

Service Backup Plan for Central Region Offices

<u>Table of Contents</u>		<u>Page</u>
1.	Purpose.....	3
2.	Responsibilities.	3
2.1	Field Offices.....	3
2.2	Weather Forecast Offices (WFO).....	3
2.2.1	WFO Responsibilities When a Servicing River Forecast Center (RFC) Requires Service Backup.	3
2.2.2	ASOS and Upper Air.	3
2.3	Center Weather Service Units (CWSU).	4
2.4	River Forecast Centers (RFC).	4
2.5	Central Region Headquarters (CRH).	4
3.	Field Office Operations	4
3.1	WFO Operations.....	5
3.2	RFC Operations.....	5
3.2.1	RFC On-Site Backup.	5
3.2.2	RFC Off-Site Backup.	5
4.	Aid and Support.....	5
5.	Verification	6
6.	Procedures and Notifications	6
7.	Dissemination.....	6
8.	Readiness	6
9.	NOAA Weather Wire Service (NWWS).	6
Appendix A - WFO Service Backup Assignments.....		A-1
Appendix B - WHFS Data Transfer for Service Backup Requirements.....		B-1
Appendix C - RFC Backup Operations.....		C-1
Appendix D - WFO Tertiary Service Backup Office Pairs.....		D-1

1. **Purpose.** The National Oceanic and Atmospheric Administration's National Weather Service (NWS) field offices provide forecast and warning services to a variety of users. This Supplement provides a backup plan with detailed instructions for Central Region (CR) offices to follow when they cannot provide those services.

2. **Responsibilities.**

2.1 **Field Offices.** Each field office will develop specific plans to respond to disruption of critical products, and for assuming functions of their assigned site backup office(s). Plans, procedures, and priorities for backup and evacuation will be reflected in the local procedures.

2.2 **Weather Forecast Offices (WFO).** The goal for service backup in CR is WFO-to-WFO backup for the provision of all products and services. That is, when a WFO cannot provide its suite of products and services, a single WFO will provide that entire set of products and services, if possible, while serving as either the primary or secondary service backup office. However, circumstances may not allow for one office to entirely backup another office. These circumstances may include, but are not limited to, ongoing weather, staffing or widespread failure of infrastructure. In such extenuating circumstances, an office's operations may need to be divided up between the primary and secondary or given to additional tertiary offices.

Provision of services while operating in a backup role is predicated by priority. The priority of product and service provision is defined in NWSI 10-2201. WFOs are encouraged to develop and maintain an intranet site which contains all resources required for service backup.

Tables detailing primary and secondary backup responsibility are outlined in Appendix A. Tertiary backup is outlined in Appendix D.

2.2.1 **WFO Responsibilities When a Servicing River Forecast Center (RFC) Requires Service Backup.** While the servicing RFC establishes service backup, each affected CR WFO should have the capability to provide critical hydrological services without RFC river forecasts (RVF) and flash flood guidance (FFG) and related digital guidance) within the first 24 hours of a RFC failure (Ref. NWSI 10-2201). Essential services include issuing hydrologic watches, warnings, and statements.

2.2.2 **ASOS and Upper Air.** A WFO providing service backup will provide ASOS observation monitoring and quality control as described in NWSI 10-1305.

ASOS and the Upper Air systems automatically connect and/or can be dialed manually to transmit the observations per a network configuration plan including redundant dial backup. This network_configuration plan is not a part of this Supplement. If the primary and backup automated communication systems fail and/or manual observations are generated, the responsible WFO will:

- (1) Attempt to manually transmit the observation via Advanced Weather Information Processing System (AWIPS); or
 - (2) work with the service backup WFO responsible for data acquisition to ensure the observations are manually transmitted in a timely manner.
- A network communication table for both systems can be found on the CR Intranet in the Program Information Section.

2.3 Center Weather Service Units (CWSU). Service backup of CR CWSU Operations will be in accordance with NWSI 10-803, "Support to Air Traffic Control Facilities."

