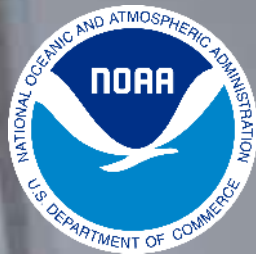




# ***National Weather Service Winter Weather Spotter and Safety Training***



***Sam Lashley  
Warning Coordination Meteorologist  
NWS Indianapolis, IN***



# *Purpose of This Training*

- Educate you on winter weather hazards and how to stay safe when winter weather occurs
- Teach you about different precipitation types and how they develop and might change during a winter storm
- Show you simple techniques for measuring and reporting winter precipitation to the NWS
- Share internet resources and ways to get more information about winter weather hazards

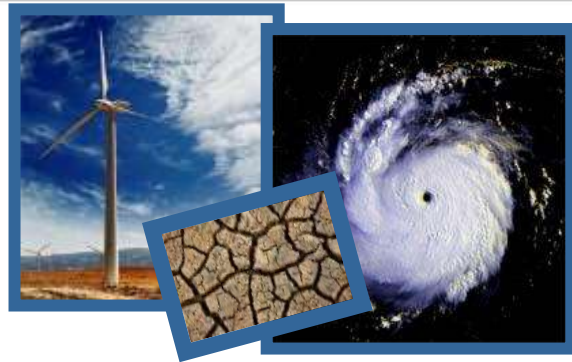




# *National Weather Service*

## MISSION

Provide weather, water, and climate data, forecasts, warnings and impact-based decision support services for the protection of life and property and enhancement of the national economy



## VISION

A Weather-Ready Nation:  
Society is prepared for and responds to weather, water, and climate-dependent events



# NWS Indiana Offices and Contacts

## Six NWS Offices Covering Indiana

- **Indianapolis (IND)**
  - State Liaison Office
  - 39 central counties
- **Chicago (LOT)**
  - 5 NW counties
- **Northern Indiana (IWX)**
  - 24 NC and NE counties
- **Wilmington OH (ILN)**
  - 8 SE counties
- **Louisville, KY (LMK)**
  - 10 southern counties
- **Paducah, KY (PAH)**
  - 6 SW counties

## National Weather Service Indiana WCM Contacts

NWS Chicago (LOT)  
815-834-0600  
Mike Bardou WCM  
[mike.bardou@noaa.gov](mailto:mike.bardou@noaa.gov)

NWS Northern Indiana (IWX)  
574-834-1104  
Lonnie Fisher  
[lonnie.fisher@noaa.gov](mailto:lonnie.fisher@noaa.gov)  
Amos Dodson  
[amos.dodson@noaa.gov](mailto:amos.dodson@noaa.gov)

NWS Indianapolis (IND)  
317-856-0351  
Sam Lashley WCM  
[sam.lashley@noaa.gov](mailto:sam.lashley@noaa.gov)

NWS Wilmington (ILN)  
937-383-0031  
Brandon Peloquin WCM  
[brandon.peloquin@noaa.gov](mailto:brandon.peloquin@noaa.gov)

NWS Louisville (LMK)  
502-969-8842  
Michael Kochasic WCM  
[michael.kochasic@noaa.gov](mailto:michael.kochasic@noaa.gov)





# NWS Partnerships...CoCoRaHS

We can't do it alone! Consider Becoming a Volunteer

Help observe precipitation in your community !!



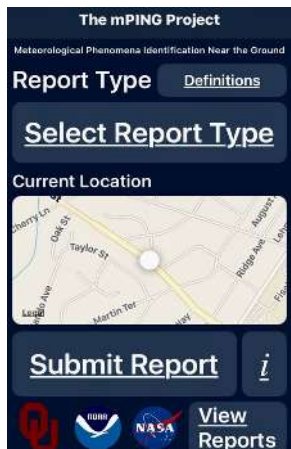
[www.cocorahs.org](http://www.cocorahs.org)

- International network of over 24,000 volunteers like you measuring and reporting precipitation each day
- Uniform tools, educational resources
- Data used by NWS to view precipitation reports and aids in warning decisions
- Data used for federal declarations
- More information at:  
<https://cocorahs.org>



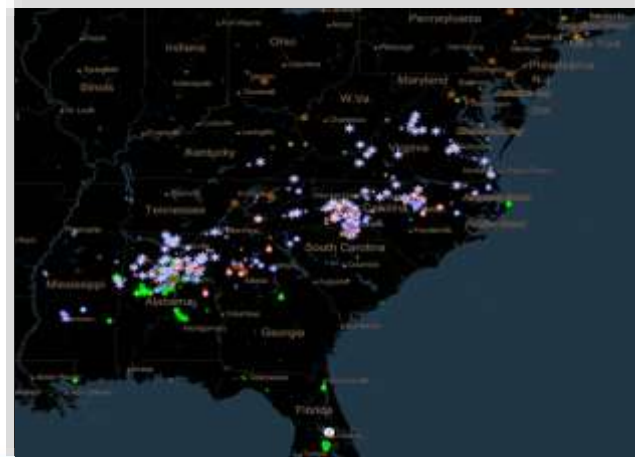
# NWS Partnerships...mPING

We can't do it alone! Consider Becoming a Volunteer



- mPING is a free smartphone app to quickly report precipitation type, severe weather, flooding, and reduced visibility
- Also available through Radarscope App
- Used by NWS to see precipitation type reports in the winter
- More information at:

<https://mping.nssl.noaa.gov>







# ***NWS Partnerships***

**We can't do it alone! Consider Becoming a Volunteer**

- Dedicated volunteers like you!
- When most people think of Skywarn, they think of severe thunderstorms
- Skywarn spotters also make valuable contributions in the winter by reporting precipitation types, amounts and impacts

<https://www.weather.gov/SKYWARN>





# NWS Partnerships

We can't do it alone! Weather Data You Can Use



- Midwest Regional Climate Center (MRCC) and the Indiana State Climate Office
- Providing climate data and services to Indiana and the midwest
- Many useful tools for weather data analysis
- More information at:

<https://mrcc.purdue.edu/>

<https://ag.purdue.edu/indiana-state-climate/>





# **Winter Weather Terms and “Headline Criteria”**



# *Winter Weather Definitions*

- **Freezing Rain** – Rain falls as liquid and then **freezes on contact**
- **Sleet** – Raindrops freeze into ice pellets prior to reaching ground.
- **Snow** – An aggregation of many ice crystals
- **Graupel** – Snowflakes which have been heavily rimed. Also called snow pellets.





# *Winter Weather Definitions*

- **Snowfall** - Snow that falls and accumulates during a period of time between measurements.
- **Snow Depth** - The combined total depth of both old and new snow on the ground. Usually measured once per day





# Winter Weather Definitions

## SNOW:RATIO

*The percentage of water within a sample of snow is called "snow ratio". An old rule of thumb was that for every 10 inches of snow, there would be 1 inch of water (10:1).*

*However, snow ratios can vary dramatically around the country and from event to event.*

*Variables that affect snow ratio*



Depth of the "warm" layer from the surface into the snow-producing cloud.



Amount of ice in the snow-producing cloud.



If it's windy, snowflakes can fracture, losing their "lacy" structure.



Deep cold leads to higher snow ratios.

Rain

Wet Snow

Normal/Usual Snow

Dry Snow

Snow:Liquid Ratio 0:1

5:1

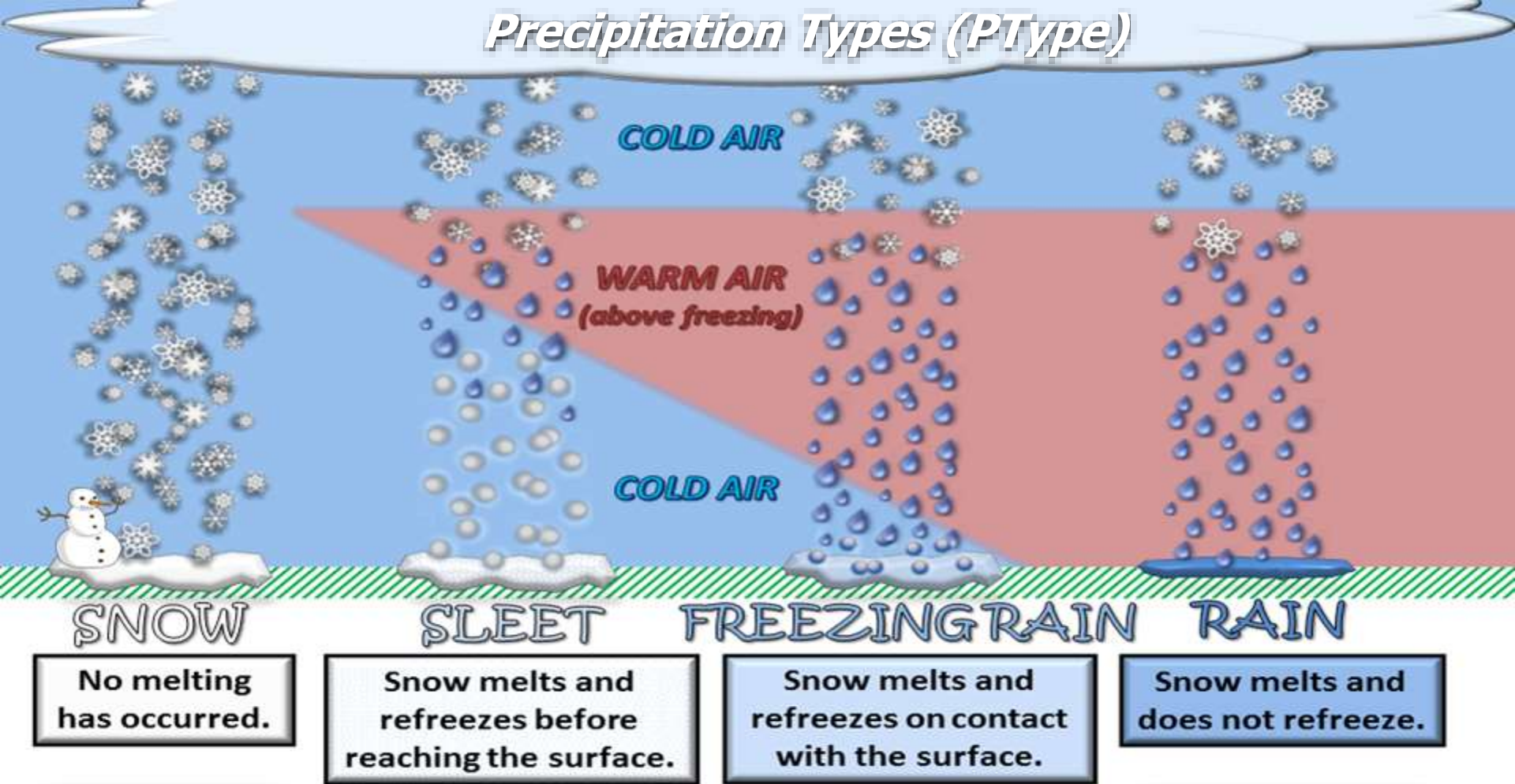
10:1

15:1

20:1

30:1

# Precipitation Types (PType)





# ***Hazardous Weather Outlook***

Daily Hazardous Weather Outlooks Give You “Heads Up” Information

- **Issued every day between 5 AM and 7 AM**
- **Updated as necessary throughout the day**
- **Outlines potential weather hazards expected over the next 7 days**
- **Potential storms mentioned once forecaster confidence reaches 30 percent**

Hazardous Weather Outlook  
National Weather Service Indianapolis  
515 AM EST Sat Feb 13 2021

.DAY ONE...Today and tonight.

