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MEMORANDUM FOR: Claudia Bell, Scott Carpenter
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National Weather Service, Western Region

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SUBJECT: 2014 Annual Fire Weather Report

The following report evaluates WFO Tucson's Fire Weather products and services in support of Southeast Arizona land management agencies and public safety partners in the 2014 calendar year. This report includes verification statistics for Fire Weather Watches and Red Flag Warnings; the number of spot forecasts issued; the number of IMET dispatches with the number of days out of the office; and information on fire weather teaching assignments and liaison activities.

Weather Synopsis:

The year 2014 can be classified as one of extremes. After a very dry December, the remaining winter months of January and February were very warm with both months ending up being in the top five warmest months based on Tucson data. Overall January was 1-5 degrees warmer than average and February 3-7 degrees warmer. It was also a very dry period with very little precipitation for the two month period, generally less than 5 percent of normal. For the mountains, there was little to no snowpack to move into the spring months.

For the spring months of March through May, the very warm and dry conditions continued with significantly above normal temperatures and below normal rainfall for the three months. By March, temperature data recorded at Tucson indicated that the average yearly temperature was on its way to being the warmest ever, a trend that continued through the remainder of the year. Average temperatures for the March through May period ended up being up to 4 degrees warmer than normal. Despite a bit of precipitation across portions of southeast Arizona in March, fuel conditions were so dry that red flag warnings started to be issued in the middle of March for elevations below 5000 ft. Fuel conditions above 5000 ft. were not much better as the little snow that had fallen had melted away by March. As a result of these fuel conditions, a fire in the Huachuca Mountains above 7000 ft. started, resulting in a Type 1 team being assigned in April. The March through May period was also windier than normal and the windiest since 2004.

After a bone dry May, the first month of summer maintained the ongoing conditions with average temperatures across southeast Arizona ending up 2 to 6 degrees warmer than normal for the month of June. Other than a couple of tenths of an inch of rain over the far southeast corner of Cochise County at the end of the month, the entire month of June was dry. Interestingly, despite the exceptional heat, dryness and fuel moistures, the fire season for the Tucson county warning area remained unremarkable.

The tide turned somewhat for the remaining summer months of July and August as the monsoon kicked in right at the first of July with rain spreading across the entire area the first week. Due to the convective nature of the monsoon, rainfall amounts were highly variable as is typical but rainfall amounts averaged near normal overall for July and only a bit below average for August. Temperatures both months were near normal, however we were still maintaining the warmest year of record for Tucson.

The fall months were very noteworthy for the precipitation extremes. Moisture from three decaying tropical systems (each were previously significant hurricanes over the eastern Pacific) moved across

southern Arizona in September and early October spreading significant rains across portions of the area resulting in numerous flooding reports. The remains of hurricane Norbert was the first to impact the region in early September while the remnants of Odile followed shortly after in mid-September. The remains of hurricane Simon moved northeast across eastern and central parts of the forecast area with significant rains. Thanks to these three tropical systems, the months of September and October ended up wetter than normal overall. However, this was followed by a November that was dry except for some light rain over the eastern third of the county warning area. Despite the rainfall, the three fall months continued the warmer than normal temperature trend with the three months averaging up to 4 degrees warmer than the long term average. By the end of November, the record for warmest year on record was almost assured.

The first month of winter, December, maintained the warm and wet trend with above normal temperatures for the first three weeks before colder air moved across the Southwest at the end of the month. Several weather systems impacted the region through the month with valley rains and very high elevation snow. A particularly cold and wet system moved across the region on the last day of the month with accumulating snows occurring as low as 2000 feet including across the Tucson metro area.

For the year as a whole, temperatures ended up much warmer than normal with Tucson having its warmest year ever, besting the stand out year of 1989. While better than last year, precipitation totals remained somewhat below normal across much of the county warning area with the exception of most of Cochise county, far western Pima county and the Sky Island mountains where precipitation was as much as 150% of normal.

Fire Information:

Despite another exceptionally hot and dry winter and spring on top of continued long term drought conditions, the year was rather quiet across southeast Arizona with a similar number of fire and acreage burned when compared to last year. Indications are that this is partially due to preparations made by fire-fighting agencies in pre-positioning extra resources around the region for initial attack and an enhanced public awareness campaign. There was one incident that required a Type I Incident Management Team while the remainder were handled by the local units. As a result, there was one IMET dispatch within the WFO Tucson county warning area. The following is a breakdown of the fires in Southeast Zone (SEZ) which approximately mirrors the TWC CWA.

Wildfire	# of fires – 409,	# of acres 19,580
Prescribed	# of fires – 8,	# of acres 2,058
Total	# of fires – 417,	# of acres 21,638

Fire Weather Watch/Red Flag Warning Verification:

This year on April 1st, our office restructured the fire weather zones from a 3-zone configuration (FWX146, 147 & 148) to a 4-zone configuration (FWX150, 151, 152 & 153). The transition was made a bit challenging by the fact we had red flag warnings in effect on the day of the switch. Although some of the zones cover similar areas, all zones, old and new, were included here separately.

