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Backup Operations, NWSI 10-2201***

BACKUP PLAN FOR CENTRAL REGION OFFICES

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Date

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1. Purpose. NOAA'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 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. 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 Appendix A.

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 Appendix B of NWSI 10-803, "Support to Air Traffic Control Facilities."

2.4 River Forecast Centers (RFC). RFCs will follow established procedures 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 TDY 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.

3. Field Office Operations. For planned service backup operations, the field office requesting backup will coordinate with affected WFOs, RFCs and/or CWSUs and notify CRH via e-mail (cr.sig.ops@noaa.gov).

The following are a few examples which may prompt immediate implementation of service backup:

- 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.), or
- 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.

For emergency situations, CRH should be notified as soon as possible per instructions in the CR Supplement to NWSI 10-1603. Upon return of normal operations, the field office returning from backup operations will notify affected WFOs, RFCs and/or CWSUs. CRH will be notified via e-mail (cr.sig.ops@noaa.gov).

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 backup, some aspects of web page, ESP and/or 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 and the RFC needs to move to a backup facility remote from the RFC or if an on-site backup exceeds or is expected to exceed a period of 48 hours. The designated off-site backup facility for MBRFC is CRH. The designated off-site backup facility for 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. An office requiring backup will contact its primary or secondary backup office dependent on weather demands and workload requirements. Dependent on communication capabilities of the requesting office, the designated service backup office may be responsible for notification of the servicing RFCs and surrounding WFOs.

For most service backup situations, a telephone call to CRH is not necessary. A brief e-mail to: cr.sig.ops@noaa.gov explaining the situation will be sufficient (Ref. CR Supplement filed with NWSI 10-1603).

Once normal operations have been restored, the office which required backup will issue a CRHADMCRRH message advising backup offices that it is resuming normal operations. It is recommended that the office which required backup follow-up the notification with a telephone call.

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 office's 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 the 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

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
JKL	ILN ²	RLX ²

WFO	1st Backup	2nd Backup
LBF	UNR	GID
LMK	PAH	IND
LOT	ILX ³	MKX
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 ⁴	
BYZ (WR)		RIW ⁴

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 MKX responsible for GLF and Near Shore IFPS grids

⁴ 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:

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 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.

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 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 at various NWS groups, including: 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, Informix, and 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
- Pre-configure a printer to function at the designated backup facility.
- 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 semi-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.
- 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.)

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
 - 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.
 - View and edit forecasts in Tulsa Plot.
 - 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 OFS backup database.
 - Save changes to precip stations in the OFS backup database.
 - XSETS
 - Create, view and edit text-based river forecasts and contingency products.
 - Transmit product to the LDM
 - XDAT
 - Query and edit data from the OFS backup database.
 - 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 satellite-based 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.
- Edit 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
- Water Supply Outlook text-based products
 - Create, view and edit product T
 - Transmit product to the LDM
- 12Planet
 - Maintain chat capabilities with CR WFOs and RFCs.

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
 - Flash Flood Graphics
 - HPC QPF Graphics
- Access to D2D software and tools.
- 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