – 80TH PCTL ERC 43.0 – 90TH PCTL				**30** ⎪ **7**

PEAK ERC DAYS: 52.10   SEP 10, 2022   **# DAYS F100 </= 10:   0**

48.06   SEP 11, 2022   **LOWEST AVE F100:   10.58   SEP 11, 2022**

47.00   SEP 9, 2022   **10.60   JUN 27, 2022**

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2022 FUELS SUMMARY ZONE 607				
	ERC AVE	**F100 AVE**	**F1000 AVE**	
DATE	*Red ERC values indicate 90th percentile or greater (42.33)*			
May 15-20	0.00	26.51	27.24	**LOG CREEK STATS:** *# DAYS ERC >33: 53*
May 21-31	0.00	25.20	26.19	
Jun 1-10	1.93	24.73	25.24	*49.7 – SEP 2*
Jun 11-20	0.32	27.59	26.64	*48.4 – OCT 15*
Jun 21-30	23.33	15.32	20.19	*47.2 – OCT 14*
Jul 1-10	20.43	18.02	17.76	**RED BOX STATS:** *# DAYS ERC >39: 40*
Jul 11-20	30.84	14.87	16.68	
Jul 21-31	42.05	12.80	14.67	*59.6 – JUL 30*
Aug 1-10	**43.80**	13.51	13.17	*56.7 – JUL 31*
Aug 11-20	36.86	15.30	15.66	*54.2 – JUL 29*
Aug 21-31	35.07	15.95	16.14	**WANDERER'S PEAK STATS:** *# DAYS ERC >39: 52*
Sep 1-10	41.06	13.88	15.19	
Sep 11-20	28.07	18.07	16.83	*63.4 – JUL 30*
Sep 21-30	27.04	16.89	17.95	*62.6 – JUL 31*
Oct 1-10	35.31	15.10	17.23	*57.8 – AUG 1*
Oct 11-20	**45.49**	12.70	14.30	**# DAYS ERC > 37.0** / **# DAYS ERC >42.33**
ERC 37.0 – 80TH PCTL **ERC 42.33 – 90TH PCTL**				**48** / **32**

PEAK ERC DAYS: 55.70   JUL 30, 2022   **# DAYS F100 </= 10:**   1

                        54.97   JUL 31, 2022   **LOWEST AVE F100:**   10.00   JUL 31, 2022

                        52.03   AUG 8, 2022   10.28   JUL 30, 2022

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2022 FUELS SUMMARY ZONE 608				
	ERC AVE	**F100 AVE**	**F1000 AVE**	
DATE	*Red ERC values indicate 90th percentile or greater (48.4)*			
May 15-20	6.53	22.52	23.85	**PEBBLE STATS:** *# DAYS ERC >39: 33*
May 21-31	12.33	20.41	21.24	
Jun 1-10	10.91	20.86	21.87	*46.9 – SEP 10*
Jun 11-20	4.90	24.00	24.21	*45.8 – SEP 11* *44.4 – OCT 17*
Jun 21-30	28.03	13.97	18.20	
Jul 1-10	23.34	17.68	17.09	**EMIGRANT STATS:**
Jul 11-20	31.94	14.39	16.20	*# DAYS ERC >55: 34*
Jul 21-31	41.54	12.77	14.34	
Aug 1-10	38.96	14.54	14.58	*63.1 – JUL 31* *63.0 – JUL 30*
Aug 11-20	35.63	14.98	15.56	*62.8 – SEP 10*
Aug 21-31	37.09	14.87	15.73	**BOULDER STATS:**
Sep 1-10	43.80	13.13	14.69	*# DAYS ERC >32: 60*
Sep 11-20	31.70	16.94	15.70	*50.4 – SEP 11*
Sep 21-30	24.70	17.75	18.57	*49.4 – SEP 10* *48.9 – JUL 31*
Oct 1-10	35.36	14.70	17.23	**# DAYS ERC > 41.8** / **# DAYS ERC >48.4**
Oct 11-20	45.66	12.42	14.35	
ERC 41.8 – 80TH PCTL ERC 48.4 – 90TH PCTL			**28**	**6**

