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# *WESTERN REGION WFO BACK-UP PLAN*

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Signed 11/06/03
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Director, Western Region

Table of Contents: Page



1. Purpose: This regional supplement provides instruction for service and system back-up of Western Region WFOs. **System back-up** is defined as action required to restore/back-up or otherwise compensate for either partial or total loss of capabilities of the WSR-88D, WFO computer systems including AWIPS, telephone systems, or other hardware and software. Service back-up involves the assumption of product preparation and dissemination of one office by another. For purpose of this supplement, "disabled" site is defined as the site requesting back-up or assistance. The term "back-up" site is defined as the site providing service back-up, (which may not be the closest
office).

NOTE: This plan cannot address every situation. Responsibility for the success of any system or service back-up resides with the operational team involved, exercising good judgement and common sense. Final responsibility resides with the Meteorologist in Charge (MIC) and, ultimately, with the Regional Director.

a. Local instructions. Each WFO is required to have local back-up plans. These plans will include preparing and disseminating public, fire weather, marine, hydrologic, and aviation warnings, forecasts, statement, and continuing NOAA Weather Radio broadcasts, etc., for occasions when their offices are being backed up.

2. Format and Procedures.

2.1 System Back-Up: The AWIPS systems architecture provides redundancy, except for LDAD and the firewall, with back-up procedures if individual system components fail. In the event the Satellite Broadcast Network becomes inoperative, either at the Master Ground Station or at a WFO, the AWIPS Wide Area Network (WAN) provides for limited data and product transfer between WFOs and the Network Control Facility (NCF), or between WFOs if the WFO downlink is inoperative. In addition, the NCF can dial into a WFO if a portion of the WAN is inoperative to allow the WFO to disseminate products.

Within the WFO, the AWIPS architecture incorporates a design of functional partitioning to enable the AWIPS system to operate during a failure of an individual data or applications server. Accordingly, WFOs should be able to continue functioning unless a catastrophic failure of the AWIPS system occurs. In the case of catastrophic AWIPS failure, partial system back-up can be achieved via use of other WFO computers receiving graphical/satellite data via the Regional WAN, Internet, or by telephone dial. Site-specific instructions for use of particular systems for back-up purposes should be included in a locally created back-up reference handbook. This handbook(s) should address back-up for each system used in forecast operations at WFOs.

2.2 WSR-88D: Partial or total failure of the WSR-88D shall NOT be cause to request service back-up. If a WFO cannot access their local WSR-88D data the WFO will request an adjacent (normally a site assigned as either primary or secondary back-up) office monitor its WSR-88D's products, if possible including those products available only via AWIPS requests, as deemed appropriate. The adjacent office will provide the disabled office "advice" as to any possible significant or severe weather indicated on the WSR-88D. If there is a potential for severe weather, the adjacent office may transmit a "suggested warning" to the disabled office. Responsibility for issuance of any warning or forecast based upon the WSR-88D shall remain with the disabled office.

In the event of failure or degraded operation of the disabled site's RPG or ORDA (AWIPS still operational) the disabled site should monitor adjacent WSR-88Ds which provide partial surveillance of their CWFA. The disabled site should also request that adjacent offices monitor the primary site’s CWFA to the extent possible, and provide the disabled office information such as storm structure, etc., that cannot be received by accessing the adjacent WSR-88D via an AWIPS request.

2.3 Norstar Telephone System: In the event of a failure of either (1) the Norstar telephone system or (2) land line telephone service, WFOs are equipped with analog phones and a cellular telephone for back-up purposes. In the case of an equipment failure of the Norstar system, WFO's have been provided with four back-up analog phones. The analog phones support two lines each. Three of the phones should be placed in an accessible area (i.e., operations) and one phone should be installed in the communications room. In the event of a land line service failure each WFO has been provided with one priority cell phone. These back-up capabilities are minimal and should be used on a priority basis.

2.4 CRS: CRS is a redundant system with dual processors. There is no nationally-established backup of the CRS in the event of a complete failure of the system including the "fail-over" processor. In such a case WFOs should work with WRH/NWSH to take whatever actions necessary to restore/replace the equipment as soon as practicable. In the event of a partial failure of the CRS operational staff must be prepared to broadcast live, especially in an emergency. When an office must evacuate the automated CRS program will be able to continue broadcasting as normal as long as products come into AWIPS from the service backup office and are automatically transmitted to CRS. For those products that are not fully automated, an office should add a short message to the broadcast cycle stating that only limited updates will be available until further notice (do not announce the office has been evacuated). The Voice Improvement Processor (VIP) is not redundant in itself; however if it fails, products will automatically be voiced by the synthesized system with CRS itself.

