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APPLICABLE TO NWSI 10-401
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Operations and Services
Products and Services to Support Fire and Other Incidents , NWSPD 10-4
Fire Weather Services Product Specification, NWSI 10-401

WESTERN REGION FORECAST OFFICE FIRE WEATHER SERVICES

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SUMMARY OF REVISIONS: The directive supersedes NWS Western Region Supplement 4-2005, dated June 15, 2009. The following revisions were made to this supplement:

1) Changes throughout to make compliant with NWSI 10-401;
2) There is no longer a regional requirement for separate lightning-based Red Flag Warning (RFW) verification (Sec. 3.0);
3) All RFW verification goals are now set by the Office of Climate, Weather and Water Services (OCWWS).

Signed 10/24/11
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1. Introduction: The Western Region (WR) Fire Weather Program provides critical decision support services (DSS) to fire suppression, land management and emergency management agencies at all government levels. During periods of high wildfire danger, fire weather may be the most important program at a WR Weather Forecast Office (WFO). Meteorologists in Charge (MIC) should ensure that WFO operations adequately address this importance.

Because of the variety of customers and to allow local flexibility, it is imperative that each WFO thoroughly assess and work closely with their fire weather customers to determine appropriate application of national and regional guidance. Further, standardization of fire weather products and services (both content and format) from several WFOs across the jurisdiction of a Geographic Area Coordination Center (GACC) should be done as much as possible and reflected in the local NWS-Fire Agency Annual Operating Plan (AOP).

2. Fire Weather Products: NWS fire weather decision support services continuously evolve with technology and user needs to provide the best information possible. It is important that fire weather products remain logically consistent with other forecast products, digital, text and graphic.

2.1 Core Grids and Related Applications: Provision of NWS fire weather information in digital and graphic format is of increasing importance to fire weather users. This information is used in a variety of ways by fire agencies for decision support, including "point and click" forecast and guidance information, web graphics and Geographic Information System (GIS) compatible files. It is critical that GFE fire weather elements are kept updated and collaborated. At a minimum, fire weather forecast elements will meet the inter-WFO collaboration thresholds outlined in NWSI 10-201. When all parties agree, AOP collaboration requirements may be tighter and assigned to fire weather elements without national standards.

2.2 Fire Weather Watch / Red Flag Warning (RFW): All WR RFW statements are issued using a bullet format as outlined in NWSI 10-401, Section 3. RFW headline format and dissemination requirements are also stated in NWSI 10-401. Local RFW issuance criteria must be clearly defined in the AOP.

At times during the local fire weather off/low season, weather and fuel dryness can meet AOP Red Flag Criteria. Examples of this include dry vegetation combined with Chinook Winds in eastern Montana in late winter and early spring, or a spring offshore wind event in southern California following a dry winter. Per interagency agreement listed in the AOP, WFOs may issue Red Flag Warnings for these events with no other fire weather products issued.

At user request and as documented in the AOP, WR WFOs may use GFE-produced web-based graphics to help relay RFW information. Showing expected locations of lightning on receptive fuels, or a web page illustrating locations of forecast strongest winds during a Santa Ana Wind event in southern California are two examples. WFOs utilizing "graphic RFWs" also issue a brief complimentary text RFW to alert users to availability of the graphic(s). A web link must be included as a text bullet in the RFW to provide convenient access to critical information contained in the graphic:

PLEASE GO TO **HTTP://WWW.WRH.NOAA.GOV/WFO/FIRE/GRAPHIC NAME** FOR THE LATEST MAP OF THE AFFECTED AREA.

2.3 Site-Specific (Spot) Forecast (FWS): The spot forecast, although issued primarily for fire agency support, is also applied to "all-hazard" incidents. The WFO Fire Weather Program Manager, Warning Coordination Meteorologist (WCM) and MIC work together to ensure NWS spot forecast assistance and capability is known to all local first response and emergency management agencies. For prescribed burns and other non-wildfire needs, spot forecasts can be in narrative and/or tabular format as described in NWSI 10-401, dependent on needs of the requesting agency for the incident or project.

