

PORTLAND FIRE WEATHER – 2012 ANNUAL REPORT

2012 FIRE SEASON OVERVIEW

The 2012 fire season for Northwest Oregon and Southwest Washington was somewhat deceptive. The early portion, June and July, was cool and wet, especially June. This was partly due to persistent La Nina conditions. By August 1st it appeared the 2012 fire season would be one of the most benign years in recent history. However, an abrupt change to an unseasonably warm and dry pattern started in August, and did not end until the second week of October. Although the area experienced just two large fires, many areas observed record-setting fuel indices in September and early October. The most extreme fuel conditions occurred during the first week of October, several weeks later than usual.

La Nina conditions continued in late 2011 through early spring 2012, and then showed signs of weakening. Near-neutral conditions developed by early summer. The winter precipitation did not seem to follow normal La Nina characteristics. November precipitation was close to normal over much of the region, instead of above-normal in a typical La Nina situation. December was more unusual, with many areas receiving 30 to 50 percent of normal. Government Camp (elevation near 4000 feet), had 14.8 inches of snow in December, far below the average of 50.9 inches. On January 1st, 2012 snowpack measurements yielded 70-90 percent of normal in the South Washington Cascades, 50-70 percent of normal for the North Oregon Cascades, and just 25-49 percent of normal in the Central Oregon Cascades. Typical La Nina conditions returned in January, resulting in improved snowpack conditions throughout the Cascades, although remaining slightly below normal. March was a classic La Nina month, dominated by a cold upper level trough over the Northeast Pacific. Numerous storms brought plenty of snow to the Cascades, with several bouts of low-elevation snowfall, even near the coastline and in the Coast Range and Southwest Washington lowlands. Government Camp has an average March snowfall of 45 inches. In 2012 the March total was 82.3 inches. Falls City, at 600 feet in the North-Central Oregon Coast Range, recorded almost 10 inches of snow in March. April 1st measurements showed 90 to 150 percent of normal throughout the South Washington and North Oregon Cascades, with the highest amounts in the South Washington portion. Above-normal precipitation continued in April and May.

It seemed summer would never arrive as cool and moist conditions persisted in June and early July. June precipitation was 110 to 200 percent of normal across the forecast area. The Portland airport recorded measureable precipitation on 16 days. The average June temperature was general 2 to 4 degrees below normal. July 3rd marked the last day of significant rainfall over the forecast area. Several RAWS sites received 0.25 inches or more, with the South Washington Cascades and foothills having the highest amounts. Elk Rock RAWS registered 0.70 inches and Dry Creek had 0.49 inches. By early July Energy Release Component values (ERC) were well below normal, especially in the Central Oregon Cascades and foothills.

Climatological summer in the Pacific Northwest started late, generally in late-July. The first major heat wave did not occur until the second week of August, and was the start of an extremely long dry spell. The seasonal dry spell for most of the climatic areas was 100 days or longer. Typically, fuel conditions approach or exceed critical levels by late July. ERC and 100-hour fuel moisture values were well behind seasonal normal values in mid-July, but accelerated to critical levels by the second week of August. Record or near-record ERC values developed in

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mid-September and remained at or above the 97th percentile through early October. The Cascade zones exceeded 97th percentile ERC values around September 15th, but the highest readings occurred October 3rd through 7th. The peak part of the fire season went from early August to the second week of October, which is about normal in duration, but 3-4 weeks later to start and end.

Lightning was fairly sparse after August 1st, but one episode resulted in one of the largest fires in many years to occur in the forecast area. A strong upper-level ridge dominated the Pacific Northwest in early September. The pattern started to break down on the 7th, as a disturbance approached the Oregon Coast. A surface thermal trough moved across the Willamette Valley early-afternoon of the 8th. The elevated instability helped to produce isolated thunderstorms west of Portland around 1500 PDT. These storms moved north into Clark County of Southwest Washington later in the afternoon. Enhanced elevated instability in the South Washington Cascades during the evening and overnight produced scattered thunderstorms, one of which sparked the Cascade Creek Fire. The fire was detected early morning of the 9th about 8 miles north of Trout Lake, WA. Several days of high-level Haines 5 environment, extremely dry fuels and significant spotting allowed the fire to reach about 12,000 acres by September 20th. The fire was naturally contained in mid-October, but not before consuming just over 20,000 acres.

The district had one other significant fire, which was the Buckhead Complex. This cluster of fires was detected August 5th in the Middle Fork district of the Willamette NF and started by lightning. The entire complex comprised about 300 acres. The most prominent fires were the Buckhead, Bobby, Evangeline, and Steeple fires. Full containment was established August 25th.

Five Red Flag events occurred during the season, more than double last year. The first event was August 14th through 16th for dry and unstable conditions. This was followed by a new warning issued on the 17th and valid on the 18th for lightning and critical fuels in all Cascade zones. Lightning developed in the North Oregon and South Washington Cascades after the warning ended. The third event occurred September 12th through 14th and was for east wind and low humidity. The warning covered all northern zones except the South Washington and North Oregon coast. The fourth event, September 21st through 22nd, was for lightning and critical fuels, and covered all Cascade zones. Initially, the general synoptic pattern appeared favorable for another lightning outbreak, especially in the South Washington Cascades. The on-going Cascade Creek fire resulted in a heightened sensitivity to any potential lightning. However, lightning did not materialize. The final Red Flag event was the long-duration offshore episode October 3rd through 7th. Warnings were issued for all fire weather zones, including the coastal strip zones. There was one missed lightning event that covered one zone, but resulted in the 20,000+ acre Cascade Creek Fire in Southwest Washington. There were 29 total warnings, 25 of which verified.

Red-Flag criteria remained unchanged for the 2012 season. The concept of problematic lightning devised by the Northwest Coordination Center continued to be used. Its main premise was to develop Red-Flag criteria highly dependent on current and forecast fuel conditions before, during, and after a significant weather event. The idea was to move away from the subjectivity inherent in the dry lightning concept, or the idea of using specific rainfall criteria. The new criteria provide a better means of verification. Considerable attention continues to be directed at Haines 6 patterns, specifically, surface thermal trough passages. The primary focus has shifted

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to the mid-level Haines, instead of the high-level Haines. In the past several years, surface thermal trough passages have been responsible for extreme fire behavior resulting in significant fire growth on existing fires. Dry and unstable conditions brought the Gnarl Ridge Fire of 2008 back to life in mid-September, after about four weeks of inactivity. The Cold Springs fire in 2008 exhibited significant nocturnal fire growth due to the presence of a surface thermal trough and associated subsidence inversions. This was also the case for the Tumblebug Complex in September of 2009.

A major fire is defined as an incident that is at least 100 acres or requires at least a Type II management team. The forecast district experienced two large fires in 2012, which is about average for any given year. In 2008 there were four large fires, and in 2007 there was one large fire.

It was a busy year for the Portland Incident Meteorologists (IMETS), despite the lack of large fires in the forecast area. The IMETS provided service on nine incidents, covering a total of 86 days. The last dispatch, continued support on the Cascade Creek Fire, occurred in late September through October 7th.

The number of spot forecasts in 2012 was about 25% less than 2011. The dry period from mid-September through early October would suggest ample opportunities for agencies to conduct prescribed burning activity. However, extreme fuel conditions severely curtailed prescribed burn projects, especially in the Cascades. Spot forecast requests continued into the first half of November. There were 157 spot forecast requests in 2012, compared to 222 in 2011. There were 51 wildfire spot requests this year versus 93 last year. Prescribed spot requests in 2012 were down substantially from 2011. The forecast office received 79 prescribed burn spot requests, compared to 114 last year. One of the main contributors to the prescribed burn total was the US Fish and Wildlife Service with 21 spots. Eugene BLM contributed another 10 spot requests. The USFS was the primary source of prescribed burn spot requests with 41. The Willamette NF had the most prescribed burn spot requests, with 27. The Mt. Hood NF had 13 prescribed burn spot requests. City and county emergency management have become more involved in the spot forecast process, especially in non-fire situations. Search and Rescue (SAR) requests are becoming more prevalent, as well as requests for local fire and fire academy training exercises, and ocean buoy deployment and maintenance.

Training and outreach remain a significant part of the fire weather program at the Portland office. The staff taught numerous classes, conducted office tours, and gave several presentations to a wide range of users. Outreach activities began as early as mid-December 2011 and continued through June 2012. The Portland office continues to provide assistance to some of its former east-side users as well, primarily Central Oregon Community College.

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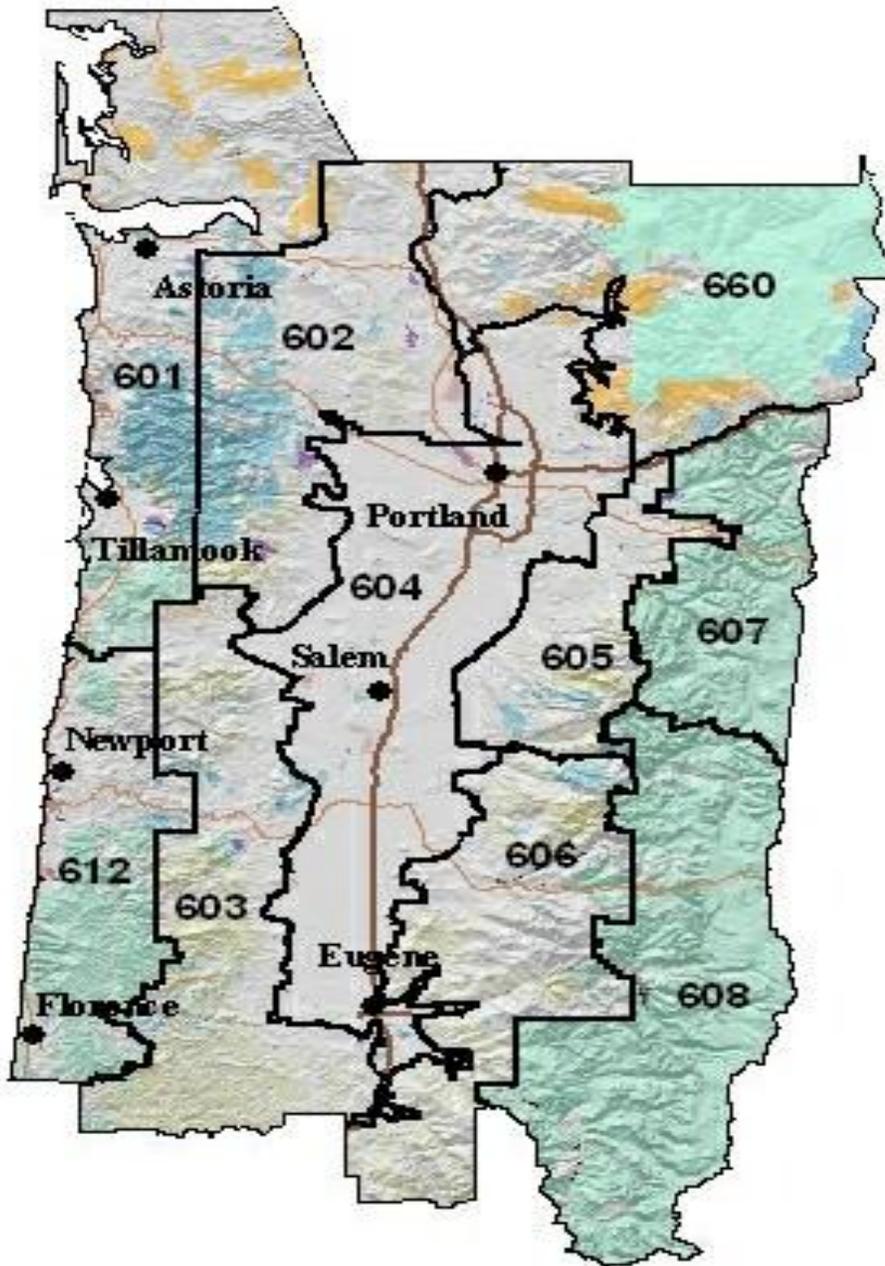


FIGURE 1 – PORTLAND FIRE WEATHER DISTRICT

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2012 PRE-SEASON: PRECIPITATION

Table one (page 8) shows precipitation amounts for various locations from fall through spring. Waning La Nina winter conditions prevailed in 2011-2012. December was quite dry, with most areas receiving 30 to 50 percent of normal precipitation, which is not typical of La Nina conditions. Government Camp snow depth in late-December was down to 3 inches. Typical La Nina patterns returned in January 2012 as most areas received normal or slightly above normal precipitation. Plentiful Cascade snowfall occurred in January, with Government Camp recording a peak snow depth of 59 inches on the 19th. January precipitation at Government Camp came to 19.44 inches. The Alsea-Falls Creek station recorded 18.20 inches, about 4 inches above normal. February 2012 was slightly drier than normal, but any deficit was overcome in March. Most areas had 150% to 250% of normal precipitation in March, with local 300%+ in the Central Oregon Coast Range (see figure 2 below). The extremely wet March boosted Snow Water Equivalent (SWE) in the South Washington, North Oregon, and Central Oregon Cascades to 110-180% of normal (see figure 3). The peak seasonal Government Camp snow depth of 82 inches occurred March 22nd. The Alsea-Falls Creek site had 22.56 inches in March, over 200% of normal. The wet pattern continued through April, but not as extreme as March. Most areas received average to slightly above average April precipitation. The SWE on May 1st remained above 100% of normal in most areas, primarily in the South Washington and North Oregon Cascades. Despite the weakening La Nina signature, June was another wet month. The majority of the forecast area had 125-175% of normal precipitation. The Portland airport recorded 4.10 inches, with measurable rainfall on 16 days.