2.5 Grids/Graphic Forecaster Editor: When service backup is requested, IFPS software has been designed to provide a current set of grids covering the backed up office's CWA and a local configuration of their formatters. In some cases, where fire weather districts are larger than the CWA, those girds will also be included in the grid set. The assuming office will have all necessary configured software to maintain both grids and text based products via formatters. Every effort will be made to maintain a complete and current set of grids for the backed up offices service area. When the failed office can resume ownership of their warning and forecast responsibilities, the backing up office will transfer the latest set of edited grids to their data base. At a minimum each office is responsible to provide their backup offices with the latest standard IFPS local configuration via the national backup server. For any non standard configurations or local scripts needed to produce products and service, it is the responsibility of that office to provide those additional configurations and scripts and provide training on how to use them.

2.6 Service Back-Up: **PERSONNEL AT THE DISABLED SITE REMAIN THE BEST AUTHORITIES ON LOCAL WEATHER. THEY SHOULD RETAIN AS MUCH RESPONSIBILITY AS POSSIBLE DURING BACK-UP SITUATIONS.** When requested to perform service back-up, the back-up office will make every effort to fulfill the request. Except in rare circumstances, no office will perform service back-up for more than one WFO at any one time.

Appendix A contains service back-up assignments for Western Region sites. MICs are expected to develop local service back-up alternatives, particularly for public service. This might involve such things as gaining access to weather information from the FAA, a nearby military base, or local media in order to issue a local forecast. Several steps must be taken by Western Region offices to prepare for the events of a service back-up. These include:

a. Station personnel will develop and maintain a basic working knowledge of the climatology, terrain and hydrology of the sites (primary and secondary) for which they provide back-up. WFOs will provide their primary and secondary back-up sites with "fast rules-of-thumb" and climate and hydrology information (refer to Appendix E).

b. Each WFO will post on the WR Intranet, a copy of their Station Duty Manual (SDM). This will provide a list of Weather Service products and copies of product

format/files, transmission times, forms, current warning call-up lists, key media telephone numbers, and spotter call lists used by the disabled (primary) office to the appropriate back-up (primary and secondary) offices. These must be kept current; all affected back-up offices should be notified promptly of any changes. In addition, each WFO will maintain a copy of their SDM on a CD which will be provided to WFOs assigned back-up responsibility. This will ensure WFOs providing back-up have access to important information in the event they cannot access the WR Intranet. This will also enable the disabled WFO to have access to their SDM in the event they relocate to an EOC to assist the WFO providing back-up.

c. Each WFO will prepare a prioritized list of duties to follow when it is receiving service back-up but still is able to provide some local services. A sample list is included in Appendix B.

d. Each WFO will prepare a prioritized list of duties to follow when it is providing service back-up. This list will be used when it becomes impossible for the back-up office to issue products at the required times and decisions must be made to delay, shorten, or eliminate some products or services. Guidance with regard to prioritization of products at WFOs is provided by the Regional Supplement entitled "Prioritizing Products and Associated Activities for Western Region WFOs.

e. Following major storms, offices are required to conduct post-storm damage surveys. Often times, it is difficult to conduct damage surveys in a timely manner following the event due to continuing weather, numerous media inquires, or other higher priority concerns. In such an event(s), the office MIC should contact its primary or secondary backup office for assistance in conducting a survey. In addition, Western Region Headquarters can also assist in surveys as appropriate.

There is no "one-size fits all" fast rule for service back-up. The weather situation, station staffing, and types of communication available will be factors in deciding whether to request service back-up. These same factors will also determine the extent of support the disabled site(s) can offer.

In a warning situation, or when there is reason to believe a warning situation is imminent, a station should request service back-up as soon as it becomes apparent that there may be a problem in disseminating warnings. The decision to transfer other forecasts may be delayed until the scope of the problem and the amount of back-up service required may be better assessed. Western Region Headquarters MSD should be notified of each service back-up situation as soon as possible. WFOs should attempt to notify the Chief, Deputy Chief, or any program manager in this order.

Service back-up will take one of three different forms.

