



NWS River Forecast Centers

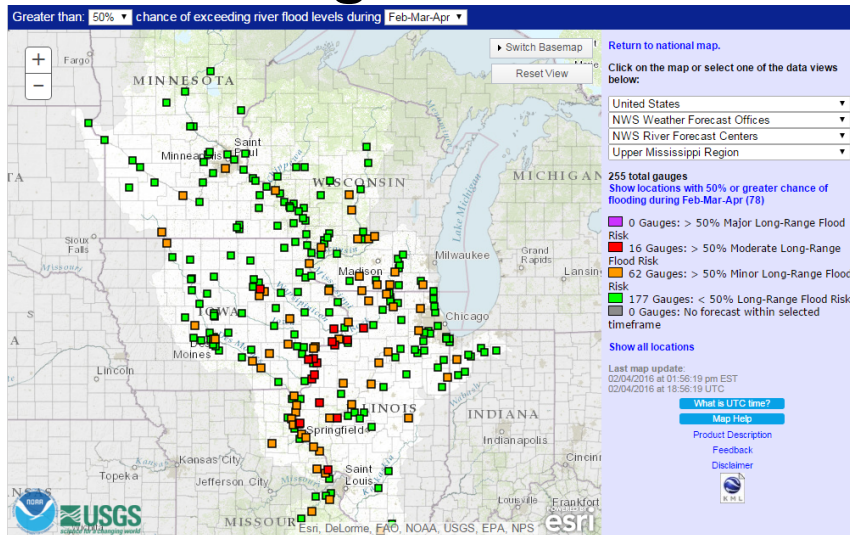
Water Forecasts for the Highs and Lows

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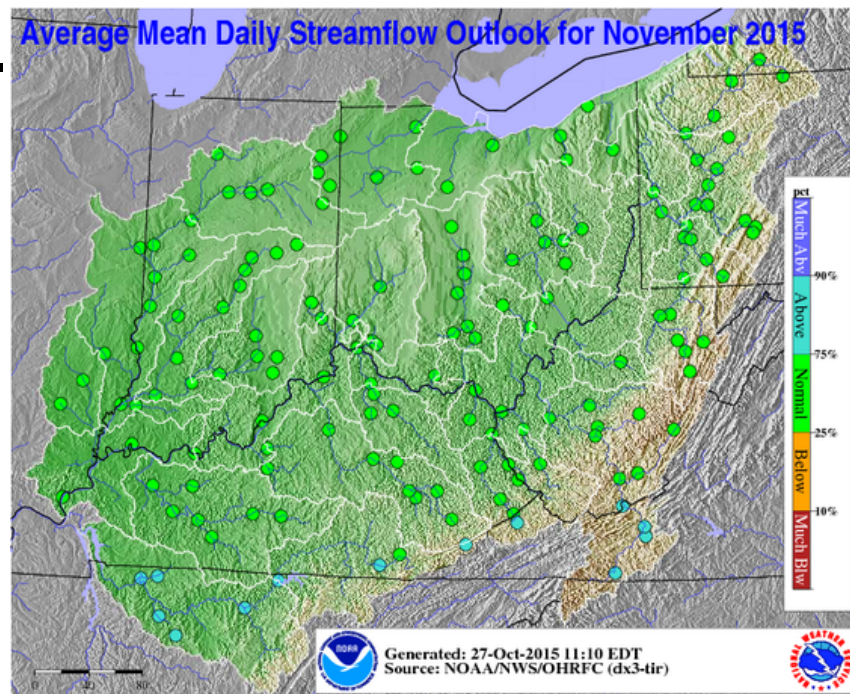


Building a Weather-Ready Nation

River Forecast Centers produce Water Resources Outlooks up to 90-days in advance to improve situational awareness for both drought and flood risk.



