

Examples of Long-Range Probabilistic Hydrologic Outlooks

Long-range hydrologic outlooks contain probability values that are calculated using current conditions of the river with multiple season scenarios from 30 or more years of historical data. Current conditions include height or flow of the river, estimated water content of any existing snow cover and soil moisture. Additionally, 30 to 90 day long-range outlooks of temperature and precipitation may also be considered. By providing the complete range of probabilities, the level of risk associated with long-range planning decisions can be determined. These probabilistic outlooks are part of the National Weather Service's Advanced Hydrologic Prediction Service (AHPS).

The flood categories used by the National Weather Service are as follows:

Minor flooding - when the river reaches flood stage and causes minimal or no property damage, but possibly some public threat.

Moderate flooding – when river levels cause some inundation of structures and roads near stream with some evacuations of people and/or transfer of property to higher elevations.

Major flooding – when river levels cause extensive inundation of structures and roads with significant evacuations of people and/or transfer of property to higher elevations.

Three examples follow that use various customer input received over the last several years. Graphical representations follow the text examples.*

In Example 1, the probabilistic hydrologic outlook contains two tables, the first table provides information on the probability of reaching minor, moderate and major flooding, and the second table provides information on the probability (at 10 % intervals) of exceeding a given stage at a given location over the next 90 days.

Example 1

THIS OUTLOOK IS VALID FROM FEB 1 2011 - MAY 2 2011

THE FOLLOWING TABLE GIVES THE CHANCE OF REACHING DIFFERENT FLOOD LEVELS AT THE GAGES DURING THE VALID PERIOD.

...TABLE 1--PROBABILITIES FOR MINOR...MODERATE AND MAJOR FLOODING...

LOCATION	FLOOD LEVELS (FT)			APPROXIMATE CHANCE OF REACHING FLOOD LEVELS		
	MINOR	MOD	MAJOR	MINOR	MOD	MAJOR
MISSISSIPPI RIVER						
DUBUQUE LD11 IA	16.0	17.0	20.5	98%	93%	67%
DUBUQUE IA	17.0	18.0	21.5	98%	98%	72%
BELLEVUE LD12 IA	17.0	18.0	20.0	88%	86%	65%

IN THE TABLE BELOW...THE 90 THROUGH 10 PERCENT COLUMNS INDICATE THE CHANCE THE RIVER COULD RISE ABOVE THE LISTED STAGE LEVELS IN THE NEXT 90 DAYS.

...TABLE 2--EXCEEDANCE PROBABILITIES...

CHANCE OF EXCEEDING STAGES AT SPECIFIC LOCATIONS

LOCATION	FS(FT)	90%	80%	70%	60%	50%	40%	30%	20%	10%
MISSISSIPPI RIVER										
DUBUQUE LD11	16.0	17.4	19.1	20.3	21.5	22.2	23.2	24.0	24.7	26.2
DUBUQUE	17.0	19.0	20.7	21.9	22.9	23.6	24.7	25.4	26.3	29.3
BELLEVUE LD12	17.0	16.9	18.6	19.8	20.7	21.3	22.0	22.6	22.8	23.8

In Example 2, the probabilistic hydrologic outlook contains three tables, the first table (1A) provides information on the probability of reaching minor, moderate and major flooding in a slightly different format than used in Example 1; the second table (1B) provides additional information on the departure from normal of reaching minor, moderate, and major flooding; and the third table (2) provides the probability (at 10 % intervals) of exceeding a given stage at a given location, similar to Example 1.

The main difference between this example and the previous example is the information in the second table (1B), which shows how the flood threat deviates from normal for minor, moderate, and major flooding.

Example 2

...TABLE 1A--PROBABILITIES FOR MINOR...MODERATE AND MAJOR FLOODING...

VALID 2/1/2011 - 5/2/2011

LOCATION	-----FLOOD STAGE-----					
	MINOR		MODERATE		MAJOR	
	STG	PCT	STG	PCT	STG	PCT
MISSISSIPPI RIVER						
DUBUQUE LD11	16.0	98%	17.0	93%	20.5	67%
DUBUQUE	17.0	98%	18.0	98%	21.5	72%
BELLEVUE LD12	17.0	88%	18.0	86%	20.0	65%

...TABLE 1B--DEPARTURES FROM NORMAL OF REACHING MINOR...MODERATE AND MAJOR FLOOD STAGE...