Type 1. The most common form of back-up involves a short-term transfer of function(s) to one or more back-up offices. When a station manager or his/her designee determines that service back-up is needed, the back-up site for each affected

program should be contacted immediately. Depending on the situation, not all programs may need to be transferred to service back-up sites. In addition, depending upon workload at the primary back-up WFO, MICs may wish to request secondary sites assume aviation responsibility to more evenly balance the impact upon back-up sites.

Type 2. At times, it will be impossible for one site to accept or continue to provide full back-up service for a program or programs. Given the choice between curtailing some products and services, or asking another (secondary) site to assume part of the back-up load, it is preferable to go to the secondary site for assistance. The need to pass back-up responsibility to another site will depend on several factors:

Host site stability. If the designated host office is experiencing hardware/software or communications problems of its own, this office may not be able to accept or retain service back-up responsibility.

Weather conditions. If the potential host site has, or expects to have, severe weather, that office should not accept or retain service back-up responsibility.

Available staff. For one office to back- up the public, aviation, fire weather, marine, and hydrology programs of another office, a minimum of one extra forecaster is needed at all times during good weather (over the CWFA of both of the back-up and disabled sites) to help issue routine forecasts. If the disabled office has extensive poor weather, the back-up site will need additional forecasters on duty at all times to help with the back-up load. Western Region stations are not staffed to absorb a significant back-up load for extended periods. Experience has shown that after the initial disruption caused by assuming back-up responsibilities, most stations can provide full back-up service for up to 24 hours without impairing the quality of products. (This almost always involves use of overtime.) When a station is short-staffed due to annual leave, sick leave, or vacancies, it may not be able to provide high quality back-up service for an extended period and hence other arrangements must be made.

Period of time back-up is required. The longer one station continues to provide full back-up service for another, the greater the likelihood of forecast degradation. At some point, the benefits of having one office issue most of the products for another office will be offset by the impact of the back-up load on the host site. The time at which this point is reached will depend on the factors above.

If it appears that the need for back-up will extend beyond a reasonable length of time, the host site should either ask the secondary host to assume some of the responsibility or request that forecasters from the disabled office be detailed. (See type 3 below.) If unresolvable problems arise in distributing the back-up load, the MSD Chief or his alternate should be contacted. If more than one region is involved, the appropriate MSD Chiefs will jointly determine what action will be followed.

Type 3. If a catastrophic event, such as a fire, flood, release of toxic substances within the office, or an evacuation due to a bomb threat occurs and will cause a station to be disabled for an extended period, it may be necessary to detail personnel from the disabled site to the service back-up site(s). It is the responsibility of the disabled site's MIC to determine whether such assistance will be necessary. **If an MIC decides that a personnel transfer would be useful, he/she should contact the Chief of MSD with the request.** The decision to detail personnel to perform service back-up will be made on a case-by-case basis. If the MSD Chief cannot be reached, then the office should contact the Deputy Regional Director, or Director in that order. If none of these persons can be contacted the MIC will make a decision with notice provided to WRH at a later time. When multiple regions are involved the appropriate MSD Chiefs, DRDs, or RDs will confer upon the matter. Unless otherwise agreed to, the region with the disabled office will pay for travel and per diem.

2.7 Staffing: Extra staff may be needed to handle the service back-up responsibility. Overtime is authorized for back-up service. If a service back-up situation is expected to be prolonged, the MIC of the back-up site may request that personnel be detailed from the disabled site by contacting WRH as discussed above.

Staff at the disabled station have the responsibility to relay to the back-up site(s) all significant weather reports received if communications exist. In addition, the staff at the disabled station should be available for consultation and advice at all times.

2.8 Product Header Identification: Backup products shall be prepared using the AWIPS product id (WMO header on the first line, followed by the NNNxxx second line) of the office being backed up. An extra line shall be added in the mass media header indicating the office that actually prepared the product, as per the following example:

FPUS56 KSEW 241140
ZFPSEW

WESTERN WASHINGTON ZONE FORECAST
NATIONAL WEATHER SERVICE SEATTLE-TACOMA, WA
ISSUED BY NATIONAL WEATHER SERVICE PORTLAND OR
415 AM PDT TUE APR 24 2001

2.9 Back-Up Tests: Tests of service and system back-ups are necessary. One test of each back-up assignment (**including both primary and secondary assignments**) for all offices will be performed each year actual back-up incidents meeting test criteria may be substituted. The test should be conducted for at least four hours and include the issuance of a complete set of public, and aviation forecasts and test warnings, and any routine hydrologic or fire weather/marine products which would normally be made during the test period. The tests should be conducted using the primary service back-up system. During the test, the WFO should

simulate a complete AWIPS failure (or more likely prepare for an event which requires the office to be evacuated). A brief report from the back-up office documenting the test including results and suggestions for improvement shall be forwarded to MSD upon completion of the exercise with a copy to the secondary or primary site, as appropriate. Please follow the outline provided in Appendix D.