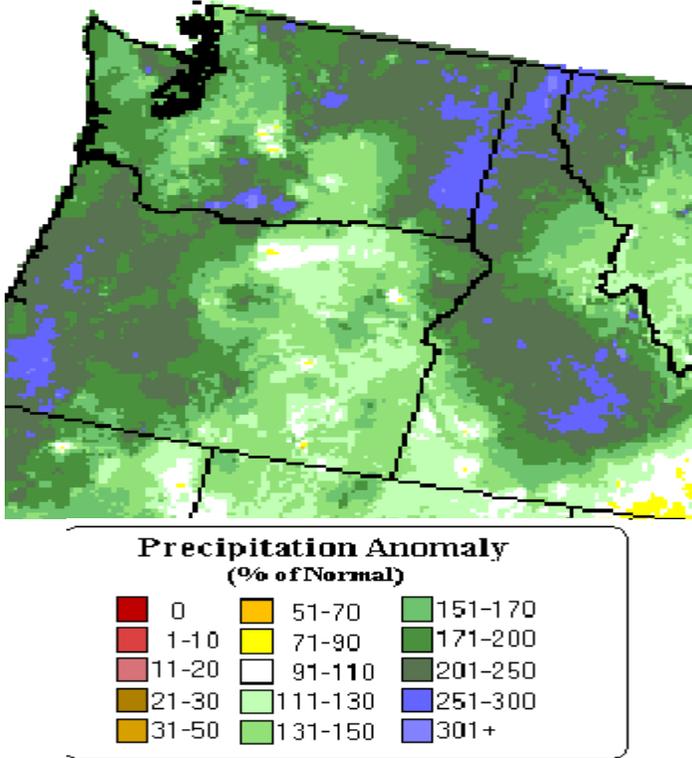
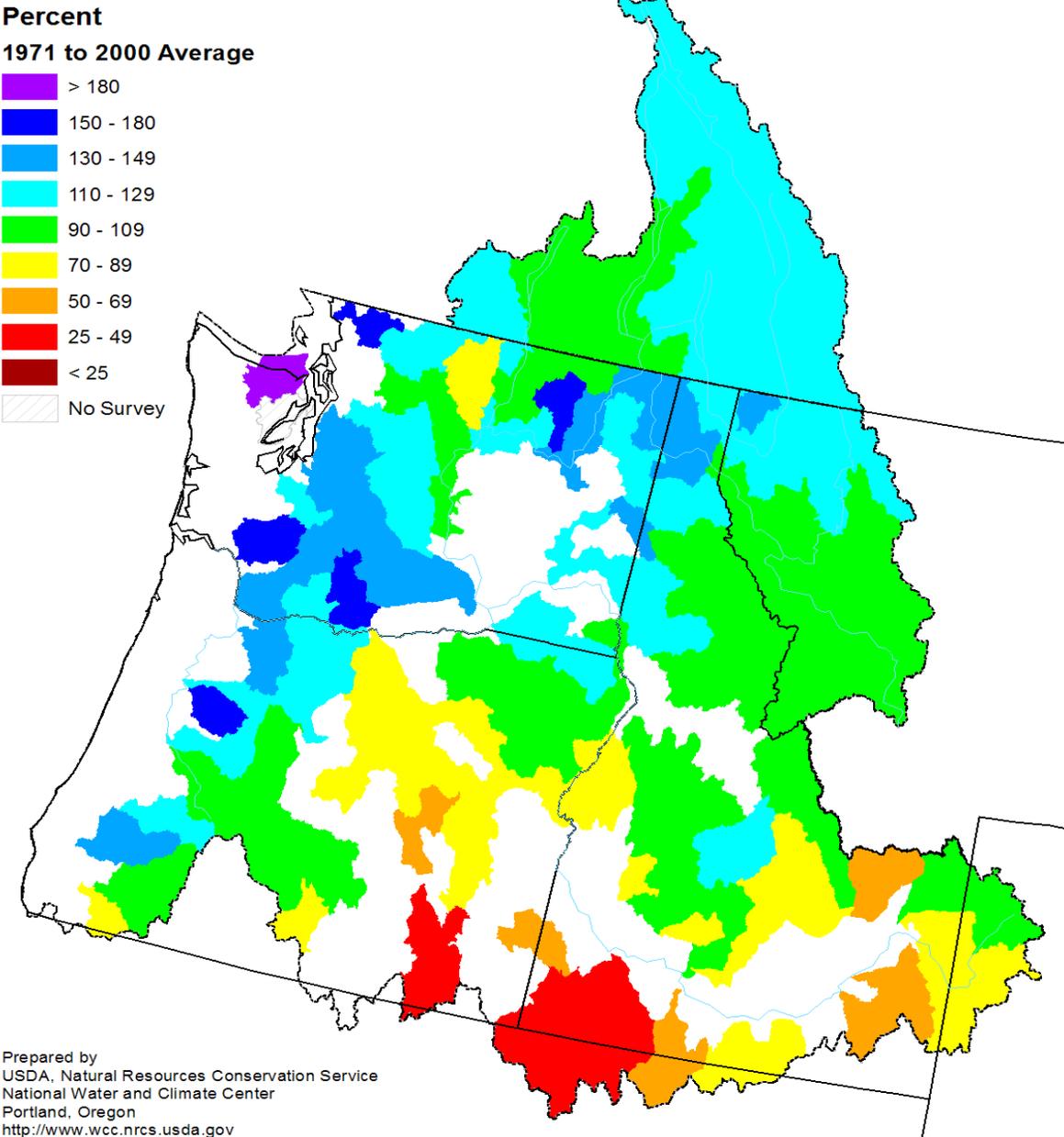


FIGURE 2 – MARCH 2012 PRECIPITATION ANOMALY

Columbia River Mountain Snowpack as of April 1, 2012



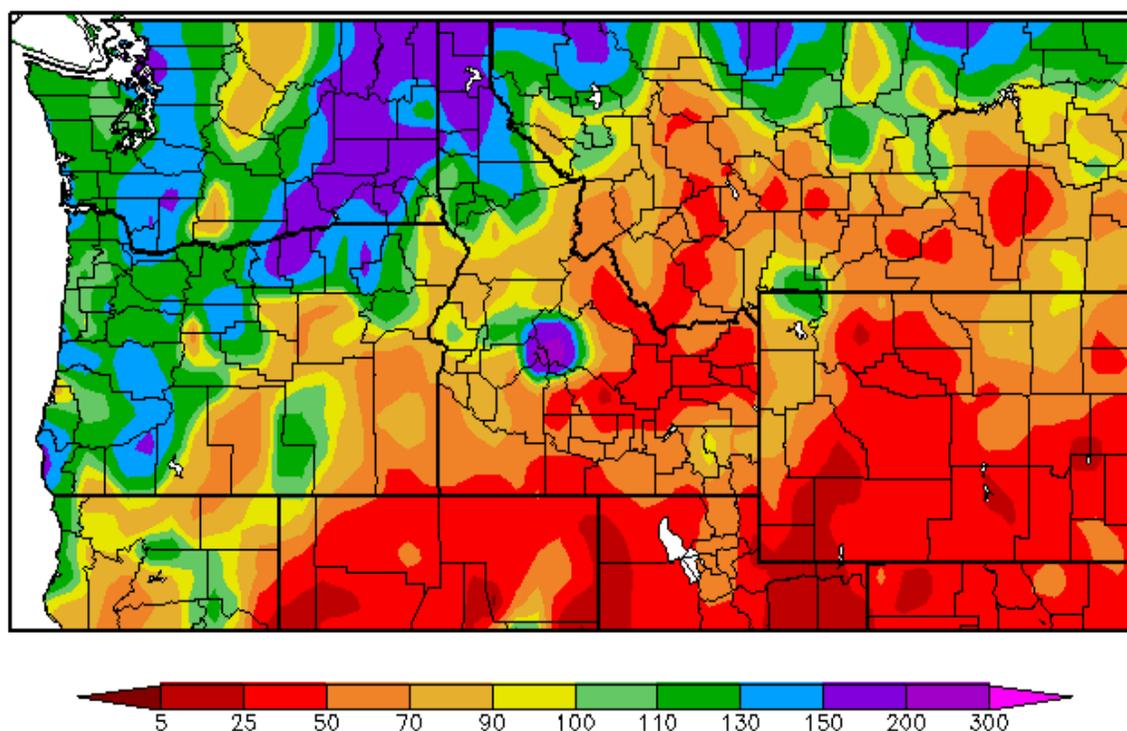
Prepared by
USDA, Natural Resources Conservation Service
National Water and Climate Center
Portland, Oregon
<http://www.wcc.nrcs.usda.gov>

FIGURE 3 – PERCENT OF NORMAL SNOWPACK APRIL 1, 2012

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Figure 4 (below), shows the Percent of Normal precipitation for the period April through June 2012. Note the 130 to 150+% values in the South Washington Cascades and the Central Oregon Cascades and foothills. The Standard Precipitation Index (SPI), which indicates the number of standard deviations away from the mean average, was 1.0 to 2.0 standard deviations above normal in the Cascade fire weather zones.

Percent of Normal Precipitation (%) 4/1/2012 – 6/30/2012



Generated 7/12/2012 at HPRCC using provisional data.

Regional Climate Centers

Figure 4 – April-June 2012 Standardized Precipitation Index (SPI)

Cascade snowfall had several peaks and valleys during the 2011-2012 season. Figure 5 on page 14 shows the Government Camp seasonal snow depth. Note the small peak in mid to late-November, and the two more significant peaks in January and March. A series of November storms resulted in a 26-inch snow depth just before Thanksgiving, but far short of the 60-inch depth measured at the end of November 2011. December snowfall was abysmal. The Government Camp snow depth dwindled to three inches on the 29th. January brought an abrupt change in overall conditions, with snow depth increasing from 10 inches on the 14th to 59 inches on the 19th. The fairly robust snow depth would not last. February saw a decrease from 46 inches on the 1st to 14 inches by the 13th. However, several big storms late in the month brought the snow depth up to 54 inches by the 29th. The parade of storms continued in March. The

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Government Camp snow depth peaked at 82 inches on the 22nd, but fell to 37 inches by the end of the month. The snow depth remained above 25 inches through the first half of April, but fell to 0 on the 22nd. Typically, Government Camp retains some degree of snow cover through at least mid-May. A few inches fell in early May, but vanished by the 10th.

Spring burning got off to a slow start due to the extremely wet March. The Eugene and BLM annual spray operations occurred about 3 to 4 weeks later than usual. Many lowland areas received periodic bouts of heavy, wet snow in March, which delayed the bud development. Classic La Nina characteristics prevailed through early spring, but waned in April and May. Fuel conditions by mid-July were several weeks behind seasonal normal, similar to last year, but managed to catch up by early August. Daily average ERC and hundred-hour fuel moistures reached critical levels in mid-August and remained elevated through October 12th. The most extreme fuel conditions occurred in mid-September and early October.

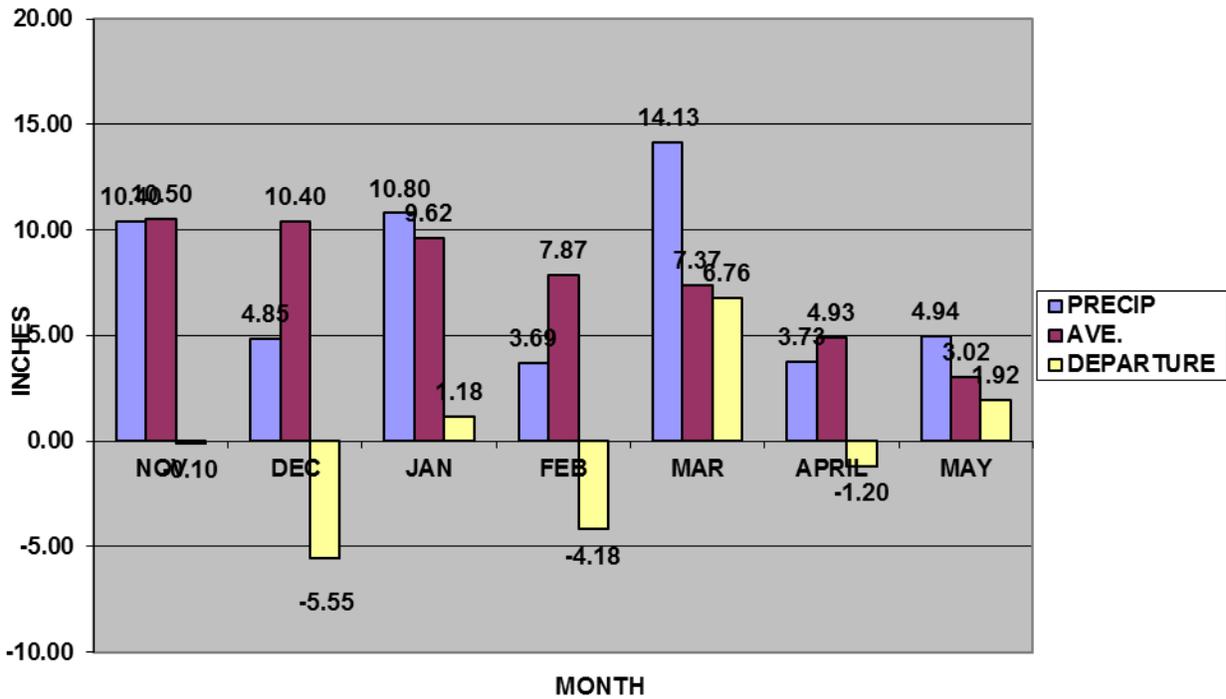
The 2012 season was generally below average for lightning. Typically, the Central Oregon Cascades, zone 608, endures about 20 lightning days during the May-early October period. In 2012 there were 11 lightning days. The South Washington and North Oregon Cascade zones, 605, 607 and 660, had 13 lightning days. There was one Red Flag lightning event in August, resulting in the Buckhead Complex in the Willamette NF. Another Red Flag lightning event the evening of September 8th through early morning of the 9th started the 20,000-acre Cascade Creek Fire near Trout Lake, WA. Zone 660 had 227 lightning strikes during this episode. There were two long-duration Red Flag events late in the season. The first occurred September 12-14 for a combination of wind and low humidity followed by dry and unstable conditions associated with a thermal trough passage. An even longer event took place October 3-7, during a particularly strong offshore pattern.