2.4 River Forecast Centers (RFC). RFCs will follow established procedures in the CHPS design for failovers and as outlined in Appendix C to maintain the capability of continuing core operations on-site or off-site, depending on the situation. If the RFC failure is expected to last beyond 24 hours, operations should be relocated to the off-site location. Off-site operations will require RFC personnel to travel to the new location to implement procedures and issue forecasts. If the RFC failure occurs during a high water situation, the RFC may place staff at affected WFOs to assist handling the event.

2.5 Central Region Headquarters (CRH). CRH responsibilities are to ensure regional data and product flow to support backup operations for all field offices; and to provide administrative support to arrange any necessary travel. Specific details for CRH support to RFC backup are provided in Appendix C. For tertiary backup, if the outage is such that the assignments detailed in Appendix D are not possible, the CRH Regional Operations Center (ROC) will determine the office pairs based on a number of factors, such as area affected by the event, forecast hazardous weather impacts, etc. The ROC will then coordinate tertiary backup with appropriate offices.

3. Field Office Operations. Specific instructions for situations requiring service backup can be found on the CR-ROC Google Form for Significant Event Logging and Notification at: <https://sites.google.com/a/noaa.gov/nws-crh-roc/crh-logging-and-notification>

Refer to the appropriate decision tree on that form for guidance. This form is designed to provide clear instructions for a variety of incidents which may require "for the record" information, while minimizing workload on the local office.

For *unscheduled/emergency* situations, the form will instruct you to (1) coordinate with affected WFOs, RFCs, and/or CWSUs; (2) call NCF; and (3) notify the ROC hot line at 816-200-1140. As an additional communication safeguard, upon selecting "Submit" button on the Google Form, an email will automatically be sent to crhroc@noaa.gov mailing list.

There is generally no need to call the ROC for planned backup, since those scenarios are less urgent. Simply disseminate an AWIPS admin message (ADMCRH) to ensure the appropriate information is conveyed to neighboring offices, NCF, BCQ, etc.

Upon restoration of normal operations, the disabled field office will notify affected WFOs, RFCs and/or CWSUs, and close out ROC notification by completing an "update to information already submitted" on the Google Form. (As noted above, this action will trigger an automatic email to the crhroc@noaa.gov mailing list.)

An UnScheduled Outage System (USOS) Report should be submitted for unscheduled service backup. Refer to [30-2112 Reporting Systems, Equipment, and Communication Outages](#) for details.

Examples of situations which may prompt immediate implementation of service backup include:

- Events outside the control of the office (e.g., facility evacuations required for staff safety, equipment failures, communications outages, etc.)
- Maintenance activities (e.g., information technology installations or upgrades, etc.)
- Testing backup plans (i.e., backup drills)

NWS Policy Directive 10-22, “Readiness”, describes all readiness activities, including service backup, as essential for the accomplishment of the NWS mission. Service backup will not be invoked to enable staff meetings, office tours, or other activities that are not essential for the accomplishment of the NWS mission.

Offices providing backup will provide services consistent with normal operations. During backup operations, additional personnel may be required. Approved temporary duty at the backup office is another available option to alleviate increased workload.

3.1 WFO Operations. WFOs should maximize efforts on priority products and services as detailed in NWSI 10-22. WFOs should consider off-loading lower priority products and services to primary or secondary backup WFOs in order to allocate resources to these higher priority duties. Designated service backup offices listed in Appendix A will provide these services until normal office operations at the affected office are restored.

3.2 RFC Operations.

3.2.1 RFC On-Site Backup. On-site backup will occur at the RFC when a critical operational component fails. The RFC is the location of the backup facility during an on-site backup. The on-site backup should not exceed a period of 48 hours. During on-site and off-site backup, some aspects of water supply, web page, probabilistic model runs and/or Advanced Hydrologic Prediction Service (AHPS) functions may be performed at local RFC discretion.

