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PROBABILISTIC HYDROLOGIC OUTLOOK
NATIONAL WEATHER SERVICE EASTERN NORTH DAKOTA/GRAND FORKS ND
1057 AM CST Thu Feb 29 2024

...SPRING FLOOD AND WATER RESOURCES OUTLOOK...

...RED RIVER BASIN OUTLOOK FOR RIVER FLOOD POTENTIAL...

This outlook covers the Red River of the North
and its Minnesota and North Dakota tributaries.

...ISOLATED MINOR FLOODING IS EXPECTED FOR SOME LOCATIONS IN THE RED
RIVER OF THE NORTH BASIN...

* This 90-day outlook covers the period from 3/4/2024 to 6/2/2024.

.OUTLOOK SUMMARY...

* Probabilities for exceeding Major, Moderate, Minor Flood Stage...

Major Flooding...

There is a low risk (less than 35 percent chance) of major
flooding across the basin.

Moderate Flooding...

There is a medium risk (35 to 65 percent chance) of moderate
flooding at Fargo/Moorhead and Oslo on the Red River. In North
Dakota, there is a medium risk of moderate flooding at Abercrombie on
the Wild Rice River.

There is a low risk (less than 35 percent chance) of moderate
flooding elsewhere across the basin.

Minor Flooding...

There is high risk (greater than 65 percent chance) of minor
flooding at Fargo/Moorhead on the Red River.

There is a medium risk (35 to 65 percent chance) of minor flooding
at Wahpeton and Grand Forks/East Grand Forks on the Red River. In
Minnesota, there is a medium risk of minor flooding at Sabin on the
South Branch Buffalo River, Dilworth on the Buffalo River, Hendrum on
the Wild Rice River, and Hallock on the Two Rivers River.

There is a low risk (less than 35 percent chance) of minor
flooding elsewhere across the basin.

.OUTLOOK DISCUSSION...

Hydrologic and climate conditions which affect each of the several
factors that significantly determine the timing and magnitude of
spring snowmelt flooding within the Red River of the North are

discussed below:

* FALL AND WINTER PRECIPITATION AND SOIL MOISTURE...

While overall fall precipitation was below normal, winter precipitation has been near to above normal for much of the basin (due to rain and ice events).

* SOIL MOISTURE...

Soil moisture remains lower than normal across much of the basin with moderate to severe drought conditions across the north and abnormally dry conditions in the south.

* RIVER FLOWS...

At the end of December, base streamflows were flowing near to slightly higher than normal on the Red River mainstem and its tributaries.

* FROST DEPTHS...

January cold formed a deep frost layer across much of the basin. However, February warmth allowed for some thawing to begin, especially in the south. Lake/river observations indicate ice cover is thinner and less consistent than normal due to mild temperatures.

* SNOWPACK CONDITIONS...

The current snowpack and associated water content is much below normal. Since December 1, 2023, snowfall has been running roughly 10 to 50 percent of normal, lowest across the southern two-thirds of the basin. The majority of any lingering snowpack melted and infiltrated the soils throughout February. Additional snow fell earlier this week across central portions of the basin and the associated water content has been incorporated into this outlook.

* FACTORS YET TO BE DETERMINED...

- Further snowpack growth,
- Rate of snowmelt/thaw,
- Heavy rain on snow or frozen ground during thaw or peak flood,
- Heavy rain on ice-covered rivers causing short-term ice jams.

* SHORT TERM WEATHER FORECAST...

Generally above normal temperatures will continue throughout the first week of March. Dry conditions will persist through the end of the week before the potential for rain and/or snow returns late in the weekend and early next week.

* LONG TERM CLIMATE OUTLOOK...

Climate outlooks indicate above normal temperatures into spring. This will continue to melt any remaining snowpack and introduce the possibility of rain instead of snow through early spring.

.NEXT SPRING FLOOD OUTLOOK...

The next 2024 spring flood outlook will be issued on Thursday, March 14, 2024.

.FLOOD OUTLOOK PROBABILITIES TABLES...

The following message has two sections: the first gives the current and normal/historical chances of river locations reaching their minor, moderate, and major flood category. The second gives the current chances of river locations rising above river stages listed.

...Red River Long-Range Probabilistic Outlook by Flood Category...

Valid from March 4, 2024 to June 2, 2024

In Table 1 below, the current (CS) and historical (HS), or normal, probabilities of exceeding minor, moderate, and major flood stages are listed for the valid time period.

CS values indicate the probability of reaching a flood category based on current conditions.

HS values indicate the probability of reaching a flood category based on historical, or normal, conditions.

