

# Red River and Devils Lake Basins - 2023 Spring Flood Outlook

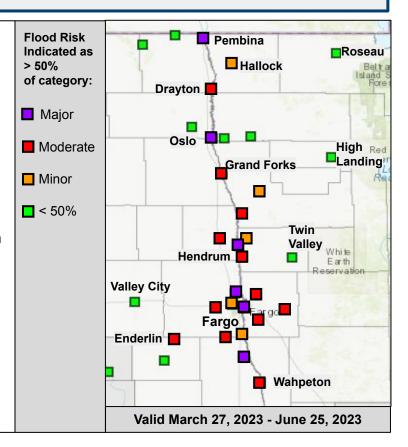
## NWS Grand Forks • North Central River Forecast Center • March 23, 2023

This outlook is based on observed conditions through Monday, March 20th and includes forecast precipitation through Monday, March 26th. Visit our website at <a href="weather.gov/fgf/currentfloodoutlook">weather.gov/fgf/currentfloodoutlook</a> for associated exceedance graphics, probabilities, and related discussions. This will be the last probabilistic spring flood outlook for 2023.

Key Message: The risk for significant (moderate or higher) flooding has increased since the last outlook (now generally above long-term historical averages for most of the Red River Basin) due to additional snowfall and delayed melt conditions.

### **Key Points:**

- Moderate to major spring flooding is depicted in this outlook (50% exceedance probability) for the mainstem Red River and southeastern North Dakota tributaries. Minor to isolated moderate flooding (50% exceedance probability) is depicted for some of the Minnesota tributaries.
- Below normal soil moisture and near normal streamflows entering into freeze-up.
- Above normal snowfall and precipitation through winter and spring so far (with the exception of the far northern basin).
- The continuation of below normal temperatures is leading to a delayed melt.
- Snowmelt timing/thaw cycle, along with any additional snow and/or rain, will be the most important factors contributing to the spring flood risk.



#### **Snowmelt Flood Components:**

- **1. Fall Precipitation and Soil Moisture at Freeze-up: Below normal.** Fall precipitation (Sep-Nov 2022) was below normal across the basin. Conditions were driest across the lower Sheyenne basin and southern Red River Valley (3-4 inches below normal); elsewhere was 1-2 inches below normal. Soil moisture heading into freeze-up was lower than normal with moderate drought conditions persisting across southern central portions of the basin and abnormally dry conditions across the north.
- **2. Base Streamflow: Near normal.** USGS analyses indicate that the Red River mainstem and its tributaries were flowing at normal ranges heading into freeze-up.
- **3. Frost Depth: Near normal to deeper than normal.** Frost depth values have started to level off for the season and remain deepest across northeastern ND (30-40 inches) while shallower and more variable across southeastern ND and much of the MN portion of the basin (20-30 inches).
- **4.** Snowpack and Associated Water Content: Normal to above normal. After a wet and snowy beginning to winter, January and early February brought less than normal snowfall/precipitation across to the basin. A more active pattern returned for the second half of February and continued into March. Total snowfall is above normal for most areas, especially across the Devils Lake and Sheyenne basins (~30-40 inches above normal). Associated water content ranges from around 2.0 inches across the far northern basin to 4.0 to 6.0+ inches across the remainder of the basin.
- **5. Future Conditions:** Below normal temperatures to continue through the end of March with near normal precipitation (normal high temperatures for late March into mid-April range from the upper 30s to low 50s). Climate outlooks indicate below normal temperatures continuing into April with no strong signal either way for above, below, or near normal precipitation.

### **DEVILS LAKE AND STUMP LAKE**

Valid March 20, 2023 - September 30, 2023

DEVILS LAKE	95%	90%	75%	50%	25%	10%	5%
Creel Bay	1449.9	1450.0	1450.1	1450.4	1450.7	1451.0	1451.6
Eastern Stump Lake	1449.9	1450.0	1450.1	1450.4	1450.7	1451.0	1451.6

Devils Lake and Stump Lake are currently at ~1449.4 ft (zero datum 1400.00 NGVD29).

