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PROBABILISTIC HYDROLOGIC OUTLOOK
NATIONAL WEATHER SERVICE EASTERN NORTH DAKOTA/GRAND FORKS ND
1246 PM CST Thu Jan 28 2021

...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.

...LOW TO MODERATE RISK OF MINOR FLOODING THIS SPRING ALONG THE
MAINSTEM RED RIVER AND ITS TRIBUTARIES...

 * This 90-day outlook covers the period from 02/01/21 to 05/02/21.

.OUTLOOK SUMMARY...

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

Major Flooding...

   There is a low risk (well below 35 percent) of major flooding
throughout the basin with this outlook issuance.

Moderate Flooding...

   There is a low risk (below 35 percent) of moderate flooding
throughout the basin with this outlook issuance.

Minor Flooding...

   There is a high risk (greater than 65 percent) of minor flooding
at Fargo on the Red River, at Sabin on the South Branch Buffalo
River, and at Dilworth on the Buffalo River. There is a medium risk
(35 to 65 percent) of minor flooding at Wahpeton and Oslo on the Red
River and Abercrombie on the Wild Rice River. There is a low risk of
minor flooding across the remainder of the basin.

*Note: With the recent completion of the Grafton Bypass, river
flows will be divided between the main channel and the diversion.
This will significantly reduce the impact on the City of Grafton and
surrounding areas protected by the diversion, and the in town river
gage at Grafton is not likely to reach the stages depicted here.
However, locations outside the protection of the diversion still have
the depicted risk probability associated with historic levels on the
Grafton gage.

.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:

 * SNOWPACK CONDITIONS...

   The current snowpack and associated water content is well below
normal across the basin. Current snow depths are generally below 5
inches across the majority of the basin with slightly higher depths
(5-7 inches) across the far southern Valley and into west central
Minnesota. Current snow water equivalent values are generally below
one inch except for slightly higher amounts in west central
Minnesota.

 * SOIL MOISTURE...

   At the time of freeze-up, soil moisture was near to below normal
due to a dry fall and winter (thus far).

* FROST DEPTHS...

   Current frost depth values are near normal (generally 12 to 24
inches) due to a shallow snow depth allowing for deep frost
penetration.

 * RIVER FLOWS...

   Base streamflows are around normal for most locations although
just slightly below normal across the far northern basin.

 * RIVER ICE...

   River ice and lake ice thicknesses are currently less than normal
due to the above normal temperatures experienced for the first half
of the winter season.

 * 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...

   The next few weeks are expected to bring a return to more normal
temperatures, possibly trending towards slightly cooler than normal
by mid-February. A slightly more active pattern may begin emerging
with a few possibilities of precipitation. However, predictability
remains low at identifying any chances for significant precipitation.

* LONG TERM CLIMATE OUTLOOK...

   Climate outlooks for February, March, and April indicate the
potential for near to slightly cooler than normal temperatures to
start the period and then trend towards above normal as we head into

spring. There are chances for a generally active weather pattern to
set up for late winter and into the spring.

.NEXT SPRING FLOOD OUTLOOK...

   The next 2021 spring flood outlook will be issued on Thursday,
February 11, 2021.

.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 February 01, 2021 to May 02, 2021

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: 02/01/2021 - 05/02/2021

				: 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
--------	------	------	------	: ---	---	---	---	---	---
Red River of the North.....									
WAHPETON	11.0	13.0	15.0	: 53	56	21	27	<5	15
HICKSON	30.0	34.0	38.0	: 18	25	<5	13	<5	<5
FARGO	18.0	25.0	30.0	: 88	80	28	37	15	24
HALSTAD	26.0	32.0	37.5	: 19	35	8	17	<5	10
GRAND FORKS	28.0	40.0	46.0	: 28	56	7	30	<5	10
OSLO	26.0	30.0	36.0	: 37	62	25	53	<5	18
DRAYTON	32.0	38.0	42.0	: 28	61	10	39	<5	16

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    PEMBINA              39.0   44.0   49.0 : 16  51    7  42  <5  21


                                              : 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
--------                  ------ ------ ------ : --- ---   --- ---   --- ---
Minnesota Tributaries.....
Note: The Roseau numbers consider the flow through its diversion
   SABIN                  13.0   15.0   19.0 : 78  49   13  15   <5  <5
   HAWLEY                  8.0    9.0   11.0 : 24  35    7  22   <5  <5
   DILWORTH               13.0   20.0   26.0 : 87  65   17  19   <5  <5
   TWIN VALLEY            10.0   12.0   14.0 : <5  15   <5  <5   <5  <5
   HENDRUM                20.0   28.0   32.0 : 34  48    7  18   <5   7
   SHELLY                 14.0   20.0   23.0 : 11  26   <5  11   <5   6
   CLIMAX                 20.0   25.0   30.0 :  5  23   <5  10   <5   8
   HIGH LANDING           12.0   12.5   13.0 : <5   7   <5  <5   <5  <5
   CROOKSTON              15.0   20.0   23.0 : 10  46   <5  24   <5   8
   ABOVE WARREN           67.0   71.0   75.0 : <5   7   <5  <5   <5  <5
   ALVARADO              106.0  108.0  110.0 : <5  22   <5  14   <5  <5
   HALLOCK               802.0  806.0  810.0 : 20  62   <5  39   <5  10
   ROSEAU                 16.0   18.0   19.0 : <5  21   <5  12   <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
--------                  ------ ------ ------ : --- ---   --- ---   --- ---
North Dakota Tributaries.....
   ABERCROMBIE            10.0   12.0   18.0 : 38  40   24  34    9  19
   VALLEY CITY            15.0   16.0   17.0 : <5  10   <5   6   <5  <5
   LISBON                 15.0   17.0   19.0 : <5  10   <5   9   <5   5
   KINDRED                16.0   19.0   20.5 :  9  19   <5  11   <5   8
   WEST FARGO DVRSN       18.0   20.0   21.0 :  5  11   <5   9   <5   8
   HARWOOD                84.0   86.0   91.0 : 13  23    8  18   <5   9
   ENDERLIN                9.5   12.0   14.0 : 11  19   <5   9   <5  <5
   MAPLETON               18.0   21.0   23.0 : 26  38   10  14   <5   5
   HILLSBORO              10.0   13.0   16.0 : <5  19   <5  10   <5  <5
   MINTO                   6.0    8.0   11.0 :  6  23   <5   7   <5  <5
   GRAFTON                12.0   13.5   14.5 : <5  16   <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  23   <5  22   <5  19