## APPENDIX A - WFO SERVICE BACK-UP

The following list shows primary and secondary back-up assignments for each Western Region Weather Forecast Office (WFO).

| Office To Be Backed Up | Primary Back-up | Secondary Back-up |
|---|---|---|
| 1. Glasgow | Billings | Great Falls |
| 2. Billings | Glasgow | Riverton |
| 3. Great Falls | Missoula | Glasgow |
| 4. Missoula | Great Falls | Spokane |
| 5. Pocatello | Boise | Salt Lake City |
| 6. Boise | Pocatello | Pendleton |
| 7. Spokane | Pendleton | Missoula |
| 8. Pendleton | Spokane | Seattle |
| 9. Seattle | Portland | Medford |
| 10. Portland | Seattle | Medford |
| 11. Medford | Eureka | Portland |
| 12. Eureka | Medford | San Francisco |
| 13. Sacramento | San Joaquin Valley | Reno |
| 14. San Francisco | Los Angeles | Eureka |
| 15. San Joaquin Valley | Sacramento | San Diego |
| 16. Los Angeles | San Diego | San Francisco |
| 17. San Diego | Los Angeles | San Francisco |
| 18. Phoenix | Tucson | Las Vegas |
| 19. Tucson | Phoenix | Flagstaff |
| 20. Flagstaff | Las Vegas | Phoenix |
| 21. Las Vegas | Flagstaff | Reno |
| 22. Reno | Elko | Sacramento |
| 23. Elko | Reno | Boise |
| 24. Salt Lake City | Grand Junction | Pocatello |

Notes:

WFO Salt Lake City, Utah, is assigned as primary back-up to WFO Grand Junction, Colorado. WFO Billings Montana is assigned as secondary back-up to WFO Riverton Wyoming. WFO San Francisco Bay area is assigned primary back-up to WFO Honolulu for public, marine, and aviation.

## APPENDIX B - SAMPLE PRIORITIZED DUTY LIST FOR SITE RECEIVING SERVICE BACK-UP

This is provided as a guideline for creating individual station lists outlining duty priorities while receiving service back-up. As long as staff has access to the office and telephone contact with the back-up site(s), these items are expected to be performed.

A. Based on observations and reports coming in from the spotter network, prepare and disseminate warnings

   (1) to the back-up site for dissemination.
   (2) over NOAA Weather Radio, if possible.
   (3) over NAWAS.
   (4) to warning call list offices and key media sources.

B. Disseminate watches - same order as item A.

C. Solicit information on potentially hazardous weather conditions in the area; relay to back-up site.

D. Answer questions as well as possible from local media or agencies on hazardous or potentially hazardous weather in the area.

E. Disseminate the local forecast via NOAA Weather Wire (as possible), and calls to the local media.

F. Update NOAA Weather Radio. In many cases, this will be limited to the local forecast, local climate data, the local observation, watches or warnings for the area, the station I.D., and a short statement to the effect that "due to computer problems, weather information outside of the immediate area is not available. We will resume normal programming as soon as possible."

   Depending on the weather regime, some routine briefings and public requests may be attempted, particularly during the first few hours of the back-up situation. These would include the following items as time permits.

G. Provide routine briefings to local media or agencies. In general, these should be restricted to the local area. Requests for further information should be referred to another NWS office which is not in a service back-up mode.

H. Handle public requests for information. For forecasts and general weather briefings outside the local area, most requests will need to be referred to another NWS office.

I. Write and disseminate climate summary, weather stories, etc. Dissemination will be via the NOAA Weather Radio and telephone calls to local media.

## APPENDIX C - WFO Readiness Checklist

Has your WFO developed up-to-date instructions both for requesting implementation of service back-up and for the assumption of service back-up responsibilities?

Does the back-up instructions contain , or electronically link to an up-to-date version of applicable parts of the SDM from WFO(s) your office may be required to back-up?