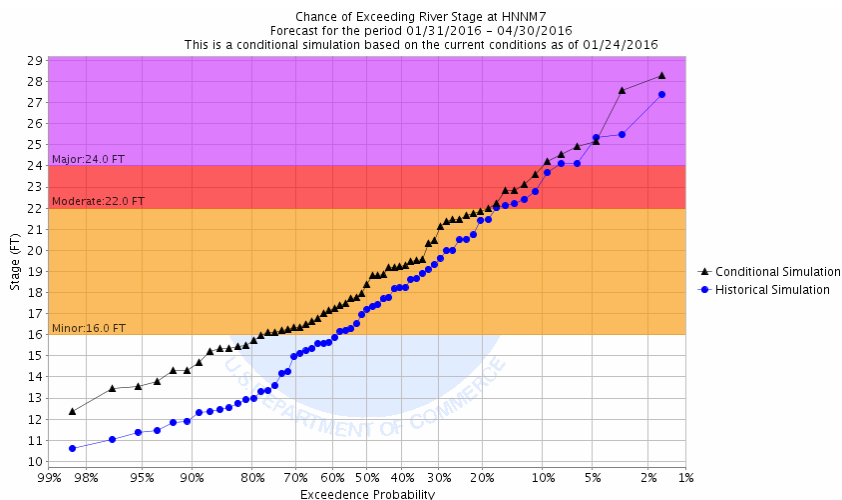
Seasonal Flood Risk Levels



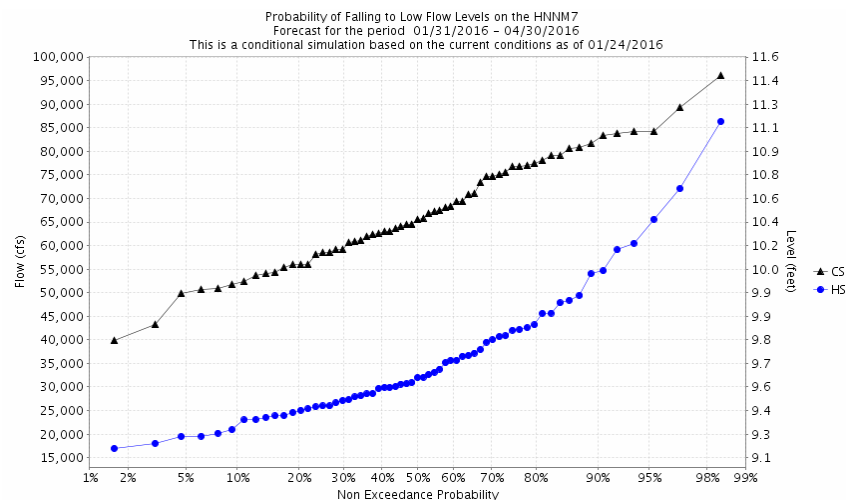
Forecast Flow Rate Characterization

High Flow Examples

Looking 90 days into the future using climate records since 1948. Climate forecasting models will be incorporated as their spatial resolution improves.