When the value of CS is greater than HS, the probability of exceeding that level is higher than normal. When the value of CS is less than HS, the probability of exceeding that level is lower than normal.

...Table 1--Probabilities for Minor, Moderate, and Major Flooding

Valid Period: 03/04/2024 - 06/02/2024

				: Current and Historical : Chances of Exceeding : Flood Categories : as a Percentage (%)					
				: Categorical : Flood Stages (FT)					
Location	Minor	Mod	Major	: Minor	CS HS	Moderate	CS HS	Major	CS HS
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Red River of the North.....									
WAHPETON	11.0	13.0	15.0	:	60 62	22 31	<5 18		
HICKSON	30.0	34.0	38.0	:	13 27	<5 14	<5 <5		
FARGO	18.0	25.0	30.0	:	86 85	36 40	13 26		
HALSTAD	26.0	32.0	37.5	:	23 38	10 22	<5 12		
GRAND FORKS	28.0	40.0	46.0	:	41 57	10 31	<5 11		
OSLO	26.0	30.0	36.0	:	49 63	37 56	<5 18		
DRAYTON	32.0	38.0	42.0	:	24 48	11 33	<5 12		
PEMBINA	39.0	44.0	49.0	:	28 52	14 43	<5 22		

				: Current and Historical : Chances of Exceeding : Flood Categories : as a Percentage (%)					
				: Categorical : Flood Stages (FT)					
Location	Minor	Mod	Major	: Minor	CS HS	Moderate	CS HS	Major	CS HS
-----	-----	-----	-----	:	--- ---	--- ---	--- ---	--- ---	---
Minnesota Tributaries.....									
Note: The Roseau numbers consider the flow through its diversion									
SABIN	13.0	15.0	19.0	:	47 61	9 17	<5 <5		
HAWLEY	8.0	9.0	11.0	:	15 40	7 25	<5 <5		

DILWORTH	13.0	20.0	26.0	:	57	71	9	21	<5	<5
TWIN VALLEY	10.0	12.0	14.0	:	<5	17	<5	8	<5	<5
HENDRUM	20.0	28.0	32.0	:	41	54	10	22	<5	7
SHELLY	14.0	20.0	23.0	:	5	28	<5	11	<5	6
CLIMAX	20.0	25.0	30.0	:	7	25	<5	12	<5	8
HIGH LANDING	12.0	12.5	13.0	:	<5	12	<5	9	<5	7
CROOKSTON	15.0	20.0	23.0	:	17	50	<5	27	<5	9
ABOVE WARREN	67.0	71.0	75.0	:	<5	11	<5	<5	<5	<5
ALVARADO	106.0	108.0	110.0	:	17	26	8	17	<5	<5
HALLOCK	802.0	806.0	810.0	:	49	62	15	41	<5	10
ROSEAU	16.0	18.0	19.0	:	<5	21	<5	13	<5	8

				:	: Current and Historical					
				:	: Chances of Exceeding					
				:	: Flood Categories					
				:	: as a Percentage (%)					
				:						
				:	Categorical					
				:	Flood Stages (FT)					
				:	Minor		Moderate		Major	
Location	Minor	Mod	Major	:	CS	HS	CS	HS	CS	HS
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North Dakota Tributaries.....										
ABERCROMBIE	20.0	22.0	28.0	:	53	42	42	34	7	20
VALLEY CITY	15.0	16.0	17.0	:	<5	10	<5	7	<5	6
LISBON	15.0	17.0	19.0	:	<5	11	<5	10	<5	7
KINDRED	16.0	19.0	20.5	:	5	20	<5	11	<5	10
WEST FARGO DVRSN	18.0	20.0	21.0	:	<5	12	<5	11	<5	10
HARWOOD	84.0	86.0	91.0	:	12	26	9	21	6	10
ENDERLIN	9.5	12.0	14.0	:	17	28	<5	11	<5	<5
MAPLETON	18.0	21.0	23.0	:	30	38	11	18	<5	5
HILLSBORO	10.0	13.0	16.0	:	5	19	<5	10	<5	<5
MINTO	6.0	8.0	11.0	:	<5	25	<5	7	<5	<5
WALHALLA	11.0	16.0	18.0	:	<5	21	<5	<5	<5	<5
NECHE	18.0	19.0	20.5	:	<5	27	<5	26	<5	20

