Winter Skywarn Spotter Training

Online Webinar

December 6th at 7:00 p.m.

HOSTED BY: National Weather Service
Pittsburgh, PA
PRESENTED BY: Charlie Woodrum
Meteorologist

Why Winter Skywarn?

- NWS's mission is to "protect life and property", and winter storms threaten life and property

- In many locations in our region, winter impacts can be at least as bad, if not worse, than summer impacts

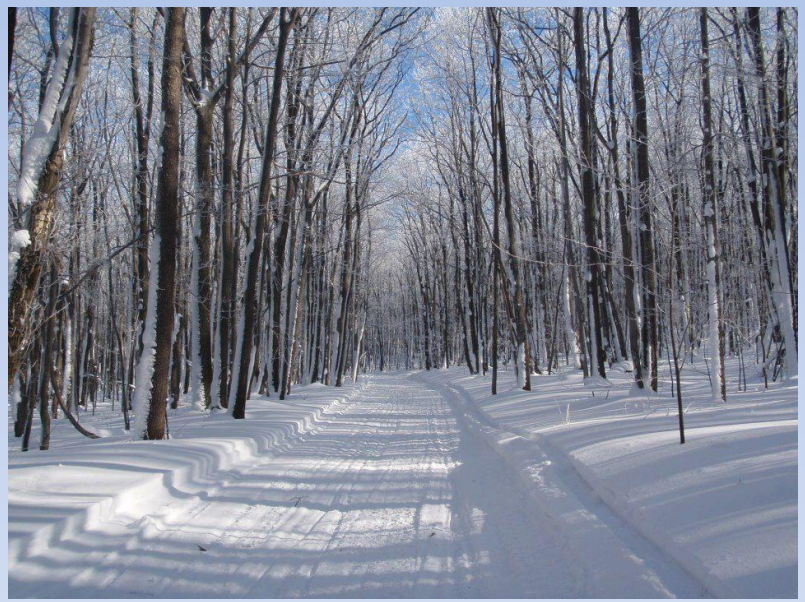


Photo courtesy of- Scott Buckles

Outline

- Winter Hazards
- Snow Climatology
- HWO/Watch/ Advisory/Warning
- Product Definitions
- Miscellaneous
- Snowfall Measuring
- What to Report

Photo courtesy of- Larry Moyer

Outline

- Winter Hazards
- Snow Climatology
- HWO/Watch/ Advisory/Warning
- Product Definitions
- Miscellaneous
- Snowfall Measuring
- What to Report

Photo courtesy of- Larry Moyer

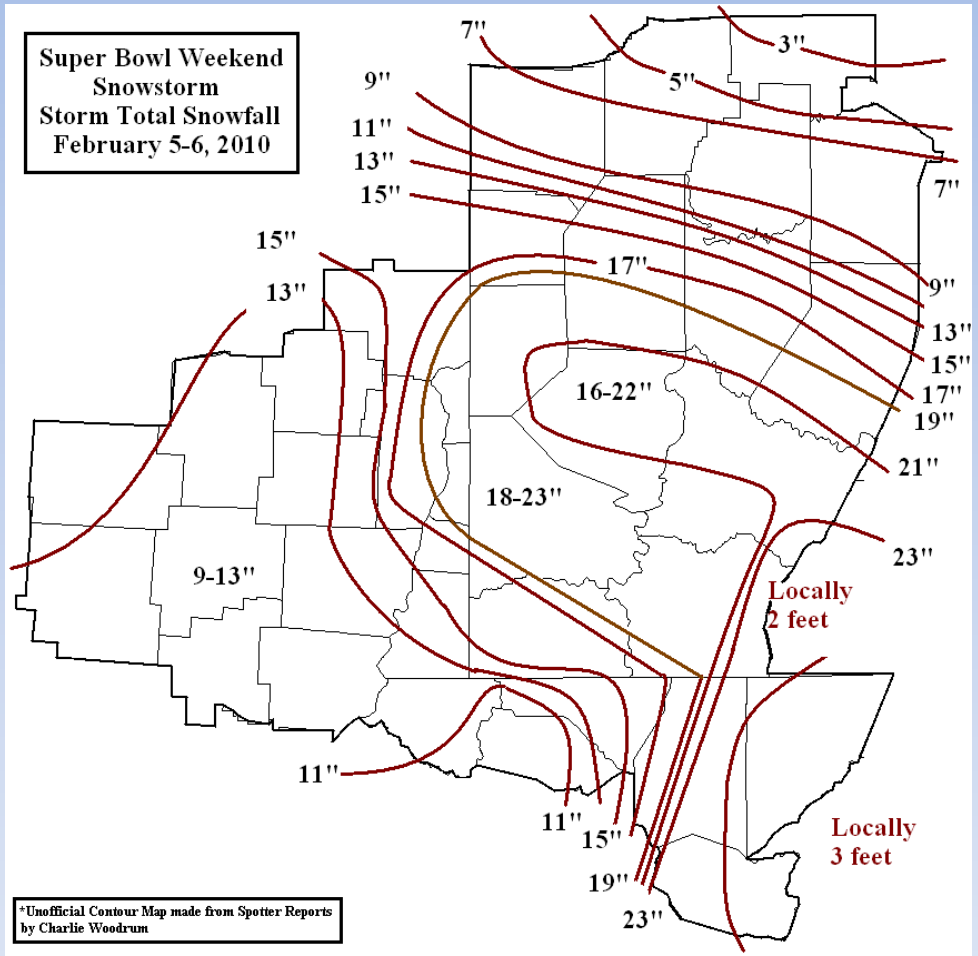
Winter Hazards

- Heavy Snow
- Mixed Precipitation (Ice)
- Cold Outbreaks
- Flooding

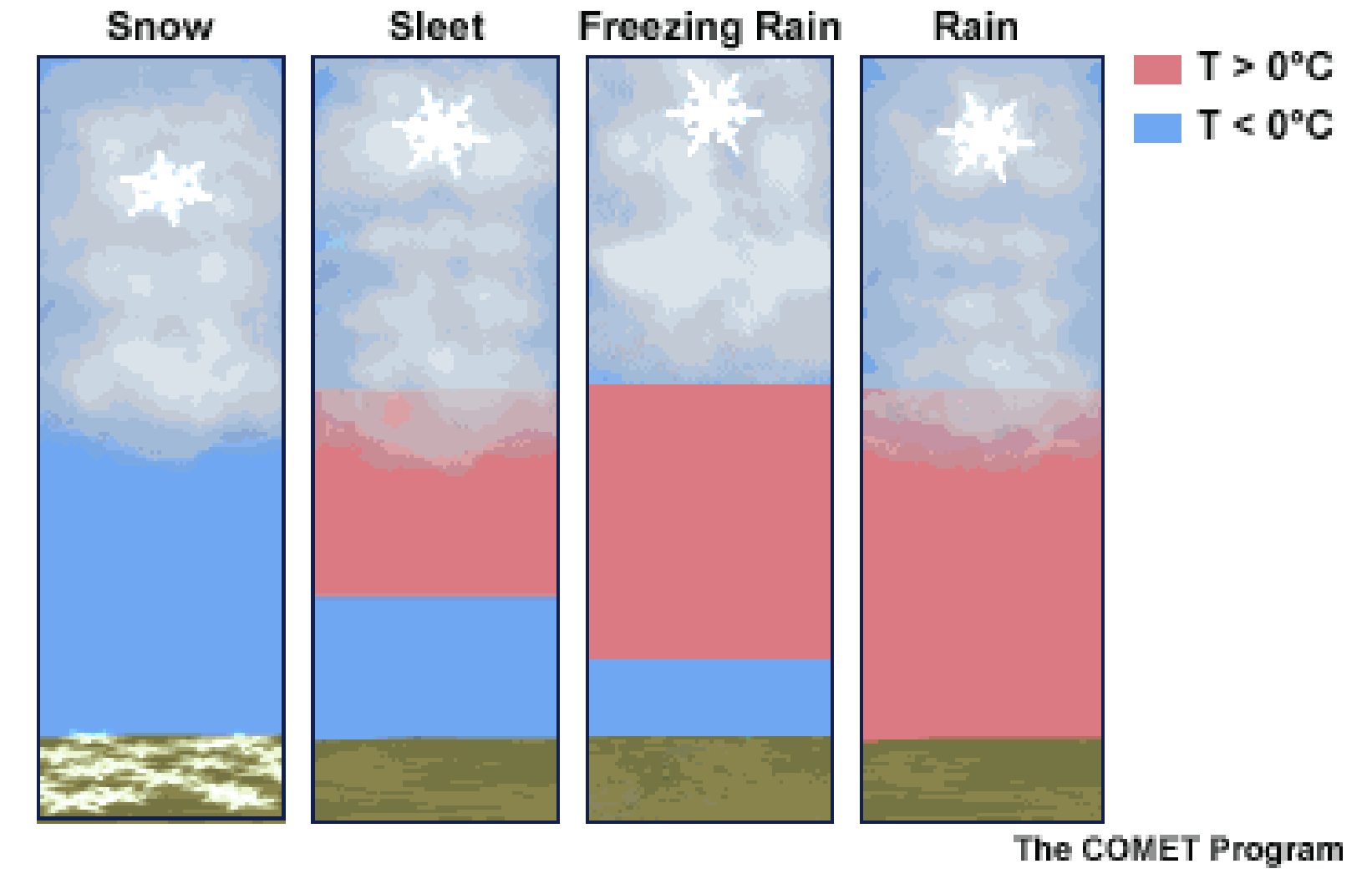
Snowfall Statistics for Pittsburgh
(records began in 1884)