Snow will spread across the area late today and tonight. Accumulations of 1 to 2 inches are expected north of I-74.

.DAYS TWO THROUGH SEVEN...Sunday through Friday.

Snow will continue on Sunday with an additional one to two inches possible north of I-70.

Minimum wind chill values between 5 below zero and 10 below zero will be possible late Sunday night into Monday morning.

Snow chances are expected to increase again Monday into Tuesday, with potential for moderate to heavy snow accumulations across the entire area.





# Graphical Hazardous Weather Outlook

<https://www.weather.gov/crh/ghwo?sid=ind>

## Excessive Rainfall Risk

Valid: 10/02/2021 08:00 AM - 10/03/2021 08:00 AM EDT



National Weather Service  
Indianapolis IN  
10/01/2021 06:15 AM EDT

Follow Us:



[weather.gov/ind](https://www.weather.gov/ind)

## 24 Hr Hazard

	Day 1	Sat	Sun	Mon	Tue	Wed	Thu
Tornado	■	■					
Hail	■	■					
Thunderstorm Wind	■	■					
Severe Thunderstorms	■	■	■	■	■	■	■
Excessive Rainfall	■	■	■	■	■	■	■
Lightning	■	■	■	■	■	■	■
Excessive Heat	■	■	■	■	■	■	■
Fog	■	■	■	■	■	■	■
NonThunderstorm Wind	■	■	■	■	■	■	■
Fire Weather	■	■	■	■	■	■	■
Grassland Fire Danger Index (GFDI)	■	■	■	■	■	■	■
Frost Freeze	■	■	■	■	■	■	■
Excessive Cold	■	■	■	■	■	■	■
Ice Accumulation	■	■	■	■	■	■	■
Snow Sleet	■	■	■	■	■	■	■



# Watches, Warnings, & Advisories

These “headlines” may be issued for lower criteria when greater impacts expected

## Watches

### Winter Storm Watch:

Conditions favorable for a winter storm event, which is a threat to life or property.

## Advisories

### Winter Weather

#### Advisory:

Issued for one or more of the following:

- Snow of 3-5" in 12 hrs
- Sleet < ½"
- Freezing rain with sleet/snow
- Blowing snow

### Freezing Rain Advisory:

Ice accumulation < ¼"

## Warnings

### Winter Storm Warning:

Heavy snow of 6" in 12 hrs or 8" in 24 hrs, or sleet of ½" or more

Ice Storm Warning: Ice accumulation ¼" or more

### Blizzard Warning:

Blizzard conditions for at least 3 hours



# General Winter Storm Event Timeline

4-7  
Days

- Focused on general overview, trends and storm potential
- Hazardous Weather Outlook, Forecast Discussions

1-3  
Days

- Increasing confidence as storm track becomes clearer (watches if needed)
- Confidence, probabilistic, & potential amount graphics created & updated frequently

0-36  
hours

- Fine tune forecast & narrow down details
- Warnings & advisories if needed with details on location and timing
- Situation Reports, Social media posts, graphics and updates

After  
Event

- Data collection/quality control of reports & finalize snowfall maps
- Post summary information on local NWS webpages



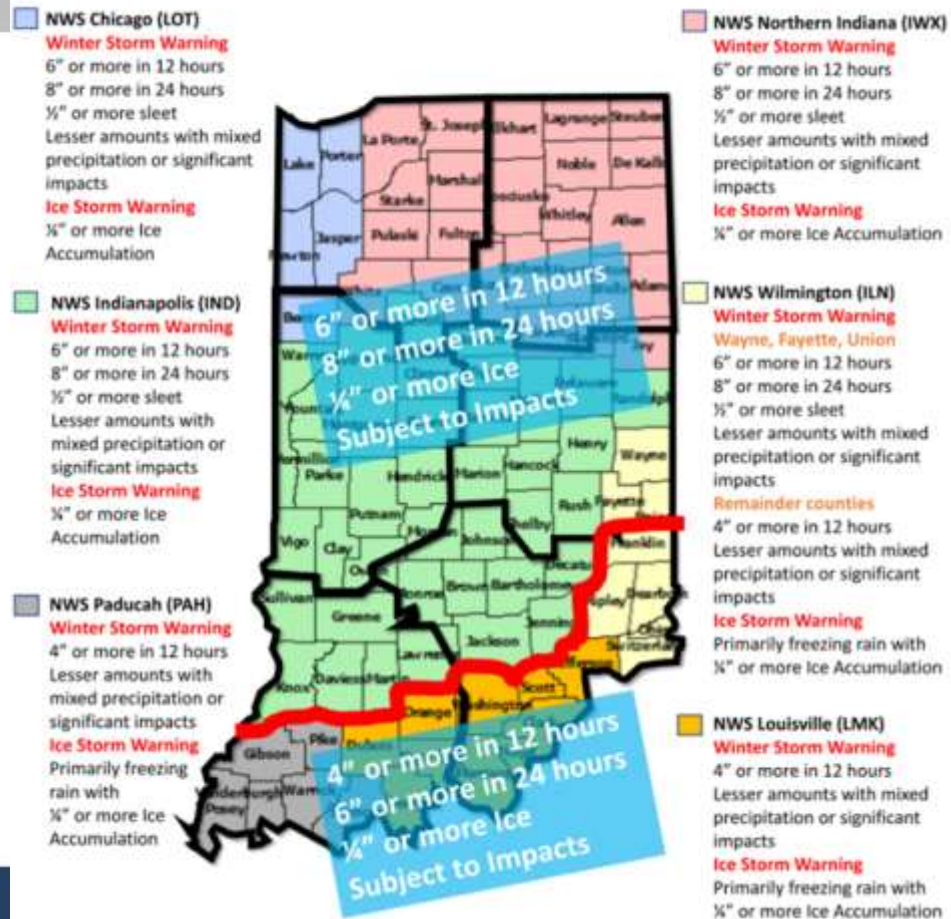




# NWS Indiana Winter Warning Criteria

## Criteria Varies Across the State

- Lower criteria (amounts) far south and southeast (PAH, LMK, ILN)
- Timing and Impacts may alter when warnings are issued from event to event for entire state
- Advisories are issued for events where warning criteria are not expected to be met but hazardous conditions could develop





# Snow Squall Warnings

- **Warning Criteria (30-60 minutes each)**

Reliable reports (Radar, INDOT, webcams, road network observations etc.) of snow squalls meeting or exceeding either of the following two conditions:

- Visibility 1/4SM or less in snow with sub-freezing ambient road temperatures
  - Plunging temperatures behind an arctic front sufficient to produce flash freezes, along with a significant reduction in visibility from falling and/or blowing snow.
- In those instances when lesser impacts are expected, a Special Weather Statement (SPS) can be issued
  - Snow squall warnings will not be issued if winter storm warnings or blizzard warnings are already in effect





# ***NWS Winter Product Summary***

***Outlooks***



**30 Percent Confidence**

***Significant Winter Impacts  
Possible***

***Watches***



**50 Percent Confidence**

***Significant Winter Impacts  
May Occur***

***Warnings***



**80 Percent Confidence**

***Significant Winter Impacts  
Will Occur***

***Advisories***



**80 Percent Confidence**

***Minor Winter Impacts  
Will Occur***





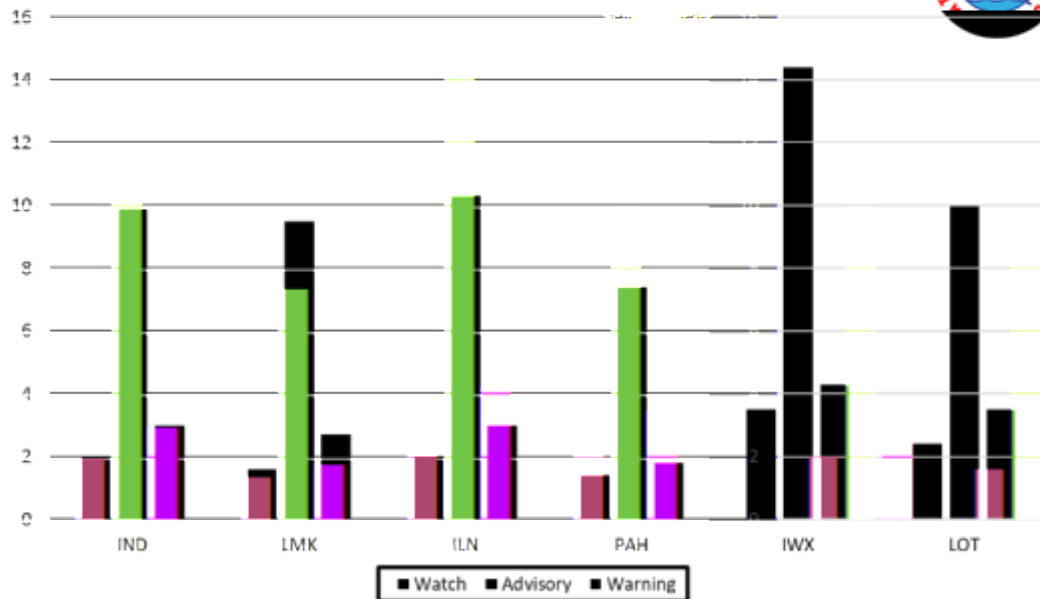
# Indiana Winter Weather Climatology



# Indiana Winter Headline Climatology

- Average number of winter headlines issued each year by NWS Office
- Greater numbers for northern offices due to lake effect snow and greater chances of having colder air during winter months
- Remainder of central and southern Indiana had similar numbers of headlines

Winter Headline Averages Per Year for NWS Indiana Offices  
(2010-2019)