TABLE 1 - 2011-2012 WET SEASON PRECIPITATION SUMMARY

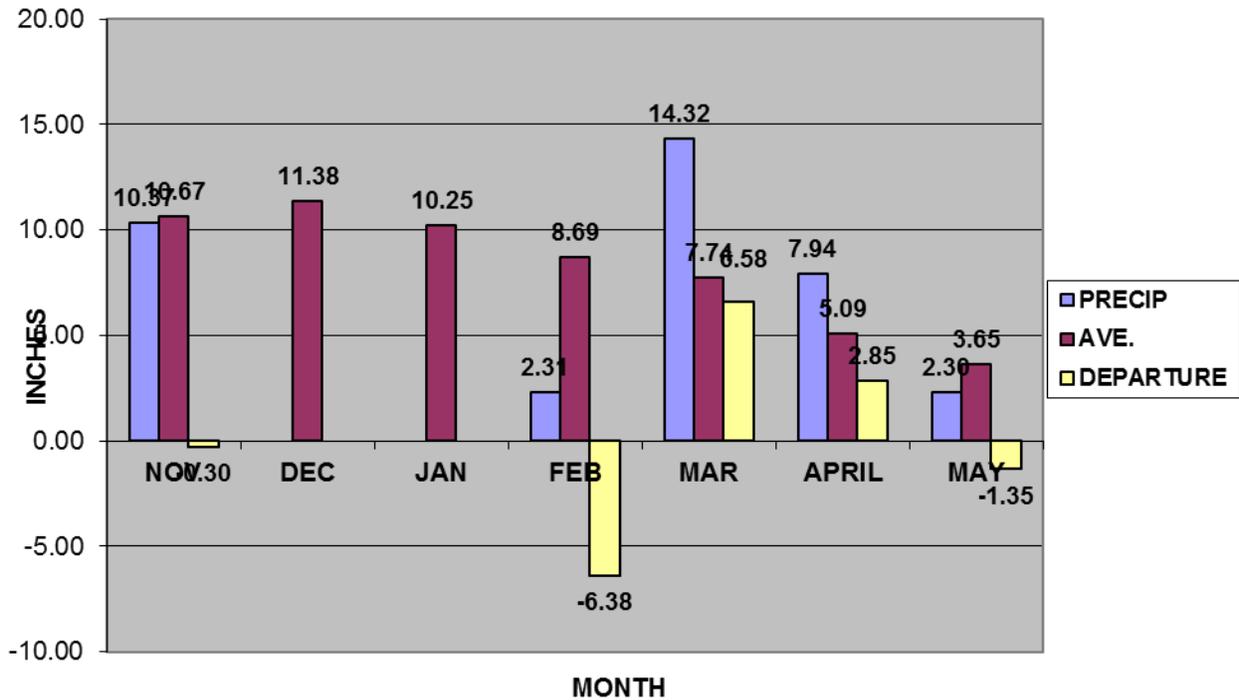
	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOT	AVE	PCT AVE
Astoria	10.40	4.85	10.80	3.69	14.13	3.73	4.94	52.54	53.71	97.82%
Newport	10.37	NA	NA	2.31	14.32	7.94	2.30	NA	57.47	NA
Fall Creek	13.12	11.00	18.20	9.33	22.56	7.73	5.02	86.96	78.34	111.00%
Portland	6.57	2.51	6.82	2.83	7.89	5.26	3.37	35.25	28.98	121.64%
Eugene	5.34	5.01	8.12	4.05	9.94	3.62	2.68	38.76	42.35	91.52%
G. Camp	12.14	11.96	19.44	12.89	18.83	8.38	7.11	90.75	71.40	127.10%
Oakridge	4.86	3.86	9.67	4.82	11.37	6.10	3.33	44.01	37.34	117.86%

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2011-2012 WET SEASON ASTORIA

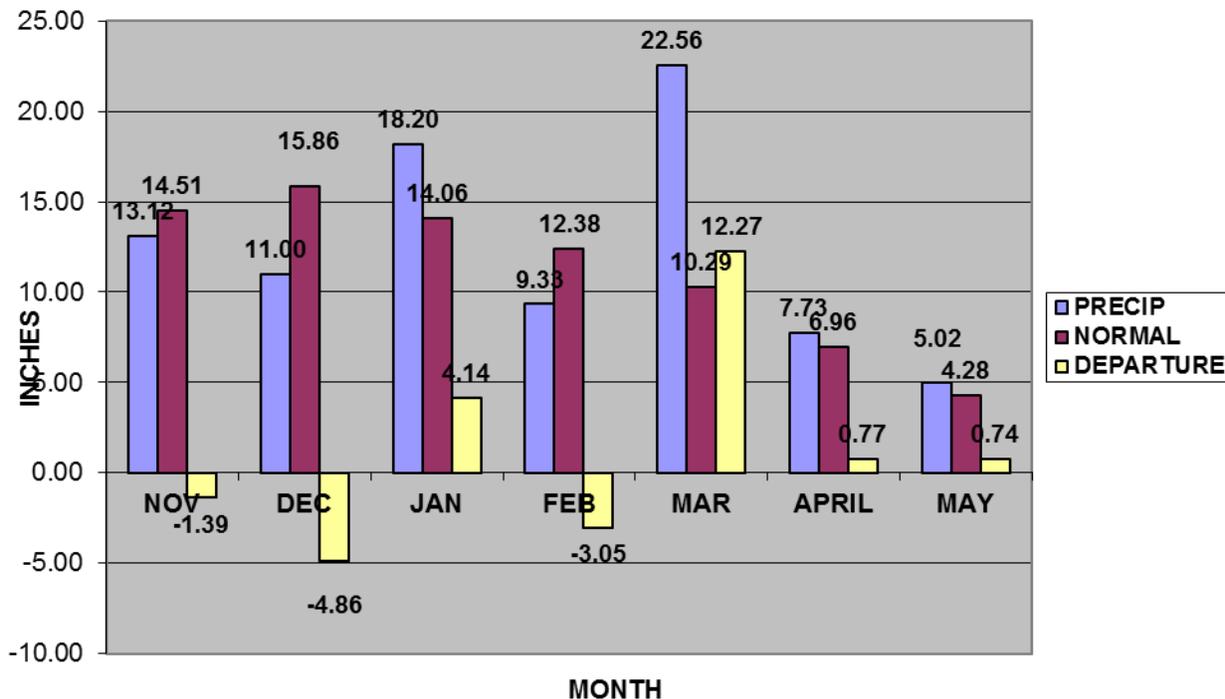


2011-2012 WET SEASON NEWPORT

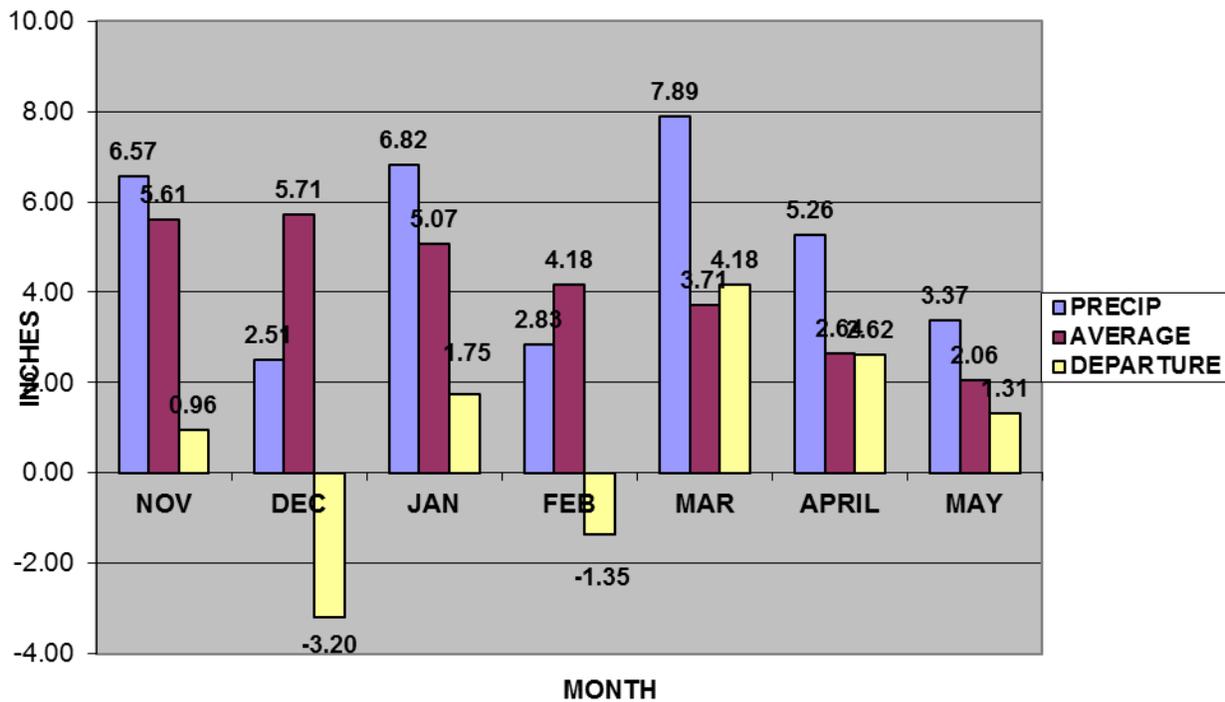


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**2011-2012 WET SEASON
ALSEA-FALL CREEK**

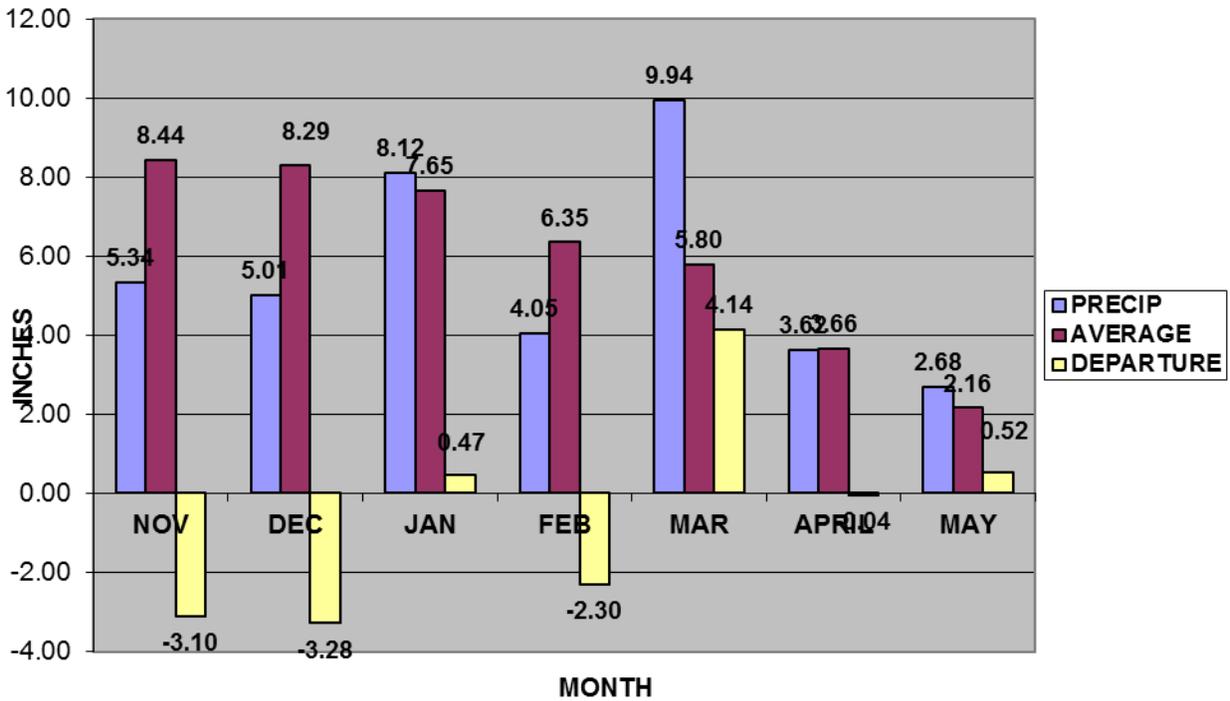


**2011-2012 WET SEASON
PORTLAND**

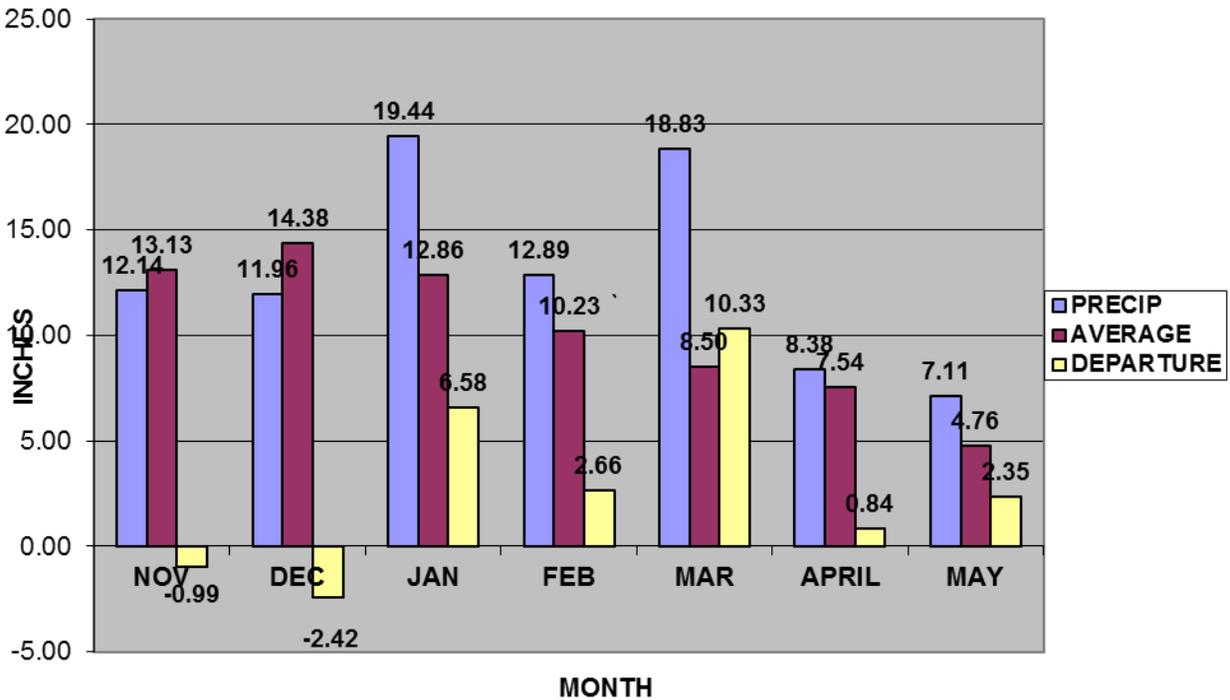


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**2011-2012 WET SEASON
EUGENE**

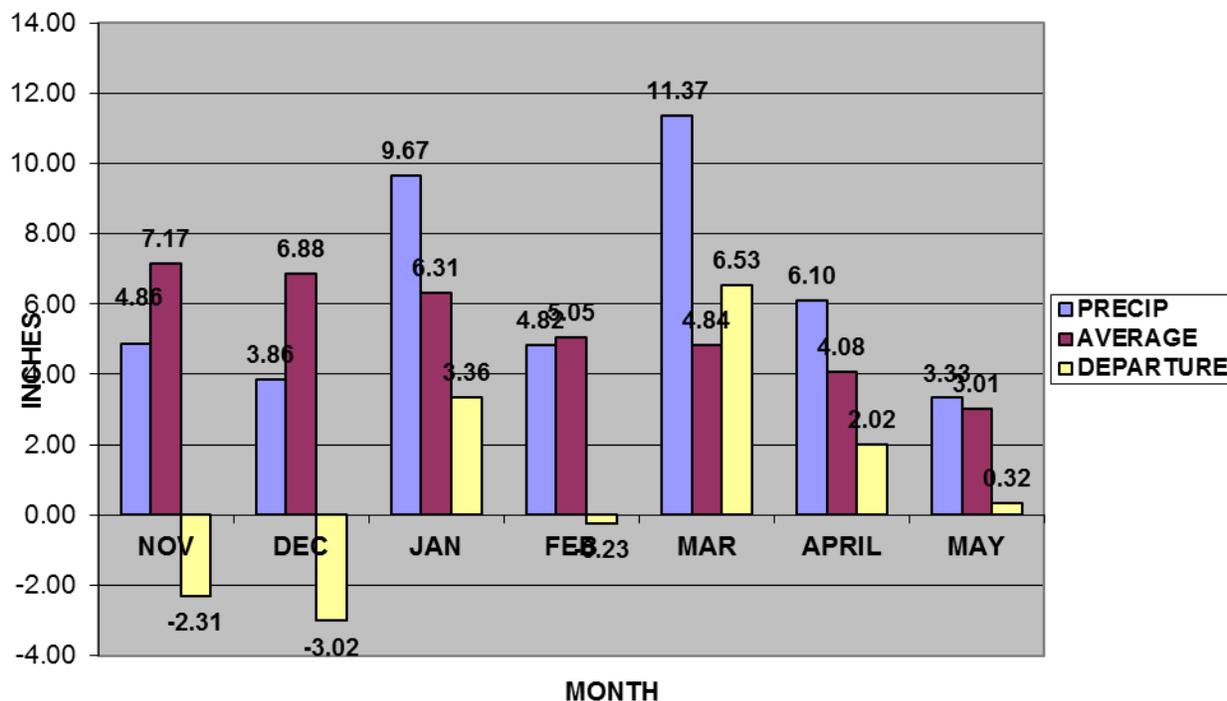


**2011-2012 WET SEASON
GOVERNMENT CAMP**



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2011-2012 WET SEASON OAKRIDGE



2012 FAST FACTS: A late-season offshore pattern in early October resulted in Red Flag conditions across many areas. Three Corner Rock RAWs, in the South Washington Cascade and foothills, registered east wind of 25-35 mph with gusts up to 55 mph. At 1136 PDT on the 5th, a wind sensor at Crown Point, a few miles east of Corbett at the far west end of the Columbia River Gorge, had a gust to 56 mph. The 5000-foot Government Camp sensor had gusts to around 50 mph. Log Creek RAWs, in the North Oregon Cascade foothills picked up gusts of 40 to 45 mph. The offshore effects were most pronounced along the South Washington and North Oregon coastline. Many locations had daytime temperatures in the mid 60s to mid 70s, humidity below 25 percent, and Northeast to East wind of 15 to 25 mph.