PEAK ERC DAYS: 52.64 SEP 10, 2022   **# DAYS F100 </= 10:**   0

51.98 SEP 11, 2022   **LOWEST AVE F100:**   10.46 SEP 11, 2022

49.36 OCT 16, 2022   11.00 OCT 16, 2022

2022 FUELS SUMMARY ZONE 612				
	ERC AVE	**F100 AVE**	**F1000 AVE**	
DATE	*Red ERC values indicate 90th percentile or greater (34.5)*			
May 15-20	1.56	25.35	26.73	
May 21-31	11.17	19.24	21.92	**CANNIBAL STATS:** *# DAYS ERC >30: 34* *49.3 – SEP 10* *43.1 – SEP 9* *40.9 – JUL 31* **GOODWIN PEAK STATS:** *# DAYS ERC >28: 48* *50.4 – SEP 10* *43.7 – SEP 9* *40.3 – SEP 8*
Jun 1-10	7.03	22.19	22.72	
Jun 11-20	2.08	24.32	25.17	
Jun 21-30	24.33	15.10	18.67	
Jul 1-10	15.09	19.80	18.75	
Jul 11-20	26.09	16.35	17.55	
Jul 21-31	31.29	15.46	16.46	
Aug 1-10	31.58	15.91	15.75	
Aug 11-20	27.72	17.29	17.38	
Aug 21-31	30.56	16.57	17.04	
Sep 1-10	34.33	15.46	16.78	
Sep 11-20	24.11	18.98	17.69	
Sep 21-30	17.06	20.49	19.70	
Oct 1-10	16.05	20.28	21.39	**# DAYS ERC > 29.0** / **# DAYS ERC >34.5**
Oct 11-20	27.14	16.80	17.95	
ERC 29.0 – 80TH PCTL ERC 34.5 – 90TH PCTL			**38**	**18**

PEAK ERC DAYS: 49.96   SEP 10, 2022   **# DAYS F100 </= 10:**   0

49.46   SEP 9, 2022   **LOWEST AVE F100:**   10.47   JUN 27, 2022

39.94   SEP 8, 2022   11.20   SEP 10, 2022

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2022 FUELS SUMMARY ZONE 660				
	ERC AVE	F100 AVE	F1000 AVE	
DATE	Red ERC values indicate 90th percentile or greater (41.6)			
May 15-20	1.22	24.32	25.21	DRY CREEK STATS: *# DAYS ERC >51: 23*
May 21-31	5.49	21.99	23.36	
Jun 1-10	4.46	22.62	23.43	*60.7 – AUG 8* *58.8 – SEP 2* *58.1 – JUL 31*
Jun 11-20	1.31	25.31	25.05	
Jun 21-30	23.91	15.47	19.60	
Jul 1-10	19.47	18.29	18.01	3 CORNER STATS: *# DAYS ERC >30: 53*
Jul 11-20	28.66	15.60	16.98	
Jul 21-31	35.07	14.85	15.64	*44.7 – SEP 11* *44.2 – OCT 19* *44.2 – SEP 2*
Aug 1-10	35.86	14.67	14.91	
Aug 11-20	32.02	16.17	16.34	
Aug 21-31	32.62	16.25	16.52	LARCH MT. STATS: *# DAYS ERC >29: 56*
Sep 1-10	37.67	14.67	15.67	
Sep 11-20	28.57	17.61	16.79	*44.9 – SEP 10* *43.8 – SEP 11* *42.2 – OCT 16*
Sep 21-30	27.61	16.76	17.49	
Oct 1-10	33.73	15.37	17.42	# DAYS ERC > 35.8 / # DAYS ERC >41.6
Oct 11-20	**42.12**	13.31	14.61	
ERC 35.8 – 80TH PCTL ERC 41.6 – 90TH PCTL				**41** / **17**