South Fork Buffalo River.....							
SABIN	8.8	9.3	11.1	12.9	13.8	14.8	15.3
Buffalo River.....							
HAWLEY	4.5	4.8	5.3	6.5	7.6	8.3	9.1
DILWORTH	7.6	8.3	10.5	15.2	17.9	19.8	20.9
Wild Rice River.....							
TWIN VALLEY	3.3	3.6	4.2	5.4	6.9	8.6	9.6
HENDRUM	7.5	8.4	12.3	18.6	22.4	27.9	28.8
Marsh River.....							
SHELLY	5.1	5.3	6.1	8.2	9.4	12.2	14.5
Sand Hill River.....							
CLIMAX	6.0	6.2	7.7	10.1	11.8	19.0	21.1
Red Lake River.....							
HIGH LANDING	2.7	2.8	3.5	4.3	5.7	7.4	8.8
CROOKSTON	6.2	6.4	7.7	11.1	13.7	18.0	19.7
Snake River.....							
ABOVE WARREN	62.0	62.1	62.7	63.3	64.2	65.9	66.8
ALVARADO	97.8	98.0	99.7	101.1	105.0	107.5	108.7
Two Rivers River.....							
HALLOCK	797.1	797.5	799.4	801.7	804.2	807.4	808.0
Roseau River..... considering the flow through the Roseau diversion							
ROSEAU	7.4	7.7	8.3	9.5	11.6	13.5	15.2

North Dakota Tribs:	95%	90%	75%	50%	25%	10%	05%
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Wild Rice River.....							
ABERCROMBIE	12.3	13.6	16.4	20.6	24.1	27.4	29.2
Sheyenne River.....							
VALLEY CITY	4.9	5.1	5.4	6.8	9.0	11.0	11.8
LISBON	4.1	4.2	4.5	5.7	8.5	10.6	11.7
KINDRED	5.6	5.6	6.7	8.4	11.0	12.5	16.7
WEST FARGO DVRSN	8.7	8.7	9.1	10.9	12.9	13.0	16.6
HARWOOD	73.0	73.3	74.1	77.3	79.9	84.7	91.2
Maple River.....							
ENDERLIN	4.1	4.5	5.2	7.1	8.7	10.3	11.5
MAPLETON	11.2	11.4	12.2	15.7	18.8	21.4	22.2
Goose River.....							
HILLSBORO	2.8	2.9	3.4	4.3	5.9	7.7	10.2
Forest River.....							
MINTO	1.9	1.9	2.1	2.8	3.4	5.3	5.8
Pembina River.....							
WALHALLA	2.7	2.8	3.2	4.0	5.0	6.5	7.8
NECHE	4.0	4.2	5.0	6.5	9.0	13.0	14.9

.THE OUTLOOK PRODUCTION PROCESS...

This long range probabilistic outlook is based on a series of peak river levels or crests taken from the forecast hydrograph results of the NWS Community Hydrologic Prediction System (CHPS). The model is run for multiple scenarios starting at current river levels and soil conditions using 69 years (1949-2018) of past precipitation and temperature conditions that were experienced for those past years during the time-frame of the outlook period. These crests can then be ranked from lowest to highest and assigned an exceedance probability. For example, for a series of 50 years, the lowest ranked crest has 49 crests above it and since 95 percent of the crests are above it, it is assigned a 95 percent probability of exceedance (POE).

A YouTube video on "How to Interpret River Outlook Products" is at:

www.youtube.com/watch?v=pSoEgvsnpv4

The probabilities can be used for risk management by using them as an indication of the range of crests that may be expected during the valid period of the outlook. By providing a range of peak river level probabilities, the NWS is contributing to the area's Decision Support Services that help with long-range flood planning and response readiness. This outlook is a part of NOAA's National Weather Service's AHPS (Advanced Hydrologic Prediction Services).

.ADDITIONAL INFORMATION SOURCES...

The AHPS Long-Range Probabilistic Hydrologic Outlooks are issued each month typically between the first and second Friday after mid-month. However, Spring Flood and Water Resources Outlooks are issued several times leading up to the spring melt period, usually on Thursdays beginning in late February or early March and ending in early April, depending on the spring flooding conditions.

This outlook is also presented as graphs of the probability of stage exceedance for the full period and for weekly intervals during the period. These graphs, along with explanations for interpreting them, are available from the NWS Grand Forks AHPS web page:

www.weather.gov/grandforks or weather.gov/fgf

then click on the "Rivers and Lakes" tab above the map.

Current river conditions for all river forecast points in the Red River of the North and Devils/Stump Lake basins are also available on our website, as well as 7-day forecasts when river levels at forecast points are in or near flood.

Additional Probabilistic Hydrologic Outlooks will be issued monthly throughout the rest of the year during the later part of the month or as conditions warrant.

Refer to the separate Devils Lake Probabilistic Hydrologic Outlook for Devils and Stump Lakes Probability of Exceedance levels and low-water non-exceedance levels.

If you have any questions, contact the NWS at 701-772-0720.

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