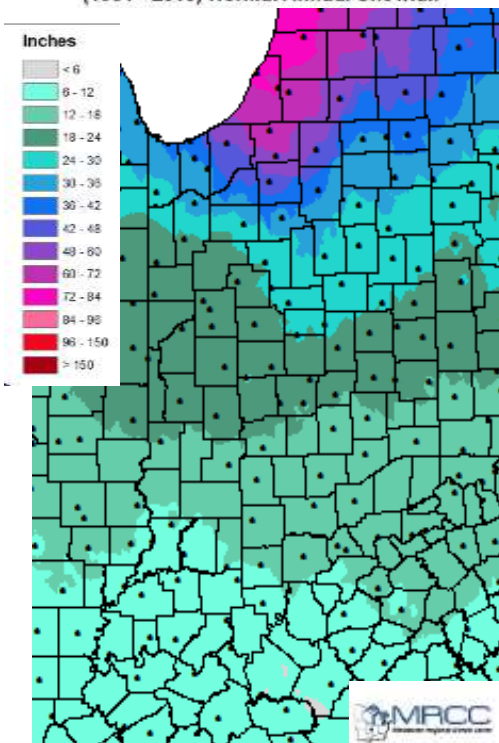




# Snowfall Last 23 Winters Across Indiana

Year	South Bend Area	Fort Wayne Area	Indianapolis Area	Evansville Area
Normal	64.5"	33.6	25.5	10.8
2022-04-30	56	23.2	11	4.1
2021-04-30	52.4	35.8	24.2	7.8
2020-04-30	44.9	26	16.2	1.1
2019-04-30	45.7	24.7	19.4	8.8
2018-04-30	93.1	32.7	23.2	12.1
2017-04-30	42.2	18.5	9.7	1.4
2016-04-30	70.2	20.1	13.3	14.2
2015-04-30	83.7	45.1	25.5	18.5
2014-04-30	108.9	74.7	55.7	12.6
2013-04-30	59.9	38.4	34.5	12.3
2012-04-30	51.2	32.2	9.8	0.5
2011-04-30	105.6	46.5	37.4	15.5
2010-04-30	57.3	29.3	33	15.3
2009-04-30	76.5	27.6	24.3	7.3
2008-04-30	75.9	43.9	23.3	10.5
2007-04-30	62.7	29.1	25.8	3.6
2006-04-30	38	27.1	27	5.8
2005-04-30	78.4	44.7	27.6	22.6
2004-04-30	44.3	36.4	20.9	7
2003-04-30	60.1	46.7	50	21
2002-04-30	62.8	16.7	10.9	6.1
2001-04-30	76.6	28.3	19.6	17.3
2000-04-30	58.9	26.5	24.1	4.4

Midwestern States  
(1981 - 2010) Normal Annual Snowfall





# Indianapolis Snowfall Climatology

<https://mrcc.purdue.edu/gismaps/snowclimatology.htm>

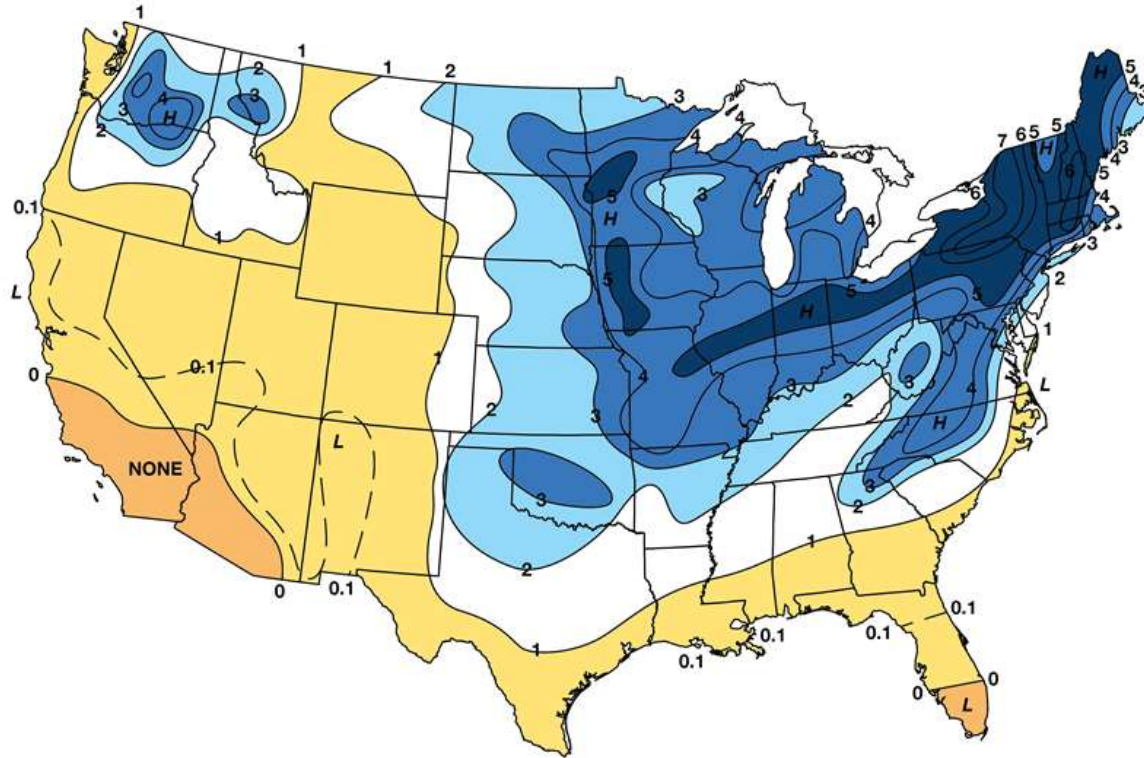
## Snow Climatology: Average number of 2-Day Snow Totals for Indianapolis Area

	≥ 0.1"	≥ 1.0"	≥ 2.0"	≥ 3.0"	≥ 4.0"	≥ 6.0"	≥ 8.0"	≥ 12.0"	≥ 18.0"	≥ 24.0"
All Months	38.4	15.9	8.4	5.1	3.3	1.6	0.7	0.1	0	0
January	11.3	4.9	2.7	1.6	1	0.5	0.3	0	0	0
February	9.4	4.1	2.2	1.4	1.1	0.6	0.1	0	0	0
March	5	1.9	1.1	0.7	0.4	0.2	0.1	0	0	0
April	1	0.3	0.1	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0	0	0	0
June	0	0	0	0	0	0	0	0	0	0
July	0	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0	0	0	0
October	0.2	0.1	0.1	0	0	0	0	0	0	0
November	2.7	0.7	0.3	0.1	0.1	0	0	0	0	0
December	8.8	3.9	2	1.2	0.7	0.3	0.1	0	0	0

Period of Record used: Snow Years 1960-61 to 2017-18



# Freezing Rain and Ice Climatologies



The average annual number of days with freezing rain, based on 1948-2000 data. From Changnon and Karl, 2003.



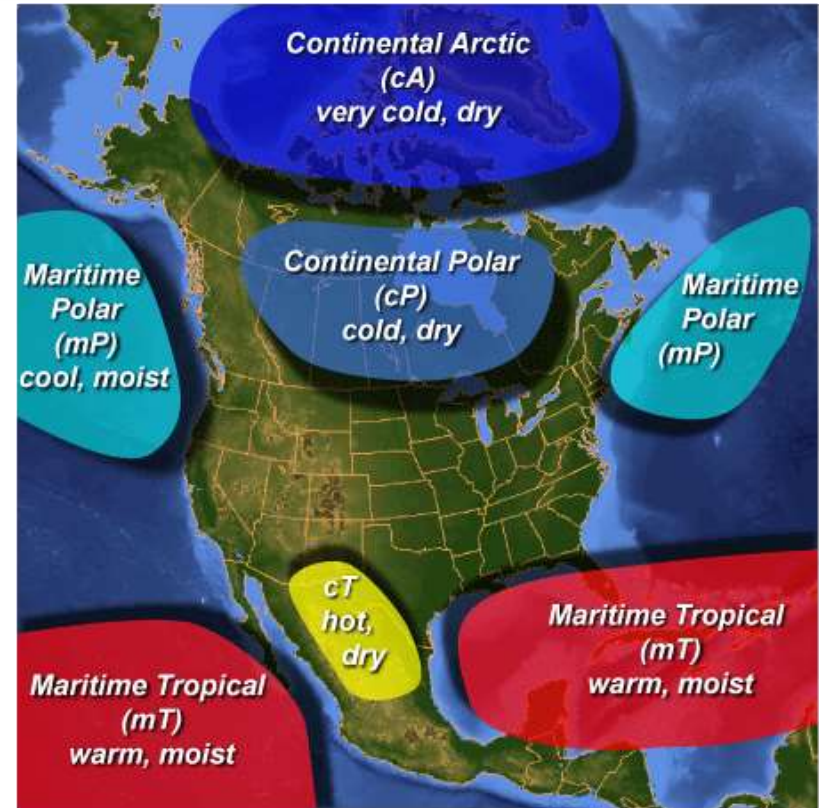
# **Indiana Winter Weather and Associated Patterns**





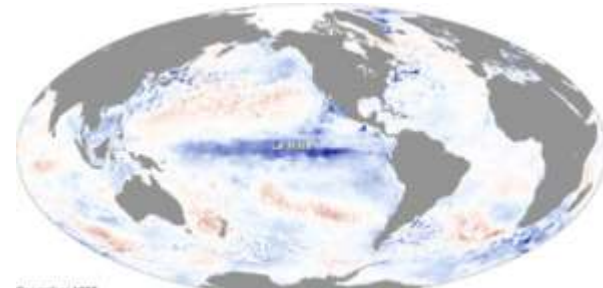
# *Air Masses of Winter*

- Our typical winter air mass is Continental Polar, cold and dry
- For heavy snow, we usually need moisture from the Gulf of Mexico - Maritime Tropical air
- Too much Maritime Tropical air can mean mixed precipitation

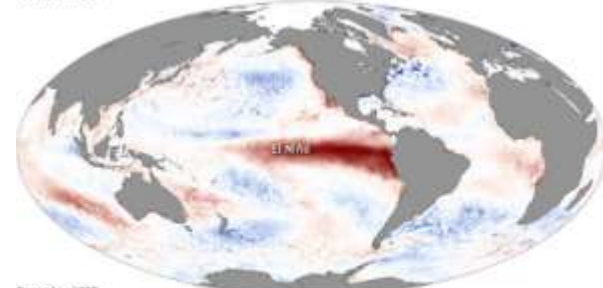




# Winter Influences - "Teleconnections"



December 1998



December 1997

Difference from average temperature (°F)  
-5 0 5

## La Niña:

- Retracted Jet Stream
- More meridional flow
- Blocking over N. Pac
- Stronger Hudson Bay

