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Probabalistic Hydrologic Outlook
National Weather Service Eastern North Dakota/Grand Forks ND
329 PM CDT Mon Sep 25 2017

...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 snow-melt
       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 category.

    - 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.

.Red River Long-Range Probabilistic Outlook by Flood Category...
        Valid from October 01, 2017 to December 30, 2017.

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 more 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: 10/01/2017 - 12/30/2017

```
                                        : Current and Historical
                                        : Chances of Exceeding
                                        :   Flood Categories
                                        :  as s 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 :  12   8     7  <5    <5  <5
  HICKSON                30.0   34.0   38.0 :   6  <5    <5  <5    <5  <5
  FARGO                  18.0   25.0   30.0 :  25  19    10   5     7  <5
  HALSTAD                26.0   32.0   37.5 :   6  <5    <5  <5    <5  <5
  GRAND FORKS            28.0   40.0   46.0 :  12  11    <5  <5    <5  <5
  OSLO                   26.0   30.0   36.0 :  13  14    11   8    <5  <5
  DRAYTON                32.0   38.0   42.0 :   6  <5    <5  <5    <5  <5
  PEMBINA                39.0   44.0   49.0 :   8  <5    <5  <5    <5  <5
Minnesota Tributaries.....
  SABIN                  13.0   15.0   19.0 :  18   8     5  <5    <5  <5
  HAWLEY                  8.0    9.0   11.0 :  <5   5    <5  <5    <5  <5
  DILWORTH               13.0   20.0   26.0 :  26  17    <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 :  11   9    <5  <5    <5  <5
  SHELLY                 14.0   20.0   23.0 :  <5  <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   23.0   25.0 :   8   9    <5  <5    <5  <5
  ABOVE WARREN           67.0   71.0   75.0 :  <5  <5    <5  <5    <5  <5
  ALVARADO              106.0  108.0  110.0 :  <5  <5    <5  <5    <5  <5
  HALLOCK               802.0  806.0  810.0 :  14   8     7  <5    <5  <5
  ROSEAU                 16.0   18.0   19.0 :  <5  <5    <5  <5    <5  <5
   Note: The Roseau numbers consider the flow thru its diversion
North Dakota Tributaries.....
  ABERCROMBIE            10.0   12.0   18.0 :  12   8    11  <5     7  <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 :  <5  <5    <5  <5    <5  <5
  WEST FARGO DVRSN       18.0   20.0   21.0 :  <5  <5    <5  <5    <5  <5
  HARWOOD               884.0  886.0  891.0 :   6  <5    <5  <5    <5  <5
  ENDERLIN                9.5   12.0   14.0 :  <5  <5    <5  <5    <5  <5
  MAPLETON              905.0  908.0  910.0 :   8  <5    <5  <5    <5  <5
  HILLSBORO              10.0   13.0   16.0 :  <5  <5    <5  <5    <5  <5
  MINTO                   6.0    8.0   11.0 :  <5  <5    <5  <5    <5  <5
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   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)


.Probabilities for Rising Above Listed River Stages...
                  from  10/01/2017 to 12/30/2017

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 location 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 7.2 feet and only a 10 percent chance
      that it will rise above 11.7 feet.

...Table 2--Exceedance Probabilities...

                        Chance of Exceeding Stages