All fire agency personnel are trained in methodologies to reduce 20 foot winds to eye-level values, dependent on observation site variables as defined in various fire behavior courses. Spot forecasts are issued with 20-foot wind forecasts as outlined in NWSI 10-401.

2.4 Fire Weather Planning Forecasts (FWF): In WR, narrative style planning forecasts as described in NWSI 10-401 are issued.

a. Issuance Times. During local "high fire season", the FWF is normally issued twice daily. During "low" or "off season", and depending on customer request, the FWF should be issued at least once per day, usually with a reduced number of forecast elements. In WR, the FWF product is utilized year-round and the Land Management Forecast (FWL) should not be used.

b. Headlines. In addition to required Fire Weather Watch and Red Flag Warning Headlines, headlines for critical fire weather events that do not reach Red Flag criteria are encouraged for fire weather customers. However, because of possible confusion when fire weather forecasts are read over agency radio broadcasts, the phrase, "Near Red Flag Conditions" will not be used; rather, describe the actual weather element(s) that may be problematic for fire agencies. For example, "GUSTY NORTH WINDS AND LOW HUMIDITY THURSDAY MORNING" is a useful headline for FWF users.

c. Extended Period. During high fire season, the FWF 3-5 (optional 7) day extended forecast period should be well coordinated between WFO(s) and the GACC Predictive Service Unit (PSU) in order to provide a consistent weather message to users. Fire agencies make expensive resource positioning decisions based on extended forecasts and good coordination for this period should occur.

2.5 Area Forecast Discussion (AFD): The AFD is frequently read by fire weather users. As outlined in NWSI 10-503, a fire weather section may be added to the narrative portion of the AFD. The fire weather AFD section can be used to help disseminate content of the FWF discussion and relay forecast uncertainty and insight not available elsewhere. The availability of a fire weather AFD section is documented in the AOP. Listing RFW issuances in the watch/warning portion of the AFD is mandatory.

2.6 Other Services: The NWS provides a variety of fire weather planning tools to fire agencies via the web. This information includes the Weather Activity Planner, Fire Weather Point Forecast Matrix, FARSITE weather support and a GIS service. WR WFOs should encourage their fire weather customers to utilize these user-driven information sources as appropriate. The increasing number of fire weather web tools should also be publicized in AOPs.

Live "webinars" and/or recorded fire weather briefings for local fire weather customers are widely used by NWS offices nationwide in local high fire season. WR offices are encouraged to utilize this aspect of DSS to assist their fire weather customers. The availability of live or recorded WFO fire weather briefings should be included in the AOP.

3. Verification: Quality fire weather information and services are critical to the NWS primary mission of protection of life and property.

Verification of fire weather forecasts is part of the national verification program as outlined in NWSI 10-1601. Minimum WR WFO fire weather verification is detailed below. Additional verification may be performed with local agreement and documented in the AOP. All WR WFOs will provide preliminary monthly Red Flag warning verification statistics to the WR Fire Weather Program Manager no later than 10 days following the end of the month. All verification data shown below is included in WFO Fire Weather Annual Reports.

3.2 Red Flag Warning and Fire Weather Watch Statement (RFW): Fire Weather Watch - Track the total number of watches issued, lead time to event, and the number of watches that were followed by Red Flag Warnings; convert to percentage.

Red Flag Warnings - FAR, POD, CSI and Lead Time are calculated for Red Flag warnings as defined in NWSI 10-1601. Annual goals for Red Flag Warning FAR, POD, CSI and Lead Time are provided by the Office of Climate, Weather and Water Services (OCWWS) via the National Fire Operations Coordinator (NFWOC). If required by local customers and documented in the AOP, separate verification statistics can be maintained for warnings issued due to lightning events versus warnings issued for other events such as wind, low humidity and instability.

3.3 Spot Forecasts (FWS):

a. Observations are used to verify spot forecasts as needed. Forecaster evaluation as defined by the need to update a spot forecast is also a qualitative method of verification.

b. Frequent spot forecast requests, especially during Red Flag and/or large wildfire events, may result in the need for more than one person to help edit, review and quality control forecasts prior to dissemination. Forecasters should anticipate the number of spot requests they may encounter on shift. If needed, additional staff should be made available to assist with spot workload. Do not rely solely on the AWIPS spot request alarm or phone calls from a customer; check the spot request web page periodically. Spot requests are logged and monitored so none are missed.