- **Largest seasonal snowfall: 82**" (1950-51)
  - 77.4" for 2009-2010 was 3rd place
- **Largest monthly snowfall: 48.7**" (Feb 2010)
  - Previous record was 40.2" in January 1978
- **Largest snowstorm: 27.4**" (Nov 24-26, 1950)
- **Largest 1 day snowfall: 23.6**" (March 13, 1993)
- **Highest snow depth: 26**" (Jan 22, 1978)

Last Widespread Major Snowstorm



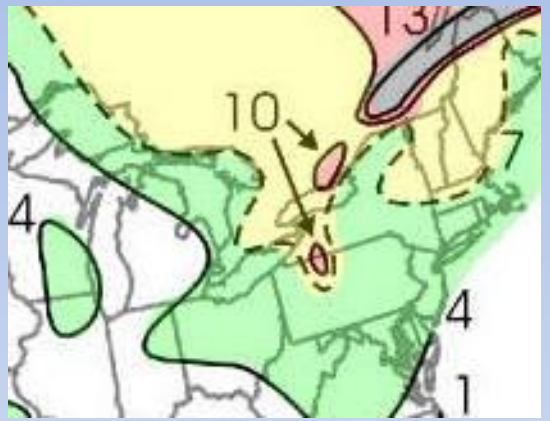
Types of Wintry Precipitation

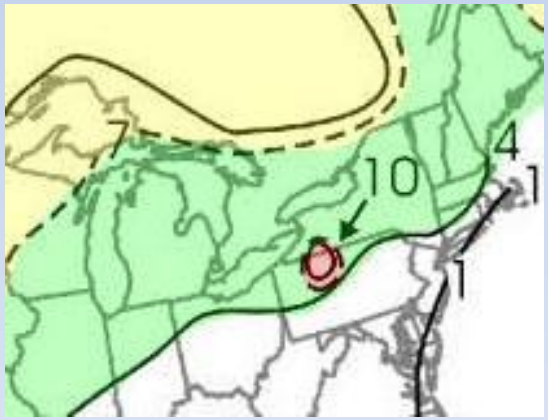


Frozen Precipitation Climatology

Freezing Rain

Sleet





Freezing Drizzle

- Green: ≥ 4 days
- Yellow: ≥ 7 days
- Red: ≥ 10 days

(per year)

Dec 13 2009 Freezing Rain event

- Freezing rain event with extensive impacts in Allegheny County and surrounding area
- All major highways in county were shut down for several hours, including tunnels and interstates

Cold Temperature Statistics for Pittsburgh

- **Longest period with temperatures ≤ 0°:** **52 hours** – 6am Jan 18, 1994 to 10am Jan 20, 1994 (lowest temp was -22°)
- **Longest period with temperatures ≤ 32°:** **33 days** – Dec 26, 1976 through Jan 27, 1977
- **Coldest low temperature:** -**22**°, Jan 19, 1994
- **Coldest high temperature:** -**3**°, Jan 19, 1994

Cold Spells in Pittsburgh
(last 5 years)

- 8th longest streak of consecutive days < 32°: 16, Dec 13-28 2010

- 13th coldest December: 25.6° in 2010
  (1981-2010 normal – 32.4, record 19.2 – 1989)

- 15th coldest January: 22.0° in 2009
  (normal – 28.4, record 11.4 – 1977)

- 6th coldest February: 20.9° in 2007
  (normal – 31.1, record 18.0 – 1979)

- 17th coldest Dec/Jan/Feb: 27.2° in 2010-2011
  (normal – 30.6, record 20.7 – 1976-77)

Photo courtesy of- Scott Buckles

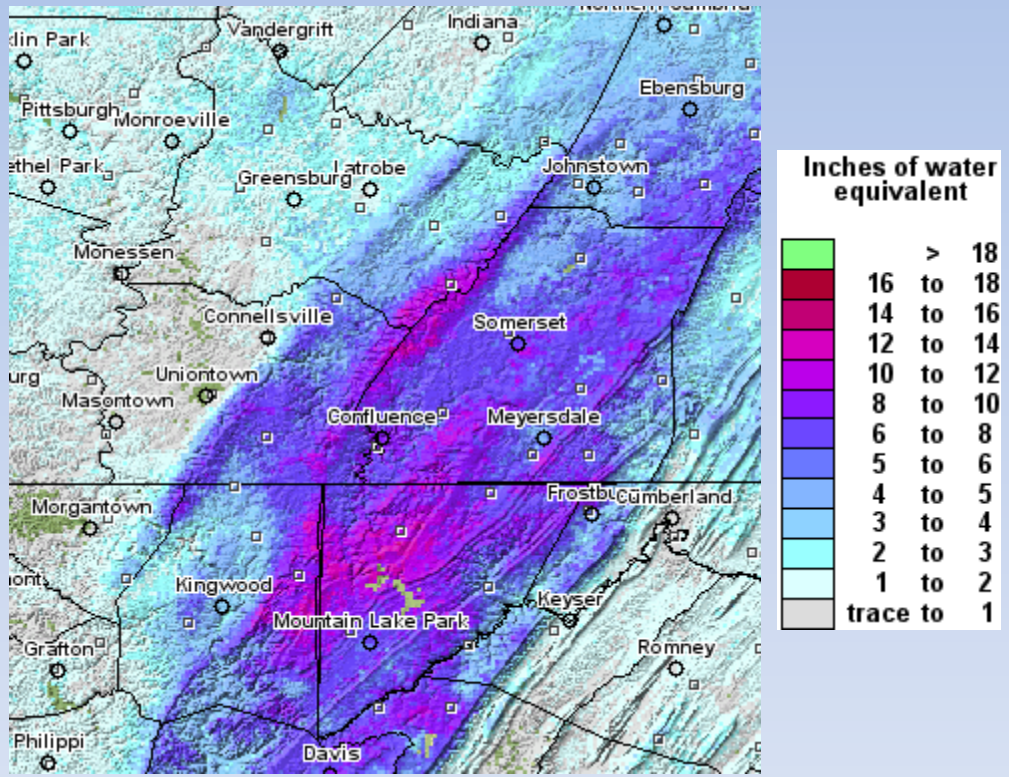
Winter and Spring Flooding

- **Multiple flooding issues during this time of year:**
  - **Ice jam**
  - **Rainfall**
  - **Snowmelt**