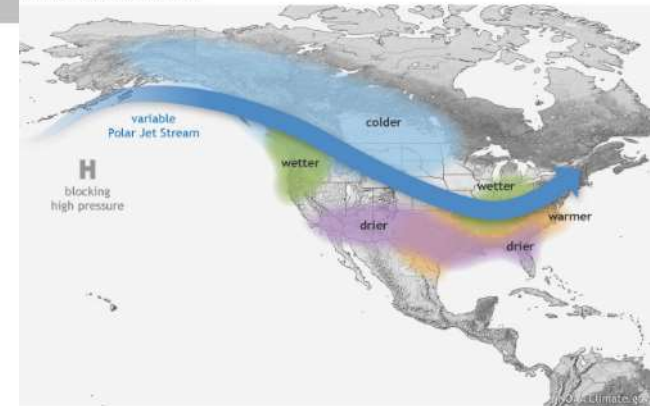
## Low

- More Arctic outbreaks

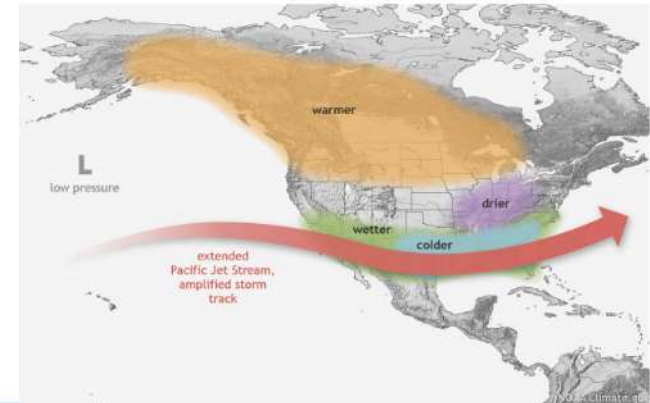
## El Niño:

- Extended Jet Stream
- More zonal flow over U.S.
- South shift of storm track
- Weaker Hudson Bay Low
- Fewer Arctic outbreaks

WINTER LA NIÑA PATTERN



WINTER EL NIÑO PATTERN

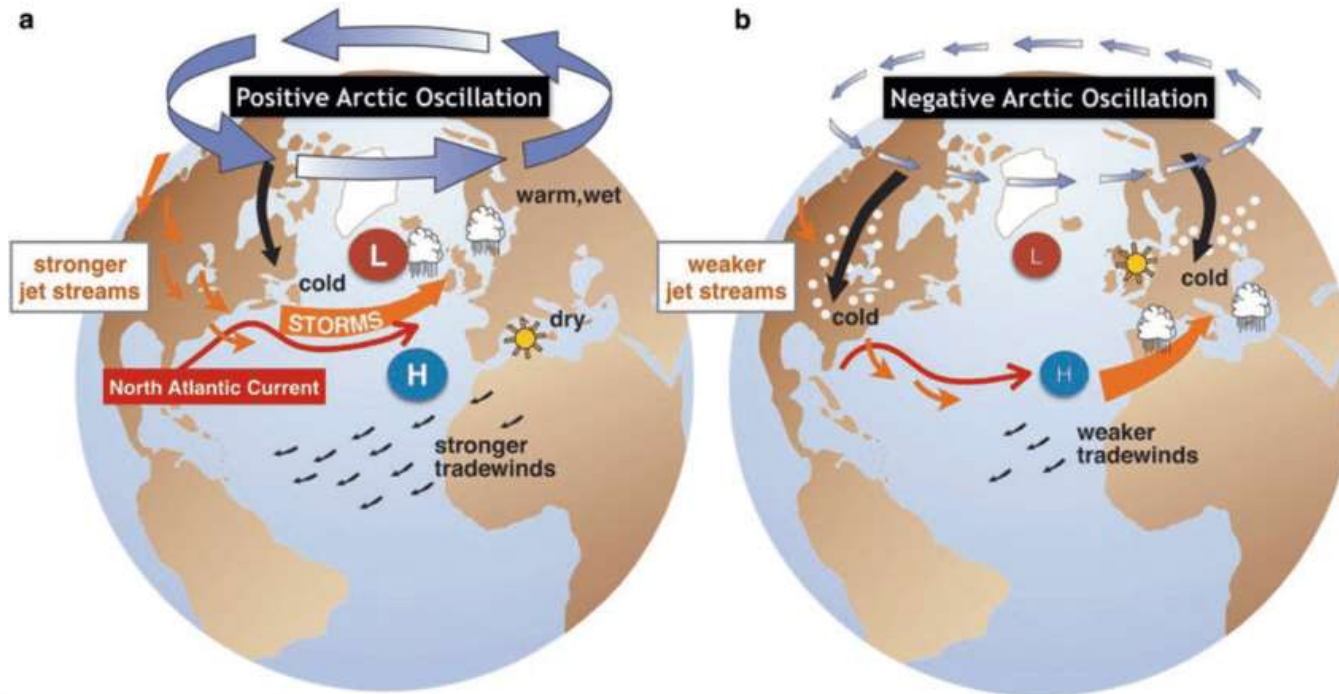




# Winter Influences - "Teleconnections"

## North Atlantic Oscillation:

- Positive and Negative







# *Winter Influences - "Polar Vortex"*



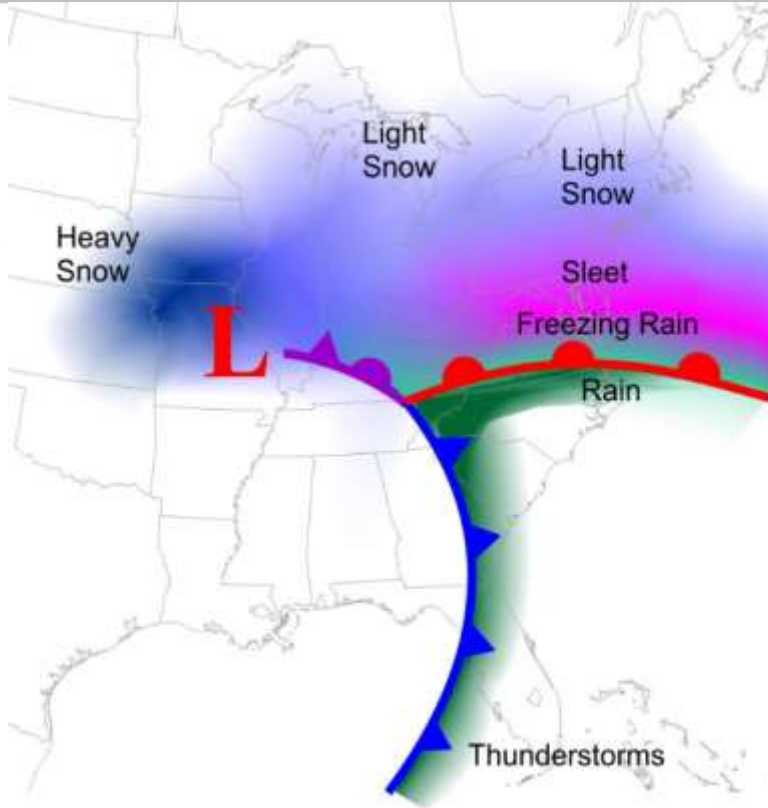


# *Influence of Track on Precipitation Type*

**Blue:** Snow

**Pink:** Wintry Mix

**Green:** Rain



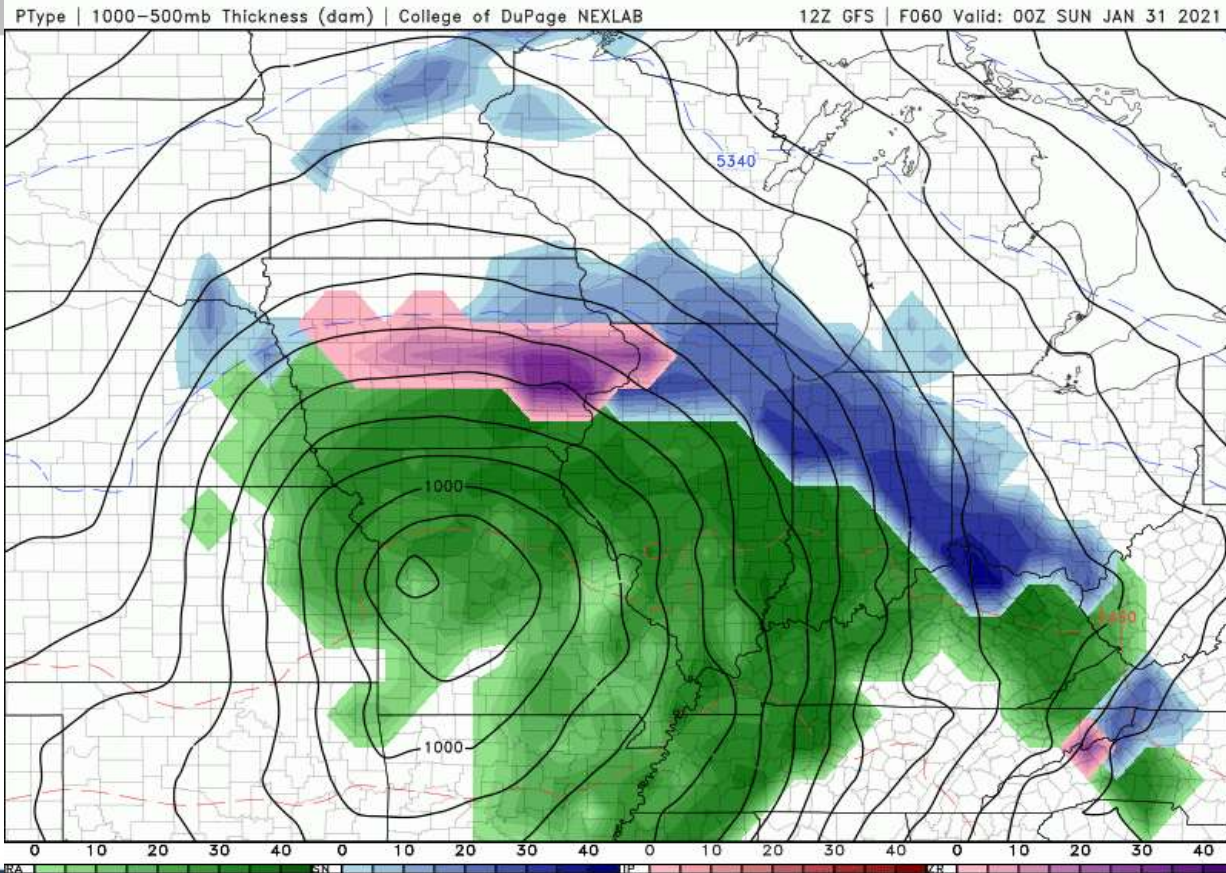
- Snow generally north and west of surface low track
- Freezing rain/sleet near and just north of surface warm front
- Rain along and south of warm front and surface low track
- Thunderstorms/heavy rain along cold front