3.4 Fire Weather Planning Forecast (FWF):

a. NDFD verification is used for FWF verification. WFOs may perform local verification depending on office and customer needs. Any local verification should be documented in the AOP with results summarized in the Annual Fire Weather Report.

b. Remember that present and forecast weather within a particular zone(s) must agree with any existing RFW statements and should reflect public forecasts. As applicable, ensure LAL and Chance of Wetting Rain (CWR) forecasts are consistent with the sky/weather forecasts.

3.5 National Fire Danger Rating System (NFDRS) Forecast (FWM):

a. National Stats-On-Demand NFRDS verification provides basic verification statistics. WFOs may choose to gather NFDRS verification periodically from the Stats-On-Demand web page and provide to their users via e-mail or the web. WFOs can perform more detailed NFRDS verification locally as determined by office and customer needs. Any special verification should be documented in the AOP with results summarized in the Annual Fire Weather Report.

b. Before sending the FWM forecast, ensure any last minute adjustments to temperature and humidity trends/forecasts are reflected in the 10-hour fuel moisture forecast. Ensure the Lightning Activity Level (LAL) forecast and other parameters are consistent with the FWF.

4. Annual Operating Plans (AOP): WR AOPs normally represent a statewide or GACC-wide area and thus comprise the fire weather responsibility of several WFOs. AOPs are made available on the internet no later than the beginning of the local fire season.

5. Annual Reports: WR WFO Fire Weather Program Annual Reports are submitted to the WR MSD Fire Weather Program Manager no later than January 15th following the previous fire season. In addition to minimum Annual Report content outlined in NWSI 10-404, WR offices will provide the number of Fire Weather Watches that were followed by a Red Flag Warning. All non-fire related IMET/WFO staff dispatches, such as those to an Emergency Operations Center (EOC), FEMA Joint Field Office (JFO), HAZMAT incident, etc. should be included in the annual report.

WFOs should coordinate with fire weather customers to determine the need for other information included in Annual Reports, such as monthly fire season weather summaries and cooperative projects with fire agencies. This type of information can be quite useful to not only the NWS fire weather program and fire agencies, but also to emergency managers, climatologists, universities and the media. Joint Predictive Services and NWS Annual Reports are permissible. Annual Reports are posted to WR WFO fire weather web pages when submitted to WR MSD.

6. Customer Service and Outreach: Due to the high potential for private property loss and public safety threat, wildfire in the urban-wildland interface is one of the top hazards across WR. The fire weather program is therefore an integral part of WR WFO outreach and preparedness activities. The WFO management team must be actively involved in the local fire weather program.

The WCM should assist and advise the fire weather focal point with outreach to local fire weather customers. Invite local fire weather customers to spotter training, open houses and other outreach activities.

Daily coordination with GACCs, area IMETs and other disseminators of critical weather information are also necessary during initial and extended fire outbreaks within the WFO CWA. This ensures a coordinated, consistent message to Incident Management Teams in the local area.

As with other high impact events, procedures should be in place at each WFO to provide efficient and coordinated information to the media and emergency managers during major fire outbreaks, especially near large metropolitan areas and/or recreation areas. The NWS may be asked to assist at a Joint Information Center (JIC) or Emergency Operations Center (EOC) to provide information to the media and state or federal representatives. Affected WFOs should fulfill these requests in coordination with the WRH Regional Operations Center (ROC). Major wildfire events usually require issuance of one or more For the Record (FTR) reports to WRH.

6.1 Customer Meetings: As outlined in NWSI 10-403, WR WFOs should meet at least annually with GACC and other fire agency staff, during the local off season to discuss lessons learned from the previous fire season and to plan operational adjustments for the upcoming fire season. Meetings may be face to face or virtual. Any changes to fire weather services and improvements in coordination are included in the AOP for the upcoming season.

If a WFO is located near the GACC, additional meetings are encouraged for familiarization between agencies, to exchange ideas for product and service improvement, to prepare for AOP meetings and other purposes. Similar meetings with local fire weather customers including interagency dispatch, coordinator groups and land managers are strongly encouraged. A joint presentation to local customers by WFO and PSU representatives to review products and services from each organization reduces confusion and promotes cooperation. Consider organizing a visit by WFO staff to a local prescribed burn as staffing and time permit.