Photo courtesy of- Shelly Buckles

March 2010 – A Near Miss

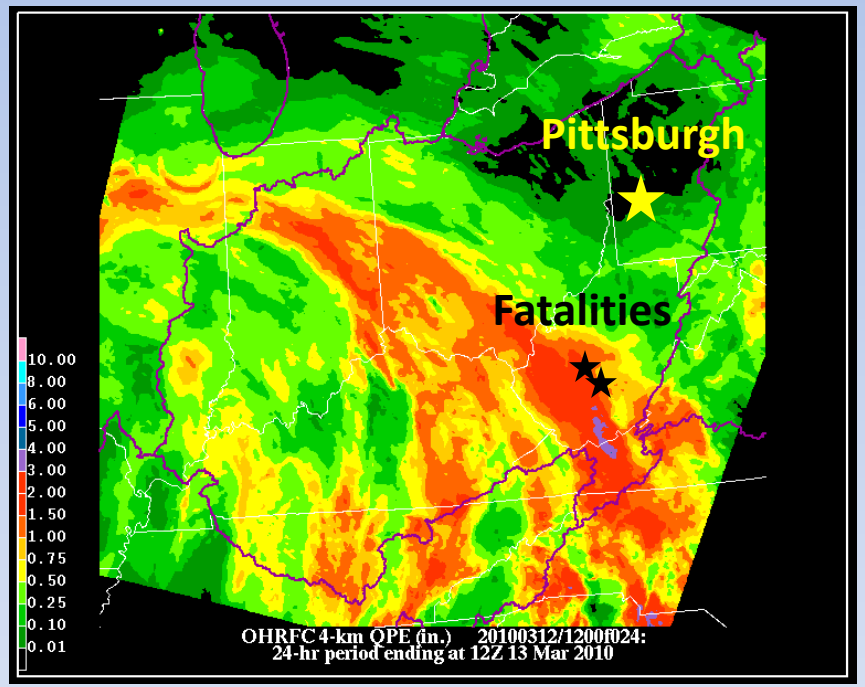
- Record snowfall from February 2010 left several inches of snow water equivalent in area snowpack
- Temperatures were forecast to reach 60 degrees for several days, along with 1-2 inches of rainfall



Snow Water Equivalent at 12Z March 6

March 2010 – A Near Miss

- Local flood control dams along Allegheny and Monongahela Rivers eased release of water downstream
- Expected rainfall occurred farther south (2 fatalities from flooding in central WV)

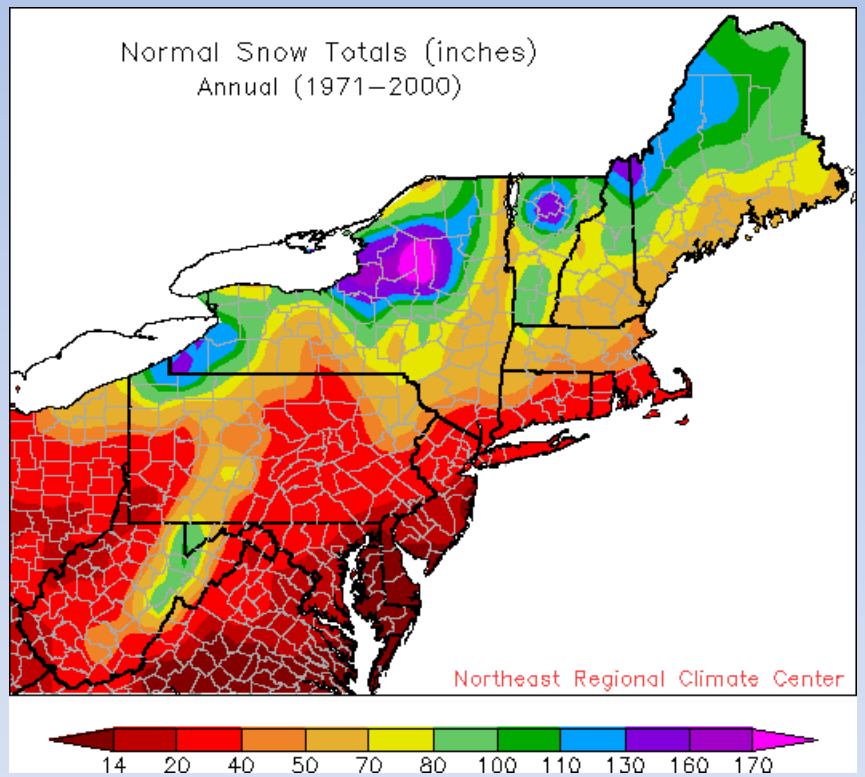


Outline

- Winter Hazards
- **Snow Climatology**
- HWO/Watch/Advisory/Warning
- Product Definitions
- Miscellaneous
- What to Report

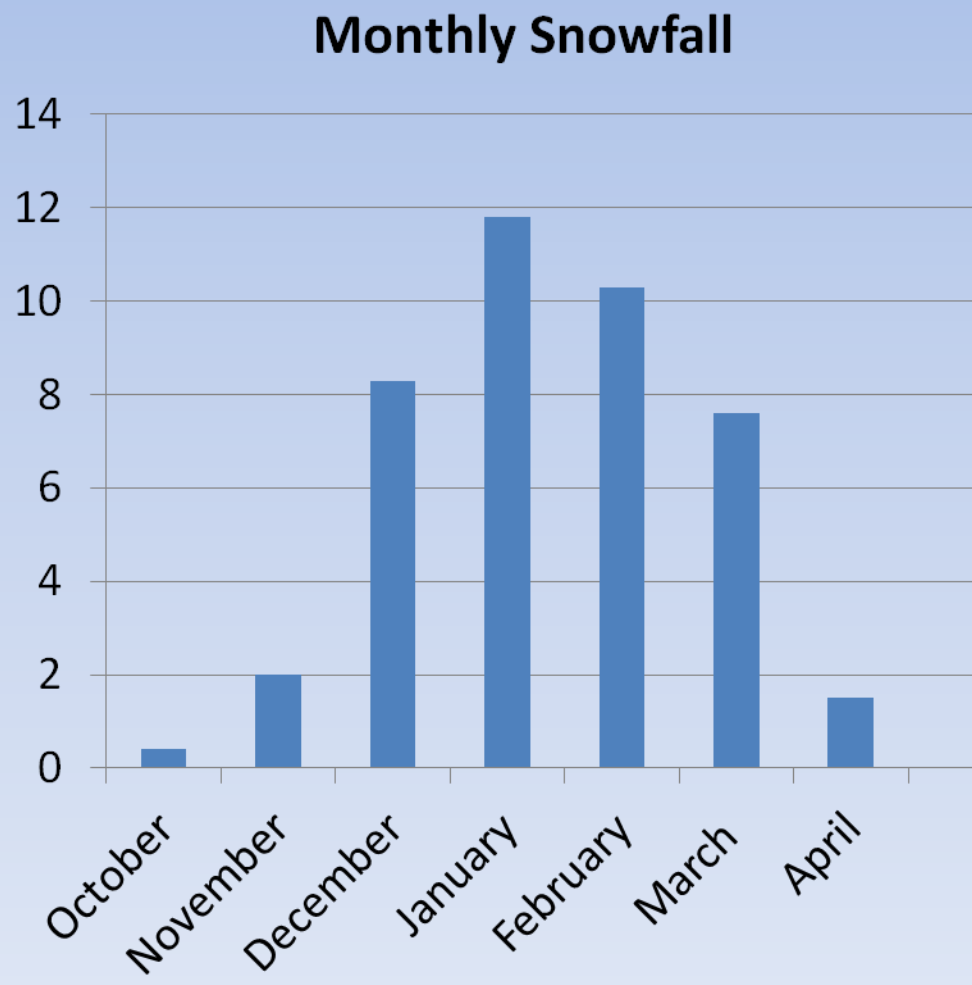
Annual Snowfall

- Broad scale climatology, which does not include smaller areas with maximum/minimum snowfalls
- WV/MD mountains, Northern PA lake effect counties are likely higher than depicted