3.2.2 RFC Off-Site Backup. Off-site backup will occur if the RFC building becomes uninhabitable or on-site communications are unavailable. The designated off-site backup facility for the Missouri Basin RFC (MBRFC) is CRH. The designated off-site backup facility for the North Central RFC (NCRFC) is WFO LaCrosse, WI (ARX). Situations where the RFC is expected to operate in backup mode for an extended or unknown period of time will require a backup facility to be selected on an ad hoc basis.

In the event of the backup location being unavailable, RFC management will have the choice of relocating to either Central Region Headquarters (CRH) or another CR RFC or WFO, where such backup is possible.

4. Aid and Support. Written instructions cannot cover every situation. Personnel must use sound judgment and initiative, evaluating situations on a case by case basis to ensure continuation of essential services. The first obligation of personnel in a disabled office is to support restoration of operations. Beyond that, they will provide support to assist offices providing backup services as much as possible. This may include obtaining data sets via alternative methods, providing draft products, soliciting and relaying real-time ground truth severe weather reports, etc.

5. **Verification.** Real-time verification of warnings and dissemination of damage reports is considered part of the backup process, and falls under the responsibility of the offices providing backup warning services.

6. **Procedures and Notifications.** An office requiring backup will contact its primary or secondary backup office, depending on weather demands and workload requirements. *The office designated to provide service back-up will disseminate an admin message (ADMCRH), informing surrounding offices that it is assuming operational services for the disabled office.*

If the primary or secondary backup WFO is unable to provide service backup, the WFO will contact the designated tertiary office listed in Appendix D. If that office cannot provide backup, the office requiring backup will contact the CRH ROC to expedite tertiary backup services.

Once normal operations have been restored, the office that required backup will issue the AWIPS notification message (ADMCRH), advising backup offices that it is resuming normal operations. That office will then close out the outage by completing an “update to previous report” on the ROC Event Notification Google Form. Upon selecting “submit”, an e-mail will automatically be sent to the crhroc@noaa.gov email list.

7. **Dissemination.** Offices will follow procedures in NWSI 10-1701 regarding formatting procedures in the Mass Media Headers.

8. **Readiness.** Offices will maintain all instructions related to service backup. Offices will maintain lists and contacts for emergency management, SkyWarn, and Cooperative Observers. All offices should also be familiar with their backup offices’ operational programs, SmartTools, and text formatters.

It is the responsibility of each office to ensure that its backup offices have been provided all necessary items, as outlined above, to accomplish backup successfully.

9. **NOAA Weather Wire Service (NWWS).** NWWS products originate from all NWS WFOs and RFCs utilizing AWIPS. Products are redundantly sent to multiple RFC offices for uplink to a communications satellite. A map of Primary and Secondary uplink assignments for all WFOs is located at <http://www.nws.noaa.gov/nwWS/poster01.pdf>.

Appendix A - WFO Service Backup Assignments

Note: an office that is engaged in primary (secondary) backup for one office may not be able to take on their other secondary (primary) backup responsibility. In such cases, secondary or tertiary backup would need to be initiated for the office in need of service backup.

WFO	1 st Backup	2 nd Backup
ABR	FSD	BIS ¹
APX	MQT	DTX
ARX	DMX	DVN
BIS	FGF	ABR
CYS	RIW	UNR
DDC	GLD	ICT
BOU	PUB	GJT
DLH	MPX	FGF
DMX	DVN	OAX
DTX	GRR	APX
DVN	ARX	DMX
EAX	SGF	TOP
FGF	BIS	DLH
FSD	ABR	MPX ¹
GID	OAX	LBF
GJT	SLC	BOU
GLD	DDC	PUB
GRB	MKX	MQT
GRR	DTX	IWX
ICT	TOP	DDC
ILX	LOT	LSX
IND	IWX	LMK
IWX	IND	GRR