                          at Specific Locations
                    Valid Period:   10/01/2017 - 12/30/2017


LOCATION              95%     90%     75%     50%     25%     10%     05%
--------            ------  ------  ------  ------  ------  ------  ------
Red River of the North.....
   WAHPETON            7.1     7.1     7.1     7.2     9.5    11.7    14.0
   HICKSON            13.6    13.6    13.6    13.6    18.3    25.5    31.2
   FARGO              16.2    16.2    16.2    16.3    18.0    25.0    31.6
   HALSTAD            11.7    11.7    11.8    11.8    14.1    21.5    27.0
   GRAND FORKS        18.7    18.7    18.8    18.8    20.6    31.6    36.0
   OSLO               13.6    13.6    13.7    13.8    18.2    31.6    33.8
   DRAYTON            15.9    15.9    16.0    16.2    20.0    29.5    33.1
   PEMBINA            19.5    19.5    19.6    19.8    26.0    35.8    41.1


Minnesota Tribs:      95%     90%     75%     50%     25%     10%     05%
--------            ------  ------  ------  ------  ------  ------  ------
South Fork Buffalo River.....
   SABIN               7.2     7.2     7.2    10.3    12.3    13.8    15.0
Buffalo River.....
   HAWLEY              3.7     3.7     3.7     3.8     4.9     6.8     7.6
   DILWORTH            6.2     6.2     6.2     8.5    13.3    17.1    20.0
Wild Rice River.....
   TWIN VALLEY         2.7     2.7     2.7     3.3     4.9     6.4     7.3
   HENDRUM             7.1     7.1     7.2     7.7    14.3    21.0    25.0
Marsh River.....
   SHELLY              5.0     5.1     5.1     5.3     7.5     9.9    12.5
Sand Hill River.....
   CLIMAX              5.8     5.8     5.8     7.1    10.2    11.8    18.0
Red Lake river.....
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    HIGH LANDING          2.0    2.0    2.0    2.1    2.8    4.5    6.2
    CROOKSTON             6.4    6.4    6.4    7.1    8.8   14.8   17.6
Snake River.....
    ABOVE WARREN         61.0   61.0   61.0   61.7   62.6   63.9   65.2
    ALVARADO             97.1   97.1   97.1   97.4   98.9  102.0  104.1
Two Rivers River.....
    HALLOCK             796.4  796.4  796.4  797.1  799.4  804.5  806.5
Roseau River..... considering the flow thru the Roseau diversion
    ROSEAU                6.2    6.2    6.2    6.8    8.6   11.3   12.8


North Dakota Tribs:   95%    90%    75%    50%    25%    10%    05%
--------            ------ ------ ------ ------ ------ ------ ------
Wild Rice River.....
    ABERCROMBIE           1.7    1.7    1.7    3.0    6.2   14.3   19.2
Sheyenne River.....
    VALLEY CITY           5.1    5.2    5.3    5.3    6.6    9.1   11.0
    LISBON                4.2    4.3    4.4    4.4    6.1    9.1   10.9
    KINDRED               5.3    5.8    6.0    6.0    7.3   11.7   13.9
    WEST FARGO DVRSN     12.2   12.3   12.4   12.4   12.9   15.6   16.5
    HARWOOD             873.2  873.5  874.1  874.1  876.0  879.2  884.4
Maple River.....
    ENDERLIN              2.8    3.1    3.5    3.6    6.2    8.1    9.2
    MAPLETON            896.6  896.9  897.6  897.6  899.5  903.4  906.7
Goose River.....
    HILLSBORO             2.0    2.0    2.0    2.4    3.6    5.3    6.6
Forest River.....
    MINTO                 1.5    1.5    1.5    1.5    2.1    2.9    4.0
Park River.....
    GRAFTON               7.4    7.4    7.4    7.4    8.3    9.1    9.7
Pembina River.....
    WALHALLA              3.0    3.0    3.0    3.0    4.2    5.2    5.9
    NECHE                 3.6    3.6    3.6    3.7    6.2    8.0    9.9
```