This Red Flag event boosted Energy Release Component (ERC) values to record values in some locations, and the highest readings of the season in many areas. The highest observed ERC values on the 8th included: 82 at Emigrant (Central Oregon Cascades), 75 at Buck Creek (South Washington Cascades), 71 Fields (Central Oregon Cascades), 70 at Log Creek and Yellowstone (both in the North Oregon Cascades and foothills), and 69 at Rockhouse (in the Central Oregon Coast Range). Critical values for the above-mentioned sites, defined as the 90th percentile or higher, are 45 to 55, except near 60 at Emigrant. The 100-hour fuel moisture values were 5-7 percent in many areas. The lowest observed readings occurred at Emigrant and Yellowstone.

Nighttime humidity recovery of 15 to 30 percent was common in elevated areas. Emigrant RAWs had a recovery of 24 percent early morning of the 6th.

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2011-2012 GOVERNMENT CAMP SNOW DEPTH DATA

The 2011-2012 Government Camp snow-depth data (Figure 5) is shown on page 14. The chart also includes data from 2010-2011 and the average snow depth. The Government Camp snow depth data is taken from the Cooperative Observer (COOP) report and collected by the Portland National Weather Service Office. The COOP data is also collected by the National Climatic Data Center (NCDC) and archived.

The Cascade snow season got off to a good start in November 2011. Snowfall began to accumulate in mid-November, and by the 20th the measured snow depth had reached 26 inches. This was the most snow on the ground on the date since at least 2003. November 2011 ended with a snow depth of 18 inches, close to average, but far below the 60 inches measured in 2010. December was a disappointing month for Cascade snowfall. Overall, December precipitation was well below normal across the forecast area. The snow depth fell to three inches on December 29th. This was the lowest amount on the date since at least 2003. On December 29th, 2005, the snow depth was five inches.

A major rise in snow depth occurred in January. The biggest single-day increase, 23 inches, took place on the 18th, which brought the snow depth to 58 inches. By the end of January the snow depth remained around 45 inches. February was another below-normal precipitation month. The snow depth dropped to 14 inches on the 13th, but grew to 54 inches by the end of the month. March was cold and wet. Government Camp recorded 18.83 inches of precipitation. The snow depth reached a seasonal maximum of 82 inches on the 22nd. This was one of the deepest depths on the date since 2003. Only March 22nd, 2008 had a higher snow depth. Snow depth hovered around normal values through the first half of April, but dropped to zero on the 23rd. A few inches fell in early May, but had melted by the 10th. Snow cover vanishes, on average, by June 10th.

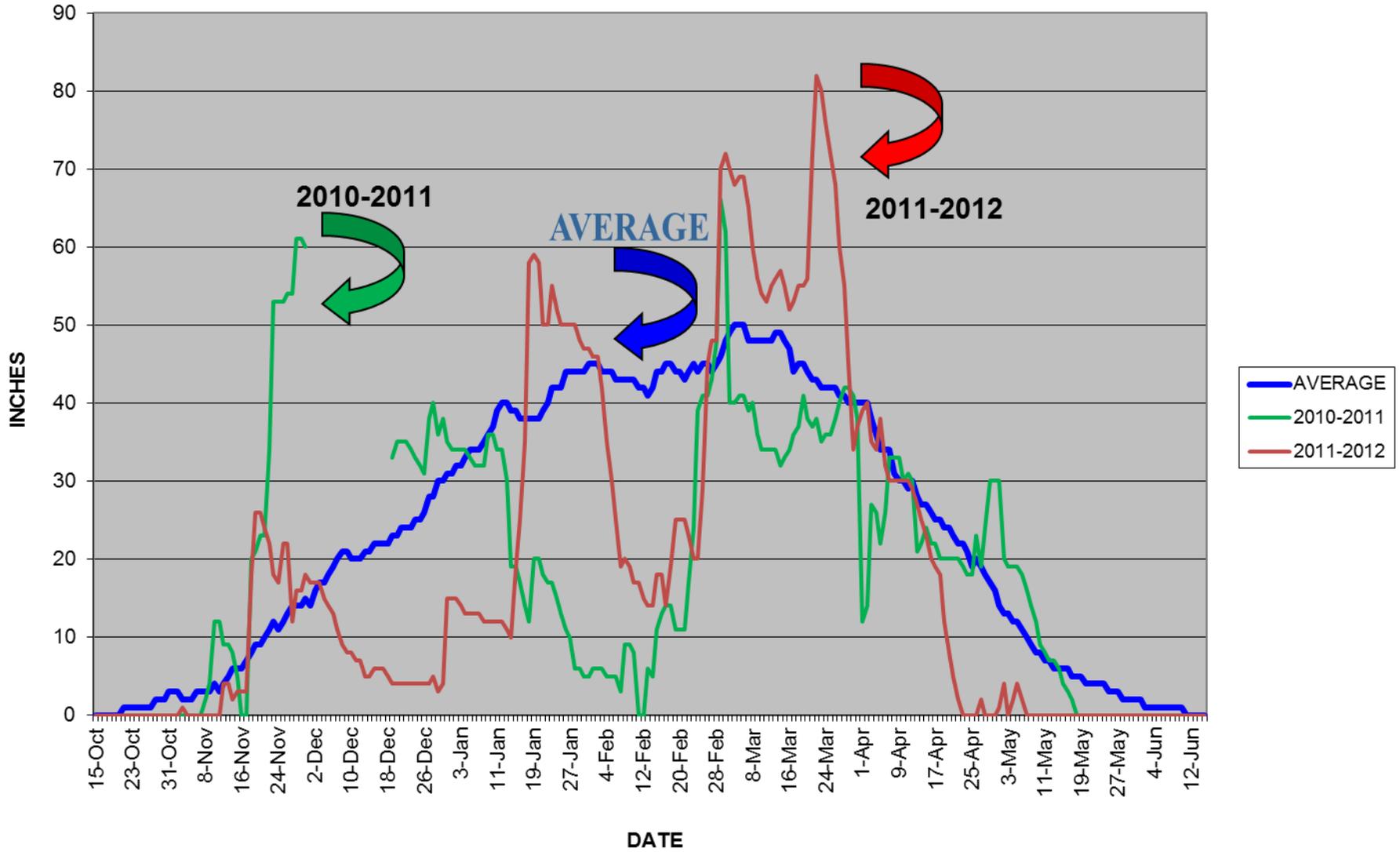
GOVERNMENT CAMP SNOW DEPTH TRIVIA: The average snow depth on Christmas Day is 25 to 30 inches. On Christmas Day 2008 there were 72 inches on the ground, which was the most since 2002. In 2011, the Christmas Day snow depth was 4 inches. New Year's Day was not much better, with a measured snow depth of 15 inches.

The largest single-day snow depth increase in 2011-2012 was 23 inches on January 18th. There was a 16-inch gain from February 25th to the 26th.



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FIGURE 5 - GOVERNMENT CAMP SNOWDEPTH



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2012 FIRE SEASON LIGHTNING DATA

Table two shows the lightning frequency, by area, for the 2012 season.

TABLE TWO: 2012 LIGHTNING DATA (MAY THROUGH OCTOBER)

AREA	#LIGHTNING DAYS 2012	AVE. # DAYS (LAST 17 YEARS)	PERCENT AVE.
ZONES 601/612	7	6.53	107.2%
ZONES 602/603	6	7.76	77.3%
ZONE 604	9	8.53**	105.5%
ZONES 605/607/660	13	12.18	106.7%
ZONES 606/608	11	13.82	79.6%

** Average over 19-year period.

TABLE TWO: 2012 LIGHTNING FREQUENCY.

DATA OBTAINED FROM BLM LIGHTNING DETECTION AND NORTHWEST COORDINATION CENTER

Overall, 2012 was an average lightning season for the Portland forecast area. The primary lightning period occurred in mid-July. Fortunately, corresponding fuel conditions were at least 2 to 3 weeks behind normal values. The coastal strip experienced three lightning days during the period, almost half their seasonal total. The Portland Office received two wildfire spot requests in July, one on the 7th and the other on the 18th. Both fires were small, under five acres, and did not require additional spot forecasts. As can be seen by the area averages, zones 606 and 608 tend to have the most lightning days in any given season. The 2012 season did not follow the typical trend. Zones 605, 607, and 660 had the most lightning days, with an unusually high frequency in zone 660. A missed evening and nocturnal lightning event in early September resulted in one of the largest fires to occur in the forecast area. The Cascade Creek Fire, near Mt. Adams in the Gifford Pinchot NF, started on September 9th, and continued to burn well into October. It was finally contained by a series of wetting rain events beginning October 12th. The fire burned just over 20,000 acres.

Climatologically, the first major lightning episode occurs around July 21st. Normally, one or two critical fire weather patterns or events occur during the fire season that likely result in problematic lightning. Such events include the breakdown of an upper ridge, Haines 6 conditions, or lightning after an extended dry period. These isolated events cause the majority of large fires. The Portland Forecast Office issued Red Flag Warnings for five events during the 2012 season. Three were for dry and unstable conditions or wind and low humidity, or a combination of the two, and the other two were for lightning. There were two long-duration

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offshore events. The first was September 12th through 14th, and the other took place October 3rd through 7th. The most critical fuel conditions during the past couple of seasons have occurred in early to mid-September, and this year was no exception. In fact, the most extreme fuel conditions occurred around the third week of September through early October. Fuel conditions went from average or below-average in late-July and early-August to extreme, 97th percentile values or greater, in mid to late August. The highest daily average ERC values occurred October 4th through 8th.

The lightning criteria for the Portland forecast area were modified five seasons ago in an attempt to better represent the true problem patterns. Dry lightning is hard to forecast and harder still to verify. The Northwest Coordination Center developed a more objective analysis for problem lightning. The general premise is to combine lightning potential with observed and forecast fuel conditions. A Red Flag Warning is warranted when lightning is expected **AND** fuel conditions are forecast to remain moderate or critical during and after the weather event. Also, lightning activity must be scattered, or greater, in coverage.



Figure 6 –Gotchen Guard Station. Cascade Creek Fire

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RED FLAG WARNING STATISTICS FOR 2012

Table three shows the Red Flag verification statistics for the 2012 fire season.

TABLE THREE (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	1.00	1.00	0.00
612	1	1	0	0	1.00	1.00	0.00
602	3	3	0	0	1.00	1.00	0.00
603	2	2	0	0	1.00	1.00	0.00
604	3	3	0	0	1.00	1.00	0.00
605	4	3	1	0	1.00	0.75	0.25
606	3	3	0	0	1.00	1.00	0.00
607	4	3	1	0	1.00	0.75	0.25
608	3	3	0	0	1.00	1.00	0.00
660	5	3	2	1	0.75	0.50	0.40
TOTALS (ALL)	29	25	4	1	0.962	0.833	0.138
LIGHTNING	6	2	4	1	0.667	0.286	0.667
WIND/RH	15	15	0	0	1.000	1.000	0.000
HAINES 6	8	8	0	0	1.000	1.000	0.000

NUMBER OF WARNED EVENTS: 5
EVENTS PRECEDED BY A WATCH: 3 OR 60%
MISSED EVENTS: 1
INCORRECT EVENTS: 1

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

EVENT LEAD TIMES

Tables 4 and 5 show the respective warning and watch lead times for all events in 2012. Ideally, the goal is to achieve 24-48 hours lead time for warnings and 48-72 hours for watches.