LEGEND:
    CS  =  Conditional Simulation (Outlook for current conditions)
    HS  =  Historical  Simulation ( "        "  normal  conditions)
    FT  =  Feet                    (above gage zero datum)
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        ...Red River Long-Range Probabilistic Outlook by River Stage...

            Valid from February 01, 2021  to May 02, 2021



LOCATION              95%    90%    75%    50%    25%    10%    05%
--------              ------ ------ ------ ------ ------ ------ ------
Red River of the North.....
   WAHPETON            8.8    9.3   10.1   11.1   12.1   14.1   14.3
   HICKSON            16.4   19.2   20.8   23.9   27.0   32.0   33.6
   FARGO              17.1   17.4   19.2   21.9   25.7   31.9   34.6
   HALSTAD            11.6   12.2   16.1   18.9   24.5   31.3   36.0
   GRAND FORKS        18.5   18.8   20.1   23.1   30.3   36.8   41.0
   OSLO               13.3   14.0   17.2   22.1   29.7   33.9   35.0
   DRAYTON            15.4   15.9   19.0   25.1   33.5   37.9   40.6
   PEMBINA            18.6   20.0   23.0   29.1   35.7   42.3   45.9



Minnesota Tribs:      95%    90%    75%    50%    25%    10%    05%
--------              ------ ------ ------ ------ ------ ------ ------
South Fork Buffalo River.....
   SABIN              11.9   12.3   13.1   13.7   14.4   15.8   17.8
Buffalo River.....
   HAWLEY              4.6    4.8    5.6    6.4    7.9    8.6    9.6
   DILWORTH           11.9   12.5   14.7   17.5   19.4   21.7   24.2
Wild Rice River.....
   TWIN VALLEY         3.9    4.0    4.4    5.6    6.4    7.3    8.9
   HENDRUM             8.5   10.2   13.3   17.6   21.6   26.3   28.9
Marsh River.....
   SHELLY              4.8    5.1    5.8    7.4   10.2   15.0   19.8
Sand Hill River.....
   CLIMAX              5.7    5.8    6.7    7.8   11.2   15.8   20.4
Red Lake River.....
   HIGH LANDING        4.5    4.7    5.2    6.4    7.9    9.0    9.7
   CROOKSTON           6.8    7.0    7.8    9.1   11.4   14.9   17.2
Snake River.....
   ABOVE WARREN       61.1   61.2   61.6   62.1   62.6   63.0   63.7
   ALVARADO           96.7   96.9   97.4   98.4  100.0  101.6  102.2
Two Rivers River.....
   HALLOCK           795.8  796.4  797.4  798.3  800.7  803.5  805.6
Roseau River..... considering the flow through the Roseau diversion
   ROSEAU              6.3    6.5    6.9    7.5    8.7   10.6   11.5



North Dakota Tribs:   95%    90%    75%    50%    25%    10%    05%
--------              ------ ------ ------ ------ ------ ------ ------
Wild Rice River.....
   ABERCROMBIE         3.3    3.9    5.5    8.3   11.2   16.7   20.2
Sheyenne River.....
   VALLEY CITY         4.7    4.7    4.7    5.2    6.0    7.5    9.3
   LISBON              3.4    3.4    3.7    4.5    5.9   10.0   13.6
   KINDRED             4.0    4.0    4.7    7.2    9.0   14.8   18.6
   WEST FARGO DVRSN    8.6    8.6    8.7    9.4   10.9   15.0   18.8
   HARWOOD            71.2   71.2   72.0   76.0   79.0   84.9   90.8
Maple River.....
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   ENDERLIN                1.6    1.6    3.9    6.2    7.5    9.8   11.2
   MAPLETON                8.2    9.5   11.1   14.7   18.1   21.1   22.2
Goose River.....
   HILLSBORO               1.8    1.8    1.8    2.7    3.5    4.3    4.6
Forest River.....
   MINTO                   1.4    1.5    1.7    2.1    2.9    4.1    6.2
Park River.....
   GRAFTON                 7.4    7.4    7.6    7.9    8.5    9.2    9.6
Pembina River.....
   WALHALLA                1.5    1.7    2.3    3.0    4.2    5.7    6.3
   NECHE                   2.5    2.6    3.5    4.8    7.3    9.9   11.1
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.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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www.weather.gov/fgf

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