Chances of Exceeding Historical Highs

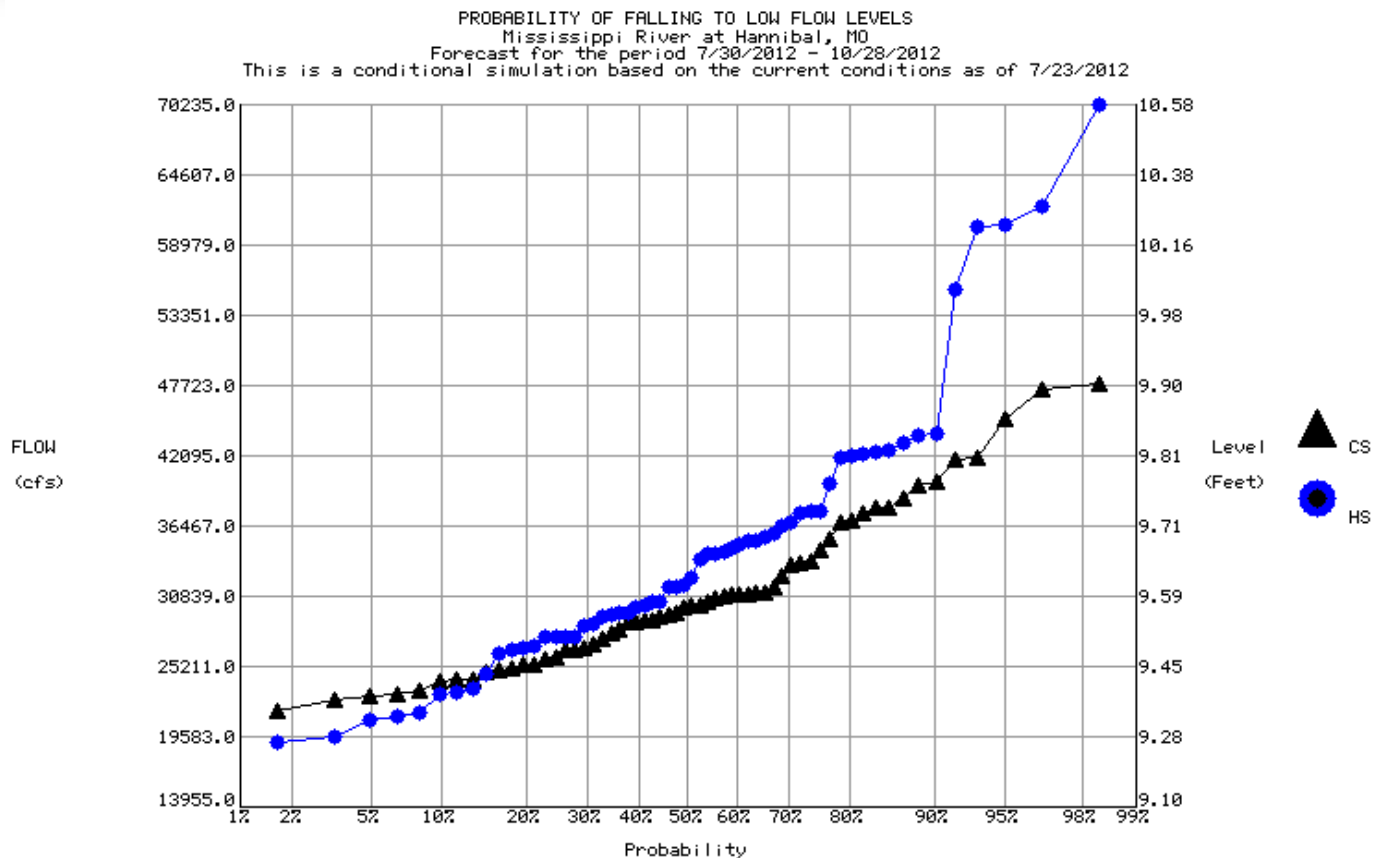


Chances of Breaching Historical Lows

Hannibal Missouri outlook for this spring indicates flows more likely to exceed historical highs than breach historic lows.



Low Flow Example



90 day outlook July 23, 2012 indicated more likely to breach lows.



Value Added Examples



- ☐ **Reservoir Management**
- ☐ **Water Supply Intake Monitoring**
- ☐ **Non-Governmental Organization**