# *Influence of Track on Precipitation Type*

**Blue:** Snow  
**Pink:** Wintry Mix  
**Green:** Rain

**Be cautious with  
weather model  
depictions of  
precipitation types**

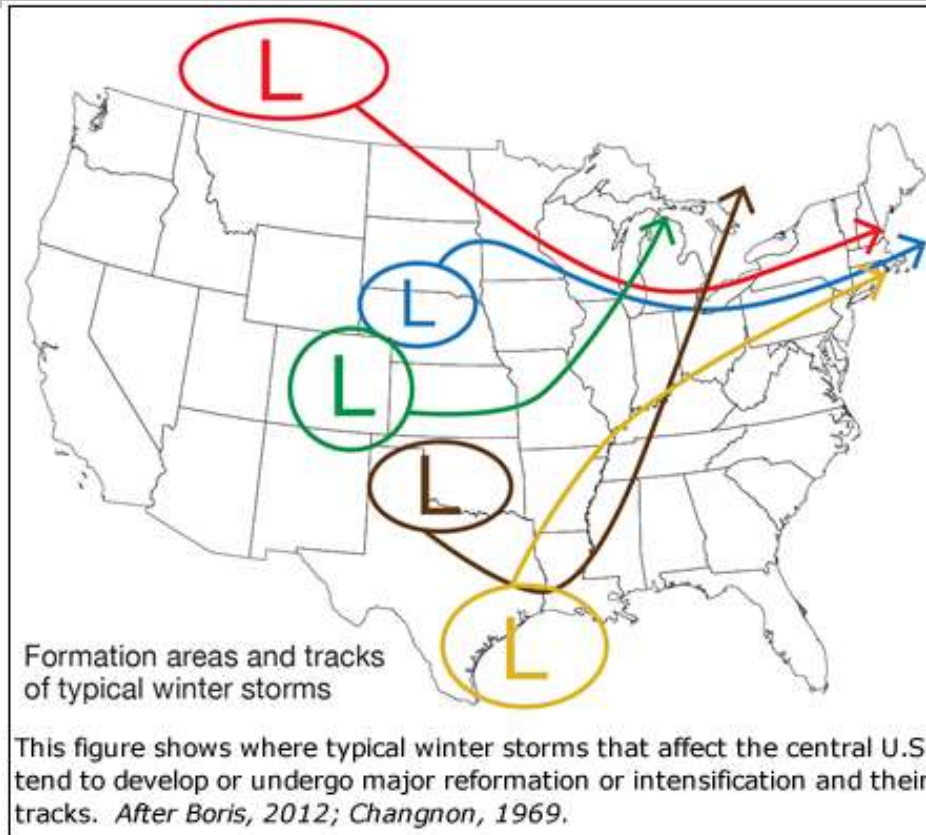






# Weather Systems

## Main Winter Storm Tracks Impacting Indiana





# Alberta Clipper Systems



- Typically 1-3 inches snow north of surface low track
- Little/no snow south of surface low track
- Liquid snow ratios often between 20:1 and 30:1 ("dry snow")
- Reinforcing arctic air follows surface low
- Snow squalls most likely with this storm type



# Alberta Clipper Systems

## Surface and Upper Level Features







# Alberta Clipper Systems

## Surface and Upper Level Features





# Alberta Clipper Systems

## Surface and Upper Level Features

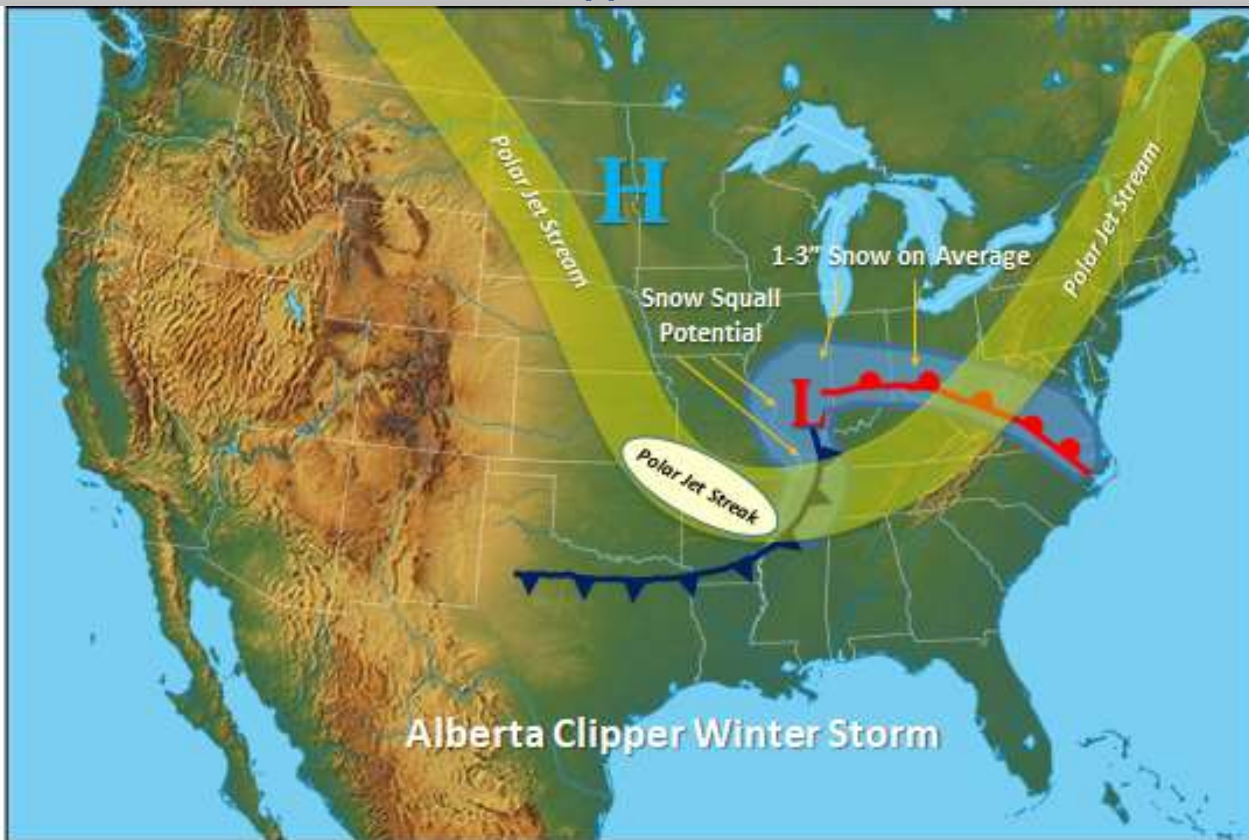






# Alberta Clipper Systems

## Surface and Upper Level Features



Alberta Clipper Winter Storm



# Alberta Clipper Systems

## Surface and Upper Level Features





# Panhandle Hook Systems



Figure 3-2. Location of the center of the surface low-pressure system (denoted by "L") at 6-hour intervals between 6 a.m. CST on February 12, 2007, and 12 a.m. CST on February 15.



- Typically 6+ inches snow well north of surface low track
- Rain near and south of surface low track
- Freezing rain/sleet sometimes between low track and heavy snow
- Liquid snow ratios often between 8:1 and 15:1 ("wet snow")
- Arctic air may follow, sometimes with an Alberta Clipper 1 to 2 days later

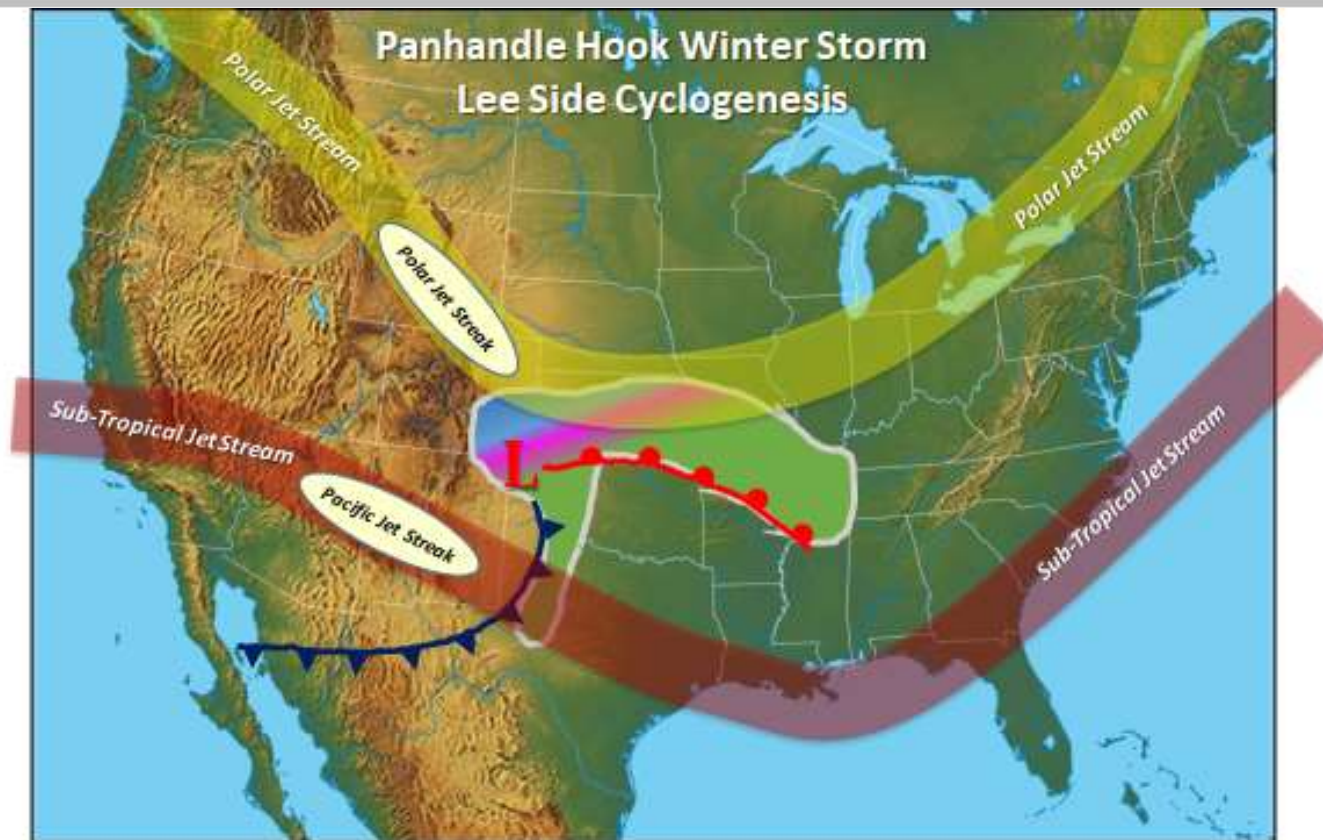
Images Courtesy [Major Winter Storms in the Midwest during Winter 2006-2007](#). Changnon, Stanley A. and Kenneth E. Kunkel., 2007 ISWS DCS 2007-04