WFO	1st Backup	2nd Backup
JKL	ILN ²	RLX ²
LBF	UNR	GID
LMK	PAH	IND
LOT	ILX ³ /MKX ⁴	MKX ³ /IWX ⁴
LSX	EAX	ILX
MKX	GRB	LOT
MPX	DLH	ARX
MQT	APX	GRB
OAX	GID	FSD
PAH	LMK	SGF
PUB	BOU	GLD
RIW	CYS	BYZ
SGF	LSX	PAH
TOP	ICT	EAX
UNR	LBF ¹	CYS ¹
ILN (ER)	JKL	
RLX (ER)		JKL
SLC (WR)	GJT ⁵	
BYZ (WR)		RIW ⁵

¹ South Dakota WFOs have access to the South Dakota State trunk radio system to facilitate backup communications.

² Per Eastern Region Backup Plan

³ Responsible for nongridded forecasts

⁴ Responsible for gridded forecasts

⁵ Per Western Region Backup Plan

Appendix B - WHFS Data Transfer for Service Backup Requirements

Backup preparation is more than having the files and data in place. *Routine testing* of hydrologic backup should be part of hydro program management. WFOs must ensure the following hydrologic information is up-to-date for their HSA as well as at their primary and secondary backup sites (tertiary backup preparation cannot be done ahead of time but only on an as needed basis with assistance from the WHFS support group):

1. WHFS database, including updates to cooperative observing sites
2. RiverPro templates
3. Site-Specific model updates

Transfer WHFS database information and RiverPro templates by using the following procedure on an as-needed basis:

- During regular work hours, ask the WHFS group to populate the backup sites' database and templates.
- For an emergency off-hours situation, call the NCF (they will call the WHFS group).

RiverPro Templates

- Since office-specific Riverpro templates are not stored at a central location, HPMs need to be proactive in ensuring templates are up-to-date at primary and secondary backup sites.
 - Request the WHFS group to transfer updated templates to the primary and secondary backup sites.
 - Ensure the backup sites are copied on the request, or otherwise in the loop.
 - Backup sites should test the new templates within two weeks. WFOs may coordinate quicker updates due to upcoming flood situations.

Site-Specific model updates

- The backup site must ensure to ingest the necessary data (e.g. observed/forecast data, flash flood guidance).

The MPE domain defined at the backup office must be large enough to cover the basin in which the site specific location exists. This may not be possible for the tertiary backup site as the domain may be too large. Tertiary backup coverage would be determined on a case-by-case basis.

WHFS and Tertiary Backup

- What a tertiary backup office will be able to do:

- Create the same official products in RiverPro that the original office would create.
 - Create and upload XML files to support AHPS web pages for the original site.
 - Ingest, store and manipulate all of the data that the original site could.
 - View data in the Time Series application on a station by station basis.
- What a tertiary backup office will NOT be able to do:
 - Run Site Specific for points in the original HSA.
 - View data in Hydroview map display unless the backup WFO staff chooses to re-define their viewing area for Hydroview. Station data will be viewable however.
 - Use MPE for the backed-up office. MPE requires a lot of extra configuration that is not really feasible for a tertiary backup.
 - View the same pre-defined groups in the Time Series application.
 - View the dam locations in the DamCREST application.
 - Use the pre-defined setting in RiverMon/PrecipMon

Appendix C - RFC Backup Operations

Responsibilities During RFC Backup Operations

On-Site Backup. During on-site backup, the responsibilities to support RFC operations exist at various NWS groups, including: the impacted RFC, CRH, and an alternate site for backup product transmission to AWIPS.

The RFC will:

- Provide equipment and software to generate products required during RFC backup operations.
- Notify CRH. Early notification for backup operations that are scheduled is recommended.
- Notify pre-arranged alternate site for backup product transmission to AWIPS.

CRH will:

- Provide a data feed for the RFC to conduct backup operations
- Provide access to Local Data Acquisition and Dissemination (LDAD) for product transmission to occur.