Reservoir Vigilance

MINNESOTA POWER ISLAND LAKE DRAFT OPERATING PLAN - May 2005

TIMEFRAME	DRY CONDITION	NORMAL TO WET CONDITION
Pre-Winter Drawdown Period (November Mts to discuss overwinter drawdown) (November 1 st through January 31 st) <ul style="list-style-type: none">Review past 6 months of precipitationAssess antecedent conditions and determine if in dry periodDetermine if dry winter is predictedDocument process and decisions	Determine if dry conditions are present, and adjust drawdown schedule (maximum of 2.5 feet drawdown reduction see below). Future adjustment of drawdown schedule may eventually be based upon a long-term forecast by the National Weather Service and the State Climatology Office. Pre-winter drawdown adjustments will not be made unless consensus is reached concerning the accuracy of the long term forecast. Maintain FERC license minimum flow (cfs): November - 180 December - 170 January and February - 175 March - 215	Drawdown to 27.8 feet by March 31 st . Maintain FERC license minimum flow (cfs): November - 180 December - 170 January and February - 175 March - 215
Mid-Winter Drawdown Period (February Mts to discuss extent of drawdown) (February 1 st through March 31 st) <ul style="list-style-type: none">Review updated precipitation data and forecast to determine if in dry periodReview current snow coverReview model runoff predictionDetermine if adjustments are necessaryDocument process and decisions	Evaluate if dry conditions are present and adjust drawdown schedule. Drawdown adjustment decisions may include snow depth, moisture content, frost depth, spring runoff forecast, etc. A spring runoff forecast will be developed by the National Weather Service and the State Climatology Office depending upon availability of weather observer volunteers. Maximum reduction of overwinter drawdown from 38.5 to 30.3 feet (2.5 ft reduction which is one-half of the remaining water volume left under a full drawdown schedule of 10.7 feet). Maintain FERC license minimum flow (cfs): November - 180 December - 170 January and February - 175 March - 215	Drawdown to 38.5 to 27.8 feet (10.7 feet) or below if there is an above normal amount of snow cover. Maintain FERC license minimum flow (cfs): November - 180 December - 170 January and February - 175 March - 215
Spring Refill Period (Mid-April to Mid-May Mts to discuss refill forecast) Dry Refill Period - April 1 st through July 15 th Normal to Wet Refill Period - April 1 st through June 1 st <ul style="list-style-type: none">Review updated precipitation data and spring runoff forecastDetermine if dry period persistsDevelop a modified plot of Island Lake Reservoir elevations for the calendar year showing minimum discharge, actual discharge, inflow, normal refill curve, upper dry refill curve, and lower dry refill curve.Document process and decisions.	The Q95 minimum flow (cfs) are: April - 186 (84 cfs less than current minimum) May - 219 (106 cfs less than current minimum) June - 263 (77 cfs less than current minimum) July - 164 (1 cfs less than current minimum) If a Dry Drawdown Period is declared in the previous period, and when the U.S. Drought Monitor indicates D1 status or greater (moderate, severe, extreme, or exceptional drought), the Q95 minimum flow (cfs) or inflow, whichever is less, will be implemented. If a Dry Drawdown Period is declared in the previous period and the U.S. Drought Monitor indicates D0 status (abnormally dry), the Q95 minimum flow (cfs) will not be instituted until the actual Reservoir Refill elevation line intersects the Upper Dry Refill Curve.	Maintain FERC license minimum flow (cfs): April - 270 May - 325 June - 340 July - 165

Operations Guidance Matrix

Probability of Inflow Summary

	Dry Conditions Lower Target 36	Dry Conditions Upper Target 37.5	38.5
4/1 – 7/15	58%	50%	40%
3/21 – 7/15	58%	52%	43%
2/25 – 7/15	60%	53%	45%

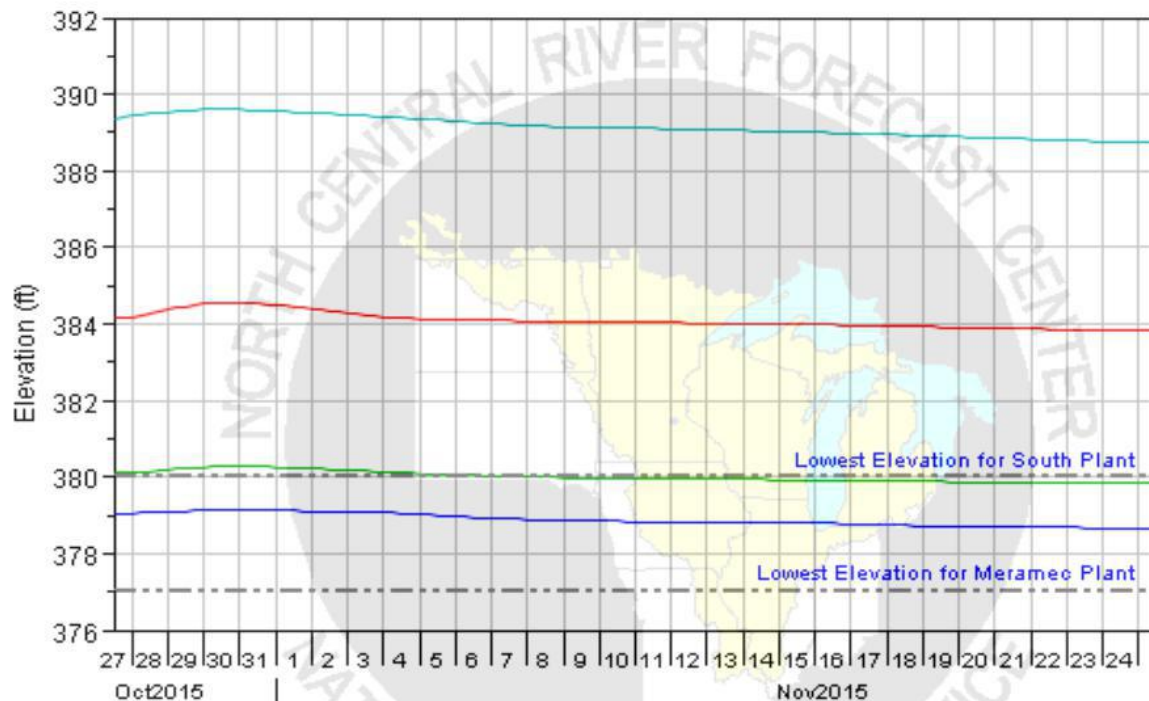
Chance of Achieving
Sufficient Inflow Volume