# Panhandle Hook Systems

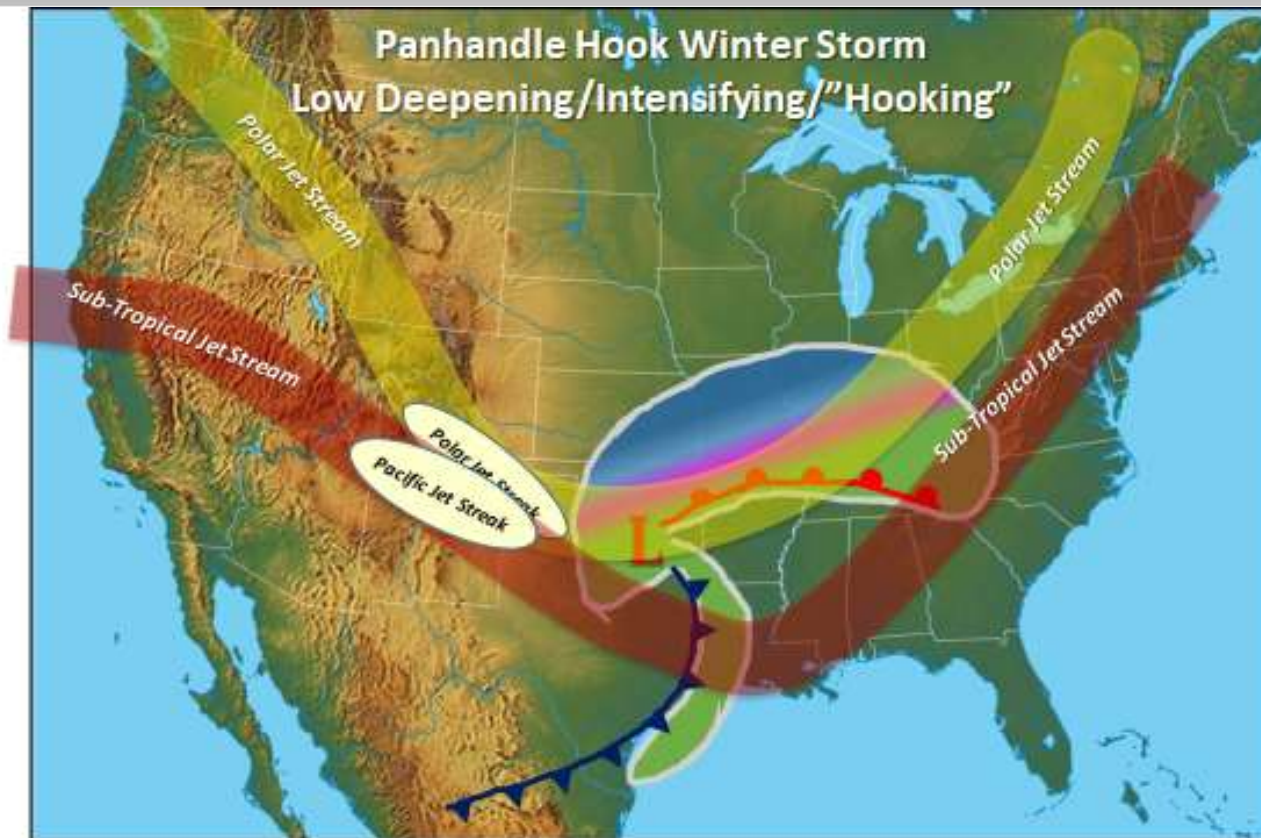
## Surface and Upper Level Features





# Panhandle Hook Systems

## Surface and Upper Level Features

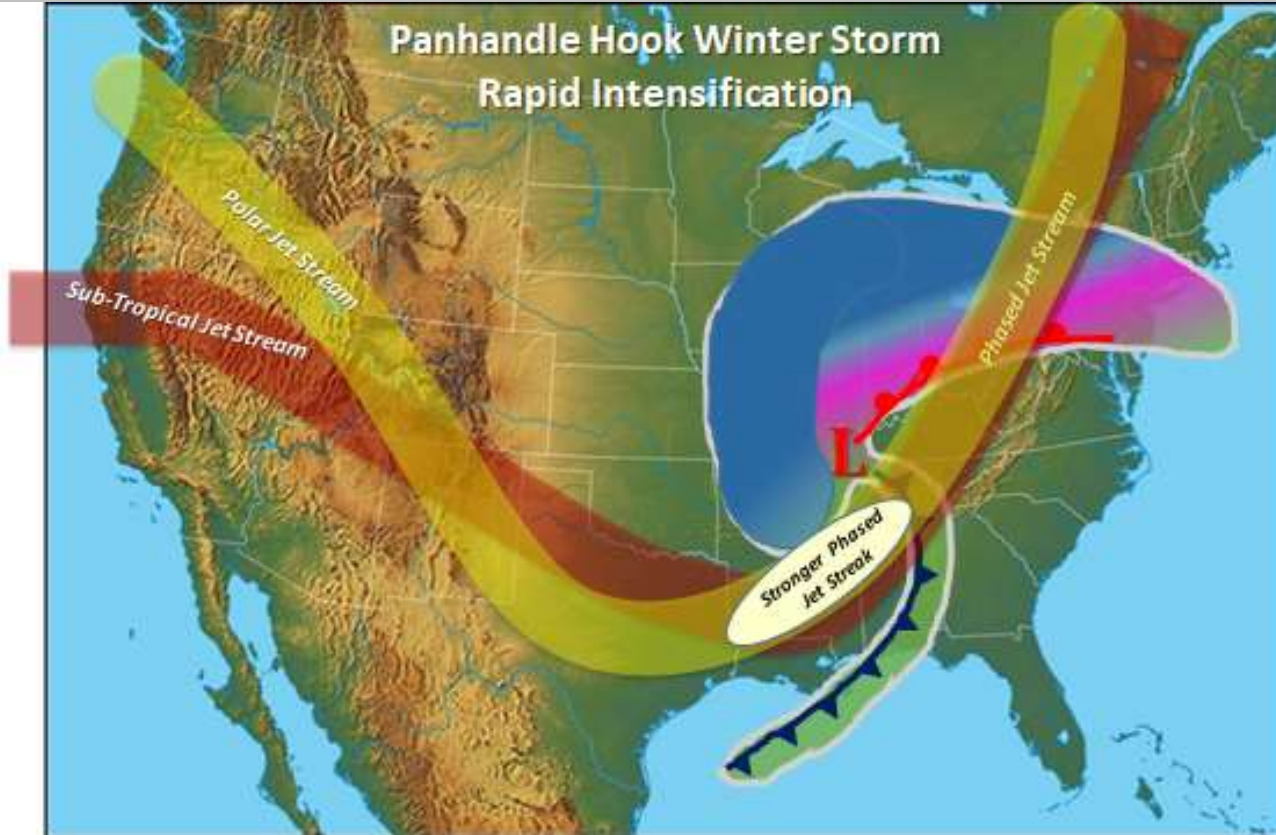






# *Panhandle Hook Systems*

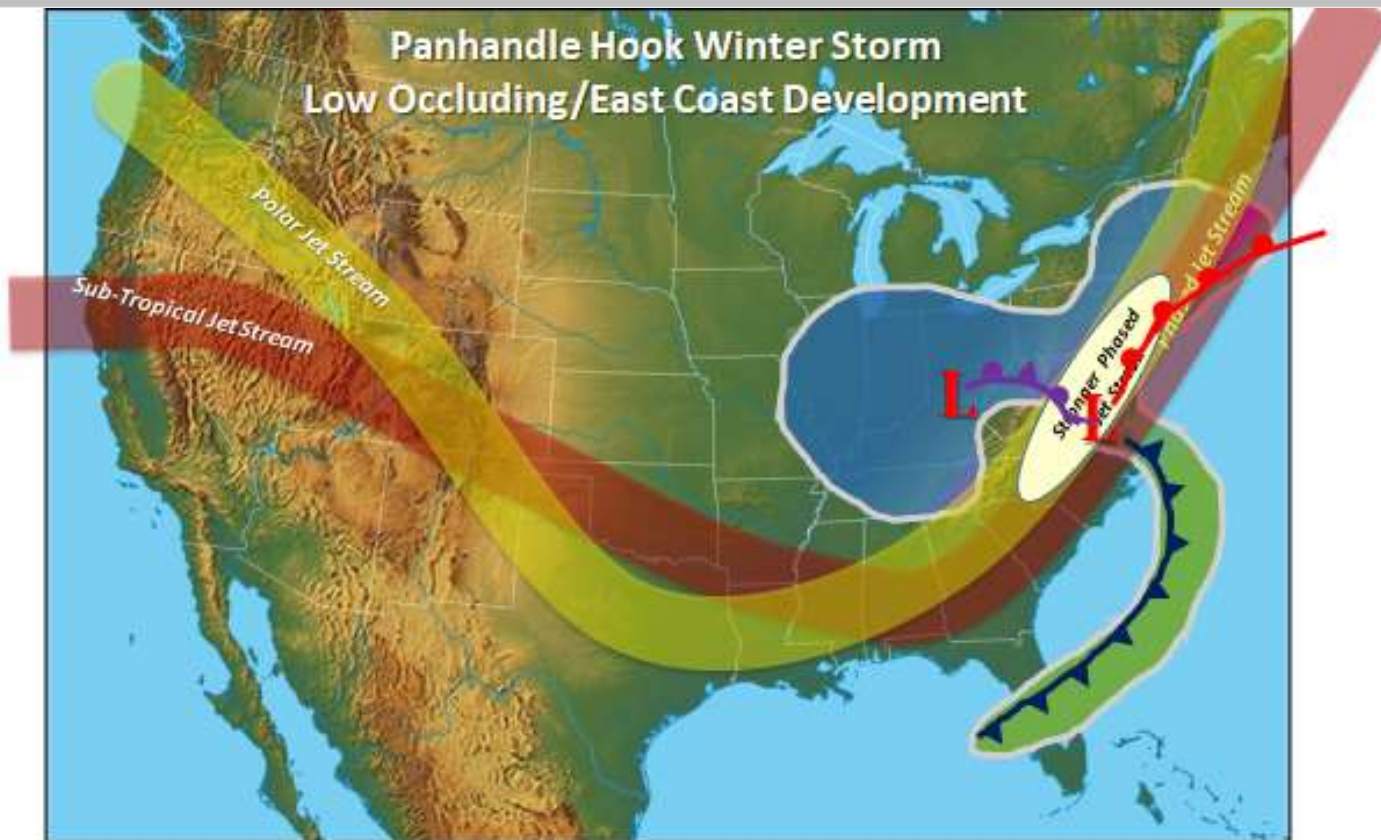
## Surface and Upper Level Features





# *Panhandle Hook Systems*

## Surface and Upper Level Features

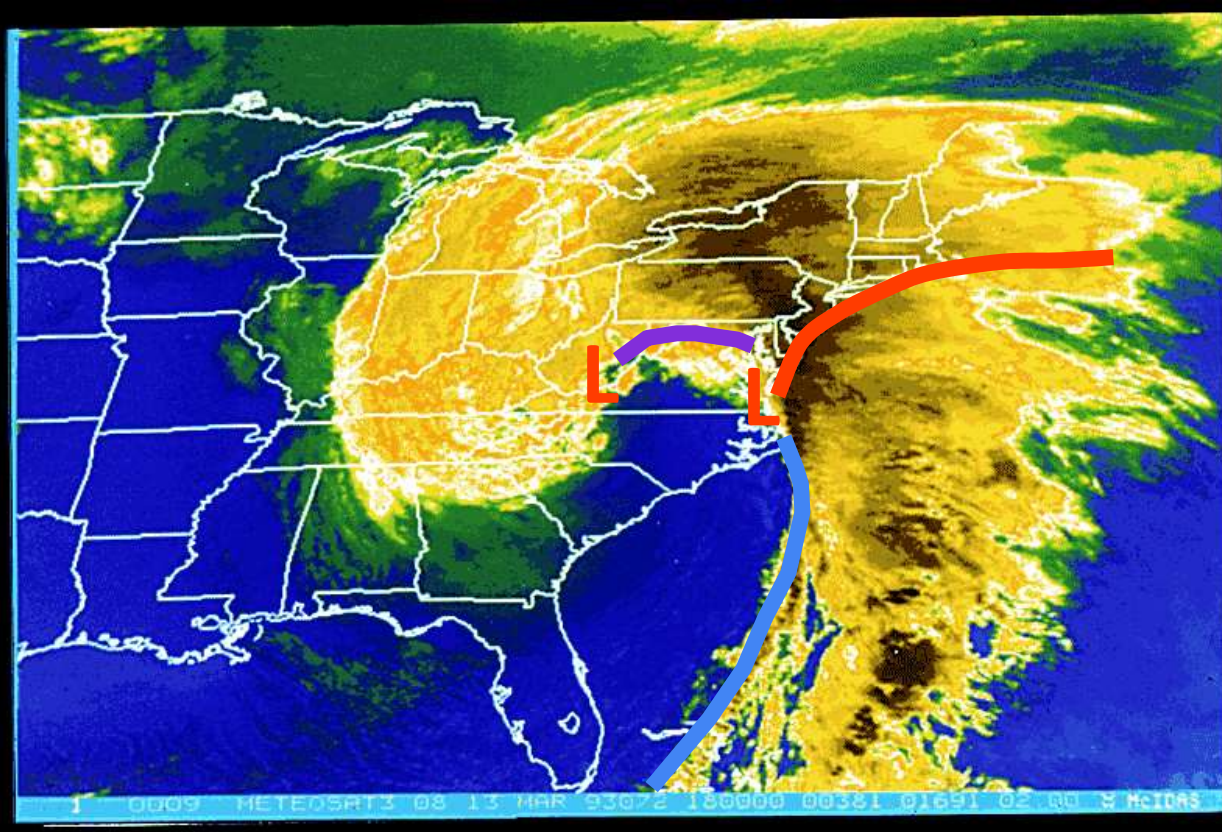






# *Panhandle Hook Systems*

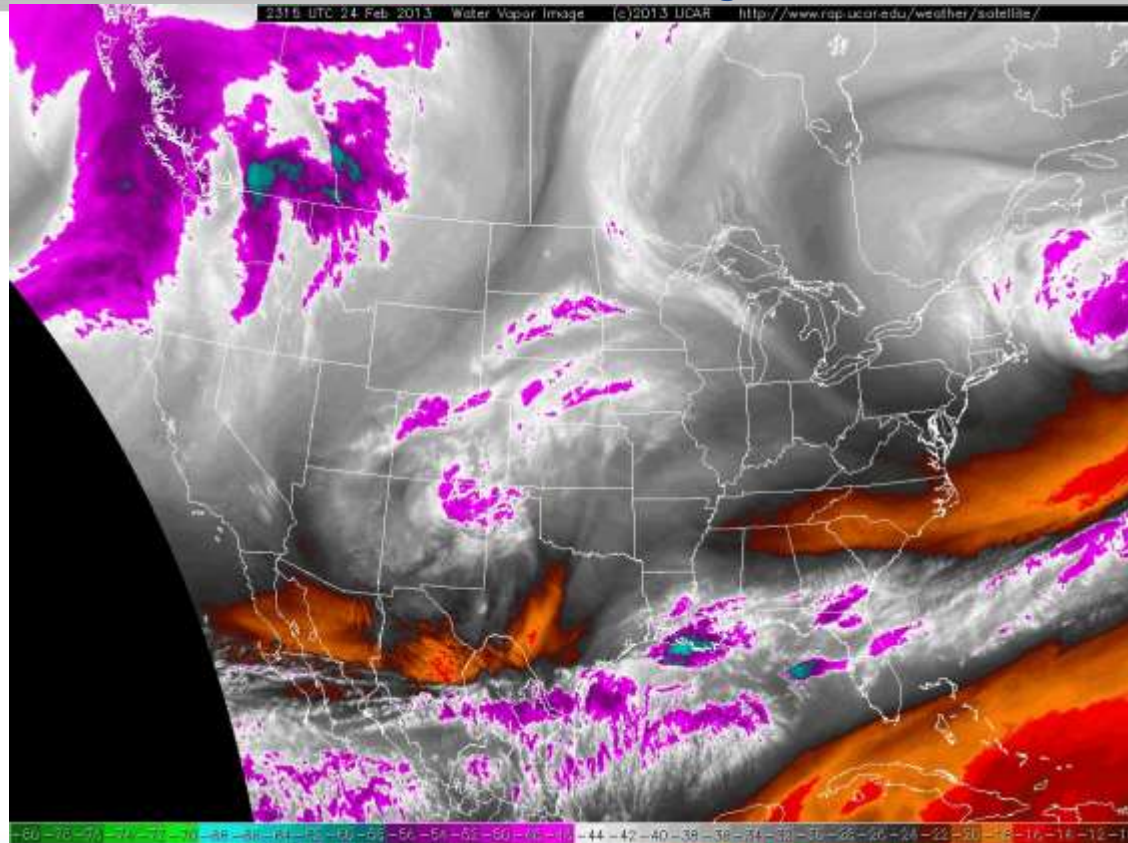
Satellite View of an Occluding System





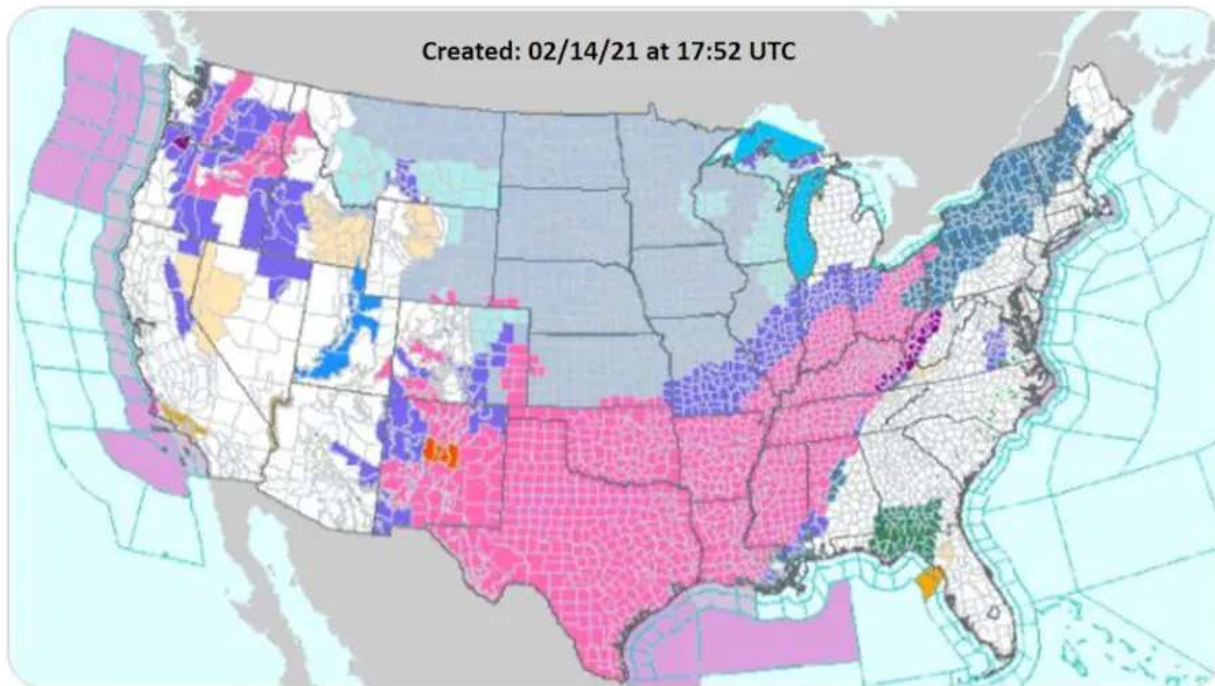
# Panhandle Hook Systems

## Satellite View - A Lot Going On!





# *Panhandle Hook Systems*



- Typical Watches/Warnings and Advisories with a Panhandle Hook System
- Feb 12-16th 2021 Winter Storm
- These storms impact a large part of the country
- Often followed by a clipper system in 1-2 days





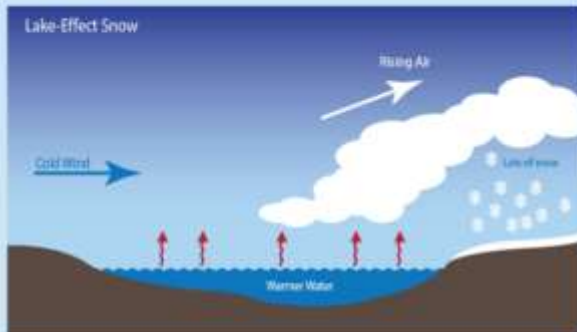
# **Other Winter Weather Hazards and Concerns**



# Other Indiana Winter Weather Events

Lake Effect Snow Can Extend into Central Indiana

## Lake Effect Snow



- Significant lake effect snows are most common in parts of northwest Indiana, but occasionally in northeast Illinois.
- Lake effect can have a **HUGE** impact on driving with greatly reduced visibilities and sudden changes in road conditions over short distances.
- Lake effect snow season usually runs from November through March.

