Winter 2020-21 Outlook
What can we expect the rest of this winter?

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Roadmap

- **La Niña Conditions in Place:** How could this affect our winter weather?
- **Typical Winter Temperatures and Snowfall**
- **Where have we been & where are we going?** Warm Nov. & CPC Outlooks
- **Precipitation and Snowfall Data**
- **Conclusion:** NWS Chicago’s Winter Outlook Thoughts!
- **Bonus!** Lake Michigan remains very high → elevated lakeshore flood risk
- **Time for Questions!**
La Niña Likely to Influence Our Winter Season

- **El Niño** and La Niña are regularly recurring water temperature patterns near the Equator in the Pacific Ocean which affect weather patterns globally, including in North America (NOAM).

- They may shift the typical track of weather systems, influencing temperature and precipitation.

- Strongest link in NOAM winter.
La Niña Likely to Influence Our Winter Season

Global SST Departures (°C) November 1st-November 28th

- Equatorial SSTs were below average in the central and eastern Pacific Ocean

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La Niña Signal

Equatorial SSTs were below average in the central and eastern Pacific Ocean.
La Niña Likely to Influence Our Winter Season

What does this mean for us?

- Increased “storminess”
  - More precipitation
  - Not always more snow

- No strong signal for temperature
  - Large temp swings/variability
  - Some recent indicators are pointing to more mild than cold

- These are typical impacts, but every winter is unique!

<table>
<thead>
<tr>
<th>Year</th>
<th>Strength</th>
<th>DJF Temps</th>
<th>Precip Dep</th>
<th>Snow Dep</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017-2018</td>
<td>Weak</td>
<td>+0.5°F</td>
<td>+1.00”</td>
<td>-0.2”</td>
</tr>
<tr>
<td>2016-2017</td>
<td>Weak</td>
<td>+4.2°F</td>
<td>+0.39”</td>
<td>-10.2”</td>
</tr>
<tr>
<td>2011-2012</td>
<td>Weak</td>
<td>+6.4°F</td>
<td>+0.38”</td>
<td>-16.5”</td>
</tr>
<tr>
<td>2010-2011</td>
<td>Moderate</td>
<td>-3.3°F</td>
<td>+1.02”</td>
<td>+21.6”</td>
</tr>
<tr>
<td>2008-2009</td>
<td>Weak</td>
<td>-4.0°F</td>
<td>+4.55”</td>
<td>+16.4”</td>
</tr>
<tr>
<td>2007-2008</td>
<td>Strong</td>
<td>-1.6°F</td>
<td>+3.18”</td>
<td>+24.0”</td>
</tr>
</tbody>
</table>
Notable Events in Recent La Niña Winters

- Early Jan. 1999 Blizzard: 2nd largest Chicago snowstorm in mild winter
- 2007-08: Much snowier than average; huge temperature swings
  - Early January: EF-3 tornado; major flooding in central IL
- 2011 “Groundhog Day Blizzard”: 3rd largest Chicago snowstorm
- 2011-12: Warm & little snow; unprecedented March heat wave
- 2016-17: Snowy December; springlike Jan-Feb; 2/28 tornado outbreak
- 2017-18: New Year COLD; record snow stretch 2/3-11; late Feb flooding
What’s our Typical Winter Weather Like?

<table>
<thead>
<tr>
<th>City</th>
<th>Snowfall (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago</td>
<td>36.3”</td>
</tr>
<tr>
<td>Rockford</td>
<td>36.7”</td>
</tr>
<tr>
<td>IN Dunes</td>
<td>40.3”</td>
</tr>
<tr>
<td>Mundelein</td>
<td>43.2”</td>
</tr>
<tr>
<td>Pontiac</td>
<td>23.5”</td>
</tr>
</tbody>
</table>

Snowfall Season: Fall-Spring
What’s our Typical Winter Weather Like?

<table>
<thead>
<tr>
<th></th>
<th>Chicago</th>
<th>Rockford</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Highs</strong></td>
<td>45</td>
<td>52</td>
</tr>
<tr>
<td><strong>Highs 20F or colder</strong></td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td><strong>Lows</strong></td>
<td>24</td>
<td>32</td>
</tr>
<tr>
<td><strong>Lows 0F or colder</strong></td>
<td>8</td>
<td>13</td>
</tr>
</tbody>
</table>
Warm and Dry November 2020

- 4th warmest on Record in Chicago (47.4°) and Rockford (45.6°).

Normal November Mean Temperature
Chicago: 40.3° (+7.1° in Nov. 2020)  Rockford: 38.9° (+6.7° in Nov. 2020)
Can November Help Tell Us How the Winter May Play Out?

- In La Niñas, Nov. temp. departures tended to correlate with winter temp. departures.

Average November Temp. Anomaly (Departure from Normal in °C) of 9 warmest La Niña Winters

Near Normal La Niña (n=6)

Coldest La Niña (n=7)
December Outlook

- Above normal temperatures below normal precipitation favored, but:
  - Signs indicating a shift to at least a short period of colder and possibly more active weather around the middle part of the month.
  - A more traditional La Niña pattern towards the end of the month → increased precip threat.

Climate Prediction Center (CPC) December 2020 Outlook
January through March Outlook

- Favors above average precipitation across our area due to an expected active weather pattern.
- Variable temperatures likely, with some potential for warmer conditions to outweigh cold periods.

Climate Prediction Center (CPC) Jan-Mar 2021 Outlook

- No strong temperature signal locally, but...
- Above normal precip. favored
  *Not a snowfall forecast*
Does Above Average Precip. Support More Snow?

Not necessarily! But, historically, more winter precip → more snow

- Wettest 25% of all winters tended to be snowier than normal
- Drier winters trended towards below average snow.

**Bottom Line:** While an above average precipitation forecast does not always lead to more snow, it increases the odds of having above average snow. Predominant temperature pattern is a big wild card.
A Note on Seasonal Snowfall

- Chicago’s snowfall record goes back to 1884
- 1981-2010 seasonal (fall through spring) normal snowfall is 36.3”

In Chicago area, odds favor roughly between 25” & 45” seasonal snowfall.

Snowfall dependent on storm tracks, how many typical light-moderate events, and if 1 or more larger events occur.

A mild winter will tend to favor below normal snow, but sometimes all it takes is one event!
Conclusion

NWS Chicago Outlook for Winter 2020-21
Northern/Central IL and Northwest Indiana

• Temperatures: Variable, but signs that warmth *could* outweigh cold
  • Confidence: low-medium in predominant regime

• Precipitation: Above normal
  • Confidence: medium-high

• Snowfall: Near normal
  • Confidence: low
High antecedent lake levels increase the threat of and impacts from lakeshore flooding.
Lakeshore Flooding Impacts During High Water Levels

February 8, 1987
Lake Level: 580.9’
Storm Surge: 2.5’ to 583.4’
Waves: up to ~20’ (estimated)

October 31, 2014
Lake Level: 579.2’
Storm Surge: 2.4’ to 581.7’
Waves: up to 22’ (obs., south buoy)
Lakeshore Flooding Impacts During High Water Levels

January 10-11, 2020
Lake Level: 581.5’
Storm Surge: 1.8’ to 583.3’
Waves - est. up to ~20 ft

~1.8’ rise

Modeled wave heights
Thank You for Reading!

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