### **RED RIVER AND TRIBUTARIES**

Valid March 27, 2023 - June 25, 2023

Wahpeton	RED RIVER MAINSTEM	95%	90%	75%	50%	25%	10%	5%
Haickson	Wahpeton	11.9	12.1	13.1	14.3	15.3	16.4	16.8
Halstad   32.5   33.7   35.7   38.2   39.5   39.9   40.2     Grand Forks   41.0   41.8   42.9   44.4   46.5   38.7     Drayton   38.6   39.5   40.1   40.8   41.8   42.9   43.5     Drayton   38.6   39.5   40.1   40.8   41.8   42.9   43.5     Pembina   45.6   46.8   47.7   49.6   50.9   52.3   52.8     MINNESOTA TRIBUTARIES   95%   90%   75%   50%   25%   10%   5%     South Fork Buffalo River   5abin   14.0   14.4   14.8   15.3   15.8   16.4   16.8     Buffalo River   14.0   14.4   14.8   15.3   15.8   16.4   16.8     Buffalo River   19.3   19.8   20.6   21.6   22.5   23.3   23.9     Wild Rice River   19.3   19.8   20.6   21.6   22.5   23.3   23.9     Wild Rice River   14.0   14.4   13.5   15.1   17.3   19.5   20.2     Hendrum   26.7   28.1   29.1   30.5   31.7   32.5   33.1     Marsh River   5helly   10.9   12.4   13.5   15.1   17.3   19.5   20.2     Sand Hill River   19.3   20.7   22.7   24.9   28.3   30.7   32.1     Red Lake River   High Landing   7.0   7.3   8.3   9.3   9.5   11.4   11.8     Crookston   13.8   14.2   15.7   17.9   20.1   22.4   23.5     Snake River   Above Warren   63.4   63.7   64.1   64.9   65.7   67.3   68.1     Alvarado   100.1   100.8   102.0   103.5   105.6   108.1   108.6     Two Rivers River   Hallock   800.3   800.6   802.0   804.1   807.1   808.3   809.0     Roseau River   Roseau River   Abercrombie   15.7   16.1   17.5   19.2   21.8   24.0   25.0     Sheyenne River   Valley City   11.6   12.0   12.6   13.3   14.3   18.0   19.5     Lisbon   12.0   12.6   13.2   15.5   20.1     Kindred   16.8   17.2   18.3   19.6   20.5   21.2   21.2     West Fargo Diversion   16.5   17.2   18.3   19.6   20.5   21.2   21.3     Mapleton   21.0   21.6   22.3   22.4   22.8   23.7     Goose River   Hillsboro   9.8   11.6   12.0   22.4   22.8   23.2   23.7     Goose River   Hillsboro   9.8   11.6   13.0   13.9   14.4   15.6   15.6     Forest River   Minto   4.3   4.6   5.2   5.7   6.5   7.1   7.2     Pembina River   Walhalla   5.4   5.7   6.2   6.9   8.3   10.4   11.3	· · · · · · · · · · · · · · · · · · ·							
Grand Forks	Fargo	29.5	30.7	32.7	34.2	36.4	37.8	38.6
Oslo         35.0         35.3         35.7         36.3         37.3         38.4         38.7           Drayton         38.6         39.5         40.1         40.8         41.8         42.9         43.5           MINNESOTA TRIBUTARIES         95%         90%         75%         50%         25%         10%         5%           South Fork Buffalo River         Sabin         14.0         14.4         14.8         15.3         15.8         16.4         16.8           Buffalo River         Hawley         8.2         8.7         9.1         9.8         10.3         10.8         11.2           Dilworth         19.3         19.8         20.6         21.6         22.5         23.3         23.9           Wild Rice River         Twin Valley         6.8         7.2         7.8         8.9         9.6         11.0         11.9           Hendrum         26.7         28.1         29.1         30.5         31.7         32.5         33.1           Marsh River         Shelly         10.9         12.4         13.5         15.1         17.3         19.5         20.2           Sand Hill River         11.0         11.9         14.2         13.5	Halstad	32.5	33.7	35.7	38.2	39.5	39.9	40.2
Drayton   Sa.6   39.5   40.1   40.8   41.8   42.9   43.5   52.8	Grand Forks	41.0	41.8	42.9	44.4	46.5	49.2	50.0
MINNESOTA TRIBUTARIES	Oslo	35.0	35.3	35.7	36.3	37.3	38.4	38.7
MINNESOTA TRIBUTARIES   95%   90%   75%   50%   25%   10%   5%   50w	Drayton	38.6	39.5	40.1	40.8	41.8	42.9	43.5
South Fork Buffalo River Sabin 14.0 14.4 14.8 15.3 15.8 16.4 16.8 Buffalo River Hawley 8.2 8.7 9.1 9.8 10.3 10.8 11.2 Dilworth 19.3 19.8 26.6 21.6 22.5 23.3 23.9 Wild Rice River Twin Valley 6.8 7.2 7.8 8.9 9.6 11.0 11.9 Hendrum 26.7 28.1 29.1 30.5 31.7 32.5 33.1 Marsh River Shelly 10.9 12.4 13.5 15.1 17.3 19.5 20.2 Sand Hill River Climax 19.9 20.7 22.7 24.9 28.3 30.7 32.1 Red Lake River High Landing 7.0 7.3 8.3 9.3 9.5 11.4 11.8 Crookston 13.8 14.2 15.7 17.9 20.1 22.4 23.5 Snake River Above Warren 63.4 63.7 64.1 64.9 65.7 67.3 68.1 Alvarado 100.1 100.8 102.0 103.5 105.6 108.1 108.6 Two Rivers River Hallock 800.3 800.6 802.0 804.1 807.1 808.3 809.0 Roseau River Roseau 8.0 8.5 9.3 10.6 13.2 15.6 17.0  NORTH DAKOTA TRIBUTARIES 95% 90% 75% 50% 25% 10% 5% Wild Rice River Abercrombie 15.7 16.1 17.5 19.2 21.8 24.0 25.0 Sheyenne River Valley City 11.6 12.0 12.6 13.3 14.3 18.0 19.5 Lisbon 12.0 12.6 13.2 13.9 15.2 18.5 20.1 Kindred 16.8 17.2 18.3 19.6 25.0 21.2 21.3 21.3 Harwood 89.3 90.1 91.1 91.5 91.8 92.1 92.2 Maple River Enderlin 11.4 11.6 12.3 12.9 13.2 13.8 14.2 Mapleton 21.0 21.6 22.0 22.4 22.8 23.2 23.7 Goose River Hillsboro 9.8 11.6 13.0 13.9 14.4 15.1 15.6 Forest River Malballa 5.4 5.7 6.2 6.9 8.3 10.4 11.3	Pembina	45.6	46.8	47.7	49.6	50.9	52.3	52.8