Building a Weather-Ready Nation

Water Supply Intakes

Meramec River - HEC-RAS Low Flow Model
Wed Oct 28 10:40:22 AM CDT 2015



The actual change in the elevations will depend on many factors.
This plot only includes one day of future rain for example.
Not an official forecast - model guidance only.

- Valley Park Gage
- South Plant
- Meramec Plant
- Arnold Gage


Plot forecast river levels with water intake levels



NGO As Regional Aggregator




The International Water Institute and their consultant worked with Federal, State and Local government units to compile a regional drought resource.

**Red River Basin**
Decision Information Network
Shared Tools for Regional Problem Solving

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Regional Drought Decision Support System




The **Regional Drought Decision Support System (RDDSS)** for the Red River of the North Basin (Red River Basin) is the vision of the **International Water Institute (IWI)** and collaborators. The intent of the RDDSS is to allow a user to obtain and display drought forecast information in an easy-to-use and interactive web application to make better, more informed decisions to mitigate impacts from drought events in the Red River Basin.

The project was funded through the National Oceanic and Atmospheric Administration (NOAA) Sectoral Applications Research Program (SARP: Water Resources and Drought Management category) Fund. The project timeline ran from 2009 through the end of 2011.

The RDDSS was designed as a demonstration project with the intent of developing a regional template for a drought DSS that is consistent with, and can be integrated into, the efforts of the **National Integrated Drought Information System (NIDIS)**. The project is being guided by a Steering Committee.

Project Team:

- International Water Institute
- National Weather Service North Central River Forecast Center
- Houston Engineering Inc.

**Red River Basin**
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Home About News Resources Projects Tools Contact Us

Regional Drought Decision Support System

SITE TABLE OF CONTENTS

- Welcome Page
- Regional Drought Tools**
 - Charts of Hydrologic Data
 - Subbasin Reports
 - Regional Drought Viewer
- Support Information**
 - Project Library
 - RDDSS Web Services
 - Project Collaborators and Participants
 - Other Drought Resources

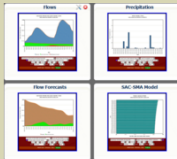
Welcome to the Regional Drought Decision Support System (RDDSS) for the Red River of the North Basin

The *Regional Drought Decision Support System (RDDSS)* for the Red River of the North Basin (Red River Basin) is the vision of the International Water Institute (IWI) and collaborators. The intent of this system is to allow a broad and diverse audience access to a common base of drought-related information for the Red River Basin. The RDDSS project was funded through the National Oceanic and Atmospheric Administration (NOAA) Sectoral Applications Research Program (SARP: Water Resources and Drought Management category) fund. The project was completed in December 2011.


The RDDSS was designed as a demonstration project with the intent of developing a regional template for a drought decision support system that is consistent with and can be integrated into the efforts of the National Integrated Drought Information System (NIDIS). The project is a collaborative effort between the IWI, the National Weather Service (NWS) North Central River Forecast Center (NCRFC), and Houston Engineering, Inc. and is being guided by a Steering Committee.

The products and applications developed through this project are one component of the Red River Basin Decision Information Network (RRBDIN) currently under development. The vision for the RRBDIN is to serve as the home and repository for a number of shared applications and data to improve decision-making within the Red River Basin.