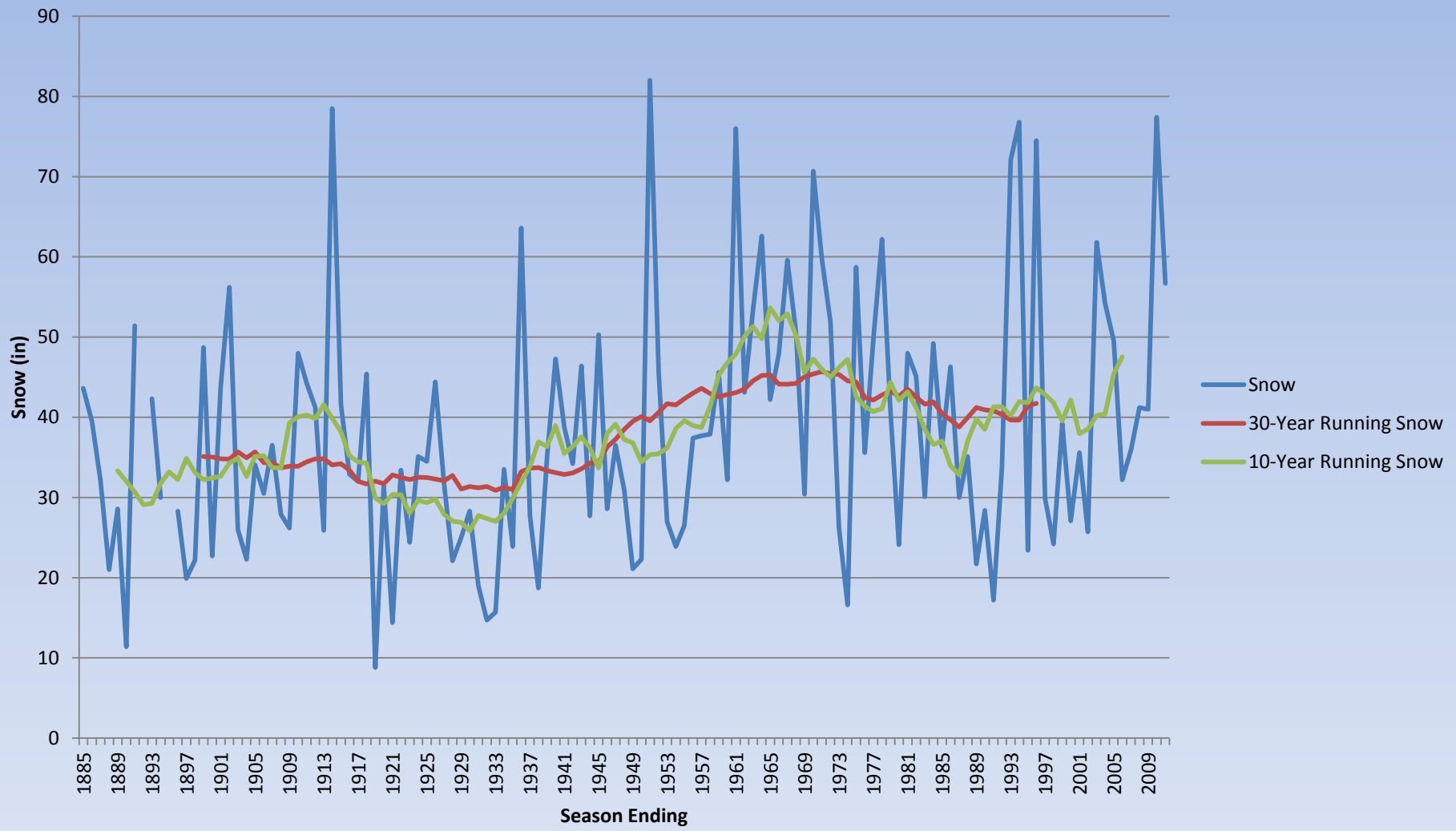


Snowfall Statistics for Pittsburgh Averages from 1981-2010

- **Average seasonal snowfall: 41.9”**



Pittsburgh Snow

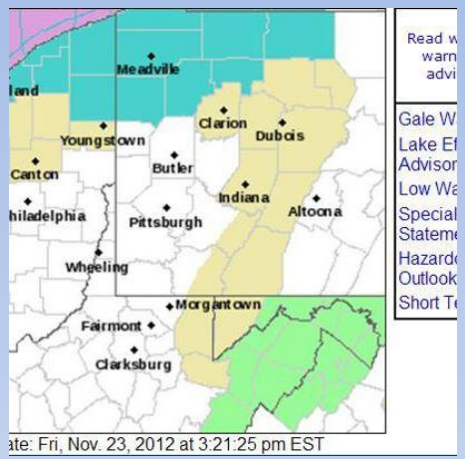


Outline

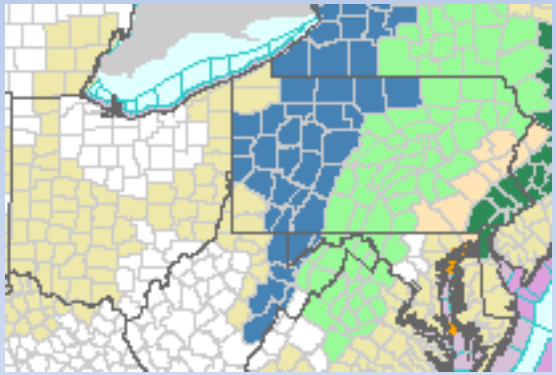
- Winter Hazards
- Snow Climatology
- **HWO/Watch/Advisory/Warning**
- Product Definitions
- Miscellaneous
- What to Report

3 Levels of Notification

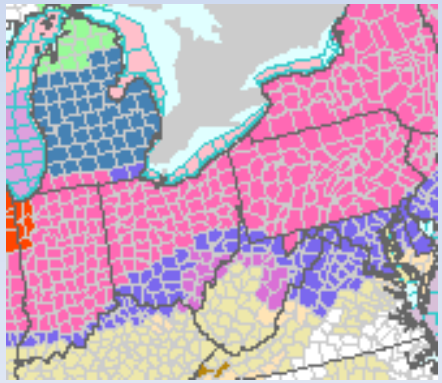
- **Hazardous Weather Outlook**



- **Watch**

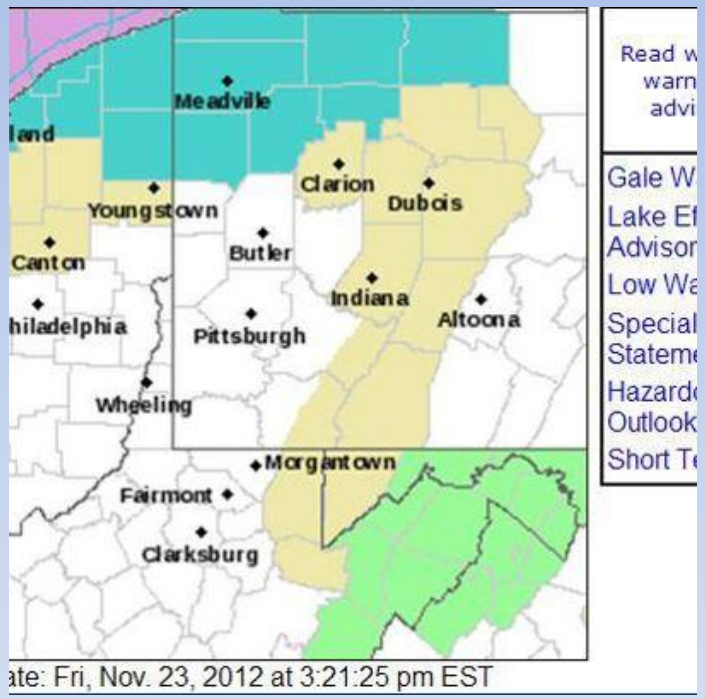


- **Advisory/Warning**



Hazardous Weather Outlook

- Valid for 0 – 7 day forecast
- Generally discusses storms/events several days in advance to alert the public for potential and allows for early planning and preparations
- Issued with ~ 30% confidence of warning criteria