.Probabilities for Falling Below Listed River Stages...
         from 10/01/2017 to 12/30/2017

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 location 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 4.2 feet and only a 10 percent chance
     that it will fall below 4.0 feet.

...Table 3--Non-Exceedance Probabilities...

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                       Chance of Not Exceeding Stages
                           at Specific Locations
                    Valid Period:   10/01/2017 - 12/30/2017


LOCATION              95%    50%    75%    50%    25%    10%    05%
--------            ------ ------ ------ ------ ------ ------ ------
Red River of the North.....
    WAHPETON              5.4    4.9    4.5    4.2    4.0    4.0    4.0
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    HICKSON         11.8   11.1   10.7   10.5   10.3   10.3   10.3
    FARGO           15.4   14.8   14.5   14.4   14.2   14.2   14.2
    HALSTAD          7.4    5.8    4.7    4.1    3.8    3.7    3.7
    GRAND FORKS     17.0   16.4   15.8   15.5   15.4   15.3   15.3
    OSLO             9.5    8.3    6.9    6.2    5.6    5.3    5.3
    DRAYTON         13.6   13.1   12.0   11.7   11.5   11.5   11.4
    PEMBINA         14.9   13.3    9.6    8.2    7.6    7.4    7.4


Minnesota Tribs:    95%    90%    75%    50%    25%    10%    05%
--------          ------ ------ ------ ------ ------ ------ ------
South Fork Buffalo River.....
  SABIN             5.6    5.3    4.9    4.7    4.6    4.6    4.6
Buffalo River.....
  HAWLEY            3.6    3.4    3.2    3.1    3.1    3.1    3.1
  DILWORTH          4.3    3.8    3.1    3.0    2.8    2.8    2.8
Wild Rice River.....
  TWIN VALLEY       2.4    2.3    2.2    2.1    2.1    2.1    2.1
  HENDRUM           3.6    2.4    2.1    2.0    1.9    1.9    1.9
Marsh River.....
  SHELLY            4.3    4.1    3.9    3.9    3.8    3.8    3.8
Sand Hill River.....
  CLIMAX            4.9    4.8    4.5    4.2    3.9    3.9    3.9
Red Lake river.....
  HIGH LANDING      1.6    1.2    0.8    0.7    0.7    0.6    0.6
  CROOKSTON         4.8    4.3    3.6    3.4    3.2    3.2    3.2
Snake River.....
  ABOVE WARREN     61.0   61.0   60.9   60.8   60.8   60.8   60.8
  ALVARADO         96.9   96.8   96.4   96.3   96.3   96.3   96.3
Two Rivers River.....
  HALLOCK         794.6  794.3  793.9  793.5  793.4  793.4  793.4
Roseau River..... considering the flow thru the Roseau diversion
  ROSEAU            5.9    5.8    5.6    5.2    5.1    5.0    5.0


North Dakota Tribs: 95%    90%    75%    50%    25%    10%    05%
--------          ------ ------ ------ ------ ------ ------ ------
Wild Rice River.....
  ABERCROMBIE       0.9    0.8    0.4    0.3    0.3    0.3    0.3
Sheyenne River.....
  VALLEY CITY       4.6    4.5    4.3    4.2    4.2    4.1    4.1
  LISBON            3.4    3.2    3.0    2.8    2.8    2.8    2.8
  KINDRED           3.5    3.4    3.1    3.0    2.9    2.9    2.9
  WEST FARGO DVRSN 10.2   10.1   10.0    9.8    9.8    9.8    9.8
  HARWOOD         869.4  869.1  868.4  867.9  867.7  867.6  867.6
Maple River.....
  ENDERLIN          2.2    2.2    2.0    2.0    1.9    1.9    1.9
  MAPLETON        895.6  895.5  895.2  895.1  895.0  895.0  895.0
Goose River.....
  HILLSBORO         2.0    1.9    1.9    1.9    1.8    1.8    1.8
Forest River.....
  MINTO             1.4    1.4    1.3    1.3    1.3    1.3    1.3
Park River.....
  GRAFTON           7.3    7.3    7.3    7.3    7.3    7.3    7.3
Pembina River.....
  WALHALLA          2.8    2.5    2.4    2.3    2.3    2.3    2.3
  NECHE             3.3    2.7    2.5    2.3    2.3    2.3    2.3
```

.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, low and
 soil conditions and using over 60 years 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 then be 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).

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

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

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

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

Current river conditions for all river forecast points in the Red
 River of the North and Devils/Stump Lake conditions are also

available on our web site, as well as the 7-day forecasts when
the river at the forecast point is in or near flood.

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

Also, 7-day deterministic forecasts will be issued at least once a
day when the river forecast locations will be at flood during that
period.

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.

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     weather.gov/fgf
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