



# Decision Support Services – National Weather Service’s Involvement During the Historic Missouri River and Souris River Basin Floods



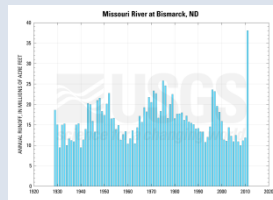
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## Introduction

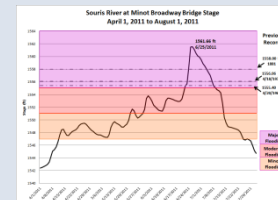
During 2011, epic flooding on the Missouri and Souris Rivers led to National Weather Service (NWS) Central Region (CR) offices staffing several emergency operations centers (EOC) for over a month.

The flooding was caused by above average snowmelt runoff combined with highly anomalous rainfall.



## Challenges Unique to Minot, North Dakota DSS

- News station issued their own “tornado warning” for marginally severe thunderstorm → City sirens set off at height of flood fight. Onsite NWS staff verified no tornado and helped diffuse situation.
- City government self-sufficient mentality weakened relationships → earning trust was difficult.
- No temporary housing → Daily commute from Bismarck (220 miles/day).
- Fatigued city personnel greatly reduced communication efficiency.



## CHALLENGES

Aligning talking points for a highly dynamic situation across all NOAA and NWS line offices

Timely dissemination and product alterations via Advanced Hydrologic Prediction Service (AHPS) web services.

Federal partner coordination of stage and flow observations and forecasts, especially with political heads present.

Communication and design of useful river contingency forecasts (e.g., How many days QPF should be used? Should this be temporarily used as the official forecast?).

Acquiring timely, accurate precipitation data from upstream basins (especially Canadian portions).

## ACTIONS TAKEN

EOC staff disseminated concise reports to NWS Bismarck and CR players to begin the upward flow of information

Manual overrides to database updates were used, as were public information statements and ‘Top News’ headlines.

Pre-coordination USGS, USACE and NWS conference calls were held to agree on USGS flow measurements; USACE rating curves; and NWS stage, flow and timing forecasts.

NWS Bismarck worked with neighboring offices, NWS Hydrometeorological Prediction Center (HPC), and NWS North Central River Forecast Center (NCRFC) to select and simulate “reasonably possible” QPF scenarios and their expected hydrologic outcomes.

Boots on the ground gathering of rainfall/runoff/high water marks were included in NCRFC Souris R. stage forecasts. Canadian data availability was a problem until after the flood event. They are now ingested directly into NWS servers.

## RESULTS

Aligning talking points for a highly dynamic situation across all NOAA and NWS line offices

Information flow rate was still insufficient to combat the dissemination of misinformation by media.

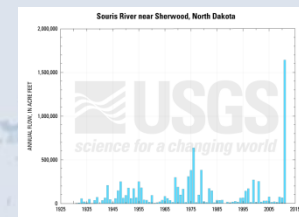
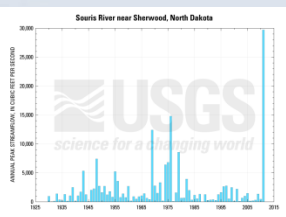
Trust earned by communicating with “one voice.” Political leaders utilized more appropriate speaking venues after being asked to limit comments during coordination calls.

Contingency forecasts were used for planning and to illustrate chances of catastrophic dike failure. Verbal communication seemed sufficient until congressional leaders demanded proof that scenarios were effectively presented → email communications were used thereafter.

Relayed reports supported NCRFC runoff adjustments in ungaged streams that greatly improved forecasts. Canadian Community Collaborative Rain, Hail & Snow Network (CoCoRaHS) was established to increase data density.

## KEY BEST PRACTICES

- NWS, USGS, and USACE pre-coordination calls fostered federal partner consensus → Built trust with officials when a consensus view is presented for planning.
- Using “reasonably possible” precipitation to generate contingency forecasts → Communicate verbally and follow up with email documentation.
- NCRFC Service Coordination Hydrologist provided onsite EOC support as meteorological threat transitioned to hydrologic threat (i.e., runoff already in system).
- Start DSS early → Use probabilistic forecasts to identify flooding risks and communicate the risk to public and partners ASAP (NWS Bismarck began discussing heightened flood risk in Fall 2010).



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