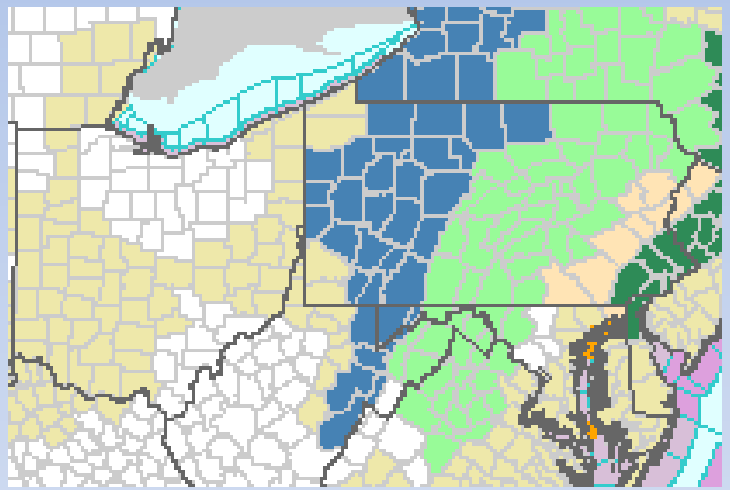


Watch

- Valid for 1 – 2 day forecast

- Issued for heightened potential of warning criteria event (winter storm, blizzard, wind chill).

- Issued with ~ 50% confidence of warning criteria



Warning

- Valid for 0 – 2 day forecast
- Issued when there is a high probability of warning criteria (winter storm, blizzard, wind chill), or warning criteria is already occurring
- Issued with ~ 80% confidence of warning criteria

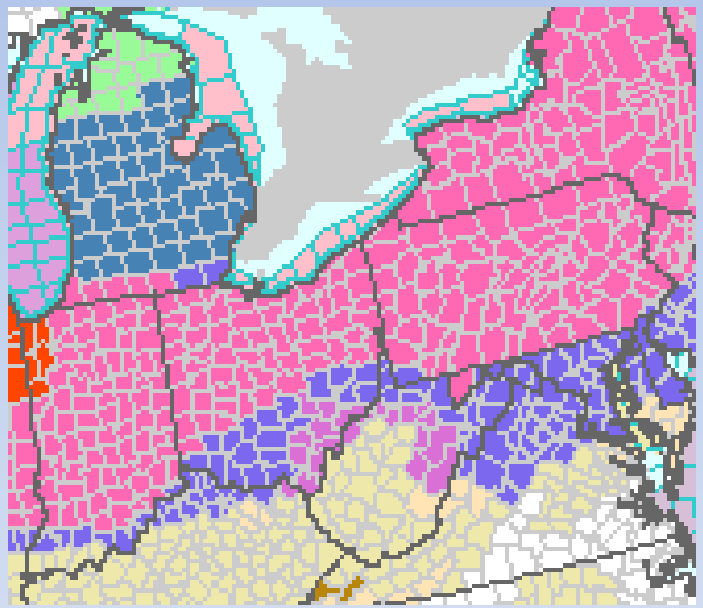
Advisory

- Valid for 0 – 2 day forecast
- Issued when there is a high probability of an event (winter storm, wind chill) that will produce conditions which are a nuisance, but not life threatening

Advisory vs. Warning

- Do not think of a watch → advisory as a “downgrade”!

- Although warning criteria is higher than advisory criteria, the issuance of an advisory still means there is high confidence that there will be important impacts



Outline

- Winter Hazards
- Snow Climatology
- HWO/Watch/Advisory/Warning
- **Product Definitions**
- Miscellaneous
- Snowfall Measuring
- What to report to us

Winter Weather Criteria

- Winter Storm Warning (snow) – **6”/12 hr** or **8”/24 hr**
- Winter Storm Warning (ice) – **¼”**

  (Ice Storm Warning)

- Winter Storm Watch (snow/ice) – potential for Winter Storm Warning criteria in the next 12-48 hr

Winter Weather Criteria

- Winter Weather Advisory (snow) – **3”/12 hr**
- Winter Weather Advisory (ice) – **any accumulation**

(Freezing Rain Advisory)

- Lake Effect Snow Warning/Advisory – same as above, but only for Venango, Mercer, and Forest counties

Winter Weather Criteria

- Wind Chill Warning – wind chill values ≤ **-25**°
- Wind Chill Advisory – wind chill values **-10 ° to -24°**

- High Wind Warning – sustained winds of ≥ **40** mph for ≥ 1 hr, or gust of ≥ **58** mph
- Wind Advisory – sustained winds of **30 to 39** mph for ≥ 1 hr , or gust of ≥ **45** mph

Blizzard Warnings

- Frequent gusts to 35 mph or more; snow (blowing or falling) reducing visibility to ¼ mile or less; lasting for ≥ 3 hr
- Quite rare for visibility to remain ≤ ¼ mile for 3 hours or more (Superstorm Sandy)
- Blizzard warnings are **not** dependent on snowfall accumulation

Photo courtesy of- Beau Dodson

Outline

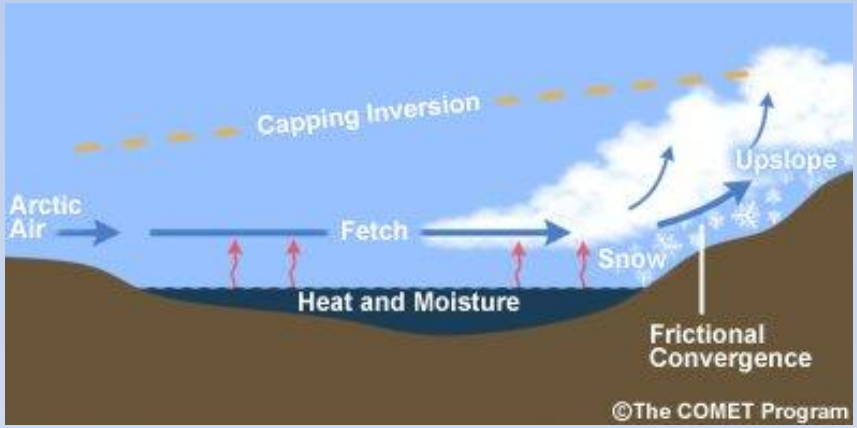
- Winter Hazards
- Snow Climatology
- HWO/Watch/Advisory/Warning
- Product Definitions
- **Miscellaneous**
- What to Report

Major Systems for Snow in Pittsburgh Forecast Area

- Lake Effect
- Alberta Clipper
- Nor'Easter
- Gulf States Low

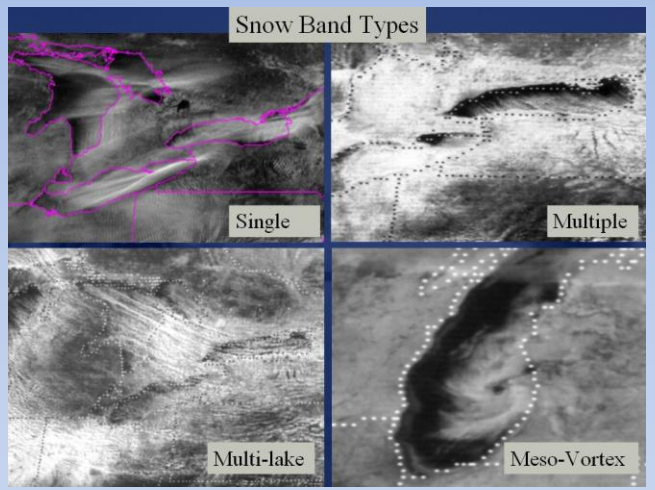
What Causes Lake Effect Snow?