PEAK ERC DAYS: 46.98   SEP 11, 2022   # DAYS F100 </= 10:   0

46.97   SEP 2, 2022   LOWEST AVE F100:   10.52   JUN 28, 2022

46.43   OCT 15, 2022   10.80   JUN 27, 2022

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2022 FUELS SUMMARY ZONE 663

DATE	ERC AVE	F100 AVE	F1000 AVE		
	Red ERC values indicate 90th percentile or greater (49.0)				
May 15-20	0.00	26.14	25.36		
May 21-31	0.00	24.12	24.87		
Jun 1-10	0.00	24.53	24.52	**BUCK CREEK STATS:** *# DAYS ERC >45: 26*	
Jun 11-20	3.79	24.21	24.64		
Jun 21-30	30.02	13.42	17.43	*55.9 – JUL 31* *55.1 – JUL 30* *54.9 –AUG 3*	
Jul 1-10	29.24	15.58	15.74		
Jul 11-20	36.65	13.74	15.18		
Jul 21-31	44.53	12.39	13.92	*# DAYS ERC >49: 14*	
Aug 1-10	**49.24**	12.46	12.04		
Aug 11-20	43.68	13.52	13.97	*# DAYS F100 <10: 2*	
Aug 21-31	42.71	14.13	14.35		
Sep 1-10	45.54	13.16	14.19	*9.70 – JUL 31* *9.97 – AUG 1* *10.01 – JUL 30*	
Sep 11-20	32.20	16.97	15.94		
Sep 21-30	31.78	15.76	17.37		
Oct 1-10	34.51	15.70	16.82	# DAYS ERC > 45.0	# DAYS ERC >49.0
Oct 11-20	41.03	13.72	15.11		
ERC 45.0 – 80TH PCTL ERC 49.0 – 90TH PCTL				**26**	**14**

PEAK ERC DAYS: 55.90 JUL 31, 2022   # DAYS F100 </= 10:   2

55.10 JUL 30, 2022   LOWEST AVE F100:   9.70   JUL 31, 2022

54.90 AUG 3, 2022   9.97   AUG 1, 2022

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2022 FUELS SUMMARY ZONE 665				
	ERC AVE	**F100 AVE**	**F1000 AVE**	
DATE	*Red ERC values indicate 90th percentile or greater (34.5)*			
May 15-20	3.48	23.07	24.18	
May 21-31	9.49	20.58	22.20	
Jun 1-10	7.05	21.56	22.22	**ABERNATHY STATS:** *# DAYS ERC >28: 56*
Jun 11-20	5.83	22.52	22.80	
Jun 21-30	21.55	16.16	18.46	*49.2 – JUL 31*
Jul 1-10	17.66	19.01	18.45	*47.2 – AUG 1*
Jul 11-20	24.25	16.75	17.59	*47.1 – AUG 3*
Jul 21-31	30.01	15.65	16.60	**CASTLE ROCK STATS:**
Aug 1-10	30.11	16.10	15.66	*# DAYS ERC >33: 0*
Aug 11-20	25.71	17.97	17.63	
Aug 21-31	26.20	17.71	17.82	*32.5 – JUL 31*
Sep 1-10	28.18	16.83	17.47	*32.4 – JUL 30*
Sep 11-20	21.85	19.18	18.49	*30.1 – AUG 17*
Sep 21-30	21.26	18.30	18.57	
Oct 1-10	19.81	19.36	20.09	**# DAYS ERC > 30.5** / **# DAYS ERC >34.5**
Oct 11-20	25.78	17.09	18.26	
ERC 30.5 – 80TH PCTL ERC 34.5 – 90TH PCTL			**20**	**6**

PEAK ERC DAYS: 40.85 JUL 31, 2022   # DAYS F100 </= 10:   0

38.20 JUL 30, 2022   LOWEST AVE F100:   12.78 JUN 27, 2022

36.00 AUG 1, 2022   13.14 JUL 31, 2022

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