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TABLE FOUR – WARNING LEAD TIMES

<i>EVENT</i>	<i>RANGE OF LEAD TIMES</i>	<i>AVE. ZONE LEAD TIME</i>
<i>August 14-16 (Dry and Unstable)</i>	24 hrs 44 min ZONE 602	24 HRS 44 MINS
	24 hrs 44 min ZONE 603	
	24 hrs 44 min ZONE 604	
	24 hrs 44 min ZONE 605	
	24 hrs 44 min ZONE 606	
	24 hrs 44 min ZONE 607	
	24 hrs 44 min ZONE 608	
<i>August 17 (Lightning)</i>	11 hrs 43 min ZONE 606	11 HRS 43 MINS
	11hrs 43 min ZONE 608	
<i>September 12-14 (Wind/Low RH and Haines 6)</i>	13 hrs 47 min ZONE 602	20 HRS 46 MINS
	21 hrs 58 min ZONE 604	
	29 hrs 32 min ZONE 605	
	19 hrs 17 min ZONE 607	
	19 hrs 17 min ZONE 660	
<i>September 21-22 (Lightning and Critical Fuels)</i>	Did Not Verify ZONE 660	Not Applicable
<i>October 3-7 (Wind/Low RH)</i>	20 hrs 58 min ZONE 601	21 HRS 52 MINS
	20 hrs 58 min ZONE 602	
	20 hrs 58 min ZONE 604	
	21 hrs 58 min ZONE 605	
	21 hrs 58 min ZONE 606	
	21 hrs 58 min ZONE 607	
	21 hrs 58 min ZONE 608	
	22 hrs 58 min ZONE 612	
OVERALL AVE. LEAD TIME		22 HRS 48 MINS

LATE JUNE WETTING RAIN: *The last 10 days of June were quite wet, with measurable rain occurring on more than half the 10 days. June 26th was especially wet. Goodwin RAWS (South Coastal zone) had 1.01 inches. Three Corner Rock (South Washington Cascades) picked up 0.83 inches, and Canyon Creek (South Washington Cascade Foothills) received 0.90 inches.*

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TABLE FIVE – WATCH LEAD TIMES

EVENT	RANGE OF LEAD TIMES	AVE. ZONE LEAD TIME
<i>August 14-16 (Dry and Unstable)</i>	32 hrs 06 min ZONE 602 32 hrs 06 min ZONE 603 32 hrs 06 min ZONE 604 32 hrs 06 min ZONE 605 32 hrs 06 min ZONE 606 32 hrs 06 min ZONE 607 32 hrs 06 min ZONE 608 32 hrs 06 min ZONE 660	32 HRS 06 MIN
<i>August 17 (Lightning)</i>	NO WATCH ISSUED	Not Applicable
<i>September 12-14 (Wind/Low RH and Haines 6)</i>	62 hrs 07 min ZONE 602 46 hrs 00 min ZONE 604 53 hrs 34 min ZONE 605 43 hrs 19 min ZONE 607 43 hrs 19 min ZONE 660	43 HRS 19 MIN
<i>September 21-22 (Lightning)</i>	DID NOT VERIFY	Not Applicable
<i>October 3-7 (Wind/Low RH)</i>	NO WATCH ISSUED	Not Applicable
OVERALL AVE. LEAD TIME		38 HRS 51 MINS

A few notes on verification and the 2012 events: The overall severity of any fire season is highly correlated with the extent and frequency of critical fire weather patterns during the season. It is not unusual to have an extended dry period during any given fire season. This, in itself, could result in an elevated degree of fire activity, provided the fuel conditions are right. However, to elevate a high fire danger situation to a critical level normally requires an additional weather element, or trigger, to be superimposed on the dryness factor. This additional trigger could be thunderstorms with no appreciable precipitation, an extremely unstable air mass (Haines 6), or a combination of strong wind and low humidity. Red Flag warnings are issued when a combination of critical weather elements exist **WITH** sufficiently dry fuels and severe burning conditions.

Determining lead-time for problematic or dry lightning is highly subjective. The Portland office has made a major effort to get away from the term *dry lightning*. In 2004, new lightning criteria were introduced to the users. However, the definition of episode lightning was misunderstood. Therefore, in 2005, the phrase *lightning with no appreciable precipitation* was introduced. The general premise was to avoid the subjectivity of determining whether lightning was wet or dry. If the fuel conditions were expected to remain high or critical during and after the lightning event, then a Fire Weather Watch or Red Flag warning was warranted. The Northwest Coordination Center developed a scheme to monitor fuel conditions. The two correlating factors were determined to be Energy Release Component (ERC) and 100-hour fuel moisture. It was found that there were distinct breakpoints of ERC and 100-hour fuel moisture that corresponded

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to minimal or no large fire potential, an average risk of large fire potential, and a higher than average risk of large fire potential.

It is a given that fires **WILL** occur during or after a lightning episode following an extended dry spell. However, does that fact alone warrant a Red Flag warning? If all the resultant fires remain small and/or initial attack can handle them, was it a critical event? Should one or more resultant lightning fires get big, then it is reasonable to assume the event was critical and a warning justified.

There were no changes in the Red Flag criteria for the 2012 season. As a review, the wind/low RH criteria are based on distinct geographic and climatic zone groupings. The Portland fire weather region is divided into five regions, and Red Flag criteria for wind and low humidity were assigned to each region. It is also assumed that if one fire weather zone within a region reaches criteria, then, by default, the remaining zones within the region achieves criteria. It is hard to imagine a synoptic-scale east wind event, typical of late spring or late summer, that verifies in the North Oregon Cascade foothills, but **DOES NOT** verify in the adjacent North Oregon Cascades or South Washington Cascades. Verification of wind and low humidity continues to be hampered by RAWS issues. The land agencies have put forth more effort at RAWS maintenance during the past couple of years, but more work needs to be accomplished. Some RAWS sites that were good wind stations in the past, have suffered due to overstory growth, understory expansion, and other environmental factors.

Another verification problem arises when verifying warnings by zone. Multiple zones may be included in a warning, but some areas may not have good verifying observing stations. Some zones end up not meeting warning criteria simply because there are no good verification stations. This, in turn, will result in lower Probability of Detection (POD) scores, and higher False Alarm Rates (FAR). Moving RAWS stations may actually hinder verification. There has been a push in the past couple of years for units or districts to conduct seasonal surveys on their RAWS stations and take appropriate action to clear brush, remove trees, etc in order to conform to RAWS site standards.

NFDRS VERIFICATION STATISTICS FOR 2012

National Fire Danger Rating System (NFDRS) forecasts remain a high priority at the Portland office. Users depend on these forecasts for a variety of reasons, such as determining whether to limit or curtail forest activities, updating pocketcards, and determining staffing levels. A Memorandum of Understanding (MOU) between the former Pacific Northwest Coordinating Group (PNWCG) and National Weather Service used to exist, that specified expected forecast performance measures for NFDRS forecasts. These verification standards were based on performance against persistence. The base performance measures were 35 percent improvement over persistence for temperature, 25 percent improvement for humidity, and 10 percent for wind. However, the MOU also called for a goal of 30 percent improvement each year. Over time, this 30 percent annual improvement became unreasonable. The MOU no longer exists. As of 2008, user expectations were simply to show some degree of improvement over time.

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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. In the past, 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 six (below) shows the 2012 NFDRS verification stations for the above listed sites. The values in red indicate improvement over the 2011 scores.

TABLE SIX – 2012 SITE-SPECIFIC NFDRS VERIFICATION

SITE	TEMPERATURE			HUMIDITY			WIND		
	FCST MAE	PERS. MAE	SCORE	FCST MAE	PERS. MAE	SCORE	FCST MAE	PERS. MAE	SCORE
<i>Village Creek</i>	4.41	6.37	30.77%	7.91	11.63	31.98%	1.15	0.98	-17.35%
<i>Pebble</i>	3.79	6.56	42.23%	9.07	14.54	37.62%	0.82	0.66	-24.24%
<i>Fields</i>	3.68	6.32	41.77%	9.78	14.31	31.66%	1.23	1.20	-0.025%
<i>South Fork</i>	3.55	6.19	42.65%	8.85	13.19	32.90%	1.38	1.43	3.50%
<i>Wanderer’s Peak</i>	3.99	7.14	44.12%	9.58	14.41	33.52%	1.37	1.31	-4.58%
<i>Horse Creek</i>	3.58	6.21	42.35%	8.94	12.70	29.61%	1.17	1.13	-3.54%
<i>Yellowstone</i>	4.62	7.05	34.47%	8.73	12.81	31.85%	1.80	1.63	-10.43%
<i>Canyon Creek</i>	4.92	8.17	39.78%	10.27	17.42	41.04%	1.84	1.65	-11.52%

MORE 2012 NFDRS VERIFICATION TIDBITS:

Overall, the 2012 NFDRS scores were lower than 2011, especially for wind. Typically, April through June contain several big-change days, which boost NFDRS performance. Big-change days can have 15-25 degree 24-hour temperature changes and 50 percent or more changes in humidity. July and August tend to be characterized by more persistent weather patterns, which make it difficult to improve over persistence. August tends to be the most difficult month to show improvement over persistence, and 2012 was no exception. The August temperature score of 24.6 percent was the lowest for any month.

The overall wind score declined, after 3-4 years of steady improvement. A majority of the RAWs station exhibit average fire-season wind speeds under 5 mph, which makes it difficult to beat persistence. Some stations have a 2-3 mph wind speed average. After a good start to the season (17.7% in April and 23.1% in May), wind scores were near or below zero the rest of

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season, ending October 15th. October was an extremely poor month, with a wind score of -35.4%.

There were frequent bouts of onshore flow throughout the summer, which resulted in a marine layer. Some of the marine surges were stronger than others, creating a deeper and more persistent marine layer. The marine layer creates havoc for the NFDRS forecaster. If the marine clouds dissipate a little sooner or later than expected, NFDRS verification scores can suffer.

The overall improvement over persistence in 2012 for the eight key sites was about the same, or lower, at nearly all locations, compared to 2011. Wind scores showed a major decline, with only one site exhibiting a positive score. The overall Mean Absolute Error (MAE) for humidity was generally lower at the eight sites, but the persistence MAE had a larger decrease. This resulted in lower humidity scores, despite the better forecast.

The following table (Table 7, next page) shows the 2012 NFDRS verification statistics, by area, and by zone. Improvement in temperature and RH are shown in blue. Improvement in wind is shown in blue, positive wind score but no improvement from 2011 is in purple, and red wind scores indicate lower scores compared to 2011.

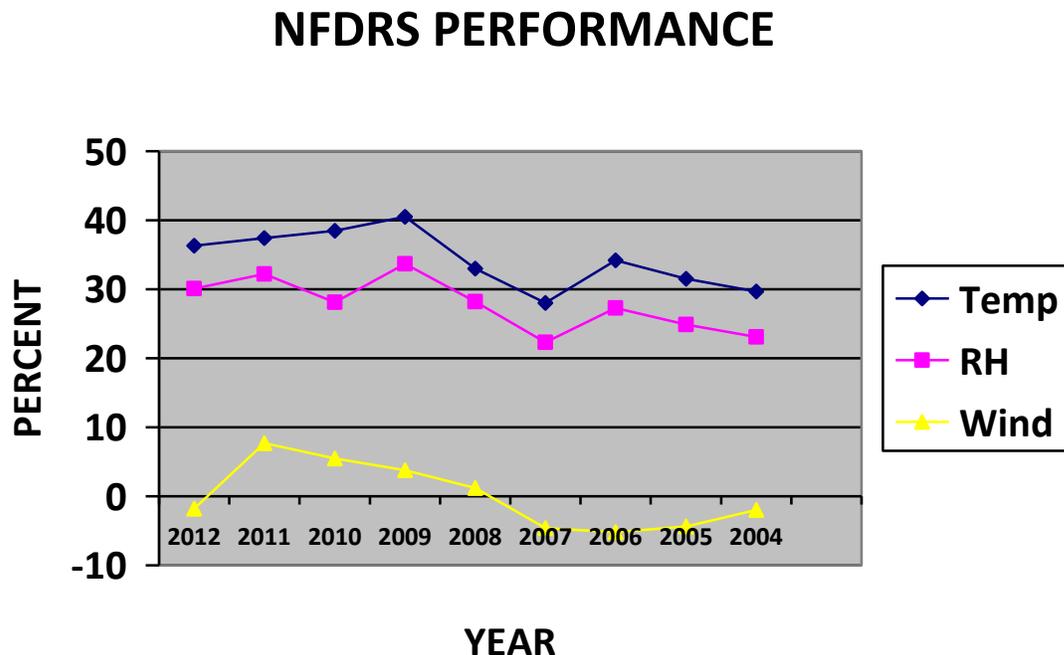


Figure 7 – Seasonal NFDRS Performance (Improvement over Persistence)

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TABLE SEVEN – 2012 NFDRS VERIFICATION

ZONE	TEMPERATURE	HUMIDITY	WIND
601	35.7%	28.7%	-12.8%
602	42.5%	32.3%	3.7%
603	24.0%	25.1%	-7.0%
604	30.6%	25.7%	6.3%
605	41.4%	34.1%	0.0%
606	33.2%	25.8%	-7.2%
607	42.1%	36.2%	-6.8%
608	43.2%	37.0%	-4.3%
612	15.1%	12.0%	8.9%
660	39.6%	37.5%	2.3%
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%

The overall 2012 results showed a steady or slight decrease in temperature and humidity performance, and a much bigger decline in wind scores. The 2011 wind score of 7.5% was the best performance for all seasons. A big change was the persistence humidity MAE. In 2010 the persistence MAE was 14.10 percent, and in 2011 it jumped to 15.27 percent. This year, the persistence MAE for humidity was 12.74 percent. June was an extremely variable month, with numerous big-change days. The average persistence humidity MAE was a whopping 17.95 percent. Forecasters were able to achieve of humidity score of 47.9 percent.

After three consecutive years of wind improvement, the trend reversed in 2012. This year, only two of the 10 fire zones had better wind scores than the previous year. October was an extremely difficult month, with a wind score of -35.4 percent.

Wind is a difficult element to forecast in the Portland forecast area due to limited variability. There were only a couple of stations with a 10 percent or greater improvement over persistence. In general, those stations with a persistence wind MAE of 2.0 or greater showed the best forecaster improvement. Forecasters did quite well at stations such as Tidewater (+19.1%), Three Corner Rock (+21.4%), Emigrant (+12.9%), and Dunes (+19.7%). The above-listed sites

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had a wind MAE of at least 2.1. Conversely, stations that had the worst wind scores, such as Huckleberry (-154.0%), Rye Mountain (-64.7%), Boulder Creek (-39.8%), and Pebble (-25.0%) had an MAE of 1.0 or less. Huckleberry had an MAE of 0.36 mph and Rye Mountain had 0.47 mph. Under seasonal conditions, forecasters typically forecast a 24-hour wind speed trend of zero, one, or two mph. However, there are times when forecasters can make significant wind-score points at sites such as Three-Corner Rock, Larch Mountain, and Abernathy Mountain. These are prominent east-wind locations. Big points can be made if there is a major change or reversal in the low-level gradient.

Big-change days are crucial to positive NFDRS statistics. These are golden opportunities to make big points over persistence. Marine surges typically offer the forecaster a chance to obtain plenty of points over persistence. Conversely, marine surges can be the most difficult pattern for NFDRS forecasts. The marine layer may be deeper or shallower than expected, which results in large mean absolute errors. Strong onshore flow could persist for multiple days, but the forecaster may believe the pattern will change sooner. This also results in large errors over persistence. The extent, or lack, of a marine layer and its dissipation heavily influences sites along the coast, in the Coast Range and Willapa Hills, Willamette Valley, and the Cascade foothills.

NEW FOR 2013:

A new Columbia Gorge fire weather zone may be established.

RAWS CHANGES:

Three-Corner Rock, and Elk Rock (zone 660), and Huckleberry (zone 601), continue to be functional on a seasonal basis. Washington DNR normally brings those stations back to service in mid to late June, depending on snowpack conditions.

NFDRS CHANGES:

The Portland office will switch to actual forecast values for temperature, humidity, and wind, instead of 24-hour trends. This will ensure reliable verification through WIMS.