Sabin   14.0   14.4   14.8   15.3   15.8   16.4   16.8     Buffalo River	MINNESOTA TRIBUTARIES	95%	90%	75%	50%	25%	10%	5%
Buffalo River	South Fork Buffalo River							
Hawley   B.2   B.7   9.1   9.8   10.3   10.8   11.2   Dilworth   19.3   19.8   20.6   21.6   22.5   23.3   23.9   Mild Rice River   Twin Valley   6.8   7.2   7.8   8.9   9.6   11.0   11.9   Hendrum   26.7   28.1   29.1   30.5   31.7   32.5   33.1   Marsh River   Shelly   10.9   12.4   13.5   15.1   17.3   19.5   20.2   23.3   23.9   23.3   23.9   23.3   23.9   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.3   23.1   23.1   23.3   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   23.1   2		14.0	14.4	14.8	15.3	15.8	16.4	16.8
Dilworth   19.3   19.8   20.6   21.6   22.5   23.3   23.9     Wild Rice River   Twin Valley   6.8   7.2   7.8   8.9   9.6   11.0   11.9     Hendrum   26.7   28.1   29.1   30.5   31.7   32.5   33.1     Marsh River   Shelly   10.9   12.4   13.5   15.1   17.3   19.5   20.2     Sand Hill River   Climax   19.9   20.7   22.7   24.9   28.3   30.7   32.1     Red Lake River   High Landing   7.0   7.3   8.3   9.3   9.5   11.4   11.8     Crookston   13.8   14.2   15.7   17.9   20.1   22.4   23.5     Snake River   Above Warren   63.4   63.7   64.1   64.9   65.7   67.3   68.1     Alvarado   10.1   100.8   102.0   103.5   105.6   108.1   108.6     Two Rivers River   Hallock   800.3   800.6   802.0   804.1   807.1   808.3   809.0     Roseau River   Roseau   8.0   8.5   9.3   10.6   13.2   15.6   17.0     NORTH DAKOTA TRIBUTARIES   95%   90%   75%   50%   25%   10%   5%     Wild Rice River   Abercrombie   15.7   16.1   17.5   19.2   21.8   24.0   25.0     Sheyenne River   Valley   11.6   12.0   12.6   13.3   14.3   18.0   19.5     Lisbon   12.0   12.6   13.2   13.9   15.5   20.1     Kindred   16.8   17.2   18.3   19.6   20.5   21.2   21.2     West Fargo Diversion   16.5   17.2   17.6   19.3   21.3   21.3   21.3     Harwood   89.3   90.1   91.1   91.5   91.8   92.1   92.2     Maple River   Enderlin   11.4   11.6   12.3   12.9   13.2   13.8   14.2     Maple River   Enderlin   11.4   11.6   12.3   12.9   13.2   13.8   14.2     Mapleton   21.0   21.6   22.0   22.4   22.8   23.2   23.7     Goose River   Hillsboro   9.8   11.6   13.0   13.9   14.4   15.1   15.6     Forest River   Walhalla   5.4   5.7   6.5   5.7   6.5   7.1   7.2     Pembina River   Walhalla   5.4   5.7   6.2   6.9   8.3   10.4   11.3	Buffalo River							
Wild Rice River         Twin Valley         6.8         7.2         7.8         8.9         9.6         11.9         11.9           Hendrum         26.7         28.1         29.1         30.5         31.7         32.5         33.1           Marsh River         Shelly         10.9         12.4         13.5         15.1         17.3         19.5         20.2           Sand Hill River         Climax         19.9         20.7         22.7         24.9         28.3         30.7         32.1           Red Lake River         High Landing         7.0         7.3         8.3         9.3         9.5         11.4         11.8           Crookston         13.8         14.2         15.7         17.9         20.1         22.4         23.5           Snake River         Above Warren         63.4         63.7         64.1         64.9         65.7         67.3         68.1           Alvarado         100.1         100.8         102.0         103.5         105.6         108.1         108.6           Two Rivers River         4         80.3         800.6         802.0         804.1         807.1         808.3         809.0           Roseau         8.0	Hawley	8.2	8.7	9.1	9.8	10.3	10.8	11.2
Twin Valley         6.8         7.2         7.8         8.9         9.6         11.0         11.9           Hendrum         26.7         28.1         29.1         30.5         31.7         32.5         33.1           Marsh River         Shelly         10.9         12.4         13.5         15.1         17.3         19.5         20.2           Sand Hill River         11.0         20.7         22.7         24.9         28.3         30.7         32.1           Red Lake River         High Landing         7.0         7.3         8.3         9.3         9.5         11.4         11.8           Crookston         13.8         14.2         15.7         17.9         20.1         22.4         23.5           Snake River         4         63.4         63.7         64.1         64.9         65.7         67.3         68.1           Alvarado         100.1         100.8         102.0         103.5         105.6         108.1         108.6           Two Rivers River         4         800.3         800.6         802.0         804.1         807.1         808.3         809.0           North DakOta Triburaries         95%         90%         75%         5	Dilworth	19.3	19.8	20.6	21.6	22.5	23.3	23.9
