Preparing For The Winter Season

National Weather Service
2018 OP3 Fall Conference
October 2, 2018

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Warning Coordination Meteorologist
NWS Wilmington OH
Topics

- National Weather Service Background
  - How we are organized
  - What we do and how we do it
- The Winter that Was (2017-2018)
- The Winter that Will Be (2018-2019)
- How to Address Snow Squalls
- Building a Weather-Ready Nation
NWS Mission

• Federal organization:

  Department of Commerce
  National Oceanic and Atmospheric Administration
  National Weather Service

• To provide weather, hydrologic, and climate forecasts and warnings for the protection of life and property and the enhancement of the national economy
Partner Agencies & Groups

- EMA
- Clinton County
- American Red Cross
- USGS
- The Great Seal of the State of Ohio
- State Highway Patrol
- Department of Defense
- US Army Corps of Engineers
- U.S. Department of Homeland Security
- FEMA
- WHIO TV 7
- WLWT
- Federal Aviation Administration
NWS Organization

- 122 Weather Forecast Offices
- 5 NWS offices serve Ohio
  - Provide forecasts, warnings, and other local services
  - Operate 24/7/365
NWS Wilmington OH

- NWS Wilmington Ohio serves 52 counties across OH, IN, and KY
- The office is staffed by 26 full-time employees
NWS Operations

- **Long-Term**
- **Public Service**
- **Severe & Hydro**
- **Aviation & Short-Term**
- **Severe Coord.**

[Image of a weather operations center with various people and equipment]
Upper Air Observations

- Used by computer models to help forecast the weather.
- Launched twice daily from 73 sites in the US and 92 in North America.
- Can reach heights over 100,000 feet
Satellite
Radar (WSR-88D)

- Inside of the Radar “Dome”
- Velocity
- Reflectivity
Computer models project a hypothetical state of the atmosphere hours and days into the future.

The computer models ingest radar, satellite and observational data and process this information through a complex series of mathematical equations to produce data/maps as shown to the right.
Winter Review
2017 - 2018

Although February featured much above normal temperatures in the state of Ohio, the cooler-than-normal months of December and January helped counteract the warmth of February. Therefore, the winter as a whole ended up with near normal average temperatures in the region.

With a very wet February across the state of Ohio, which lead to widespread flooding and river flooding in the region, the winter precipitation ended up being above normal through much of the region. The river flooding of February 2018 was some of the most extensive experienced in many years.
# Winter Review 2017 - 2018

## Temperatures: Slightly Above Normal

<table>
<thead>
<tr>
<th>SEASON</th>
<th>Location</th>
<th>Cincinnati</th>
<th>Cleveland</th>
<th>Columbus</th>
<th>Dayton</th>
<th>Toledo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec. Avg. Temp</td>
<td>32.3°F (-1.8°F)</td>
<td>28.7°F (-3.7°F)</td>
<td>31.2°F (-2.3°F)</td>
<td>28.8°F (-2.4°F)</td>
<td>26.4°F (-3.3°F)</td>
<td></td>
</tr>
<tr>
<td>Jan. Avg. Temp</td>
<td>28.0°F (-2.0°F)</td>
<td>26.9°F (-1.2°F)</td>
<td>27.3°F (-2.3°F)</td>
<td>25.7°F (-1.8°F)</td>
<td>24.9°F (-0.6°F)</td>
<td></td>
</tr>
<tr>
<td>Feb. Avg. Temp</td>
<td>40.9°F (+6.4°F)</td>
<td>36.0°F (+5.5°F)</td>
<td>38.8°F (+6.0°F)</td>
<td>37.1°F (+6.1°F)</td>
<td>31.4°F (+3.1°F)</td>
<td></td>
</tr>
<tr>
<td>Seasonal Dep.</td>
<td>+2.6°F</td>
<td>+0.6°F</td>
<td>+1.4°F</td>
<td>+1.9°F</td>
<td>-0.8°F</td>
<td></td>
</tr>
</tbody>
</table>