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STATISTICS FOR AREA ONE (COASTAL STRIP ZONES)

This area is comprised of zones 601 and 612. RAWs that represent the area include:

Cedar Creek, Cannibal Mountain, Goodwin Peak, Huckleberry, Dunes, and Tillamook.

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			3 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS >.01	DAYS >.10	DAYS >0.25	DAYS
May 1-10	55.0	37.50	64.9	0	98.0	0	2.22	27.53	4	4	3	0
11- 20	64.7	44.1	56.9	1	91.1	1	0.20	12.93	1	1	0	0
21- 31	56.1	43.0	76.4	0	99.0	0	0.00	25.63	7	4	4	0
June 1-10	57.0	41.0	68.6	0	99.5	0	0.17	25.17	9	6	4	1
11-20	61.1	46.0	70.1	0	98.1	0	4.44	22.78	5	4	1	0
21-30	61.9	47.5	64.7	0	97.8	0	0.00	22.34	8	6	3	0
July 1-10	66.5	48.1	59.4	0	96.5	0	1.90	19.68	3	1	1	0
11-20	66.7	51.6	69.0	0	96.9	0	6.18	17.44	5	0	0	3
21-31	66.8	49.2	64.9	0	98.6	0	11.31	18.29	1	0	0	0
Aug 1-10	72.7	52.0	57.5	1	95.1	0	21.30	15.74	0	0	0	0
11-20	74.1	54.6	53.8	0	88.5	0	29.02	14.28	0	0	0	1
21-31	67.6	47.7	52.2	0	97.4	0	29.15	16.36	1	0	0	0
Sept 1-10	68.8	48.9	51.9	0	91.2	0	29.36	16.00	1	0	0	0
11-20	70.9	49.5	46.4	1	80.2	2	35.20	13.64	0	0	0	0
21-30	67.5	47.3	53.8	0	91.0	0	30.44	16.84	1	0	0	0
Oct 1-10	67.2	44.2	32.8	4	76.5	2	43.02	12.09	0	0	0	1
11-15	56.4	43.0	78.4	0	99.1	0	11.04	24.20	1	1	1	2
AVE/TOT.	64.76	46.77	60.10	7	93.79	5	15.00	18.88	47	27	17	7
2011	64.89	48.10	64.04	1	96.78	5	10.86	19.74	59	35	17	1
2010	64.15	47.64	64.51	2	96.21	2	16.07	18.46	47	29	20	2
2009	65.69	49.39	60.94	2	95.22	6	15.87	16.79	35	21	11	10
2008	64.0	48.5	64.3	0	92.6	21	12.55	17.62	45	26	15	2
2007	63.5	48.0	63.2	3	93.8	18	15.49	16.94	53	29	19	6
2006	66.7	49.3	55.6	8	85.8	41	23.1	15.0	35	21	16	5
2005	64.9	49.0	63.5	2	91.5	27	13.7	18.1	65	36	24	18
2004	66.2	51.0	64.5	2	92.2	13	9.6	18.3	55	36	29	13

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<i>DRY SPELL</i>							
2012	2011	2010	2009	2008	2007	2006	2005
100 DAYS	60 DAYS	58 DAYS	29 DAYS	48 DAYS	29 DAYS	63 DAYS	60 DAYS

AREA HIGHLIGHTS

OVERVIEW: The 2012 fire season was a tale of two halves. The first half of the season was wet, with 26 of the 27 days with a median precipitation of one-tenth of an inch or more occurring from May through early July. The second half was extremely dry. The 100-day dry spell was the longest in at least 10 years. There were seven days with an average minimum humidity of 25% or less. This was the most since 2006. The seven lightning days was the most since 2009. Three of the lightning days occurred during the period July 11-20. The 10-day average ERC value reached a maximum of 43.02 in early October. This was the highest 10-day average in several years. In fact, the worst fire weather and fuel conditions occurred from mid-September through mid-October.

Average ERC values lagged well behind seasonal normals through July. The average 10-day average ERC value first exceeded 10 in late-July, and continued a steady climb through early October. The 10-day average hit 35 in mid-September, and then exceeded 40 in early October. The 90th percentile ERC is around 30, and the 97th percentile value is 35 to 40. The 10-day average ERC value exceeded the 97th percentile in early October, which is somewhat unusual. Last year the fire season came to an abrupt end in early October. The average daily ERC reached 40 or more on 8 days, or twice the number as last year. The peak daily value was 50.6 on October 7th, which was almost 10 points higher than the 2011 maximum daily value. The highest reported station ERC was 64 at Cedar Creek RAWs on October 7th. The 97th percentile value for this station is 40. On the same day, the daily average 100-hour fuel moisture was 9.4, which was well under the 97th percentile value.

The dry spell, defined as median precipitation of less than one-tenth of an inch, was 100 days. The dry spell started July 4th and ended October 11th. The number of wetting rain days, defined as average precipitation of 0.25 inches or more, was the same as last year, but slightly lower than the 10-year average.

RAWS NOTES: Data collection ended October 12th.

TEMPERATURE

The seasonal average of 64.8 was 0.13 degrees lower than 2011.

The warmest 10-day period: August 11-20 (74.1 degrees).

Number of days when the average high was 85 degrees or higher: 1

Highest daily average high: **88.8 on August 4th.**
82.3 on September 17th.

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Highest temperatures: *Cedar 95 on August 4th.*
Cannibal 93 on August 4th.
Tillamook 93 on August 4th.

Number of nights the average low was 65 degrees or greater: **0.**

Highest average nightly low: **59.0 on August 16th.**

Highest low temperatures: *Cedar Creek 70 on August 4th.*
Cannibal 65 on August 13th and 16th.

Coldest low temperature: *Cannibal 31 on May 10th.*
Huckleberry 31 on May 10th.
Tillamook 31 on October 6th.

HUMIDITY

There were seven critical daytime humidity days during the season, compared to one in 2011, and two in 2010. Critical daytime humidity was defined as a daily RAWS average of 25 percent or less. There were five critical humidity nights this year, the same as last year. The lowest 10-day average maximum humidity was 76.5 percent in early October. This was a period dominated by offshore low-level flow. The lowest 10-day minimum humidity was 32.8 during the same period.

Lowest daily average minimum humidity: **21.2% on September 13th.**
21.3% on October 7th.

Lowest single-station minimum humidity: *Cedar Creek 13% on October 6th.*
Cannibal 13% on October 7th.
Tillamook 14% on October 5th and 6th.

Number of nights with recovery 55% or less: **1**

Lowest nighttime average: **48.5% on October 4th.**
58.2% on October 7th.
59.2% on September 13th.

Lowest single-station maximum humidity: *Cedar Creek 22% on October 6th.*
Cedar Creek 24% on October 5th.
Cannibal 28% on October 7th.

PRECIPITATION

Maximum 24-hour (daily) precipitation: **Goodwin 2.20 on May 3rd.**
Cedar Creek 2.19 on May 3rd.
Cedar Creek 2.02 on October 12th.
Tillamook 1.95 on October 12th.

FUELS

The 2012 season-average ERC of 15.0 was a little more than 4 points higher than 2011, and close to the 2009 and 2010 seasonal averages. There were seven 10-day periods with an average ERC of 20 or higher,

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or twice as many as last year. The first occurrence was during the period August 1-10, which was 10 days earlier than last year. The 2012 10-day average ERC value continued to climb through early October. A series of offshore patterns in September and early October resulted in a peak 10-day average of 43.0 by October 10th. The most extreme fuel conditions occurred during the first week of October. The lowest 10-day 100-hour fuel moisture average was 12.09, which occurred from October 1-10. Last year the lowest 10-day average 100-hour fuel moisture value was 13.14. An abnormally warm and dry spell in mid-May resulted in an average 10-day 100 fuel-moisture value of 12.9, despite an average 10-day ERC near zero.

Critical ERC Days (40 or higher):	8.
Highest daily average ERC:	50.6 on October 7th. 46.6 on October 6th. 45.6 on October 8th.
Highest single-station ERC:	Cedar Creek 64 on October 7th. Cedar Creek 61 on October 6th. Cedar Creek 58 on October 8th.
Number of days 100-hr FM was 12 or less:	12 2 days of 10 or less.
Lowest daily 100-hr FM:	9.4 on October 7th. 10.0 on October 8th. 11.2 on October 5th.
Lowest single-station value:	6 – Cedar Creek on Oct. 7th and 8th. 7 – Cedar Creek on Sept. 18th.
Highest daily 100-hr FM:	36.6 on May 4th. 36.4 on May 3rd.

ERC/100-HR 2011 AND 2012

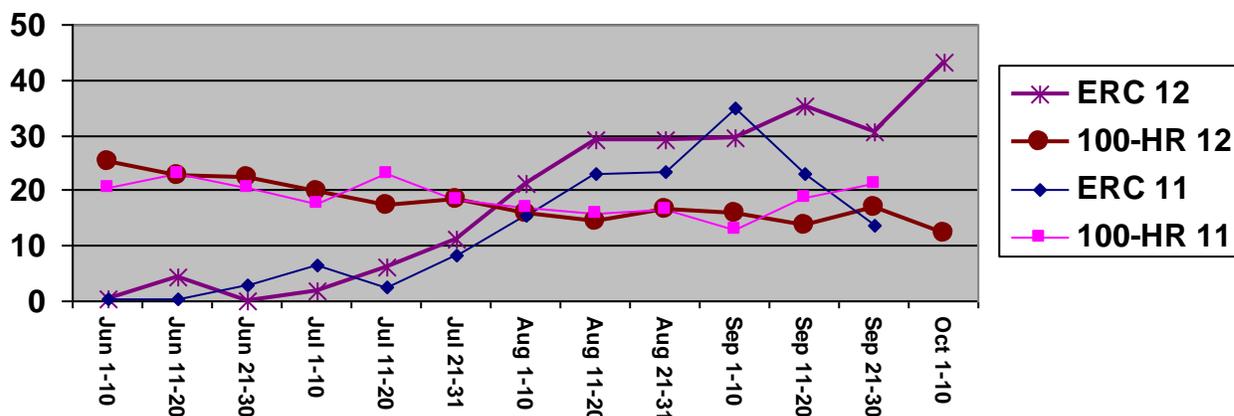


Figure 8 – Fuel Indices Zones 601 and 612

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STATISTICS FOR AREA TWO (COAST RANGE)

This area is comprised of zones 602 and 603. RAWs that represent the area include:

South Fork, Miller, Rye Mountain, Rockhouse1, Wilkinson Ridge, Village Creek, High Point, and Abernathy Mountain..

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			4 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS ≥.01	DAYS ≥.10	DAYS ≥0.25	DAYS
May 1-10	56.7	37.0	57.2	0	94.9	0	0.68	24.93	4	4	2	0
11- 20	71.2	46.1	40.6	1	82.1	1	9.60	10.79	1	1	0	0
21- 31	58.8	42.7	70.2	0	97.4	0	3.20	22.03	6	4	3	1
June 1-10	58.3	40.1	62.6	0	98.4	0	3.31	22.17	8	4	3	1
11-20	66.5	46.2	59.7	0	97.0	0	6.40	18.81	5	2	0	0
21-30	64.1	47.5	65.8	0	98.5	0	4.23	20.69	7	5	1	0
July 1-10	74.2	49.1	50.9	0	95.8	0	11.21	17.29	1	1	0	0
11-20	74.1	52.2	57.0	0	96.3	0	18.83	15.00	1	0	0	2
21-31	73.9	50.1	54.7	0	97.4	0	22.93	16.11	0	0	0	0
Aug 1-10	80.6	53.4	46.5	1	93.7	0	30.99	14.30	0	0	0	0
11-20	85.8	57.0	39.5	1	88.5	0	38.64	12.71	0	0	0	1
21-31	72.6	48.6	45.1	0	94.9	0	36.69	15.03	1	0	0	0
Sept 1-10	76.4	50.2	41.0	1	90.0	0	38.16	14.19	1	0	0	0
11-20	78.7	51.6	34.6	3	80.0	1	44.36	12.00	0	0	0	0
21-30	71.4	49.9	47.3	0	87.9	0	35.83	15.88	2	0	0	0
Oct 1-10	69.3	45.8	26.2	5	65.8	4	50.00	10.60	0	0	0	0
11-15	58.3	43.5	73.6	0	96.4	0	15.98	22.53	1	1	1	1
AVE/TOT.	70.05	47.71	51.32	12	91.47	6	21.83	16.77	38	22	10	6
2011	69.06	48.36	53.12	9	93.58	1	19.00	17.22	53	22	8	3
2010	69.38	48.07	53.73	6	93.40	1	19.83	17.58	43	25	15	7
2009	71.65	49.78	48.88	10	92.84	4	25.74	14.46	29	13	6	14
2008	71.1	49.4	49.4	12	86.7	30	26.27	14.16	31	17	8	8
2007	69.3	48.8	56.0	5	93.0	16	22.45	15.00	42	18	12	6
2006	72.9	50.1	46.3	18	86.2	37	30.2	13.7	30	18	9	8
2005	70.8	50.2	51.9	9	88.8	23	23.1	15.8	55	25	13	20
2004	71.5	50.6	54.9	8	93.4	14	17.9	16.3	45	29	16	20

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<i>DRY SPELL</i>							
2012	2011	2010	2009	2008	2007	2006	2005
100 DAYS	68 DAYS	80 DAYS	46 DAYS	68 DAYS	38 DAYS	63 DAYS	83 DAYS

AREA HIGHLIGHTS

OVERVIEW

The 2012 fire season started slow, but persisted longer than usual. This area was similar to all other areas in that the most extreme conditions occurred in September and early October. The most telling statistic was the 10-day average ERC value. The highest 10-day average, 50.0, occurred in early October, and was the highest 10-day average since at least 2006. The 10-day average of 50 is well above the 97th percentile. The seasonal average temperature and humidity were similar to 2011. The primary differences were more nights with an average humidity of 60 percent or less and far fewer occurrences of median precipitation under one-tenth of an inch. The number of wetting rain days was close to last year and about average for any given fire year. The six lightning days was double the 2011 total, but well under then 15-year average.

Seasonal fuel conditions had a similar start to the 2011 trend, but were much more extreme late this season. The seasonal average ERC was 21.8, nearly three points higher than last year. The peak 10-day average ERC was 50.0, which exceeded the 97th percentile, and was almost 5 points higher than last year's 10-day average maximum. Last year the 10-day average ERC exceeded 40 during one 10-day period. This year there were two such periods. Critical ERC conditions, defined as a daily average of 45 or higher, occurred on 16 days, more than twice as many as last year (7). The highest daily average was 57.6 on October 7th, which was an unprecedented value. The period of highest fire potential lasted for several weeks, generally from mid-August through early October. An abrupt change in fuel conditions occurred in mid-October. The 10-day average ERC was 50.0 October 1-10, but fell to 16 by October 15th.

RAWS NOTES: Data collection ended October 12th. Clay Creek data was not used.

TEMPERATURE

The seasonal average of 70.1 was 0.99 degrees warmer than 2011.