Hendrum	Wild Rice River							
Marsh River Shelly Sand Hill River Climax Red Lake River High Landing Crookston Snake River Above Warren Hallock Roseau River Roseau River Roseau River Roseau River Abercrombie Roseau River Abercrombie Roseau River Roseau River Abercrombie Risher Roseau River Abercrombie Risher Abercrombie Sheyenne River Abercrombie Sheyenne River Abercrombie Sheyenne River Abercrombie Roseau River Roseau Rosea	Twin Valley	6.8	7.2	7.8	8.9	9.6	11.0	11.9
Shelly         10.9         12.4         13.5         15.1         17.3         19.5         20.2           Sand Hill River         19.9         20.7         22.7         24.9         28.3         30.7         32.1           Red Lake River         High Landing         7.0         7.3         8.3         9.3         9.5         11.4         11.8           Crookston         13.8         14.2         15.7         17.9         20.1         22.4         23.5           Snake River         Above Warren         63.4         63.7         64.1         64.9         65.7         67.3         68.1           Alvarado         100.1         100.8         102.0         103.5         105.6         108.1         108.6           Two Rivers River         Hallock         800.3         800.6         802.0         804.1         807.1         808.3         809.0           Roseau         8.0         8.5         9.3         10.6         13.2         15.6         17.0           MORTH DAKOTA TRIBUTARIES         95%         90%         75%         50%         25%         10%         5%           Wild Rice River         15.7         16.1         17.5         19.2	Hendrum	26.7	28.1	29.1	30.5	31.7	32.5	33.1
Sand Hill River   Climax   19.9   20.7   22.7   24.9   28.3   30.7   32.1								
Climax   19.9   20.7   22.7   24.9   28.3   30.7   32.1     Red Lake River	•	10.9	12.4	13.5	15.1	17.3	19.5	20.2
Red Lake River         High Landing         7.0         7.3         8.3         9.3         9.5         11.4         11.8           Crookston         13.8         14.2         15.7         17.9         20.1         22.4         23.5           Snake River         Above Warren         63.4         63.7         64.1         64.9         65.7         67.3         68.1           Alvarado         100.1         100.8         102.0         103.5         105.6         108.1         108.6           Two Rivers River Hallock         800.3         800.6         802.0         804.1         807.1         808.3         809.0           Roseau River Roseau         8.0         8.5         9.3         10.6         13.2         15.6         17.0           NORTH DAKOTA TRIBUTARIES         95%         90%         75%         50%         25%         10%         5%           Wild Rice River Abercrombie         15.7         16.1         17.5         19.2         21.8         24.0         25.0           Sheyenne River Valley City         11.6         12.0         12.6         13.3         14.3         18.0         19.5           Lisbon         12.0         12.6	Sand Hill River							
High Landing         7.0         7.3         8.3         9.3         9.5         11.4         11.8           Crookston         13.8         14.2         15.7         17.9         20.1         22.4         23.5           Snake River         Above Warren         63.4         63.7         64.1         64.9         65.7         67.3         68.1           Alvarado         100.1         100.8         102.0         103.5         105.6         108.1         108.6           Two Rivers River         Hallock         800.3         800.6         802.0         804.1         807.1         808.3         809.0           Roseau River         808.3         80.6         82.0         804.1         807.1         808.3         809.0           Roseau River         808.3         80.6         802.0         804.1         807.1         808.3         809.0           Roseau River         808.3         80.5         9.3         10.6         13.2         15.6         17.0           NORTH DAKOTA TRIBUTARIES         95%         90%         75%         50%         25%         10%         5%           Willd Rice River         4         16.1         17.5         19.2         21		19.9	20.7	22.7	24.9	28.3	30.7	32.1
