Red River and Devils Lake Basin - 2020 Spring Flood Outlook

Discussion Points 2/27/2020

prepared by
NWS - Weather Forecast Office, Grand Forks ND
NWS - North Central River Forecast Center, Chanhassen MN

This outlook is for the U.S. portion of the basin and is based on conditions through Monday, 2/24/2020. All graphics, probabilities, and related discussions are available at weather.gov/fgf. The next update will be issued by 3/12/2020.

**Bottom Line up Front!**

- **Good News:** Flood Risk at all forecast points has been reduced slightly since mid-January.
  - No **big** late Jan or Feb storms: Snowfall has been below normal since mid-January.
  - Generally **mild** conditions: Frost depths are still shallow and quite variable.
- **Bad News:** But not very much of a risk reduction since January 23rd outlook.
  - Very wet soils and high base streamflows persist.
  - Snowpack/SWE still remains at or above normal leading to high runoff potential.
- **Good News:** Climate outlooks have no clear signal: wet, dry, or normal. No longer indicate the risk for a cooler and wetter late winter and early spring period - thus March will likely be a big risk factor, as it always is.

**Long Story Short:** The risk for significant snowmelt flooding continues to be substantial, running above long-term averages across the Red River and Devils Lake Basins (U.S. portions), but it has dropped a bit.

**Key Snowmelt Flood Components:** (slight reduction due to recent dry period - little change since Jan 23, 2020 outlook)

1. **Base Streamflow:** At or near record high levels for this time of year. USGS analyses indicate that the Red River and most of its ND and MN tributaries (south of Grafton-Argyle) are moderate-thin ice covered and/or flowing at 95th percentiles or greater [link: https://waterdata.usgs.gov/nwis/rt]. Tributaries north of Grafton-Argyle are at 76% to 95%.

2. **Soil Moisture at Freeze-up:** Much above normal throughout. Standing water frozen into some ditches. [Link: https://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml]

3. **Frost Depth:** Shallower than normal. Heavy snowcover most of the season has kept frost depths somewhat shallow across the far southern RRV at 6-12 inches. Frost at most locations north of Fargo is 10 to 30 inches deep. Lake/river ice thicknesses are less than normal and quite variable. [Link: https://www.weather.gov/ncrfc/LMI_FrostDepthMap]

4. **Winter Snowpack/SWE:** Still above normal. Since December 1st, snowfall has been running 125-275 percent of normal with SWE still ranging from 2.5 to 5.0 inches - least across far northeast ND and far northwest MN. [Link: https://www.nohrsc.noaa.gov/nsa/]

5. **Precipitation:** Sep 1st to Feb 24th still a record high. Total precipitation (rain and snow-water) measured across the basin from Sep 1st through Feb 24th was 4-8 inches above the long-term normal for most of Red River Basin. [Links: https://www.ncdc.noaa.gov/sotc/national/201913; https://water.weather.gov/precip/index.php?location_type=wfo&location_name=FGF]

**New!** Along with our flood partners, we’ve developed a display graphic which relates the current flood outlook to our historical flood levels, now available for all our forecast locations! **Check it out at:** [https://www.weather.gov/fgf/PFOS](https://www.weather.gov/fgf/PFOS)
## DEVILS LAKE & STUMP LAKE...

**Long-Range Probabilistic Outlook**

Valid February 24, 2020 - September 30, 2020

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>95%</th>
<th>90%</th>
<th>75%</th>
<th>50%</th>
<th>25%</th>
<th>10%</th>
<th>05%</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREEL BAY</td>
<td>1450.6</td>
<td>1450.7</td>
<td>1450.9</td>
<td>1451.2</td>
<td>1451.8</td>
<td>1452.4</td>
<td>1453.1</td>
</tr>
<tr>
<td>EAST STUMP LAKE</td>
<td>1450.6</td>
<td>1450.7</td>
<td>1450.9</td>
<td>1451.2</td>
<td>1451.8</td>
<td>1452.4</td>
<td>1453.1</td>
</tr>
</tbody>
</table>

The current heights of Devils Lake and Stump Lake are ~1448.95 ft MSL.