The warmest 10-day period: **August 11-20 (85.8 degrees).**

Number of days when the average high was 85 degrees or higher: **13.**

Highest daily average high: **96.0 on August 4th.**
93.0 on August 13th.
91.4 on August 17th.

Highest temperatures: ***Village Creek 102 on August 4th.***
Wilkinson 102 on August 4th.
Rockhouse 101 on August 4th.

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Number of nights the average low was 65 degrees or greater: **1.**

Highest average nighttime low: **64.8 on August 16th.**
62.5 on August 4th.
60.8 on August 12th and 13th.

Highest low temperatures: **Abernathy 71 on August 5th.**
Rockhouse 70 on August 16th.
South Fork 69 on August 16th.

Coldest low temperatures: **Abernathy 32 on May 1, 9, and 10.**
Rye Mountain 32 on May 9th.
High Point 32 on May 10th.

HUMIDITY

There were 12 critical daytime humidity days during the season, compared to 9 in 2011. Critical daytime humidity was defined as at least four RAWS stations recording a minimum humidity of 25 percent or less. The lowest 10-day average minimum humidity was 26.2 percent October 1-10. The 10-day average humidity recovery during the same early-October 10-day period was 65.8 percent. Four of the six critical humidity nights occurred in this 10-day period. The lowest daily humidity recovery night was October 7th, with an average value of 40 percent.

Lowest daily average minimum humidity: **14.6% on October 7th.**
17.1% on September 13th.
17.8% on October 6th.

Lowest single-station minimum humidity: **Abernathy 12% on October 7th.**
Rockhouse 12% on October 7th.
Rockhouse 13% on September 13th.

Number of nights with recovery 55% or less: **5.**

Lowest nighttime average: **40.0% on October 7th.**
45.1% on October 4th.
49.5% on September 13th.

Lowest single-station maximum RH: **Miller 15% on October 2nd and 7th.**
Miller 18% on October 3rd.
Miller 21% on October 4th and 6th.

PRECIPITATION

Maximum 24-hour (daily) precipitation: **Rye Mountain 1.56 on May 3rd.**
Wilkinson 1.41 on May 3rd.
South Fork 1.17 on May 22nd.
Rockhouse 1.13 on May 3rd.

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FUELS

The 2012 season-average ERC of 21.8 was about 3 points higher than last year. The 2012 average ERC followed a similar trend to 2011 during the first half of the season, but maintained critical values much longer during the latter half. The 10-day average went from 22.9 at the end of July to 36.7 by the end of August, or just above the 90th percentile. The 10-day average ERC exceeded 35 for 6 consecutive 10-day periods.

The average 100-hour fuel moisture fell to 10 or lower on 10 days. The lowest daily average was 8.1 on October 7th. The lowest single-station value was 6, recorded at Rockhouse RAWS on October 7th and 8th.

Critical ERC Days (45 or higher):	16.		
Highest daily average ERC:	57.6 on October 7th.		
	54.6 on October 8th.		
	53.1 on October 6th.		
Highest single-station ERC:	<i>Rockhouse 71 on October 7th.</i>		
	<i>Rockhouse 69 on multiple days.</i>		
NOT ROCKHOUSE:	<i>Village Creek 65 on October 7th.</i>		
	<i>Rockhouse exceeded 60 on 15 days.</i>		
Number of days 100-hr FM was 10 or less:	10	Days of 8 or less:	2
Lowest daily 100-hr FM:	8.1 on October 7th.		
	8.4 on October 8th.		
	9.4 on October 6th.		
Lowest single-station value:	<i>Rockhouse 6 on October 7th and 8th.</i>		
	<i>Miller 7 on October 7th.</i>		
Highest daily 100-hr FM:	<i>33.1 on May 4th.</i>		
	<i>32.5 on May 3rd.</i>		
	<i>30.9 on October 15th.</i>		

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MAX T/MIN RH 2011 AND 2012

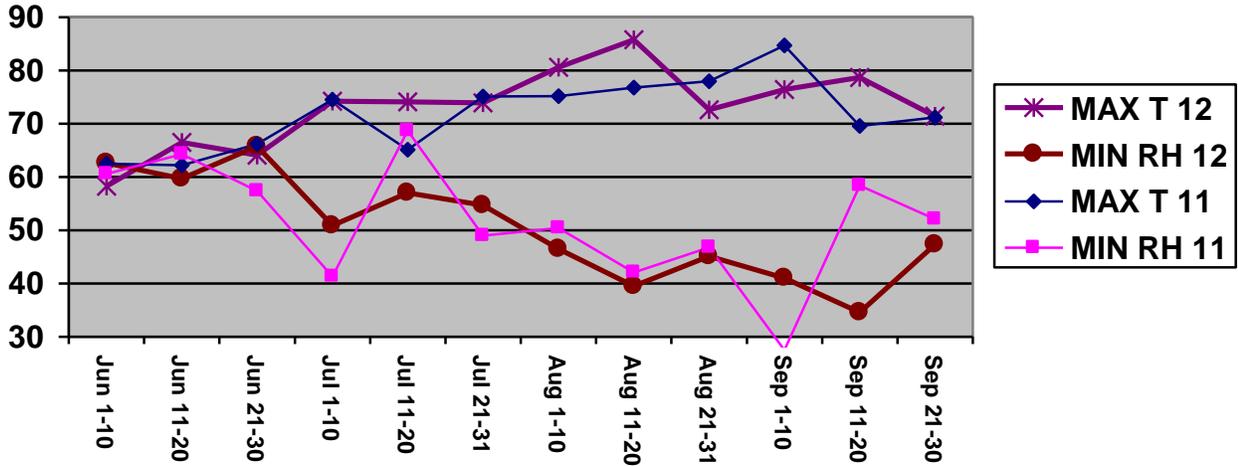


FIGURE 9 – MAX TEMP AND MIN RH ZONES 602 AND 603

2012 PRECIP MAY - JULY

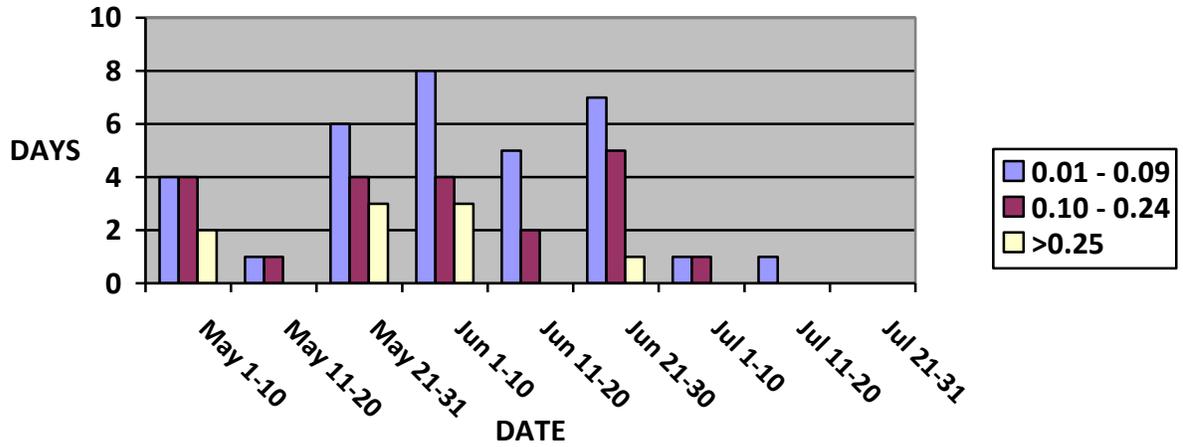


FIGURE 10 – PRECIPITATION FREQUENCY DISTRIBUTION

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STATISTICS FOR AREA THREE (SOUTH WASHINGTON CASCADES, NORTH OREGON CASCADES, AND FOOTHILLS)

This area is comprised of zones 605, 607 and 660. RAWs that represent the area include:

Log Creek, Red Box Bench, Horse Creek, Eagle Creek, Elk Rock, Buck Creek, Canyon Creek, 3-Corner Rock, Locks, Dry Creek, and Wanderer's Peak.

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			6 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS ≥.01	DAYS ≥.10	DAYS ≥0.25	DAYS
May 1-10	56.3	34.9	50.8	1	94.3	0	0.16	27.67	5	3	2	0
11- 20	72.3	46.1	30.8	2	82.0	1	6.13	19.82	1	0	0	0
21- 31	57.1	41.9	67.2	0	96.3	0	2.26	23.70	5	3	2	2
June 1-10	57.0	39.2	61.4	0	97.3	0	2.27	23.75	7	6	4	1
11-20	65.1	44.5	54.0	0	96.0	0	6.43	17.30	4	2	1	0
21-30	64.5	46.1	58.1	0	96.7	0	10.50	17.16	4	3	1	1
July 1-10	73.9	49.7	48.8	0	93.8	0	15.77	16.35	2	1	0	1
11-20	73.7	52.3	56.5	0	95.9	0	22.10	14.45	2	1	0	3
21-31	72.7	49.6	51.0	0	95.6	0	27.28	15.16	0	0	0	1
Aug 1-10	80.5	54.5	39.5	3	85.8	1	37.41	12.59	0	0	0	1
11-20	86.6	58.3	30.5	5	81.1	1	45.74	10.93	0	0	0	1
21-31	71.5	47.1	41.0	2	89.5	0	43.33	13.38	0	0	0	0
Sept 1-10	76.2	49.5	32.2	4	80.2	1	47.58	11.96	1	1	0	1
11-20	81.2	52.3	23.9	7	66.2	4	54.99	9.79	0	0	0	0
21-30	70.1	47.5	41.9	2	85.8	1	45.69	13.67	0	0	0	0
Oct 1-10	66.8	43.3	22.5	6	54.8	6	58.53	9.32	0	0	0	0
11-15	61.4	43.5	48.3	0	88.6	0	25.96	19.45	1	1	1	1
AVE/TOT.	69.82	47.08	44.61	32	87.05	15	26.60	16.26	32	21	11	13
2011	68.25	47.19	50.08	15	90.56	9	17.39	17.76	50	28	11	6
2010	67.85	46.94	51.81	13	91.65	7	20.05	17.27	47	36	23	6
2009	70.22	48.79	45.46	27	88.81	11	24.75	15.30	32	16	7	12
2008	68.4	48.2	50.0	19	87.5	40	20.50	16.25	44	25	9	8
2007	67.5	47.3	50.8	13	89.6	17	24.0	14.3	48	24	16	14
2006	71.1	48.9	43.3	30	82.1	45	27.7	14.3	35	24	10	15
2005	67.8	47.8	50.4	15	88.4	29	20.2	16.2	61	38	19	18
2004	68.5	49.3	51.5	14	87.0	33	17.9	16.1	57	37	22	28

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<i>DRY SPELL</i>							
2012	2011	2010	2009	2008	2007	2006	2005
50 DAYS	60 DAYS	59 DAYS	83 DAYS	51 DAYS	31 DAYS	48 DAYS	37 DAYS

AREA HIGHLIGHTS

OVERVIEW

This area appeared to exhibit the most active fire weather compared to the remainder of the region, even the Central Oregon Cascades and foothills. The seasonal average daytime humidity of 44.6 percent was the lowest since 2006. The 32 critical humidity days was more than double the occurrences in 2011 and the most in at least the past 10 years. There were far fewer days when the median precipitation was one-tenth of an inch or less compared to last year. The area experienced 13 lightning days, more than twice the number in 2010 and 2011, and even higher than the Central Oregon Cascades and foothills. Despite the prolonged critical fire weather period, the dry spell of 50 days was shorter than last year. The 50-day dry spell is somewhat misleading. There was one day in early September with a median precipitation of just over one-tenth of an inch. Omit that day and the dry spell would have exceeded 100 days.

A look at the 10-day average ERC and 100-hour fuel moisture values tells the story of the 2012 season. After a slow start, 10-day average ERC values were near 40 by the first of August, and then climbed to 55 by mid-September. The 97th percentile average is around 45. After a minor abatement at the end of September, the 10-day average peaked at 58.5 by October 10th, or beyond the 99th percentile value. An unexpected lightning event around September 10th started the Cascade Creek Fire in the Mt. Adams district of the Gifford Pinchot NF. The fire burned nearly 20,000 acres and was one of the largest fires of all time in the forest. The 97th percentile ERC at Buck Creek RAWS is 65. The highest recorded 2012 value was 75, which occurred 4 days in early October during the Cascade Creek Fire. Critical fuel conditions, defined as daily average ERC of 45 or greater, occurred on 41 days, compared to 6 days last year. The highest daily average ERC was 64.9 on October 7th. The highest daily average in 2011 was 55.2 on September 11th. The average daily 100-hour fuel moisture value was 10 or less on 22 days, compared to 7 last year. The lowest daily average was 6.6 on October 7th.

RAWS NOTES: 3-Corner Rock data started on June 20th. Elk Rock data commenced on May 1st. Blue Ridge RAWS no longer exists.

TEMPERATURE

The seasonal average of 69.8 was 1.57 degrees warmer than 2011.

The warmest 10-day period: **August 11-20 (86.6 degrees).**

Number of days when the average high was 90 degrees or higher: **6**

Highest daily average high: **96.3 on August 17th.**
93.0 on August 4th.
92.5 on August 12th.

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Highest temperatures: *Locks 102 on August 17th.*
 Eagle Creek 101 on August 4th.
 Dry Creek 101 on August 17th.
 Canyon Creek 100 on August 12th and 17th.

Number of nights the average low was 65 degrees or greater: **1.**

Highest nightly average low: **64.9 on August 16th.**
 63.6 on August 5th.
 62.8 on August 4th.

Highest low temperatures: *Locks 71 on August 16th.*
 Dry Creek 71 on August 12th.
 Log Creek 70 on August 4th.

Coldest low temperature: *Wanderer's Peak 22 on May 10th.*
 Red Box 25 on May 10th.
 Elk Rock 27 on May 10th.
 Horse Creek 27 on May 10th.

HUMIDITY

There were 32 critical daytime humidity days during the season, compared to 15 in 2011. Critical daytime humidity was defined as at least six stations recording a minimum of 25 percent or less on any given day. There were 15 critical humidity nights this year, compared to 9 in 2011. The lowest 10-day average maximum was 54.8 October 1-10. This was 12 percent lower than the lowest 2011 10-day average minimum humidity value. The lowest 10-day average minimum humidity was 22.5 percent October 1-10.

Lowest daily average minimum humidity: *13.4% on October 6th and 7th.*
 14.5% on September 18th.
 15.7% on September 17th.
 16.3% on September 13th.

Lowest single-station minimum humidity: *Wanderer's Peak 6% on Sept. 30th.*
 Red Box 7% on multiple days.
 Horse Creek 7% on September 26th.

Number of nights with recovery 55% or less: **11.**

Lowest nighttime average: *30.2% on October 6th.*
 34.8% on October 5th.
 35.4% on October 7th.
 37.6% on September 13th.