This was a busy red flag season having more than doubled the number of warnings compared to the previous year. It nearly matched the high point of 2011 when 63 warnings were issued during one of the busiest fire seasons in memory. While there were an above average number of red flag events, the fire season ended up being relatively tame. Our verification scores ended up near our normal office levels with a few missed events happening near the end of the long fire season.

For an event to occur, the fire danger rating, minimum relative humidity, and wind speed values (sustained and/or gusts) must have met the following criteria listed below (for 3 or more hours) and published in the 2014 Southwest Area Operations Plan.

Fire Danger Rating:	High or greater
Minimum Relative Humidity:	15 percent or less
Sustained Wind Speed (ASOS):	25 mph or greater
Sustained Wind Speed (RAWS):	20 mph or greater
Wind Speed Gusts (ASOS & RAWS):	35 mph or greater

Red Flag Raw Data:

<u>Zone</u>	<u>Issued</u>	<u>Verified</u>	<u>Unverified</u>	<u>Missed Events</u>
146	3	1	2	0
147	1	1	0	1
148	5	3	2	0
150	3	2	1	1
151	14	11	3	2
152	20	12	8	1
153	9	3	6	0
District	55	33	22	5

Red Flag Zone Verification Statistics:

<u>Zone</u>	<u>POD</u>	<u>FAR</u>	<u>CSI</u>	<u>Avg. Lead Time</u>	<u># Issued</u>
146	1.00	0.67	0.33	22.38 Hours	3
147	0.50	0.00	0.50	1.93 Hours	1
148	1.00	0.40	0.60	13.83 Hours	5
150	0.67	0.33	0.50	6.98 Hours	3
151	0.85	0.21	0.69	13.07 Hours	14
152	0.92	0.40	0.57	19.65 Hours	20
153	1.00	0.67	0.33	15.53 Hours	9
District	0.87	0.40	0.55	15.39 Hours	55

Fire Weather Watch Zone Verification Statistics:

<u>Zone</u>	<u>Issued</u>	<u>Upgraded to RFW</u>	<u>Verified</u>	<u>Avg. Lead Time</u>
146	0	0	0	00.00 Hours
147	0	0	0	00.00 Hours
148	2	2	1	47.42 Hours
150	0	0	0	00.00 Hours
151	10	9	7	47.35 Hours
152	14	13	8	50.03 Hours
153	7	6	2	39.86 Hours
District	33	30	18	46.17 Hours

2014 Spot Forecasts:

Several long-term type 3 fires resulted in a significantly greater than average number of spot forecast in 2014 and 45 more than the previous year. The number of wildfire spot forecasts for 2014 was the greatest recorded in a single year since the start of the records in 2005. The average number of all spot forecast types over the last 10 years for the Tucson CWA is 168. The increase the total number of spot forecasts is made more notable by the fact that the number of prescribed spot forecasts was less than half of a typical year. This was likely due to the ongoing long term drought and exceptionally dry late winter and spring creating volatile burning conditions.

<u>Zone</u>	<u>Wildfires</u>	<u>Prescribed</u>	<u>SAR</u>	<u>Total</u>
146	0	0	0	0
147	0	0	0	0
148	3	4	0	7
150	1	0	2	3
151	43	8	0	51
152	43	3	0	46
153	73	18	0	91
Other*	0	0	0	0
District	163	33	2	198

* Forecasts generated for locations just outside our CWA

2014 IMET Dispatches:

There was one IMET dispatch from the Tucson WFO for the 2014 calendar year.

IMET: Carl S. Cerniglia Jr.

Number of Fires: 1

Days out of the office: 5

Basin Fire, Coronado NF, AZ – April 15th – 20th

Training and Liaison Activities in 2014:

There were 13 days spent in 2014 in direct support of fire weather training and/or liaison activities. The table below lists the assignments.

<u>Course/Event</u>	<u>Location</u>	<u>Date(s)</u>	<u>Instructor/individual(s)</u>
Attended Pima Fire Chiefs Meeting	Tucson, AZ	1/28	Ken Drozd
Assist teaching S-590 class	Tucson, AZ	3/12	Carl Cerniglia
Partner Meeting, AZ State Fire	Tucson, AZ	3/24	Carl Cerniglia, Glen Sampson, Jeff Davis
Partner Meeting, Tucson Dispatch	Tucson, AZ	3/28	Carl Cerniglia, Jeff Davis, Glen Sampson
Attended Pima Fire Chiefs Meeting	Tucson, AZ	4/8	Ken Drozd
Taught S-290 Class, Saguaro NP	Tucson, AZ	4/23	Carl Cerniglia
Spotter Training including Fire Folks	Tucson, AZ	4/26	Ken Drozd,
Partner Meeting, Springerville Dispatch	Springerville, AZ	4/28	Carl Cerniglia, Jeff Davis
Partner Meeting, Alpine RS	Alpine, AZ	4/29	Carl Cerniglia, Jeff Davis
Attended Pima Fire Chiefs Meeting	Tucson, AZ	5/27	Ken Drozd
Attended Pima Fire Chiefs Meeting	Tucson, AZ	7/29	Ken Drozd
Attended Pima Fire Chiefs Meeting	Tucson, AZ	9/30	Ken Drozd, Carl Cerniglia
Attended Pima Fire Chiefs Meeting	Tucson, AZ	11/25	Ken Drozd, Carl Cerniglia