The alternate site for backup product transmission to AWIPS will:

- Provide access to LDAD for product transmission to occur in the event that the CRH LDAD is unavailable.

Off-Site Backup. During off-site backup, the responsibilities to support RFC operations exist among various NWS groups, including staff from: the impacted RFC, CRH, the backup location, and an alternate site for backup product transmission to AWIPS.

The RFC will:

- Have the backup server and laptops with software available to generate products required during RFC backup operations. The baseline software (Linux, IHFS relational database, and Local Data Manager (LDM)) will not be altered without permission from CRH.
- Make arrangements for backup client laptops to arrive at the supporting backup location as soon as possible
- Notify CRH and backup status and backup location as soon as possible. Early notification for backup operations that are scheduled is recommended.
- Determine staff to relocate and begin coordination with CRH and have the backup location assist with travel arrangements.
- Pre-arrange the locations for backup support.

- Pre-arrange a local off-site storage location for the backup server laptop, and local update procedures.
- Provide staff with operational instructions to perform backup.
- Perform annual test of off-site backup to ensure staff familiarity.
- Issue a CRHADMCRRH AWIPS message when regular RFC operations resume.

CRH will:

- Make arrangements for backup client laptops to arrive at the supporting backup facility location (CRH) as soon as possible.
- Arrange access to any RFC equipment stored at CRH in a timely manor
- Make necessary networking changes (IP address entries) to ensure access of RFC backup equipment to data feeds and CRH LDAD.
- Provide a data feed for the RFC to conduct backup operations, this includes access to 72 hours of data, OFS files, etc.
- Provide 24x7 CRH Help Desk support to ensure availability of backup data feed.
- Provide access to CRH AWIPS/LDAD for product transmission to occur.
- Provide assistance with travel arrangements as requested by supporting WFO and RFC staff, (e.g. Blanket travel orders.)
- Pre-configure a printer to function at the designated backup facility.

The backup location will:

- Pre-arrange network access (IP addresses) for backup equipment.
- Issue a CRHADMCRRH AWIPS message under the addressed to ALL to identify RFC backup will be necessary and that RFC personnel are en-route to the backup location. Other pertinent and factual information should be included, such as the reason for the outage.
- Contact CRH to identify RFC backup will be necessary. Pertinent and factual information should be included, such as the reason for the outage.
- Provide 24x7 access to the facility for the RFC staff to conduct backup RFC operations.
- Provide physical space for up to 4-6 persons with associated equipment to conduct RFC backup operations.
- Provide ESA/IT/ET support as requested by RFC staff. At a minimum, this will include assistance with equipment connection to network and IP assignments.
- Provide access to office equipment/software to support RFC operations. At a minimum, this will include: one dedicated telephone, an AWIPS workstation (with 12Planet), and one PC with Internet access.
- Provide access to AWIPS/LDAD for product transmission to occur, in the event that the CRH LDAD is unavailable.
- Provide administrative support for RFC staff relocated to backup facility
- Provide network access to a printer.
- As an option, provide one additional PC for client use.

Operational Capabilities Maintained During CR RFC Backup:

Functional Capabilities to Continue will include all products and services the RFC will provide during the backup mode.

Functional Capabilities to Continue:

- Maintain constant connectivity to:
 - LDM connection
 - Internet connection
 - E-mail capabilities
 - Live data feed into the RFC backup system.
 - Backup facility printers
- Maintain functionality of the operational software:
 - NWSRFS IFP and/or Community Hydrologic Prediction System (CHPS)
 - Load operational files for all defined forecast groups.
 - Load operational mod files from previous runs on the backup server.
 - Connect to and load precipitation and stage data from the OFS backup database.
 - Create and edit mods.
 - Save forecast time series on the backup server.
 - Daily hydrometeorological discussion
 - Edit and transmit a daily hydrometeorological discussion
 - Transmit product to the LDM
 - FFG scripts
 - Generate FFG grids and text products
 - Transmit grids and text product to the LDM
 - XNAV
 - View and edit spatial data from the IHFS relational database.
 - Save changes to precipitation stations in the IHFS relational database.
 - Forecast formatter software (XSETS, GIFTS, OPIE, etc.)
 - Create, view and edit text-based river forecasts and contingency products.
 - Transmit product to the LDM
 - XDAT
 - Query and edit data from the IHFS relational database.
 - WHFS TimeSeries
 - Query and edit data from IHFS relational database, review and QC observed and river forecast data.
 - Afos_text
 - Query and edit data through the Afos_text interface.
 - Create and transmit a Hydrometeorological Coordination Message (HCM).
 - Transmit product to the LDM
 - MPE
 - Ingest radar-based, ground-based and precipitation estimates.
 - Run MPE suite of tools to edit or adjust precipitation.
 - Save MPE grids on backup server for use in operational model.
 - Transmit product to the LDM

- NMAP
 - Ingest HPC QPF grids.
 - Create QPF grids with NMAP tools.
 - Save QPF grids on backup server for use in operation model.
- Site Specific Model
 - Ingest MPE precipitation data.
 - Edit or adjust hydrologic model states as needed.
 - Run model and generate forecasts.
- ESP-ADP
 - Run ESP and ESP-ADP and create a set of AHPS graphics for designated AHPS forecast points.
- Damcrest or Dambreak products
 - Run Damcrest or Dambreak and generate Dambreak scenarios
- 12Planet
 - Maintain chat capabilities with CR WFOs and RFCs.
- NWS Chat
 - Maintain internet based NWS Chat function

Functional Capabilities not Supported in the CR RFC Backup

Functional Capabilities not Supported in the Initial Implementation of the RFC Backup are products and services the RFC will be unable to provide during backup mode.

- Ability to modify, update and transmit graphical web products where the ArcView GIS software package is required to generate graphics:
 - Flood Outlook Product
 - Water Supply Outlook
 - Forecast River Conditions
 - Observed MPE Precipitation (Graphics,)
 - Flash Flood Graphics
 - HPC QPF Graphics
- Water Supply Outlook text-based products
- Specialized products and or services sent to partners and cooperators (i.e. Corp of Engineers and Bureau of Reclamation)
- Experimental products on the RFC web (i.e. 95% QPF ensemble).
- Web published radar Z-R relationships for RFC area
- Data transmission of national Precipitation Analysis experimental product
- General maintenance of RFC web site content outside of AWIPS automated product display

Appendix D - WFO Tertiary Service Backup Office Pairs

The following assignments, column 1 paired with column 2, are for planning and setup purposes, but may not be possible depending on the situation. If not possible, the CRH ROC will coordinate tertiary backup on a case-by-case basis.

Aberdeen (ABR)	Dodge City (DDC)
Bismarck (BIS)	North Platte (LBF)
Grand Forks (FGF)	Omaha (OAX)
Sioux Falls (FSD)	Goodland (GLD)
Riverton (RIW)	Pueblo (PUB)
Boulder (BOU)	Salt Lake City (SLC)
Grand Junction (GJT)	Reno (REV)
Duluth (DLH)	Grand Rapids (GRR)
Marquette (MQT)	Chicago (LOT)
Gaylord (APX)	Green Bay (GRB)
Detroit (DTX)	Milwaukee (MKX)
North Webster (IWX)	Pleasant Hill (EAX)
Jackson (JKL)	Springfield (SGF)
Paducah (PAH)	Des Moines (DMX)
Louisville (LMK)	Davenport (DVN)
Lacrosse (ARX)	Indianapolis (IND)
Minneapolis (MPX)	St. Louis (STL)
Cheyenne (CYS)	Topeka (TOP)
Hastings (GID)	Central Illinois (ILX)
Wichita (ICT)	Rapid City (UNR)

Western Region Office