- Warm water heats air above
- Warm air is unstable and rises
- Snow bands form
- Frictional convergence at shoreline, mountains each add additional lift



Lake Effect Snow (LES)

- Locally, W-NW winds are the primary flow to develop LES
- Flow does not require low pressure; even high pressure over Great Lakes ("good weather") can still bring LES
- LES bands can make significant progress inland, even if not resulting in warning level snowfall

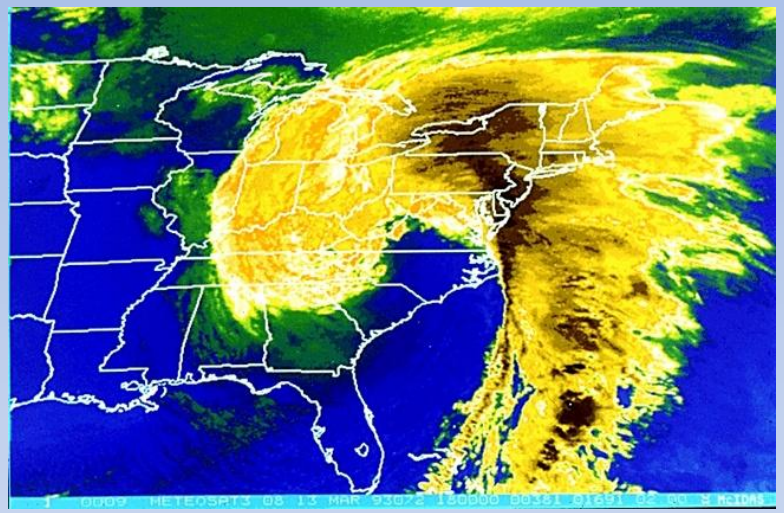


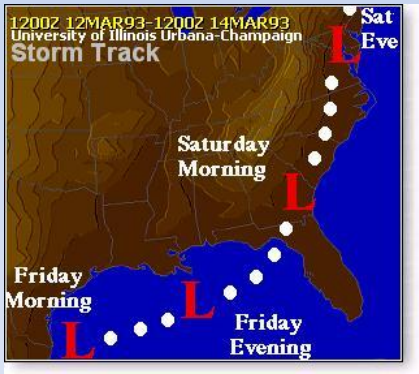
Alberta Clipper

- Since system develops over land, limited moisture may result in only light snowfall, even if coverage is widespread
- After clipper passes, LES may develop behind storm

Nor'easter

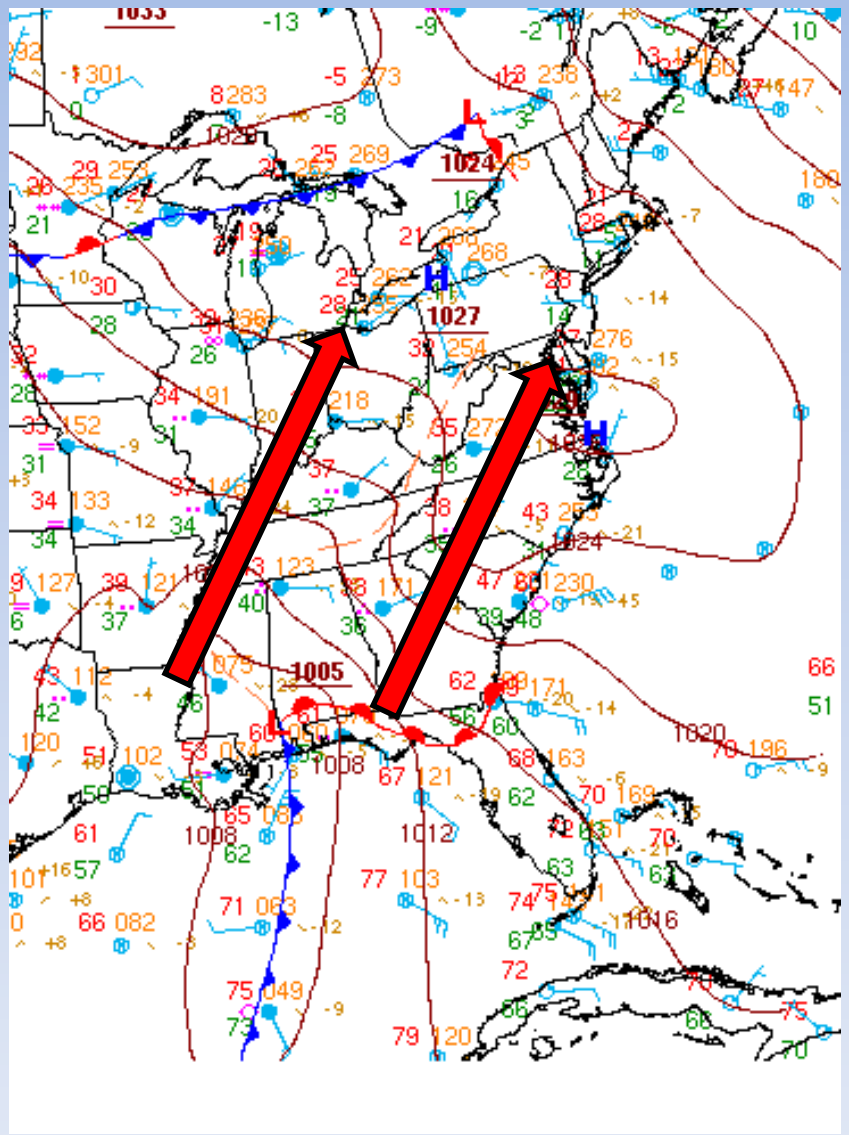
- Named for
  - Storm motion towards NE
  - NE winds experienced on leading edge of storm
- Typically forms/moves up along East Coast
- Many pass east of forecast area, but not all of them