For more information about this project please consult the project abstract or the full proposal. The Project Library link on the left side of this page also contains more information including technical memoranda and Steering Committee presentations created during the completion of the project. In-depth information on the functionality of the tools within the RDDSS and the information being presented are contained within the RDDSS Help document. Additional information can be obtained from the Principal Investigator, Mr. Charles Fritz, Director, International Water Institute, Phone: 701.388.0861, Email: charles@iwinst.org



Charts of Hydrologic Data



Regional Drought Viewer





NGO As Regional Aggregator



Detailed Water Availability and Use Reports

Weekly Subbasin Forecast Conditions Water Report

Subbasin Name: Red River of the North at Halstad, MN

NWSRFC Subbasin ID: HILN8

Area: 560 sq. miles

Water balance time period: 04/30/2015 - 05/06/2015

Report Created: February 05, 2016

Forecast/Modeled Values

Forecast streamflow:

Source: NWS NCRFC
Average streamflow: 803 cfs
Average streamflow volume: 1,594 AF/day
Normal average streamflow: 8,035 cfs
Departure from Normal: -7732.00 cfs
Percent of Normal: 10%
Decile: No Data

Forecast UZTWC:

Source: NWS NCRFC
Average depth: 1.4 inches
Average volume: 1,060,310 AF (assumes uniform soil moisture content over whole sub-basin)
Normal average depth: 1.47 inches
Departure from Normal: -0.07 inches
Percent of Normal: 95%
Decile: 5

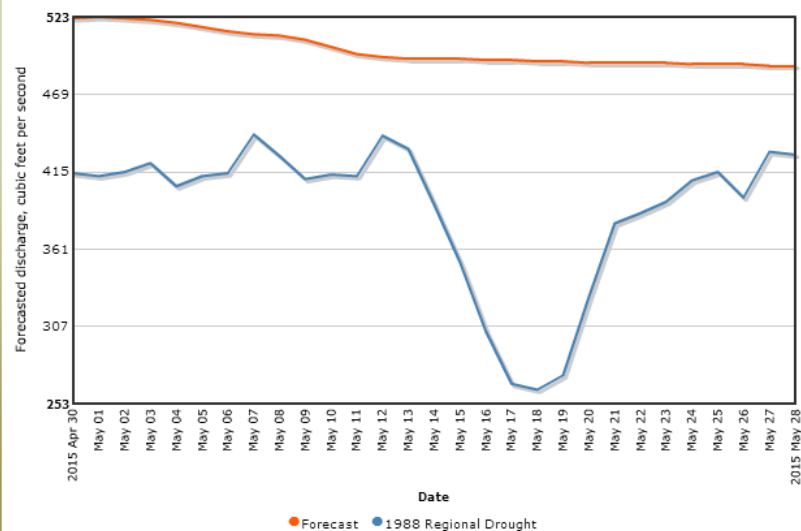


Permitted Withdrawers in the Subbasin

Top 5 Permittees	Permitted Volume		Permitted Rate		Max Allowable Withdrawal Rate(cfs)
	(acre-ft/year)	cfs	(gallons/minute)	(cfs)	
FARGO, CITY OF	109,500	151.3	67,320	150.0	151.3
MOORHEAD PUBLIC SERVICE	3,650	5.0	6,950	15.5	15.5
MOORHEAD PUBLIC SERVICE	9,000	12.4	0	0.0	12.4
AMERICAN CRYSTAL SUGAR CO.	1,841	2.5	3,456	7.7	7.7
FARGO, CITY OF	4,480	6.2	2,782	6.2	6.2
Sum of top 5 permitted withdrawers in the subbasin (cfs)					193.1
Sum of all permitted withdrawers in the subbasin (cfs)					197.8
Percent of Normal Average Streamflow					2472.5%
Percent of Forecasted Average Streamflow					24.6%

Red River Of The North at Fargo ND

USGS Station 05054000, NWS Location Identifier: FGON8
Daily values from 2015-04-30 to 2015-05-28



Red River Of The North at Fargo ND
Display 1988 drought data
Apr 30 2015 to May 28 2015
Chart: Solid Line Width: 640 Height: 480
RDDSS Home | Charts | Disclaimer | Help | [Submit](#)

Graphical Presentations



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