## Snowfall: Mixed

<table>
<thead>
<tr>
<th>SEASON</th>
<th>Location</th>
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<th>Columbus</th>
<th>Dayton</th>
<th>Toledo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec. Snowfall</td>
<td>3.8”</td>
<td>17.2”</td>
<td>8.1”</td>
<td>8.6”</td>
<td>13.9”</td>
<td></td>
</tr>
<tr>
<td>Jan. Snowfall</td>
<td>6.2”</td>
<td>12.0”</td>
<td>10.5”</td>
<td>10.3”</td>
<td>6.6”</td>
<td></td>
</tr>
<tr>
<td>Feb. Snowfall</td>
<td>1.6”</td>
<td>7.1”</td>
<td>6.0”</td>
<td>2.6”</td>
<td>10.3”</td>
<td></td>
</tr>
<tr>
<td>Seasonal Total</td>
<td>11.6” (-4.2”)</td>
<td>36.3” (-11.4”)</td>
<td>24.6” (+4.3”)</td>
<td>21.5” (+3.2”)</td>
<td>30.8” (+2.4”)</td>
<td></td>
</tr>
</tbody>
</table>

*Stats for December 2017, January 2018 and February 2018 only*
Annual Snowfall

*Record Annual Snowfall

<table>
<thead>
<tr>
<th>City</th>
<th>MAX</th>
<th>MIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cincinnati</td>
<td>53.9”</td>
<td>5.0”</td>
</tr>
<tr>
<td></td>
<td>(1977)</td>
<td>(1919)</td>
</tr>
<tr>
<td>Cleveland</td>
<td>108.4”</td>
<td>13.0”</td>
</tr>
<tr>
<td></td>
<td>(2005)</td>
<td>(1931)</td>
</tr>
<tr>
<td>Columbus</td>
<td>49.4”</td>
<td>3.9”</td>
</tr>
<tr>
<td>Dayton</td>
<td>52.9”</td>
<td>8.0”</td>
</tr>
<tr>
<td></td>
<td>(1978)</td>
<td>(2001)</td>
</tr>
<tr>
<td>Toledo</td>
<td>77.4”</td>
<td>6.6”</td>
</tr>
</tbody>
</table>

*Only Years That Had No Missing Data Per Year

Image Courtesy of MRCC (Midwest Regional Climate Center)
# Winter Temperatures

## Regional Extremes

<table>
<thead>
<tr>
<th>Location</th>
<th>Cincinnati</th>
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</tr>
</thead>
</table>

**2017-2018 Winter**

<table>
<thead>
<tr>
<th>Highest Temp</th>
<th>Cincinnati</th>
<th>Cleveland</th>
<th>Columbus</th>
<th>Dayton</th>
<th>Toledo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest Temp</td>
<td>*79°F (02/20)</td>
<td>73°F (02/20)</td>
<td>77°F (02/20)</td>
<td>75°F (02/20)</td>
<td>70°F (02/20)</td>
</tr>
<tr>
<td>Lowest Temp</td>
<td>-7°F (01/02)</td>
<td>-5°F (01/07)</td>
<td>-4°F (01/02)</td>
<td>-13°F (01/02)</td>
<td>-8°F (12/28)</td>
</tr>
</tbody>
</table>

**Records Since:** 1873 1876 1879 1894 1875

*The high temperature of 79°F at Cincinnati on February 20th was the highest temperature ever recorded at the site in any winter month of December, January, or February.*
Early/Late Snowfall
Regional Extremes

Earliest/Latest Snowfall

<table>
<thead>
<tr>
<th>Location</th>
<th>Earliest Date</th>
<th>Latest Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cincinnati</td>
<td>10/19 (1989)</td>
<td>05/05 (1992)</td>
</tr>
<tr>
<td>Cleveland</td>
<td>10/02 (2003)</td>
<td>05/10 (1907)</td>
</tr>
<tr>
<td>Columbus</td>
<td>10/19 (1989)</td>
<td>05/07 (1989)</td>
</tr>
<tr>
<td>Dayton</td>
<td>10/18 (1989)</td>
<td>05/09 (1923)</td>
</tr>
<tr>
<td>Toledo</td>
<td>10/18 (1972)</td>
<td>05/07 (1989)</td>
</tr>
</tbody>
</table>