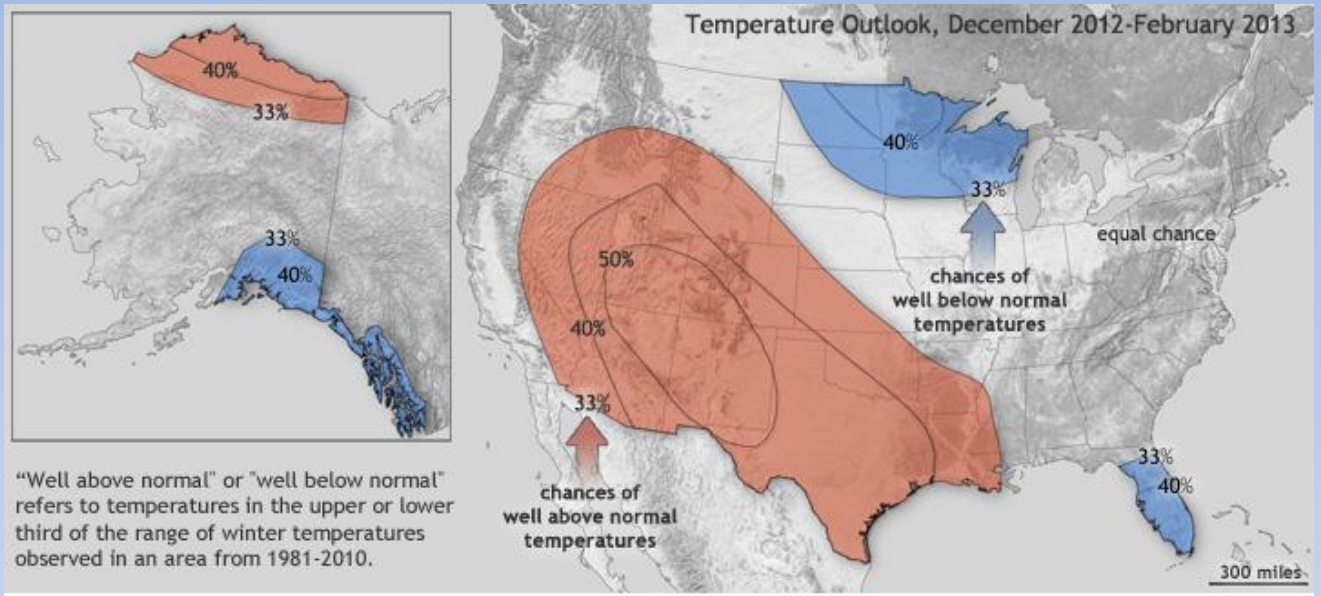


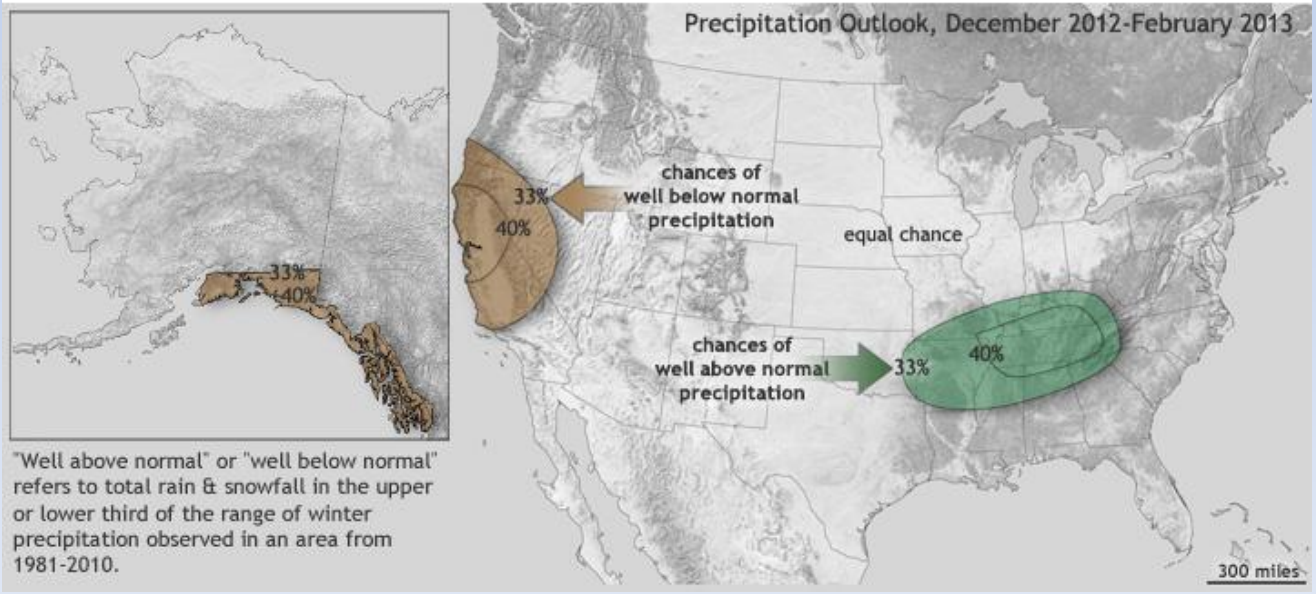
Low from the Gulf States

- Surface low approaches from the southwest
- Low pressure system pulls abundant moisture into the area from the Gulf of Mexico
- Wintry mix of precipitation depending on low's track

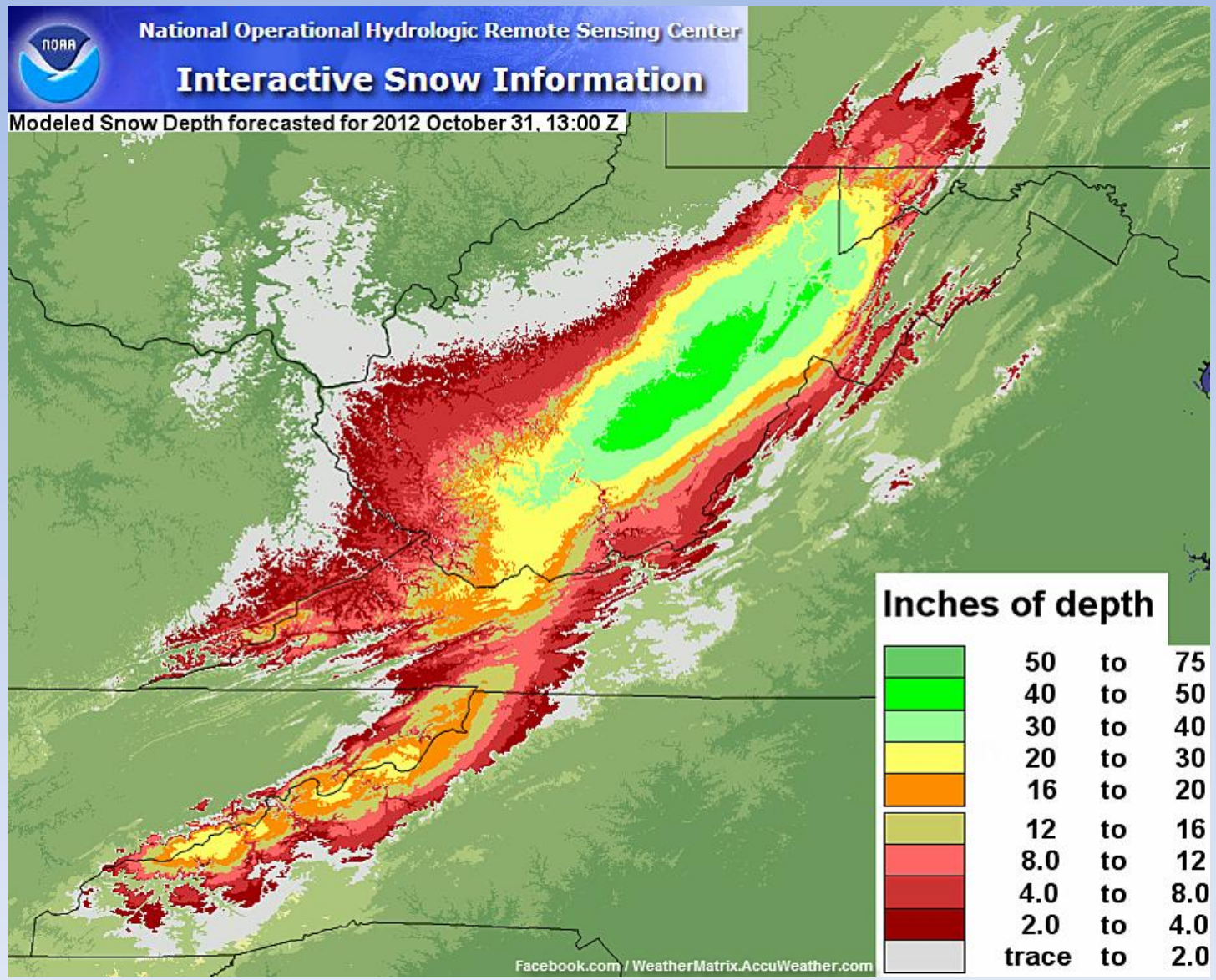


Winter Outlook





Hurricane Sandy



Hurricane Sandy

Photos courtesy of- Beau Dodson

Outline

- Winter Hazards
- Snow Climatology
- HWO/Watch/Advisory/Warning
- Product Definitions
- Miscellaneous
- **Snowfall Measuring**
- What to Report

Pre-Season Preparation

- When snow or freezing precipitation is expected
  - Prep the 8-inch or 4- inch rain gauge by removing the funnel and inner tube
  - Inspect the outer cylinder for any leaks
    - This is especially important after drier conditions where it is rare for precipitation to overflow into the outer cylinder
  - Set out the snow board in an appropriate area and mark with a flag
  - Make sure any needed repairs are taken care of prior to first snow of the season

