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Probabilistic Hydrologic Outlook
National Weather Service Eastern Grand Forks ND
1201 PM CDT Thu Jun 25 2020

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

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

  Probabilistic Hydrologic Outlooks now use 64 years (1949-2012)
    of past weather, temperature, and precipitation for the
    ensemble predictive hydrographs used in calculating the
    probabilities of exceeding a river level for the valid period
    of the outlook.

  Outlook Schedule - The National Weather Service in Grand Forks,
    North Dakota will be providing the Advanced Hydrologic
    Prediction Services (AHPS) Long-Range Probabilistic Hydrologic
    Outlooks for the Red River of the North and its Minnesota and
    North Dakota tributaries according to the following schedule:

    - Near the end of the month throughout the year, except for...

    - The Spring Flood and Water Resources Outlooks that will be
       issued at least twice a month during the spring snowmelt
        season beginning in mid-to-late February or early March.

  The following message has three river data sections:

    - The first (Table 1) gives the current and normal/historical
       chances of river locations reaching their minor, moderate,
        and major flood categories.

    - The second (Table 2) gives the current chances of river
       locations rising above the river stages listed.

    - The third (Table 3) gives the current chances of river
       locations falling below the river stages listed.

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: 06/29/2020 - 09/27/2020

	Categorical Flood Stages (ft)			:	Current and Historical Chances of Exceeding Flood Categories as a Percentage (%)					
				:	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	:	33	36	15	12	<5	<5
Hickson	30.0	34.0	38.0	:	6	7	<5	<5	<5	<5
Fargo	18.0	25.0	30.0	:	38	41	9	11	<5	5
Halstad	26.0	32.0	37.5	:	<5	<5	<5	<5	<5	<5
Grand Forks	28.0	40.0	46.0	:	18	13	<5	<5	<5	<5
Oslo	26.0	30.0	36.0	:	21	21	17	10	<5	<5
Drayton	32.0	38.0	42.0	:	17	14	10	8	<5	<5
Pembina	39.0	44.0	49.0	:	12	7	<5	<5	<5	<5

	Categorical Flood Stages (ft)			:	Current and Historical Chances of Exceeding Flood Categories as a Percentage (%)					
				:	Minor		Moderate		Major	
Location	Minor	Mod	Major	:	CS	HS	CS	HS	CS	HS
--------	------	------	------	:	---	---	---	---	---	---
Minnesota Tributaries.....										
Sabin	13.0	15.0	19.0	:	20	12	<5	<5	<5	<5
Hawley	8.0	9.0	11.0	:	9	9	7	8	<5	<5
Dilworth	13.0	20.0	26.0	:	27	25	<5	<5	<5	<5
Twin Valley	10.0	12.0	14.0	:	<5	<5	<5	<5	<5	<5
Hendrum	20.0	28.0	32.0	:	12	12	<5	<5	<5	<5
Shelly	14.0	20.0	23.0	:	9	<5	<5	<5	<5	<5
Climax	20.0	25.0	30.0	:	<5	<5	<5	<5	<5	<5
High Landing	12.0	12.5	13.0	:	<5	<5	<5	<5	<5	<5
Crookston	15.0	20.0	23.0	:	25	17	<5	<5	<5	<5
Above Warren	67.0	71.0	75.0	:	9	9	5	<5	<5	<5
Alvarado	106.0	108.0	110.0	:	9	9	8	6	<5	<5
Hallock	802.0	806.0	810.0	:	27	18	14	8	<5	<5
Roseau	16.0	18.0	19.0	:	7	7	<5	<5	<5	<5

  Note: The Roseau numbers consider the flow thru its diversion

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                                        : 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 :  9  10    6   8   <5  <5
  Valley City           15.0   16.0  17.0 : <5  <5   <5  <5   <5  <5
  Lisbon                15.0   17.0  19.0 : <5  <5   <5  <5   <5  <5
  Kindred               16.0   19.0  20.5 :  7   5   <5  <5   <5  <5
  West Fargo Dvsn       18.0   20.0  21.0 : <5  <5   <5  <5   <5  <5
  Harwood               84.0   86.0  91.0 :  7   5    7  <5   <5  <5
  Enderlin               9.5   12.0  14.0 :  7   5   <5  <5   <5  <5
  Mapleton              18.0   21.0  23.0 : 13   7    7   5   <5  <5
  Hillsboro             10.0   13.0  16.0 :  7  <5   <5  <5   <5  <5
  Minto                  6.0    8.0  11.0 : <5  <5   <5  <5   <5  <5
  Grafton               12.0   13.5  14.5 : <5  <5   <5  <5   <5  <5
  Walhalla              11.0   16.0  18.0 : <5  <5   <5  <5   <5  <5
  Neche                 18.0   19.0  20.5 : <5  <5   <5  <5   <5  <5


LEGEND:
    CS  =  Conditional Simulation (outlook for current conditions)
    HS  =  Historical  Simulation ( "        "  normal  conditions)
    ft  =  feet                   (above gage zero datum)



In Table 2 below, the 95 through 5 percent columns indicate the
   probability of exceeding the listed stage levels (ft) for the
    valid time period at the locations listed.