VALID 2/1/2011 - 5/2/2011

LOCATION	-----FLOOD STAGE-----					
	MINOR		MODERATE		MAJOR	
	STG	DEPARTURE	STG	DEPARTURE	STG	DEPARTURE
MISSISSIPPI RIVER						
DUBUQUE LD11	16.0	53% ABOVE	17.0	56% ABOVE	20.5	60% ABOVE
DUBUQUE	17.0	51% ABOVE	18.0	58% ABOVE	21.5	65% ABOVE
BELLEVUE LD12	17.0	58% ABOVE	18.0	67% ABOVE	20.0	59% ABOVE

NR NORMAL = WITHIN 5% OF NORMAL

...TABLE 2--EXCEEDANCE PROBABILITIES... (same as Ex. 1 Table 2)

CHANCE OF EXCEEDING STAGES AT SPECIFIC LOCATIONS

VALID 2/1/2011 - 5/2/2011

LOCATION	FS(FT)	90%	80%	70%	60%	50%	40%	30%	20%	10%
MISSISSIPPI RIVER										
DUBUQUE LD11	16.0	17.4	19.1	20.3	21.5	22.2	23.2	24.0	24.7	26.2
DUBUQUE	17.0	19.0	20.7	21.9	22.9	23.6	24.7	25.4	26.3	29.3

BELLEVUE LD12 17.0 16.9 18.6 19.8 20.7 21.3 22.0 22.6 22.8 23.8

In Example 3 the probabilistic hydrologic outlook contains only two tables, the first table (1) combines information on the probability of reaching minor, moderate and major flooding in a similar format to what was used in example 2(1A) above, but with only information on the departure from normal of reaching flood stage; and the second table (2) provides the probability of exceeding a given stage at a given location but uses different and fewer percentage intervals than what was used in examples 1 and 2.

The main difference in this example is that it only gives you departure from normal for reaching flood stage (not for moderate or major flooding), and this example uses different, and fewer, percentage intervals for exceedance probabilities.

Example 3

CHANCE OF EXCEEDING MINOR TO MAJOR FLOOD STAGE
 DEVIATION FROM NORMAL FLOOD RISK
 VALID PERIOD: 2/1/2011 - 5/2/2011

...TABLE 1--PROBABILITIES FOR MINOR...MODERATE AND MAJOR FLOODING...

LOCATION	-----FLOOD STAGES-----						DEP FROM NORMAL OF REACHING FLOOD STAGE
	MINOR		MODERATE		MAJOR		
	STG	PCT	STG	PCT	STG	PCT	
MISSISSIPPI RIVER							
DUBUQUE LD11	16	98%	17	93%	21	67%	ABOVE NORMAL
DUBUQUE	17	98%	18	98%	22	72%	ABOVE NORMAL
BELLEVUE LD12	17	88%	18	86%	20	65%	ABOVE NORMAL

...TABLE 2--EXCEEDANCE PROBABILITIES...

CHANCE OF EXCEEDING STAGES AT SPECIFIC LOCATIONS
 VALID PERIOD: 2/1/2011 - 5/2/2011

	95%	90%	75%	50%	25%	10%	5%
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MISSISSIPPI RIVER							
DUBUQUE LD11	16.5	17.4	19.1	22.2	24.5	26.2	27.3
DUBUQUE	18.1	19.0	21.1	23.6	26.0	29.3	31.5
BELLEVUE LD12	16.3	16.9	18.7	21.3	22.8	23.8	24.7

LEGEND

STG = STAGE (FEET)