Does the back-up instructions contain a checklist of step-by-step instructions of when and how your office can request service back-up including alternate request methods in the event of a major telephone communications failure?

Does the back-up instructions contain a checklist of step-by-step instructions of actions to be taken when your office is requested to assume service back-up for another WFO?

Does the back-up instructions contain a checklist of step-by-step instructions of actions to be taken by your WFO after your WFO has been inoperable and is now resuming normal operations?

Does your WFO have 24 hour capability to configure an AWIPS workstation to emulate a workstation at a WFO for which you need to provide back-up?

## APPENDIX D - WFO BACK-UP TEST RESULTS (OFFICE PROVIDING BACK-UP)

Was your staff able to reconfigure an AWIPS workstation to provide back-up products as required?

Was the workstation reconfiguration accomplished in a timely manner, i.e. less than 15 minutes for long term back-up and less than 5 minutes for short term?

Did the reconfigured workstation have the proper software and could it be properly configured for generating forecast and warning products for the area requiring back-up?

Was your office able to obtain data (as deemed necessary) both from the area to be backed up and pertaining to the area to be backed up to support service back-up? (i.e., had AWIPS been properly configured to acquire and store the data necessary to support back-up operations?)

Was the staff successful in preparing draft back-up products with proper communications headers and coding for all product types which might be required during back-up operations?

Was the staff successful in establishing contact with a random selection of individuals/entities on the back-up notification lists who would need to be notified in the event service back-up was implemented for their area?

Did the AWIPS properly disseminate the back-up products prepared by your office? (i.e., products were disseminated by the AWIPS SBN and the NWWS?)

Was your office able to notify appropriate officials; institutions; organizations in the area being backed up that service back-up was being provided?

Was your office able to maintain contact with appropriate officials; institutions; organizations in the area being backed up during the period of back-up operations?

## APPENDIX E - GUIDELINES FOR WFO HYDROLOGIC SERVICES BACK-UP

The Western Region Backup plan described in this supplement also applies to hydrologic services in the WFOs. The backup assignments are the same as in Appendix A with the following exceptions:

| Office To Be Backed Up | Primary Hydrology Back-up | Secondary |
|---|---|---|
| Glasgow | Great Falls | Billings |
| Billings | Great Falls | Glasgow |
| Great Falls | Billings | Glasgow |
| Missoula | Spokane | Boise |

The above assignments are for backing up hydrologic services for river flooding only (does not include flash flooding).

Local knowledge of hydrology in each office's HSA is an important part of providing quality hydrologic services to customers. It is difficult for back-up offices to maintain the same level of local knowledge of the hydrology of the HSAs they provide back-up services to. Basic information to allow them to issue critical hydrologic products during a back-up situation needs to be documented and made available to the back-up offices. This should include:

- Relevant parts of the HSM Manual (including detailed maps, examples of products issued by your office, explanation of special cases or conditions at river points in your HSA, etc.).
- Up-to-date E-19s.
- Templates or preformats for hydrologic products, along with instructions.
- Current rating tables.
- List of Hydrologic customers, including their phone numbers and what products they use.

WHFS and HYDROMET at the backup sites need to have access to all the hydrometeorological data needed to perform hydrologic backup operations, as well as the forecasts generated by the RFC.

Any changes to the above documentation and databases need to be coordinated with the back-up sites. Automated procedures can be developed (or already exist) to do some of this coordination and updating. Currently there is no easy way to coordinate changes to WHFS databases with other offices. Some tools already exist in WHFS that provide some help for back-up. For example, a filtering system allows the user to display select groups of data points (for instance, one may choose to display forecast points for the office being backed up instead of the usual

display). In addition, Riverpro has an option which will allow you to create Riverpro products for the office under the settings menu.

If a WFO is expected to be disabled for more than 24 hours during a hydrologic event, it is strongly encouraged for staff from the disabled WFO to travel to the back-up site and help out with back-up operations, since they have the hydrologic expertise of the HSA. In addition, RFC(s) are expected to provide more specialized support to offices that have been tasked to provide back-up services to another office, in the form of explaining forecasts, monitoring conditions, and assisting in situation assessment.

In backup mode, higher priority shall be given to warnings and watches (refer to the WR supplement filed with 10-503, "Prioritizing Products and Associated Activities for Western Region WFOs"). Routine (non-flood related) hydrologic products may be dropped if the workload becomes too great. It is not expected for the backup office to provide the same level of services as the disabled office would have.