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PROBABILISTIC HYDROLOGIC OUTLOOK
NATIONAL WEATHER SERVICE EASTERN NORTH DAKOTA/GRAND FORKS ND
1017 AM CDT Thu Mar 14 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.

...MINOR FLOODING IS EXPECTED FOR A FEW LOCATIONS IN THE RED RIVER OF THE NORTH BASIN...

* This 90-day outlook covers the period from 3/18/2024 to 6/16/2024.

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

Minor Flooding...

There is a high risk (greater than 65 percent) 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 Oslo on the Red River. In North Dakota, there is a medium risk of minor flooding at Abercrombie on the Wild Rice River. In Minnesota, there is a medium risk of minor flooding at Sabin on the South Branch Buffalo River, Dilworth on the Buffalo 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 SNOWPACK...

Precipitation has been above normal through winter for much of the basin due to rain and ice events. Much of the remaining snowpack has melted into the soils across the basin.

* 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.

* FROST DEPTHS AND RIVER ICE...

January cold formed a deep frost layer across much of the basin. However, February/early March warmth has 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.

* 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.

* 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 near to above normal temperatures and dry conditions into next week. The exception will be chances for light precipitation this weekend across the northern Red River Valley into northwest Minnesota.

* LONG TERM CLIMATE OUTLOOK...

Climate outlooks indicate above normal temperatures through spring. This will continue to increase the possibility of rain instead of snow through spring.

.NEXT SPRING FLOOD OUTLOOK...

This is the last official spring flood outlook for 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 18, 2024 to June 16, 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: 03/18/2024 - 06/16/2024

Location	Categorical Flood Stages (FT) Minor	Mod	Major	Current and Historical Chances of Exceeding Flood Categories as a Percentage (%) Minor CS	Minor HS	Moderate CS	Moderate HS	Major CS	Major HS
Red River of the North.....									
WAHPETON	11.0	13.0	15.0	49	64	19	34	<5	18
HICKSON	30.0	34.0	38.0	14	28	<5	16	<5	<5
FARGO	18.0	25.0	30.0	73	84	33	41	11	28
HALSTAD	26.0	32.0	37.5	19	38	9	22	<5	12
GRAND FORKS	28.0	40.0	46.0	33	59	12	31	<5	11
OSLO	26.0	30.0	36.0	37	66	32	56	<5	18
DRAYTON	32.0	38.0	42.0	18	48	12	33	<5	12
PEMBINA	39.0	44.0	49.0	23	52	13	43	<5	22

Location	Categorical Flood Stages (FT) Minor	Mod	Major	Current and Historical Chances of Exceeding Flood Categories as a Percentage (%) Minor CS	Minor HS	Moderate CS	Moderate HS	Major CS	Major HS
Minnesota Tributaries.....									
Note: The Roseau numbers consider the flow through its diversion									
SABIN	13.0	15.0	19.0	39	60	6	17	<5	<5
HAWLEY	8.0	9.0	11.0	11	39	<5	23	<5	<5
DILWORTH	13.0	20.0	26.0	44	69	8	21	<5	<5
TWIN VALLEY	10.0	12.0	14.0	<5	17	<5	8	<5	<5
HENDRUM	20.0	28.0	32.0	33	54	7	22	<5	7
SHELLY	14.0	20.0	23.0	5	28	<5	11	<5	6
CLIMAX	20.0	25.0	30.0	6	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	19	53	8	28	<5	9
ABOVE WARREN	67.0	71.0	75.0	<5	11	<5	<5	<5	<5
ALVARADO	106.0	108.0	110.0	17	28	7	17	<5	<5
HALLOCK	802.0	806.0	810.0	42	63	16	43	<5	11
ROSEAU	16.0	18.0	19.0	6	24	<5	14	<5	9

Current and Historical

Location	Categorical Flood Stages (FT) Minor	Mod	Major	Chances of Exceeding Flood Categories as a Percentage (%) Minor CS	Minor HS	Moderate CS	Moderate HS	Major CS	Major HS
North Dakota Tributaries.....									
ABERCROMBIE	20.0	22.0	28.0	39	43	33	36	5	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	7	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	10	26	8	21	<5	10
ENDERLIN	9.5	12.0	14.0	16	26	<5	11	<5	<5
MAPLETON	18.0	21.0	23.0	27	39	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

LEGEND:
CS = Conditional Simulation (Outlook for current conditions)
HS = Historical Simulation (" " normal conditions)
FT = Feet (above gage zero datum)

...Red River Long-Range Probabilistic Outlook by River Stage...