6.2 Pre-Season and End of Season Notification: WFOs may send a brief “pre-season” message to fire agency managers in the CWA. If used, this message should provide a brief summary of NWS fire weather operations for the upcoming “high season”, highlighting any changes.

Similarly, an “end of season” message may be sent to customers providing the proposed date at which a WFO will switch to “low season” fire weather services, with a reminder that spot forecasts are always available. The message should encourage off-season visits and communication to improve services and customer response for next year.

7. WFO Training: MICs ensure adequate fire weather training to the forecast staff and IMETs as outlined in NWSI 10-405.

7.1 Pre-Season: Pre-season fire weather refresher training is provided to the forecast staff. Pre-season fire weather seminars are encouraged at WFOs. Seminars may include a review of fire weather forecast problems in the local area, any operations changes for upcoming high season and any other updated procedures. A presentation to the staff from a local fire customer is encouraged. Any seminars should be followed by a review/refresher exercise of one-on-one training for appropriate staff, including WES cases.

7.2 All-Hazards Training: As defined by WRH and/or WSH, all-hazards DSS training will be provided to appropriate WFO staff. In addition to distance learning courses, other free or low cost training may be provided by or through local emergency response agencies and may include both classroom and simulated exercise training.

8. Fire Weather Service Back-Up: A WFO may need to request service back-up for their fire weather program as discussed in WR Supplement 18-2003. WFO service back-up plans for fire weather will be documented. When service back-up is required in high season, and depending on communications capability, either the WFO requiring back-up or the WFO assuming responsibility will notify the GACC and/or interagency dispatch centers by telephone of the situation. Customers will also be notified when operations return to normal.

a. Fire Weather Manual Web Posting: In order to facilitate easy exchange of specific fire weather program information, each WFO will post an electronic version of their local Fire Weather information to Sharepoint.

b. Service back-up for Spot Forecasts: For short term problems, faxing of completed NWS Spot Forecast Request Form D-1 will be the primary means of providing spot forecast service back-up. For outages expected to last more than 72 hours, the following procedure should be used to allow another WFO to provide spot forecast request service back-up:

` (1) Determine the Internet Protocol (IP) address (es) of the PC (s) in the WFO(s) that will provide service back-up.

(2) Provide the IP address (es) to Art Thomas (art.thomas@noaa.gov) who will then edit access configuration files to NWS Spot. This may be done ahead of time for planned outages (equipment maintenance, etc.).

9. Incident Meteorologist (IMET) Services: On-site IMET forecasting is one of the most critical and valuable services provided by the National Weather Service. IMET services are managed as a national NOAA/NWS resource.

9.1 Availability: When taking into account existing dispatches and/or staffing shortages, WR MICs are expected to make every effort to deploy an IMET when requested. IMETs will maintain status of their availability for dispatch on the National IMET Sharepoint page. Instructions for accessing this page are available from the NFWOC.

9.2 All Hazards Meteorological Response System (AMRS) Replenishment: Prior to the local fire season, the IMET(s) at a WFO will ensure operability of all components of the AMRS unit(s). Any deficiencies will be reported to the MIC for resolution prior to a dispatch of the AMRS unit(s). Some specialized AMRS parts must be procured with assistance from the NFWOC. If an AMRS problem occurs at an incident, simple AMRS parts and supplies can be ordered by incident officials. Similar procedures are used for the Atmospheric Theodolite Meteorological Unit (ATMU). Further information, including an equipment checklist, is found in the IMET Handbook.

9.3 Safety and Personal Protective Equipment: Personal safety is the highest priority in all aspects of IMET response, including travel to and from and incident. IMETs are not required to perform activities that are classified as "hazardous" (i.e., a visit to the fire line is considered voluntary). Complete information on hazard pay can be found in NWSI 10-402, Section 4.3.

Boots are provided to all IMETs or IMET trainees at the Type 1 IMET workshop. Camping equipment and fire retardant clothing can be purchased through the GSA "Wildland Fire Equipment Catalog" or supplied at an incident. If IMET equipment purchases are made using WFO funds, the items remain property of the government. IMETs may also use personal camping equipment for dispatches.