---

## RED RIVER AND TRIBUTARIES...

**Long-Range Probabilistic Outlook**

Valid March 2, 2020 - May 31, 2020

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>95%</th>
<th>90%</th>
<th>75%</th>
<th>50%</th>
<th>25%</th>
<th>10%</th>
<th>05%</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAHEPTON</td>
<td>12.0</td>
<td>12.3</td>
<td>12.7</td>
<td>13.8</td>
<td>15.5</td>
<td>16.6</td>
<td>17.1</td>
</tr>
<tr>
<td>HICKSON</td>
<td>27.6</td>
<td>28.1</td>
<td>29.3</td>
<td>32.2</td>
<td>34.0</td>
<td>35.5</td>
<td>36.1</td>
</tr>
<tr>
<td>FARGO</td>
<td>32.0</td>
<td>32.5</td>
<td>33.7</td>
<td>34.8</td>
<td>36.2</td>
<td>38.5</td>
<td>39.1</td>
</tr>
<tr>
<td>HALSTAD</td>
<td>36.3</td>
<td>37.1</td>
<td>38.3</td>
<td>38.8</td>
<td>39.4</td>
<td>39.9</td>
<td>40.3</td>
</tr>
<tr>
<td>GRAND FORKS</td>
<td>45.1</td>
<td>45.6</td>
<td>47.1</td>
<td>48.2</td>
<td>50.2</td>
<td>52.2</td>
<td>53.3</td>
</tr>
<tr>
<td>OSLO</td>
<td>37.1</td>
<td>37.2</td>
<td>37.4</td>
<td>37.7</td>
<td>37.9</td>
<td>38.0</td>
<td>38.0</td>
</tr>
<tr>
<td>DRAYTON</td>
<td>41.5</td>
<td>41.9</td>
<td>42.5</td>
<td>43.0</td>
<td>43.7</td>
<td>44.6</td>
<td>45.2</td>
</tr>
<tr>
<td>PEMBINA</td>
<td>50.9</td>
<td>51.7</td>
<td>52.2</td>
<td>52.7</td>
<td>53.6</td>
<td>54.0</td>
<td>54.6</td>
</tr>
</tbody>
</table>

### Minnesota Tributaries:

- South Fork Buffalo River
  - SABIN 15.4 15.8 16.1 16.7 17.6 18.4 19.2
- Buffalo River
  - HANLEY 8.6 9.0 9.4 9.8 10.4 10.9 11.2
  - DILWORTH 21.6 22.1 22.7 23.5 24.2 25.3 26.2
- Wild Rice River
  - TWIN VALLEY 9.9 10.1 10.7 11.7 12.8 13.6 15.0
  - HENDRUM 29.7 30.5 31.7 32.1 32.6 33.3 33.9
- Marsh River
  - SHELY 15.1 16.3 17.5 18.7 20.3 21.8 22.9
- Sand Hill River
  - CLINAX 24.3 25.9 28.3 29.8 32.0 34.0 35.7
- Red Lake River
  - HIGH LANDING 9.7 10.5 11.5 12.2 13.0 13.2 13.4
  - CROOKSTON 19.5 20.4 21.3 22.8 24.8 26.8 28.0
- Snake River
  - ABOVE WARREN 65.4 65.4 65.9 66.6 67.7 69.7 70.8
  - ALVARADO 105.5 105.8 106.9 108.4 109.3 110.0 110.5
- Two Rivers River
  - HALLLOCK 804.9 805.8 806.5 807.5 808.2 809.2 809.8
- Roseau River
  - ROSEAU 13.3 13.9 14.9 15.5 17.7 18.3 18.5

### North Dakota Tributaries:

- Wild Rice River
  - ABERCROMBIE 19.9 20.4 21.4 22.8 23.9 26.1 26.8
- Sheyenne River
  - VALLEY CITY 14.2 15.1 16.5 17.9 20.8 22.4 26.8
  - LISBON 16.1 16.5 17.1 18.2 21.1 23.5 29.4
  - KINDRED 20.3 20.4 20.6 21.0 21.2 21.2 21.2
  - HARWOOD 91.4 91.4 91.7 91.8 92.0 92.2 92.3
- Maple River
  - ENDERLIN 12.0 12.1 12.4 12.9 13.4 13.9 14.5
  - MAPLETON 22.0 22.1 22.4 22.6 23.0 23.6 24.0
- Goose River
  - HILLSBORO 11.7 12.1 13.1 14.0 14.4 15.3 16.8
- Forest River
  - MINTO 4.8 5.1 5.6 6.2 6.8 8.0 8.5
- Park River
  - GRAFTON 10.0 10.1 10.5 10.9 12.1 13.9 15.2
- Pembina River
  - WALHALLA 9.0 9.3 10.1 11.1 12.6 14.2 15.3
  - NEOKE 16.6 17.0 18.4 20.0 21.1 21.4 21.5

### Notes:

1. **Devils Lake Basin runoff risk is quite high.** A rise of 2 to 3 ft is expected (75% to 25% risk range). A 0.5 to 1 ft rise on Devils Lake is considered about normal.

2. **Red River Basin runoff risk is overall quite high.** All Red River mainstem points will see significantly high flows.

3. **Above normal snowpack and runoff potential is evident in most all MN tributaries.**

The northern-most MN tribus have the wettest soils but a somewhat lesser snowpack.

4. **ND Wild Rice, Sheyenne, and Maple Rivers are at a much higher runoff risk.**

Mid and Upper Sheyenne is carrying substantial soil moisture and snowpack with potential for both early and later crest issues.

Lower Sheyenne through east-central ND tribus are also at an exceptionally elevated risk.

Northeast ND threat is mixed, with lesser runoff at the upper basin of the Pembina, Forest, and Park Rivers.

**Note:** Reduced risk expected for areas protected by new Grafton Bypass!