Crookston         13.8         14.2         15.7         17.9         20.1         22.4         23.5           Snake River         Above Warren         63.4         63.7         64.1         64.9         65.7         67.3         68.1           Alvarado         100.1         100.8         102.0         103.5         105.6         108.1         108.6           Two Rivers River         Hallock         800.3         800.6         802.0         804.1         807.1         808.3         809.0           Roseau River         Roseau River         808.3         800.6         802.0         804.1         807.1         808.3         809.0           NORTH DAKOTA TRIBUTARIES         95%         90%         75%         50%         25%         10%         5%           Wild Rice River         15.7         16.1         17.5         19.2         21.8         24.0         25.0           Sheyenne River         11.6         12.0         12.6         13.3         14.3         18.0         19.5           Lisbon         12.0         12.6         13.2         13.9         15.2         18.5         20.1           Kindred         16.8         17.2         18.3								
Snake River         Above Warren         63.4         63.7         64.1         64.9         65.7         67.3         68.1           Alvarado         100.1         100.8         102.0         103.5         105.6         108.1         108.6           Two Rivers River         800.3         800.6         802.0         804.1         807.1         808.3         809.0           Roseau River         8.0         8.5         9.3         10.6         13.2         15.6         17.0           NORTH DAKOTA TRIBUTARIES         95%         90%         75%         50%         25%         10%         5%           Wild Rice River         Abercrombie         15.7         16.1         17.5         19.2         21.8         24.0         25.0           Sheyenne River         Valley City         11.6         12.0         12.6         13.3         14.3         18.0         19.5           Lisbon         12.0         12.6         13.2         13.9         15.2         18.5         20.1           Kindred         16.8         17.2         18.3         19.6         20.5         21.2         21.2           West Fargo Diversion         16.5         17.2         17.6								
Above Warren Alvarado 100.1 100.8 102.0 103.5 105.6 108.1 108.6 Two Rivers River Hallock Roseau River Roseau  NORTH DAKOTA TRIBUTARIES 95% 90% 75% 50% 25% 10% 5% Sheyenne River Valley City Lisbon 12.0 12.6 13.2 15.2 18.5 20.1 Kindred Kindred 16.8 17.2 18.3 19.6 20.5 21.2 21.2 West Fargo Diversion Harwood 89.3 90.1 91.1 91.5 91.8 92.1 92.2 Maple River Enderlin 11.4 11.6 12.3 12.9 13.2 13.8 14.2 Mapleton 21.0 21.0 21.6 22.0 22.4 22.8 23.2 23.7 Goose River Hillsboro Forest River Minto 4.3 4.6 5.2 5.7 6.5 7.1 7.2 Pembina River Walhalla 800.3 800.6 802.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 804.1 807.1 808.3 809.0 809.0 10.6 13.2 13.2 13.2 13.2 13.8 14.3 18.0 19.5 809.0 12.0 12.6 12.3 12.9 13.2 13.8 14.2 13.0 13.0 13.9 14.4 15.1 15.6 13.0 13.0 13.9 14.4 15.1 15.6 13.0 13.0 13.9 14.4 15.1 15.6 13.0 13.0 13.9 14.4 15.1 15.6 13.0 13.0 13.9 14.4 15.1 15.6 13.0 13.0 13.0 14.4 15.1 15.6 13.0 13.0 13.0 14.4 15.1 15.6 13.0 13.0 13.0 14.4 15.1 15.6 13.0 13.0 13.0 14.4 15.1 15.6 13.0 13.0 13.0 14.4 15.1 15.6 13.0 13.0 13.0 14.4 15.1 15.6 13.0 13.0 13.0 14.4 15.1 15.6 13.0 13.0 13.0 14.4 15.1 15.6 13.0 13.0 13.0 14.4 15.1 15.6 13.0 13.0 13.0 14.4 15.1 15.6 13.0 13.0 14.4 15.1 15.6 13.0 14.0 14.0 14.0 14.0 14.0 14.0 14.0 14		13.8	14.2	15.7	17.9	20.1	22.4	23.5
Alvarado 100.1 100.8 102.0 103.5 105.6 108.1 108.6 Two Rivers River Hallock 800.3 800.6 802.0 804.1 807.1 808.3 809.0 Roseau River Roseau 8.0 8.5 9.3 10.6 13.2 15.6 17.0 NORTH DAKOTA TRIBUTARIES 95% 90% 75% 50% 25% 10% 5% Wild Rice River Abercrombie 15.7 16.1 17.5 19.2 21.8 24.0 25.0 Sheyenne River Valley City 11.6 12.0 12.6 13.3 14.3 18.0 19.5 Lisbon 12.0 12.6 13.2 13.9 15.2 18.5 20.1 Kindred 16.8 17.2 18.3 19.6 20.5 21.2 21.2 West Fargo Diversion 16.5 17.2 17.6 19.3 21.3 21.3 21.3 Harwood 89.3 90.1 91.1 91.5 91.8 92.1 92.2 Maple River Enderlin 11.4 11.6 12.3 12.9 13.2 13.8 14.2 Mapleton 21.0 21.6 22.0 22.4 22.8 23.2 23.7 Goose River Hillsboro 9.8 11.6 13.0 13.9 14.4 15.1 15.6 Forest River Minto 4.3 4.6 5.2 5.7 6.5 7.1 7.2 Pembina River Walhalla 5.4 5.7 6.2 6.9 8.3 10.4 11.3								
Two Rivers River Hallock 800.3 800.6 802.0 804.1 807.1 808.3 809.0 Roseau River Roseau 8.0 8.5 9.3 10.6 13.2 15.6 17.0   NORTH DAKOTA TRIBUTARIES 95% 90% 75% 50% 25% 10% 5% 25% 10% 5% 25% 10% 5% 25% 25% 25% 25% 25% 25% 25% 25% 25%								