   Interpretation Aid: The flood stage for Wahpeton on the Red
    River of the North is 11 feet. There is a 50 percent chance
     that it will rise above 9.5 feet and only a 10 percent chance
      that it will rise above 13.4 feet.



...Table 2--Exceedance Probabilities...
            Valid Period:   06/29/2020 - 09/27/2020



LOCATION                95%    90%    75%    50%    25%    10%    05%
--------                ------ ------ ------ ------ ------ ------ ------
Red River of the North.....
  Wahpeton               6.9    6.9    7.1    9.5   11.7   13.4   14.2
  Hickson               12.8   12.8   13.3   17.1   23.2   28.5   30.7
  Fargo                 15.8   15.8   16.1   17.0   20.5   24.2   26.6
  Halstad                9.7    9.7    9.7   11.7   17.1   22.3   25.9
  Grand Forks           18.8   18.8   18.9   20.1   23.8   33.8   36.7
  Oslo                  15.0   15.0   15.0   17.2   23.6   33.0   33.9
  Drayton               18.6   18.6   18.6   18.6   26.1   38.1   39.0
  Pembina               27.2   27.2   27.2   27.2   31.7   39.3   41.0
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Minnesota Tribs:       95%    90%    75%    50%    25%    10%    05%
--------              ------ ------ ------ ------ ------ ------ ------
South Fork Buffalo River.....
  Sabin                 5.6    5.6    6.6    9.4   12.6   13.8   14.4
Buffalo River.....
  Hawley                4.1    4.1    4.4    5.1    5.9    7.5   10.3
  Dilworth              5.3    5.3    6.2    8.9   14.0   17.4   19.6
Wild Rice River.....
  Twin Valley           3.0    3.0    3.0    4.2    5.2    6.9    8.0
  Hendrum               5.8    5.8    6.4   11.1   16.6   21.3   22.9
Marsh River.....
  Shelly                4.6    4.6    4.6    5.1    9.2   13.6   14.8
Sand Hill River.....
  Climax                5.3    5.3    6.6    7.6    9.6   13.7   15.3
Red Lake River.....
  High Landing          8.2    8.2    8.2    8.2    9.0    9.5   10.6
  Crookston             8.0    8.0    8.4   10.9   15.1   18.2   19.0
Snake River.....
  Above Warren         61.6   61.6   62.0   62.6   63.8   65.8   71.2
  Alvarado             98.2   98.2   98.2   99.1  101.4  104.4  109.6
Two Rivers River.....
  Hallock             800.8  800.8  800.8  800.8  802.5  806.9  808.8
Roseau River..... considering the flow thru the Roseau diversion
  Roseau                6.1    6.1    6.3    7.5   10.1   14.6   16.7


North Dakota Tribs:    95%    90%    75%    50%    25%    10%    05%
--------              ------ ------ ------ ------ ------ ------ ------
Wild Rice River.....
  Abercrombie           1.4    1.4    1.4    2.4    4.8    9.2   13.3
Sheyenne River.....
  Valley City           5.5    5.5    5.5    5.9    8.0   10.1   12.3
  Lisbon                5.0    5.0    5.0    5.1    7.6   10.5   12.4
  Kindred               6.9    6.9    6.9    6.9    9.8   13.6   16.7
  West Fargo Dvsn      10.7   10.7   10.7   10.7   10.8   13.5   16.2
  Harwood              73.8   73.8   73.8   73.8   76.2   80.0   90.2
Maple River.....
  Enderlin              2.8    2.8    2.8    2.8    6.2    8.5   11.0
  Mapleton             10.2   10.2   10.2   10.2   14.0   18.7   22.7
Goose River.....
  Hillsboro             2.6    2.6    2.6    2.6    3.5    6.7   12.6
Forest River.....
  Minto                 1.6    1.6    1.6    1.8    2.3    3.9    5.4
Park River.....
  Grafton               7.6    7.6    7.6    7.9    8.7    9.5   10.3
Pembina River.....
  Walhalla              1.9    1.9    2.4    3.2    4.4    6.0    7.7
  Neche                 2.8    2.8    3.6    4.9    7.0    9.8   14.5
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In Table 3 below, the 95 through 5 percent columns indicate the
  probability of falling below the listed stage levels (ft) for
   the valid time period at the locations listed.