Valid from March 18, 2024 to June 16, 2024

LOCATION	95%	90%	75%	50%	25%	10%	05%
Red River of the North.....							
WAHPETON	6.4	7.4	9.4	11.0	12.7	14.1	14.8
HICKSON	12.4	13.3	16.4	20.1	26.2	31.1	33.7
FARGO	15.6	15.9	17.6	19.9	25.6	31.5	33.7
HALSTAD	9.2	9.2	11.2	16.2	23.8	31.1	34.3
GRAND FORKS	19.6	19.6	19.7	22.3	30.9	40.8	42.8
OSLO	16.8	16.8	16.8	21.7	31.4	34.9	35.8
DRAYTON	18.8	18.8	18.9	22.9	30.0	38.8	40.2
PEMBINA	24.7	24.7	24.8	30.4	38.3	46.4	48.3

Minnesota Tribs:	95%	90%	75%	50%	25%	10%	05%
South Fork Buffalo River.....							
SABIN	5.8	8.1	10.2	12.2	13.7	14.7	15.0
Buffalo River.....							
HAWLEY	4.2	4.2	4.7	5.6	7.1	8.2	9.0
DILWORTH	5.7	6.0	9.4	12.4	17.5	19.2	20.8
Wild Rice River.....							
TWIN VALLEY	2.9	3.3	3.8	4.8	6.8	8.8	9.5
HENDRUM	6.3	6.3	9.2	15.2	22.5	27.3	28.3
Marsh River.....							
SHELLY	5.5	5.5	5.6	7.7	9.6	12.6	14.2
Sand Hill River.....							
CLIMAX	7.4	7.5	7.6	9.0	11.9	19.1	20.6
Red Lake River.....							
HIGH LANDING	2.9	2.9	3.5	4.5	6.3	8.0	9.0
CROOKSTON	7.3	7.3	7.7	10.1	14.1	19.1	21.0
Snake River.....							

ABOVE WARREN	62.1	62.1	62.6	63.4	64.2	65.9	66.5
ALVARADO	98.0	98.1	98.8	100.8	104.7	107.4	108.6
Two Rivers River.....							
HALLOCK	796.8	796.9	798.8	801.0	803.8	807.4	808.0
Roseau River..... considering the flow through the Roseau diversion							
ROSEAU	7.2	7.3	8.2	9.3	11.2	15.0	16.6

North Dakota Tribs:	95%	90%	75%	50%	25%	10%	05%
Wild Rice River.....							
ABERCROMBIE	11.2	11.2	13.7	16.9	23.2	26.3	28.4
Sheyenne River.....							
VALLEY CITY	5.6	5.6	5.6	6.8	9.0	10.8	12.7
LISBON	4.8	4.8	4.8	5.9	8.1	11.0	13.2
KINDRED	7.4	7.4	7.4	8.0	10.2	13.5	17.3
WEST FARGO DVRSN	10.3	10.3	10.3	10.8	11.7	14.5	17.2
HARWOOD	74.5	74.5	74.5	75.8	79.7	84.6	90.5
Maple River.....							
ENDERLIN	4.1	4.1	4.8	6.0	7.8	10.2	11.7
MAPLETON	12.1	12.1	12.1	13.6	18.2	21.3	22.2
Goose River.....							
HILLSBORO	2.9	2.9	3.0	3.9	5.4	7.4	9.7
Forest River.....							
MINTO	2.0	2.0	2.0	2.5	3.4	4.9	5.5
Pembina River.....							
WALHALLA	3.0	3.2	3.7	4.4	5.5	7.1	7.7
NECHE	4.6	4.9	5.7	7.2	9.6	13.5	14.8

.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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