Snowfall Measurements

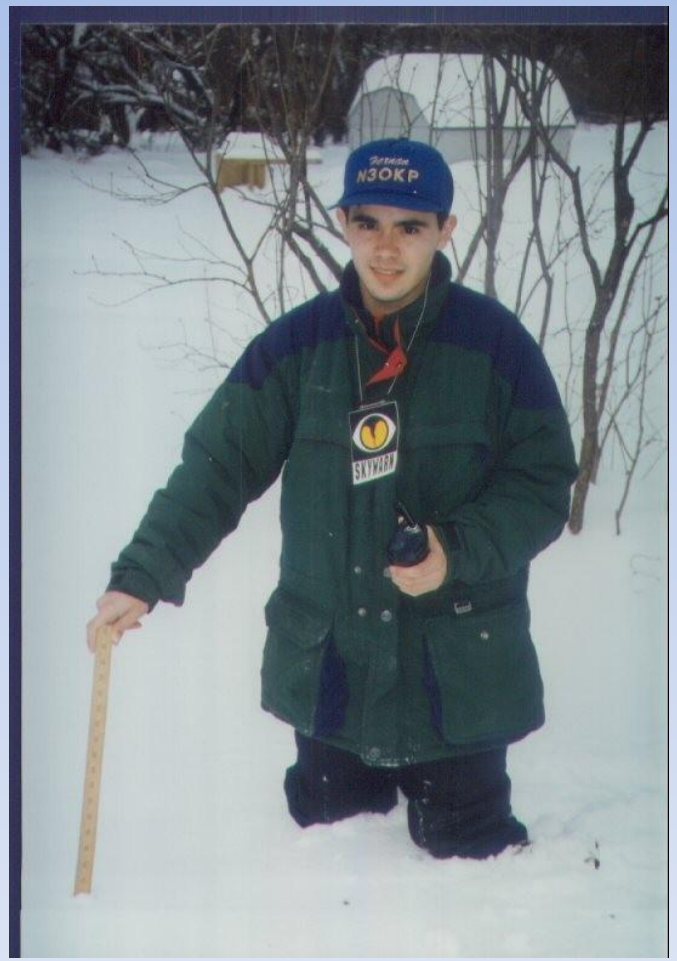
- Measure the greatest amount of snowfall since the last observation that has accumulated on the snowboard
  - If snow melts, record the greatest depth before melting
  - If snow melts as it falls, record a trace
  - Recorded in tenths of an inch

Snow Depth Measurements

- Determine the total depth of snow, sleet or ice on the ground
  - Taken from a permanently mounted snow stake or as an average of several depth readings in non-drifted areas
  - If accumulation is from hail, record as such in remarks
  - Recorded in whole inch increments

References

- **Snow measurement guidelines**
  - http://www.nws.noaa.gov/om/coop/snowguid.htm
- **Snow Measurement Video**
  - https://madis-data.noaa.gov/snow_video.html
- **National Weather Service Manual 10-1315**
  - http://www.nws.noaa.gov/directives/sym/pd01013015curr.pdf



Outline

- Winter Hazards
- Snow Climatology
- HWO/Watch/Advisory/Warning
- Product Definitions
- Miscellaneous
- Snowfall Measuring
- **What to Report**

Remember, we need your snowfall reports!

What to Report

- When you report weather, please be sure to give your location (including your county) and the time of the observation

- **Snow**
  - **Snowfall** – when you first measure 2”, 4”, 6”, 8” and more
  - **Snowfall** – ≥ 1” of snow per hour
  - **Snowfall/Snow Depth** – ≥ 1” of snow in past 24 hours and snow depth, between 5-8am

What to Report

- **Freezing Drizzle/Rain** – any occurrence, and again if accumulation ≥ ¼”
- Thunder or Lightning associated with snow, sleet, or freezing rain
- **Wind speed** ≥ 40 mph

How Can You Submit a Report?

- Email: PBZ-Skywarn@noaa.gov

- Internet: http://espotter.weather.gov/

eSpotter Online Weather Reporting System

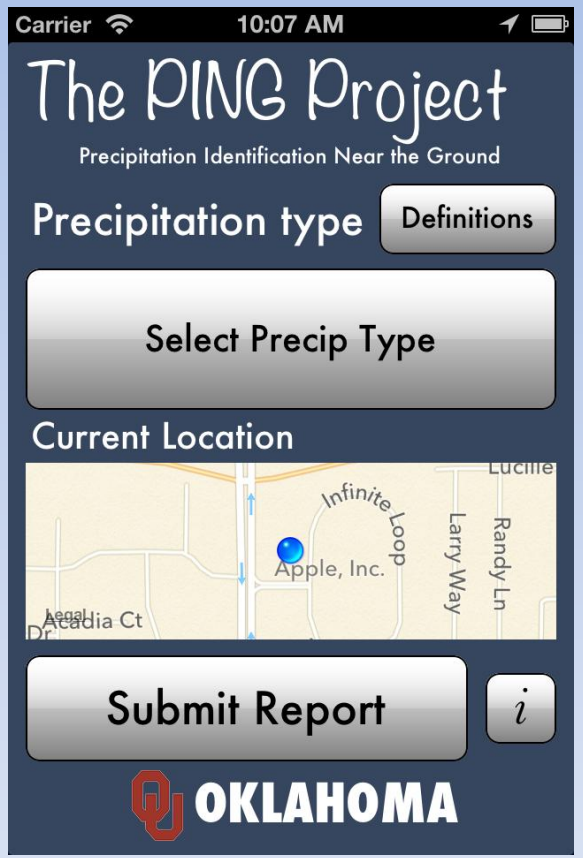
- Facebook: http://www.facebook.com/US.NationalWeatherService.Pittsburgh.gov
- https://twitter.com/NWSPittsburgh
  - Tweet us @NWSPittsburgh
  - Hashtag #PAwx, #MDwx, #WVwx, #MDwx

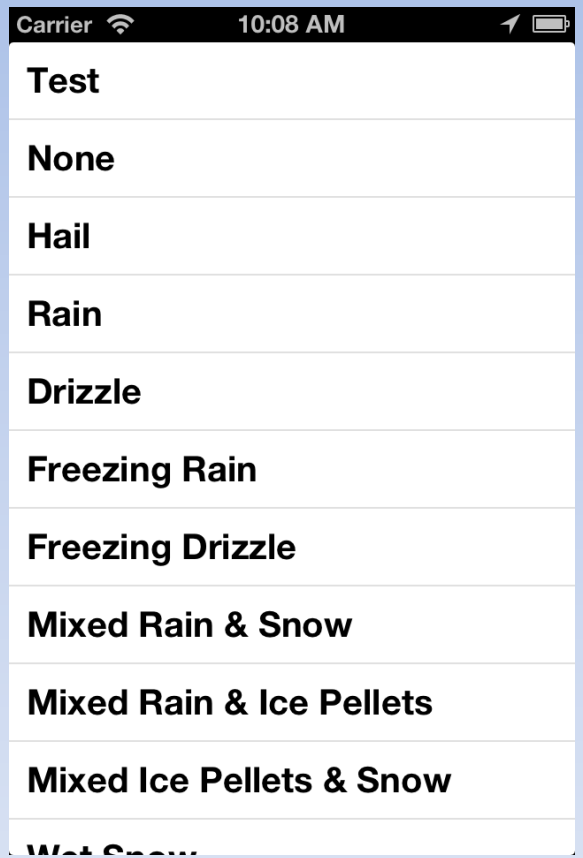
PING program for public

- ***P***recipitation ***I***dentification ***N***ear the ***G***round
- Collaboration between University of Oklahoma (OU) and National Severe Storms Laboratory (NSSL)
- Public provides real-time observation of precipitation type using smartphone app, which is then matched up with forecast sounding

PING application

- iOS version of PING will be titled mPING ("mobile PING"), and will be released within about a week
- Android version will be coming out shortly afterwards





Thank You!

How Can You Submit a Report?

- **Phone:**
  - **Public number:** 412-262-2170
  - **Skywarn number:** 1-800-242-0510 (speak to forecaster, 24/7)
  - **Pictures –** PBZ-Skywarn@noaa.gov

SkyWarn Certification

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE
PITTSBURGH, PA

Certificate of Training

Presented To:

Tom Green

For Successfully Completing the
Basic Weather Spotter Training

10/26/2010
Class Date

Fred McMullen
Warning Coordination Meteorologist

SkyWarn card: http://www.erh.noaa.gov/pbz/skywarncard.php
Code: **2012Skywarn**