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Lowest single-station maximum RH: *Log Creek 21% on October 6th.
Log Creek 22% on September 13th.
Canyon Creek 23% on October 7th.*

PRECIPITATION

Maximum 24-hour (daily) precipitation: *Dry Creek 1.92 on May 3rd.
Horse Creek 1.55 on May 3rd.
Horse Creek 1.48 on June 4th.
Horse Creek 1.28 on October 12th.*

FUELS

The 2012 season-average ERC of 26.6 was the highest since the 27.7 in 2006. Average ERC values were at or below 10 through mid-June, reached 25 in late July, and then made a big jump to 46 by mid-August. The 10-day average remained near or above 45 through October 10th. The peak 10-day average was 58.5 in early October. Critical ERC values, 45 or greater, occurred on 41 days. The highest daily average, 64.9, occurred on October 7th. The average 100-hour fuel moisture content was 10 or less on 22 days.

Critical ERC Days (45 or higher): **41.**

Highest daily average ERC: *64.9 on October 7th.
64.7 on October 8th.
62.5 on September 18th.*

Highest single-station ERC: *Buck Creek 75 4 days early October.
Buck Creek 74 on September 19th.
Buck Creek 73 Sept. 18th and Oct. 10th.*

Number of days 100-hr FM was 10 or less: **22.** 8 or less: **4.**

Lowest daily 100-hr FM: *6.6 on October 8th.
7.1 on October 7th.
7.7 on October 6th.*

Lowest single-station value: *Wanderer's Peak 6 on June 17th.
Dry Creek 6 on Sept. 18th and 19th.
Horse Creek 6 on October 7th.
Canyon Creek 6 on September 11th.*

Highest daily 100-hr FM: *30.1 on May 3rd.
29.6 on May 4th.
29.1 on October 15th.*

FAST FACT: *Buck Creek RAWS recorded a daily ERC of 70 or more on 22 days.*

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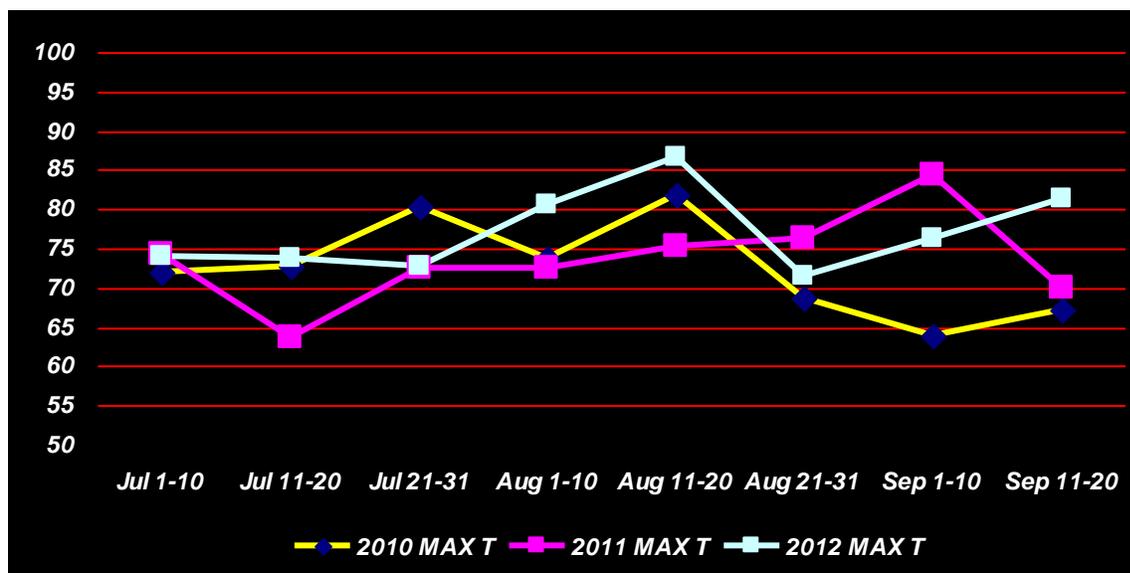


FIGURE 11 – 10-DAY AVERAGE MAX. TEMPERATURES ZONES 605, 607, AND 660

CASCADE CREEK FIRE: Critical fuel conditions developed in mid-August and persisted through October 10th. On Saturday, September 8th, an upper level disturbance moved into Northwest Oregon and Southwest Washington, which resulted in the classic critical fire weather pattern known as an upper level ridge breakdown. A surface thermal trough was centered between the Coast Range and Willamette Valley early-afternoon of the 8th. The thermal trough moved into the Cascades late in the afternoon. Enhanced mid-level instability resulted in isolated thunderstorms over the North Willamette Valley after 1400. Isolated convection spread into the South Washington Cascade foothills early that evening, then blossomed into scattered coverage overnight in the Gifford Pinchot NF. This unexpected lightning outbreak resulted in the Cascade Creek Fire.

The fire was detected around 630 am on September 9th, about 8 miles north of Trout Lake in the Mt. Adams district. The fire had grown to around 12,000 acres by September 20th and tentative plans had been made to turn it over to the local Type III organization that weekend. However, a switch to southeast transport wind on the 20th allowed the fire to spot across the Salt Creek drainage on the northwest flank and make a two-mile run. The fire continued to grow via natural consumption and suppression burn-outs, reaching 20,000 acres in early October. Season-ending rain in mid-October put an end to the fire, although debris flows off the fresh burn scars were a major concern.

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STATISTICS FOR AREA FOUR (CENTRAL CASCADES AND FOOTHILLS)

This area is comprised of zones 606 and 608. RAWs that represent the area include:

Boulder Creek, Yellowstone, Trout Creek, Brush Creek, Pebble, Fields, and Emigrant.

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			4 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS >.01	DAYS >.10	DAYS >0.25	DAYS
May 1-10	58.0	34.4	48.2	1	94.4	0	0.27	22.81	5	4	2	0
11- 20	75.3	44.6	26.3	4	83.9	1	12.38	10.02	0	0	0	0
21- 31	59.2	40.5	61.3	0	96.0	0	2.89	20.54	6	5	4	1
June 1-10	58.5	37.7	60.8	0	98.4	0	0.67	25.64	9	8	5	1
11-20	67.8	43.9	46.2	0	95.1	0	2.89	17.98	2	1	0	0
21-30	65.5	44.9	55.8	0	97.7	0	1.67	20.84	7	6	3	2
July 1-10	76.7	50.1	44.4	0	94.0	0	8.12	16.61	2	0	0	1
11-20	75.0	51.6	49.1	0	95.0	0	18.37	14.09	2	0	0	3
21-31	76.7	48.7	41.9	0	95.7	0	26.49	14.62	0	0	0	0
Aug 1-10	83.6	53.1	32.7	1	86.4	1	37.90	12.06	0	0	0	1
11-20	88.8	57.1	27.1	3	81.3	0	46.29	10.89	1	0	0	2
21-31	75.4	46.9	34.8	1	91.3	0	47.34	12.95	0	0	0	0
Sept 1-10	78.5	49.0	28.0	6	80.1	1	49.57	11.56	0	0	0	0
11-20	83.5	52.2	21.7	7	69.0	3	56.93	9.64	0	0	0	0
21-30	73.8	48.2	35.7	3	85.8	1	48.48	13.22	3	0	0	0
Oct 1-10	71.9	42.6	17.9	6	58.4	4	61.69	8.77	0	0	0	0
11-15	64.7	42.4	42.7	1	90.0	0	32.80	16.97	1	1	1	0
AVE/TOT.	72.52	43.46	39.68	33	87.79	11	26.75	15.25	38	25	15	11
2011	71.37	46.31	44.56	24	92.09	4	22.05	16.61	47	30	22	8
2010	70.72	46.40	45.99	15	92.29	5	25.02	16.22	45	31	21	15
2009	73.42	47.46	40.21	35	88.83	12	29.96	13.35	31	18	8	18
2008	73.0	48.1	42.6	28	85.0	42	26.87	13.85	40	22	11	10
2007	70.5	46.8	44.8	18	89.4	19	28.9	13.3	35	25	20	12
2006	73.9	48.6	39.6	37	82.0	42	29.4	13.5	33	25	16	17
2005	70.5	47.3	45.6	20	88.7	29	23.7	15.6	58	36	18	19
2004	71.8	49.0	45.6	19	86.5	30	23.3	14.8	43	26	20	24

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<i>DRY SPELL</i>							
2012	2011	2010	2009	2008	2007	2006	2005
103 DAYS	66 DAYS	45 DAYS	29 DAYS	51 DAYS	30 DAYS	89 DAYS	51 DAYS

AREA HIGHLIGHTS

OVERVIEW

One of the most glaring aspects of the 2012 season for this area was the extreme dry spell. The 103-day dry spell was the longest since at least 2001. The seasonal average minimum humidity of 39.7 percent was the lowest since 2006, and the second-lowest in the past 10 years. The second half of the fire season, late-July through September, was extremely dry, as can be seen by the dry-spell length and fuel conditions. Fortunately, there were only three lightning days during this time. There were 11 critical humidity nights, the most since 2009. Frequent subsidence inversions resulted in poor humidity recovery, especially at elevations above 3000 feet. The relatively low number of critical humidity nights, compared to 2008 and prior years, may be attributed to the methodology used to determine humidity recovery of 60 percent or less. In the past, only the hours from midnight to 0700 were considered. In the past few years, the late-evening hours were also incorporated. Often, humidity on slopes and lower ridges will increase during the evening, before subsidence inversions become firmly established. Thus, the maximum RH is likely to occur before midnight.

Similar to the other inland regions, the most extreme portion of the fire season occurred from mid-August through early October. The average ERC value was at 20 or below through July 20th, on a similar track to the 2011 season. By August 10th the 10-day average ERC had reached 38, and by September 20th was an astounding 56.9, which is well above the 97th percentile. A strong and prolonged offshore event in early October boosted the 10-day average ERC to 61.7 by October 10th. Some RAWS stations reached or exceeded record ERC values in September and early October. The average daily ERC value exceeded 50 on 29 days, compared to 13 last year.

The highest 10-day average high temperature was 88.8 August 11-20. Last year no RAWS station exceeded 100 degrees. The warmest daytime temperature this season was 102 at Trout Creek on August 4th. The area experienced four Red Flag events, one of which occurred in early October. Lightning in mid-August resulted in the Buckhead Complex, at the south end of the Willamette NF. The series of fires encompassed nearly 300 acres and was one of the largest incidents for the area. There were much larger fires the previous two years. Despite the lengthy dry-spell, and prolonged extreme fuel conditions, the overall fire season was not that bad. The focus seemed to be in North Oregon and South Washington Cascades.

Similar to the other fire weather climate areas, fire weather zones 606 and 608 had fewer days with a median precipitation amount of one-tenth of an inch compared to last year. There were 15 wetting rain days, compared to 22 last year. All of the wetting rain days occurred before July 1st.

This area tends to receive the most lightning in the forecast area. In 2012 there were 11 lightning days, about 65% of average. The 2012 season was one of the rare occasions when zones 605, 607, and 660 had more lightning than zones 606 and 608.

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TEMPERATURE

The seasonal average of 72.52 was 1.15 degrees warmer than 2011.

The warmest 10-day period: **August 11-20 (88.8 degrees).**

Number of days when the average high was 90 degrees or higher: **9.**

Highest daily average high: **97.0 on August 4th.**
96.0 on August 17th.
93.7 on September 13th.

Highest temperatures: **Trout Creek 102 on August 4th.**
Emigrant 99 on August 4th.
Yellowstone 99 on August 17th.

Number of nights the average low was 65 degrees or greater: **0.**

Highest average nightly low: **63.0 on August 16th.**
62.6 on August 4th.
61.1 on August 17th.

Highest low temperatures: **Fields 70 on August 4th.**
Brush Creek 69 on August 4th.
Yellowstone 69 on August 12th.

Coldest low temperature: **Boulder Creek 20 on May 10th.**
Boulder Creek 25 on May 9th.
Pebble 25 on May 10th.

HUMIDITY

There were 33 critical daytime humidity days during the season, compared to 24 in 2011. Critical daytime humidity was defined as at least four stations recording a minimum of 25 percent or less on any given day. The lowest 10-day average minimum humidity was 17.9 percent October 1-10. The lowest 10-day humidity recovery period was 58.4 percent during the same period.

Lowest daily average minimum humidity: **8.9% on October 7th.**
9.3% on September 13th.
12.3% on October 6th.
13.6% on September 17th.

Lowest single-station minimum humidity: **Pebble 5% on May 10th.**
Emigrant 5% on September 13th.
Emigrant 6% on May 13th.
Pebble 6% on May 13th and Sept. 13th.

Number of nights with recovery 55% or less: **8.**

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Lowest nighttime average:	<i>36.3% on October 7th. 39.7% on September 13th. 42.6% on October 5th.</i>
Lowest single-station maximum RH:	<i>Emigrant 22% on October 7th.. Yellowstone 25% on October 6th. Brush Creek 26% on October 7th. Yellowstone 26% on October 5th.</i>

PRECIPITATION

Maximum 24-hour (daily) precipitation:	<i>Trout Creek 1.69 on June 4th. Yellowstone 1.50 on June 4th. Yellowstone 1.47 on October 12th. Trout Creek 1.33 on May 3rd.</i>
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FUELS

The 2012 season-average ERC was 26.8 or about five points higher than the 2011 average. The average ERC value was 10 or less through early July, but made a significant jump to near 40 by early August. The average ERC remained above 45 from August 11th through October 11th, and hit a peak 10-day average of 61.7 in early October. The 90th percentile, around 50, was reached on 29 days, with a peak daily value of 71.7 on August 26th. The 10-day average 100-hour fuel moisture content fell below 10 during 2 periods. This did not occur in 2011. The lowest 10-day average was 8.77 October 1-10. The average daily 100-hour fuel moisture content was 10 percent or less on 27 days, compared to 9 days in 2011. The average was 8 or lower on 4 days.

Critical ERC Days (50 or higher):	29.
Highest daily average ERC:	<i>71.7 on August 26th. 67.9 on October 7th. 66.9 on October 8th. 65.7 on October 9th.</i>
Highest single-station ERC: (<i>Non-Emigrant</i>)	<i>Emigrant 83 on October 7th. Fields 72 on October 7th.</i>

NOTE: Emigrant exceeded 70 on 24 days.

Number of days 100-hr FM was 10 or less:	27.	8 or less:	4.
Lowest daily 100-hr FM:	<i>6.6 on October 8th. 6.9 on October 7th. 7.5 on October 9th.</i>		
Lowest single-station value:	<i>Emigrant 5 on multiple days. Yellowstone 5 on October 8th. Emigrant 6 on many days.</i>		
Highest daily 100-hr FM:	30.9 on May 24th. 30.4 on June 5th.		