Hallock         800.3         800.6         802.0         804.1         807.1         808.3         809.0           Roseau River         8.0         8.5         9.3         10.6         13.2         15.6         17.0           NORTH DAKOTA TRIBUTARIES         95%         90%         75%         50%         25%         10%         5%           Wild Rice River         15.7         16.1         17.5         19.2         21.8         24.0         25.0           Sheyenne River         11.6         12.0         12.6         13.3         14.3         18.0         19.5           Lisbon         12.0         12.6         13.2         13.9         15.2         18.5         20.1           Kindred         16.8         17.2         18.3         19.6         20.5         21.2         21.2           West Fargo Diversion         16.5         17.2         17.6         19.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3         21.3		100.1	100.8	102.0	103.5	105.6	108.1	108.6
Roseau       8.0       8.5       9.3       10.6       13.2       15.6       17.0         NORTH DAKOTA TRIBUTARIES       95%       90%       75%       50%       25%       10%       5%         Wild Rice River       Abercrombie       15.7       16.1       17.5       19.2       21.8       24.0       25.0         Sheyenne River       Valley City       11.6       12.0       12.6       13.3       14.3       18.0       19.5         Lisbon       12.0       12.6       13.2       13.9       15.2       18.5       20.1         Kindred       16.8       17.2       18.3       19.6       20.5       21.2       21.2         West Fargo Diversion       16.5       17.2       17.6       19.3       21.3       21.3       21.3         Harwood       89.3       90.1       91.1       91.5       91.8       92.1       92.2         Maple River       Enderlin       11.4       11.6       12.3       12.9       13.2       13.8       14.2         Mapleton       21.0       21.6       22.0       22.4       22.8       23.2       23.7         Goose River       Hillsboro       9.8       <		000 3	000 6	000 0	004.4	007.4	000 0	000 0
Roseau         8.0         8.5         9.3         10.6         13.2         15.6         17.0           NORTH DAKOTA TRIBUTARIES         95%         90%         75%         50%         25%         10%         5%           Wild Rice River         Abercrombie         15.7         16.1         17.5         19.2         21.8         24.0         25.0           Sheyenne River         Valley City         11.6         12.0         12.6         13.3         14.3         18.0         19.5           Lisbon         12.0         12.6         13.2         13.9         15.2         18.5         20.1           Kindred         16.8         17.2         18.3         19.6         20.5         21.2         21.2           West Fargo Diversion         16.5         17.2         17.6         19.3         21.3         21.3         21.3           Harwood         89.3         90.1         91.1         91.5         91.8         92.1         92.2           Maple River         11.4         11.6         12.3         12.9         13.2         13.8         14.2           Mapleton         21.0         21.6         22.0         22.4         22.8         23.2		800.3	800.6	802.0	804.1	807.1	808.3	809.0
NORTH DAKOTA TRIBUTARIES         95%         90%         75%         50%         25%         10%         5%           Wild Rice River         Abercrombie         15.7         16.1         17.5         19.2         21.8         24.0         25.0           Sheyenne River         Valley City         11.6         12.0         12.6         13.3         14.3         18.0         19.5           Lisbon         12.0         12.6         13.2         13.9         15.2         18.5         20.1           Kindred         16.8         17.2         18.3         19.6         20.5         21.2         21.2           West Fargo Diversion         16.5         17.2         17.6         19.3         21.3         21.3         21.3           Harwood         89.3         90.1         91.1         91.5         91.8         92.1         92.2           Maple River         11.4         11.6         12.3         12.9         13.2         13.8         14.2           Mapleton         21.0         21.6         22.0         22.4         22.8         23.2         23.7           Goose River         Hillsboro         9.8         11.6         13.0         13.9 <td< td=""><td></td><td>0.0</td><td>0 5</td><td>0 3</td><td>10.6</td><td>12.2</td><td>15.6</td><td>17.0</td></td<>		0.0	0 5	0 3	10.6	12.2	15.6	17.0