Median Date of First Seasonal Measurable Snow

Image Courtesy of MRCC (Midwest Regional Climate Center)
According to the Climate Prediction Center (CPC), weak El Nino conditions are favored to develop late this autumn and continue through the winter months of December and January.
Weak El Nino
Implications on the Ohio Valley

- An El Nino watch is currently in effect.
  - However, a weak El Nino is favored (opposed to a strong El Nino).
- Confidence is moderate to high on a slightly warmer-than-normal winter in the Ohio Valley.
  - However, there still will be arctic outbreaks and a wide variation in day-to-day and week-to-week temperature trends.
- Confidence remains low on exactly how the precipitation patterns may evolve this winter.
  - Because a weak or nearly-non existent El Nino is expected, the precipitation patterns are difficult to ascertain this far out. As such, near normal precipitation is favored at this time.
  - With the slightly warmer than normal temperatures expected with near normal precipitation, snowfall is expected to be near or slightly below normal. This would translate to approximately 20-25 inches of snow for the state as an areal average, except in traditional lake effect snow belt areas. However, some areas will receive more or less than the above range indicated.
According to the Climate Prediction Center (CPC), the entire Ohio Valley region will have favorable probabilities for above normal temperatures during the October – December time frame.

According to the Climate Prediction Center (CPC), there is not yet a clear signal for precipitation being either above or below normal in the immediate local area from October through December.
Be Prepared...

... For Winter Hazards
Snow Squall Safety
Newspaper Articles – February 14, 2015

2 deadly pileups close Ohio Turnpike; snow grounds flights

Wind, white-out conditions cause fatal crashes
Icy roads, blinding snow cause pileups across state, killing 4

Blowing snow fueled by wind gusts of more than 40 mph caused whiteout conditions across Indiana on Saturday, causing pileups including one that killed a child and forcing the closure of highways in the north and east.

(Courtesy: Banacos, Lahiff)
Working Together to Mitigate Impacts

The Ohio Department of Transportation is a valued proactive partner that works closely with the NWS to motivate action, mitigate weather impacts, and explore different avenues to ensure a Weather Ready Nation.
The Ohio Department of Transportation reaches motorists where they are impacted based off of NWS products. What started with snow squalls has expanded to other weather messaging with the Pathfinder Initiative.
### New Snow Squall Warning This Winter

**Snow Squall Warning:** short-fused polygon warning similar to a severe/tornado warning. Future (not this winter): possible EAS/WEA.

**Snow Squall:** an intense short-lived burst of heavy snowfall that leads to a quick reduction in visibilities and is often accompanied by gusty winds. They may be characterized by one main squall or multiple squalls.

**Impact:** The combination of quick reductions in visibilities and sudden slick conditions on roadways can often lead to high speed wrecks, pileups, and subsequently injuries and fatalities.
Building A Weather-Ready Nation

Becoming a Weather-Ready Nation is about building community resilience in the face of increasing vulnerability to extreme weather, water, and climate events.

NOAA is developing new decision support services, improving technology to track and forecast storms, and expanding its dissemination efforts to achieve far-reaching national preparedness for weather events.

Decreasing Vulnerability by Increasing Resilience
WRN Ambassador

NWS Initiative

Promoting value of NOAA/NWS “Environmental Intelligence”

- Community events
- Press releases and media interviews
- Social media outreach
- Data access/formatting inquiries
- Corporate identity
- Expansion of stakeholder engagement to non-traditional sectors, including:
  - Insurance, health, real estate
  - Museums/Science Centers
  - Vulnerable populations

http://www.nws.noaa.gov/com/weatherreadynation/ambassadors.html
Weather-Ready Nation

Improving the nation's readiness, responsiveness, and resilience against extreme weather, water, and climate events.
Questions???

Thank You!