  Interpretation Aid: The flood stage for Wahpeton on the Red
   River of the North is 11 feet. There is a 50 percent chance
    that it will fall below 4.6 feet and only a 10 percent chance

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      that it will fall below 4.1 feet.

   ...Table 3--Non-Exceedance Probabilities...
            Valid Period:   06/29/2020 - 09/27/2020
```

LOCATION	95%	90%	75%	50%	25%	10%	05%
Red River of the North.....							
Wahpeton	5.5	5.2	4.9	4.6	4.5	4.1	3.9
Hickson	11.4	11.1	10.9	10.6	10.5	10.2	10.1
Fargo	15.0	14.8	14.7	14.5	14.4	14.2	14.1
Halstad	6.6	6.3	5.7	5.4	5.1	4.8	4.6
Grand Forks	17.2	17.1	16.9	16.8	16.6	16.4	16.3
Oslo	9.9	9.7	9.3	8.9	8.5	8.2	7.9
Drayton	13.6	13.4	13.2	13.0	12.7	12.5	12.4
Pembina	15.8	15.0	14.3	13.6	12.8	12.0	11.5

Minnesota Tribs:	95%	90%	75%	50%	25%	10%	05%
South Fork Buffalo River.....							
Sabin	5.2	5.0	4.9	4.9	4.8	4.8	4.8
Buffalo River.....							
Hawley	3.9	3.7	3.7	3.6	3.6	3.6	3.6
Dilworth	4.9	4.5	4.3	4.2	4.1	4.1	4.0
Wild Rice River.....							
Twin Valley	2.7	2.6	2.6	2.5	2.5	2.5	2.5
Hendrum	3.2	3.1	2.9	2.8	2.7	2.6	2.6
Marsh River.....							
Shelly	4.2	4.2	4.1	4.1	4.0	4.0	4.0
Sand Hill River.....							
Climax	4.8	4.8	4.7	4.7	4.6	4.6	4.6
Red Lake River.....							
High Landing	7.3	7.1	6.7	6.3	5.9	5.5	5.4
Crookston	6.7	6.6	6.4	6.2	6.0	5.9	5.7
Snake River.....							
Above Warren	61.3	61.1	61.1	61.0	61.0	61.0	61.0
Alvarado	97.3	97.1	97.1	97.0	96.9	96.9	96.8
Two Rivers River.....							
Hallock	794.4	794.2	793.9	793.8	793.7	793.6	793.5
Roseau River..... considering the flow thru the Roseau diversion							
Roseau	5.9	5.8	5.6	5.5	5.3	5.2	5.2

North Dakota Tribs:	95%	90%	75%	50%	25%	10%	05%
Wild Rice River.....							
Abercrombie	0.8	0.6	0.6	0.5	0.4	0.4	0.3
Sheyenne River.....							
Valley City	4.6	4.5	4.4	4.4	4.3	4.3	4.3
Lisbon	3.4	3.4	3.2	3.2	3.1	3.1	3.1
Kindred	3.9	3.7	3.7	3.5	3.5	3.4	3.4
West Fargo Dvsn	8.1	7.8	7.7	7.5	7.3	7.2	7.2
Harwood	69.8	69.5	69.3	69.1	68.9	68.8	68.8
Maple River.....							
Enderlin	2.2	2.2	2.1	2.1	2.1	2.1	2.1

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    Mapleton              9.0    8.8    8.7    8.7    8.7    8.7    8.6
Goose River.....
    Hillsboro             2.2    2.1    2.0    2.0    2.0    1.9    1.9
Forest River.....
    Minto                 1.5    1.4    1.4    1.4    1.4    1.3    1.3
Park River.....
    Grafton               7.4    7.4    7.4    7.4    7.3    7.3    7.3
Pembina River.....
    Walhalla              1.7    1.5    1.4    1.3    1.2    1.2    1.2
    Neche                 2.4    2.2    1.9    1.8    1.7    1.7    1.7
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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, snow, and
 soil conditions using over 60 years of past precipitation and
 temperature conditions that were experienced for those past years
 during the timeframe 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. 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 Impact-Based 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
 Advanced Hydrologic Prediction Services (AHPS).

This outlook was produced using precipitation and temperatures
 for the years 1949 through 2012.

.ADDITIONAL INFORMATION SOURCES...

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, together with explanations that help in
 interpreting them, are available from the NWS Grand Forks AHPS web
 page at:

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

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

Current river conditions for all river forecast points in the Red
 River of the North and Devils/Stump Lake basins are available on
 our web site. Also, 7-day deterministic forecasts will be issued
 at least once a day when river forecast locations will be at or
 above flood during that period.

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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