Wild Rice River Abercrombie 15.7 16.1 17.5 19.2 21.8 24.0 25.0 Sheyenne River Valley City 11.6 12.0 12.6 13.3 14.3 18.0 19.5 Lisbon 12.0 12.6 13.2 13.9 15.2 18.5 20.1 Kindred 16.8 17.2 18.3 19.6 20.5 21.2 21.2 West Fargo Diversion 16.5 17.2 17.6 19.3 21.3 21.3 21.3 Harwood 89.3 90.1 91.1 91.5 91.8 92.1 92.2  Maple River Enderlin 11.4 11.6 12.3 12.9 13.2 13.8 14.2 Mapleton 21.0 21.6 22.0 22.4 22.8 23.2 23.7  Goose River Hillsboro 9.8 11.6 13.0 13.9 14.4 15.1 15.6 Forest River Minto 4.3 4.6 5.2 5.7 6.5 7.1 7.2  Pembina River Walhalla 5.4 5.7 6.2 6.9 8.3 10.4 11.3	Roseau	8.0	8.5	9.3	10.6	13.2	15.6	17.0
Abercrombie       15.7       16.1       17.5       19.2       21.8       24.0       25.0         Sheyenne River       Valley City       11.6       12.0       12.6       13.3       14.3       18.0       19.5         Lisbon       12.0       12.6       13.2       13.9       15.2       18.5       20.1         Kindred       16.8       17.2       18.3       19.6       20.5       21.2       21.2         West Fargo Diversion       16.5       17.2       17.6       19.3       21.3       21.3       21.3         Harwood       89.3       90.1       91.1       91.5       91.8       92.1       92.2         Maple River       89.3       90.1       91.1       91.5       91.8       92.1       92.2         Mapleton       21.0       21.6       22.0       22.4       22.8       23.2       23.7         Goose River       Hillsboro       9.8       11.6       13.0       13.9       14.4       15.1       15.6         Forest River       4.3       4.6       5.2       5.7       6.5       7.1       7.2         Pembina River       Walhalla       5.4       5.7       6.2	NORTH DAKOTA TRIBUTARIES	95%	90%	75%	50%	25%	10%	5%
Abercrombie       15.7       16.1       17.5       19.2       21.8       24.0       25.0         Sheyenne River       Valley City       11.6       12.0       12.6       13.3       14.3       18.0       19.5         Lisbon       12.0       12.6       13.2       13.9       15.2       18.5       20.1         Kindred       16.8       17.2       18.3       19.6       20.5       21.2       21.2         West Fargo Diversion       16.5       17.2       17.6       19.3       21.3       21.3       21.3         Harwood       89.3       90.1       91.1       91.5       91.8       92.1       92.2         Maple River       89.3       90.1       91.1       91.5       91.8       92.1       92.2         Mapleton       21.0       21.6       22.0       22.4       22.8       23.2       23.7         Goose River       Hillsboro       9.8       11.6       13.0       13.9       14.4       15.1       15.6         Forest River       4.3       4.6       5.2       5.7       6.5       7.1       7.2         Pembina River       Walhalla       5.4       5.7       6.2	Wild Rice River							
Sheyenne River         Valley City       11.6       12.0       12.6       13.3       14.3       18.0       19.5         Lisbon       12.0       12.6       13.2       13.9       15.2       18.5       20.1         Kindred       16.8       17.2       18.3       19.6       20.5       21.2       21.2         West Fargo Diversion       16.5       17.2       17.6       19.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.3       21.9       21.4       22.8		15 7	16 1	17 5	10 2	21 0	24.0	25 0
Valley City       11.6       12.0       12.6       13.3       14.3       18.0       19.5         Lisbon       12.0       12.6       13.2       13.9       15.2       18.5       20.1         Kindred       16.8       17.2       18.3       19.6       20.5       21.2       21.2         West Fargo Diversion       16.5       17.2       17.6       19.3       21.3       21.3       21.3         Harwood       89.3       90.1       91.1       91.5       91.8       92.1       92.2         Maple River       Enderlin       11.4       11.6       12.3       12.9       13.2       13.8       14.2         Mapleton       21.0       21.6       22.0       22.4       22.8       23.2       23.7         Goose River       Hillsboro       9.8       11.6       13.0       13.9       14.4       15.1       15.6         Forest River       Minto       4.3       4.6       5.2       5.7       6.5       7.1       7.2         Pembina River       Walhalla       5.4       5.7       6.2       6.9       8.3       10.4       11.3		13.7	10.1	17.5	13.2	21.0	24.0	23.0
Lisbon 12.0 12.6 13.2 13.9 15.2 18.5 20.1 Kindred 16.8 17.2 18.3 19.6 20.5 21.2 21.2 West Fargo Diversion 16.5 17.2 17.6 19.3 21.3 21.3 21.3 Harwood 89.3 90.1 91.1 91.5 91.8 92.1 92.2 Maple River Enderlin 11.4 11.6 12.3 12.9 13.2 13.8 14.2 Mapleton 21.0 21.6 22.0 22.4 22.8 23.2 23.7 Goose River Hillsboro 9.8 11.6 13.0 13.9 14.4 15.1 15.6 Forest River Minto 4.3 4.6 5.2 5.7 6.5 7.1 7.2 Pembina River Walhalla 5.4 5.7 6.2 6.9 8.3 10.4 11.3	-	11 6	12 0	12 6	13 3	1/1 3	18 0	19 5