PCT = PERCENT

--- = DISTRIBUTION COMPLETELY BELOW THIS STAGE

DEP = DEPARTURE

NEAR NORMAL = 0.5 - 1.5 times normal

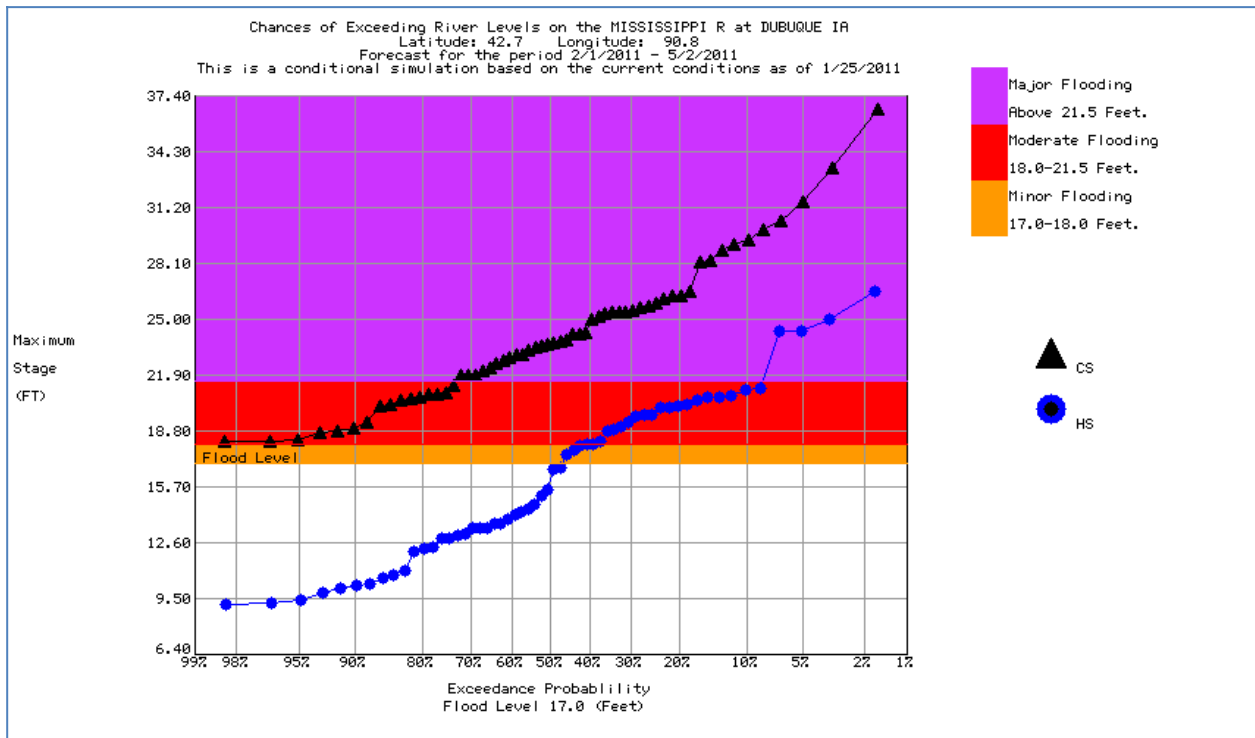
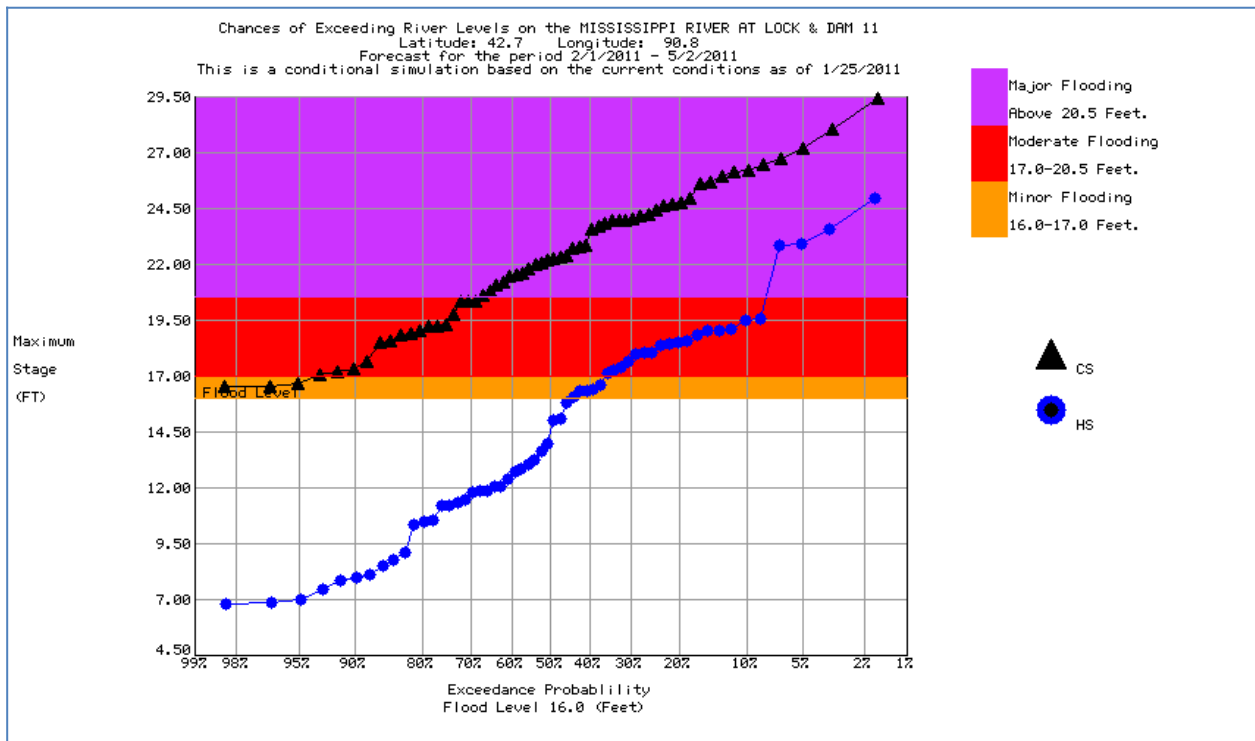
BELOW NORMAL = 0.25 - 0.50 times normal

MUCH BELOW NORMAL = <0.25 times

ABOVE NORMAL = >1.5 - 3.0 times normal

MUCH ABOVE NORMAL = > 3.0 times normal

* Hydrographs for reference:



Chances of Exceeding River Levels on the MISSISSIPPI R at LOCK & DAM 12
 Latitude: 42.4 Longitude: 90.6
 Forecast for the period 2/1/2011 - 5/2/2011
 This is a conditional simulation based on the current conditions as of 1/25/2011