9.4 Reimbursable IMET Expenses: Specific IMET reimbursement procedures are outlined in the IMET Reimbursement Handbook.

10. Burn Area Flash Flooding: Intense wildfires can consume most vegetation in a given area, leaving behind bare earth and ash that is usually "hydrophobic". Flash flooding is a threat following most large fires (> 100 acres as defined by the land management agencies). Rainfall threshold rates which can result in flash flooding from burn areas are well below typical rates used for vegetated slopes and can be less than .25 inches per hour. The flash flood threat from a specific burn area is dependent on many parameters including slope, aspect, location, geology and other antecedent conditions. The flash flood threat will be dramatically higher for several years after a wildfire, until re-vegetation stabilizes the burn area.

WFOs will confer with affected fire and land management agencies, the USGS and emergency managers to assess this threat and determine rainfall threshold rates. The WFO will coordinate with their River Forecast Center (RFC) and WRH Hydrologic and Climate Services Division (HCSD) to determine if improved guidance can be provided for the burn area(s). Warning notification and other interagency cooperative procedures should be established prior to a burn area flash flood event. Fire agencies or a GACC may have GIS-based burn area maps that can be used as background maps on AWIPS and the web. These maps can be used with radar

precipitation overlays to assist in flash flood warning operations. The Flash Flood Monitoring and Prediction (FFMP) tool may be used in real time to compare observed and forecast rainfall against threshold values from the RFC or manually inserted values at the WFO. High frequency reporting rain gages may also be monitored in real time to compare catches against the thresholds.

Other events can be triggered from rainfall on burn areas, including land failure, debris flows and sloughs. Some of these events may not be highly liquefied and may occur over a time span longer than 6 hours. Those events may not satisfy the NWS definition of flash flooding and forecasting these events is not a NWS responsibility. However, as an "all-hazards" warning agency, the NWS may relay emergency information from other government agencies regarding these threats. Use of the Civil Emergency Message and resultant EAS activation is authorized as appropriate. Specific mention of the originating agency must be included in these products. On relatively new burned areas (2 years old or less), debris flows are a common threat. Mentioning the threat of debris flow in a burn area-related flash flood watch or warning is encouraged.

For especially damaging wildfires, a land management agency may establish a Burn Area Emergency Rehabilitation (BAER) Team. BAER Teams are formed after major fires to assess damage caused by the fire and to implement a rehabilitation plan that will prevent loss of life and property and reduce further natural resource loss. BAER Teams are composed of highly skilled wildlife biologists, archaeologists, soil scientists, landscape architects, geologists, ecologists, engineers, foresters, botanists, GIS and GPS specialists and other disciplines from across the nation. A BAER Team can greatly assist a WFO in determining the flash flood threat from a burn area. Information on BAER teams should be obtained from a GACC or agency where the fire occurred.

APPENDIX A

Suggested WFO Annual Fire Weather Program Checklist

Preseason

- ✓ MIC or other designated management team member participates in Annual Operating Plan (AOP) meeting and adjusts office program accordingly. Provide link to AOP from office fire weather web page.
- ✓ Update Fire Weather Station Duty Manual and all references/procedures as needed.
- ✓ FWPL and WCM/MIC visit local fire customers, especially interagency dispatch offices.
- ✓ FWPL/SOO present review/refresh seminar to staff. Fire customer representative presents seminar on local fire problems and importance of program.
- ✓ Staff completes annual fire weather review exercise.
- ✓ Test dissemination and service back-up.
- ✓ Incident Meteorologist (IMET) reviews All-Hazards Meteorological Response System (AMRS) set-up and ensures operability. Cell phone tested. All incident supplies replenished. Approximate IMET availability schedule placed on appropriate web page.

During High Season

- ✓ Products archived per Directives and local needs.
- ✓ Products verified per Directives, regional and local requirements.
- ✓ Interagency coordination done as required by AOP and local needs.
- ✓ IMET availability kept current.

Post Season

Complete and publish Annual Report by January 15. Provide link to Report on WFO fire weather web page.