Kindred       16.8       17.2       18.3       19.6       20.5       21.2       21.2         West Fargo Diversion       16.5       17.2       17.6       19.3       21.3       21.3       21.3         Harwood       89.3       90.1       91.1       91.5       91.8       92.1       92.2         Maple River       89.3       90.1       11.6       12.3       12.9       13.2       13.8       14.2         Mapleton       21.0       21.6       22.0       22.4       22.8       23.2       23.7         Goose River       411.5       13.0       13.9       14.4       15.1       15.6         Forest River       4.3       4.6       5.2       5.7       6.5       7.1       7.2         Pembina River         Walhalla       5.4       5.7       6.2       6.9       8.3       10.4       11.3								
West Fargo Diversion       16.5       17.2       17.6       19.3       21.3       21.3       21.3         Harwood       89.3       90.1       91.1       91.5       91.8       92.1       92.2         Maple River       11.4       11.6       12.3       12.9       13.2       13.8       14.2         Mapleton       21.0       21.6       22.0       22.4       22.8       23.2       23.7         Goose River       Hillsboro       9.8       11.6       13.0       13.9       14.4       15.1       15.6         Forest River       Minto       4.3       4.6       5.2       5.7       6.5       7.1       7.2         Pembina River       Walhalla       5.4       5.7       6.2       6.9       8.3       10.4       11.3								
Harwood       89.3       90.1       91.1       91.5       91.8       92.1       92.2         Maple River       11.4       11.6       12.3       12.9       13.2       13.8       14.2         Enderlin       21.0       21.6       22.0       22.4       22.8       23.2       23.7         Goose River       4111sboro       9.8       11.6       13.0       13.9       14.4       15.1       15.6         Forest River       Minto       4.3       4.6       5.2       5.7       6.5       7.1       7.2         Pembina River       Walhalla       5.4       5.7       6.2       6.9       8.3       10.4       11.3								
Maple River         Enderlin       11.4       11.6       12.3       12.9       13.2       13.8       14.2         Mapleton       21.0       21.6       22.0       22.4       22.8       23.2       23.7         Goose River       Hillsboro       9.8       11.6       13.0       13.9       14.4       15.1       15.6         Forest River       Minto       4.3       4.6       5.2       5.7       6.5       7.1       7.2         Pembina River         Walhalla       5.4       5.7       6.2       6.9       8.3       10.4       11.3	_							
Enderlin       11.4       11.6       12.3       12.9       13.2       13.8       14.2         Mapleton       21.0       21.6       22.0       22.4       22.8       23.2       23.7         Goose River       Hillsboro       9.8       11.6       13.0       13.9       14.4       15.1       15.6         Forest River       Minto       4.3       4.6       5.2       5.7       6.5       7.1       7.2         Pembina River       Walhalla       5.4       5.7       6.2       6.9       8.3       10.4       11.3		05.5	30.1	72.1	32.3	72.0		7-1-
Mapleton       21.0       21.6       22.0       22.4       22.8       23.2       23.7         Goose River       9.8       11.6       13.0       13.9       14.4       15.1       15.6         Forest River       4.3       4.6       5.2       5.7       6.5       7.1       7.2         Pembina River       5.4       5.7       6.2       6.9       8.3       10.4       11.3	· · · · · · · · · · · · · · · · · · ·	11.4	11.6	12.3	12.9	13.2	13.8	14.2
Goose River Hillsboro 9.8 11.6 13.0 13.9 14.4 15.1 15.6 Forest River Minto 4.3 4.6 5.2 5.7 6.5 7.1 7.2 Pembina River Walhalla 5.4 5.7 6.2 6.9 8.3 10.4 11.3								
Hillsboro       9.8       11.6       13.0       13.9       14.4       15.1       15.6         Forest River       Minto       4.3       4.6       5.2       5.7       6.5       7.1       7.2         Pembina River       Walhalla       5.4       5.7       6.2       6.9       8.3       10.4       11.3	•							
Forest River Minto 4.3 4.6 5.2 5.7 6.5 7.1 7.2  Pembina River Walhalla 5.4 5.7 6.2 6.9 8.3 10.4 11.3		9.8	11.6	13.0	13.9	14.4	15.1	15.6
Minto       4.3       4.6       5.2       5.7       6.5       7.1       7.2         Pembina River       Walhalla       5.4       5.7       6.2       6.9       8.3       10.4       11.3								
Pembina River Walhalla 5.4 5.7 6.2 6.9 8.3 10.4 11.3		4.3	4.6	5.2	5.7	6.5	7.1	7.2
Walhalla 5.4 5.7 6.2 6.9 8.3 10.4 11.3								
		5.4	5.7	6.2	6.9	8.3	10.4	11.3
14CC11C	Neche	9.1	9.8	11.3	12.7	16.7	19.6	20.5

Legend:
Below Flood Stage
Minor
Moderate
Major
\*Flood of Record\*