Lake Effect Snow 1/21/14  
Griffith, IN  
Jason Lee Miller





# *Other Indiana Winter Weather Events*

## Freezing Rain and Ice Storms

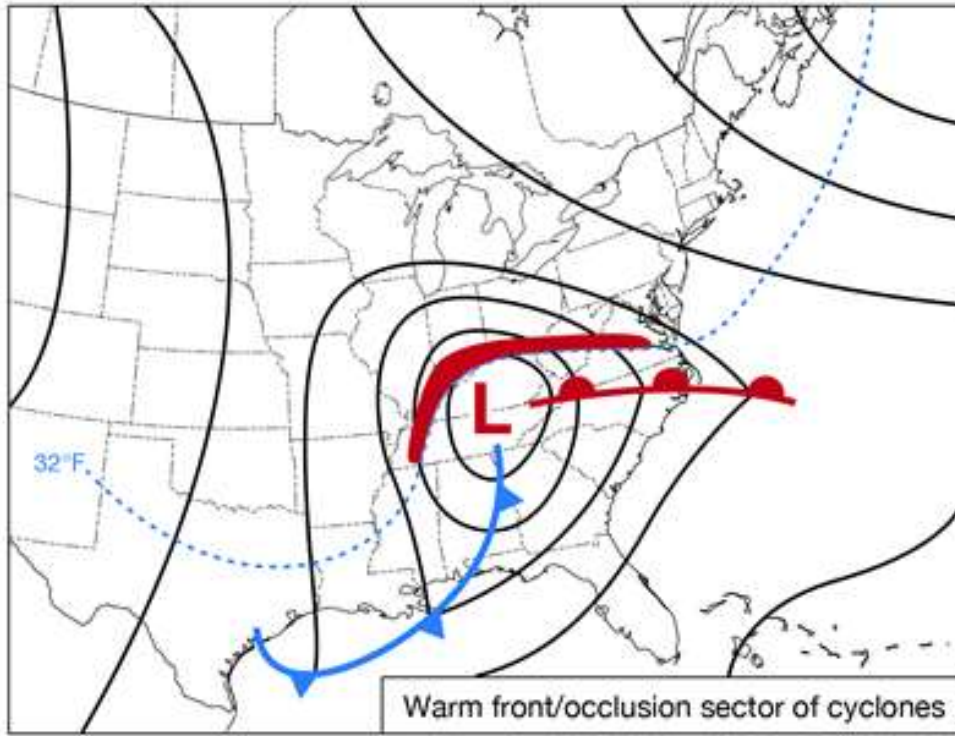
- **Large accretion of ice and wind can result in extensive tree damage and power outages**
- **In extreme cases, massive destruction of the power grid can result in power outages lasting for weeks during the coldest time of year**
- **It only takes a few tenths of an inch of ice accretion to bring down tree limbs and utility lines.**
- **Ice accretion of an inch or more has been observed in the past**





# Ice Storms

Setup 1 - Freezing rain and icing generally “light” (0.01” - 0.25”)



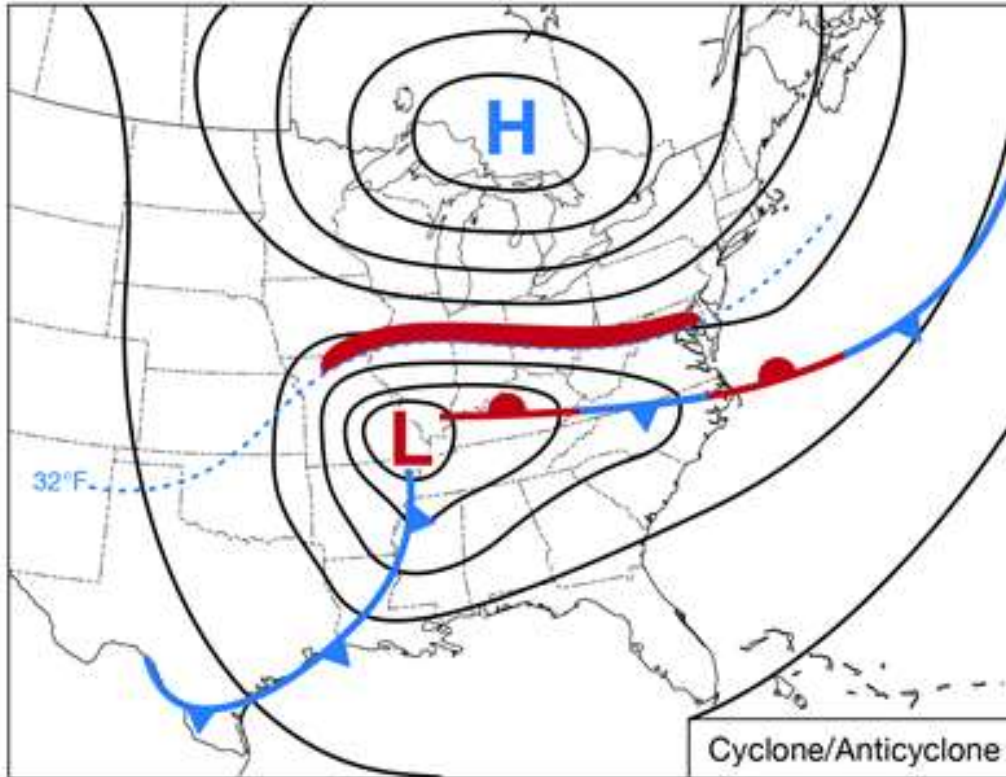
2009 Ice Storm Damage.  
Photo courtesy NWS Paducah website





# Ice Storms

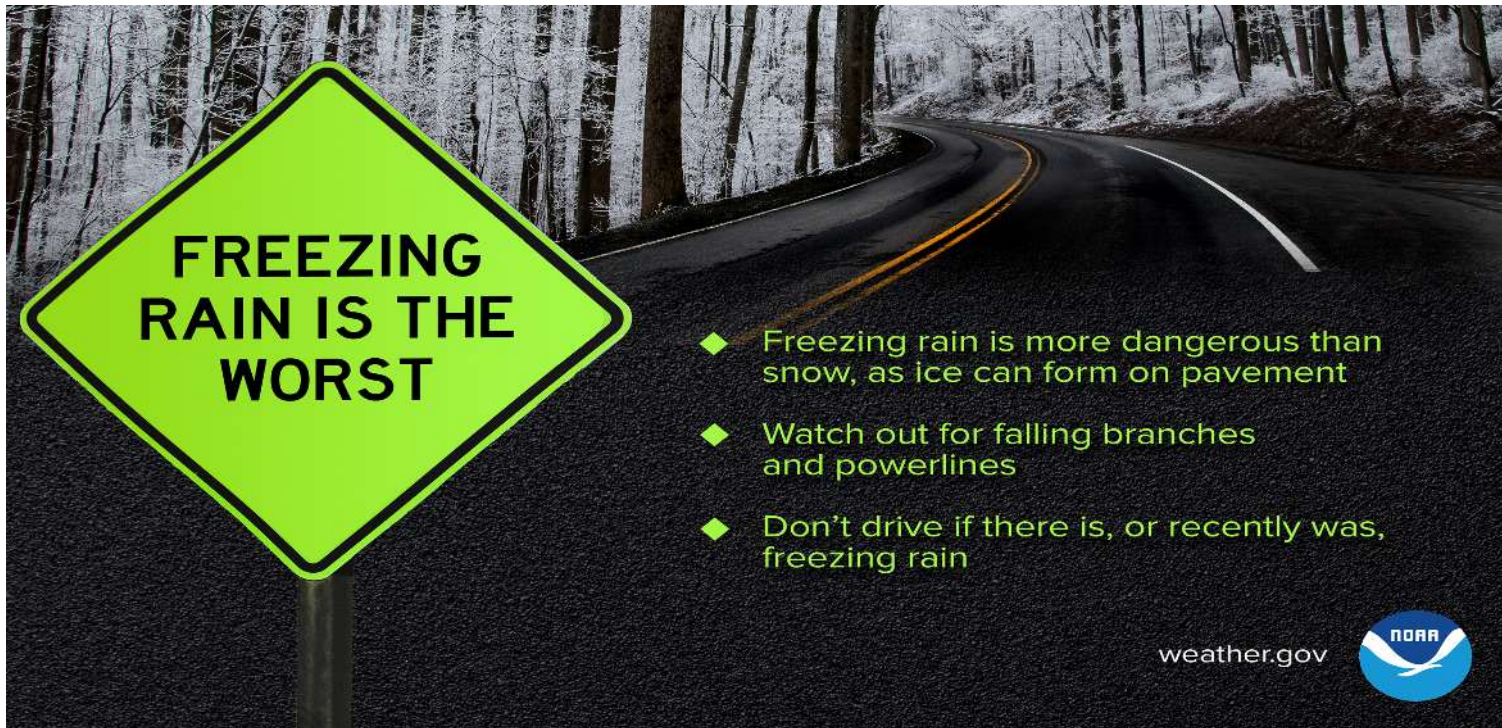
## Setup 2 - Freezing rain and icing generally "Heavy" (0.25" - 1.00+)"



- High pressure to north "locks in" cold air
- Prolonged period of freezing rain, often moderate to heavy rates
- Surface temperatures may remain below 30°F
- Severe icing potential
- Strong winds between the low and high pressure leads to significant damage




# *Ice Storms*



**FREEZING  
RAIN IS THE  
WORST**

- ◆ Freezing rain is more dangerous than snow, as ice can form on pavement
- ◆ Watch out for falling branches and powerlines
- ◆ Don't drive if there is, or recently was, freezing rain

weather.gov

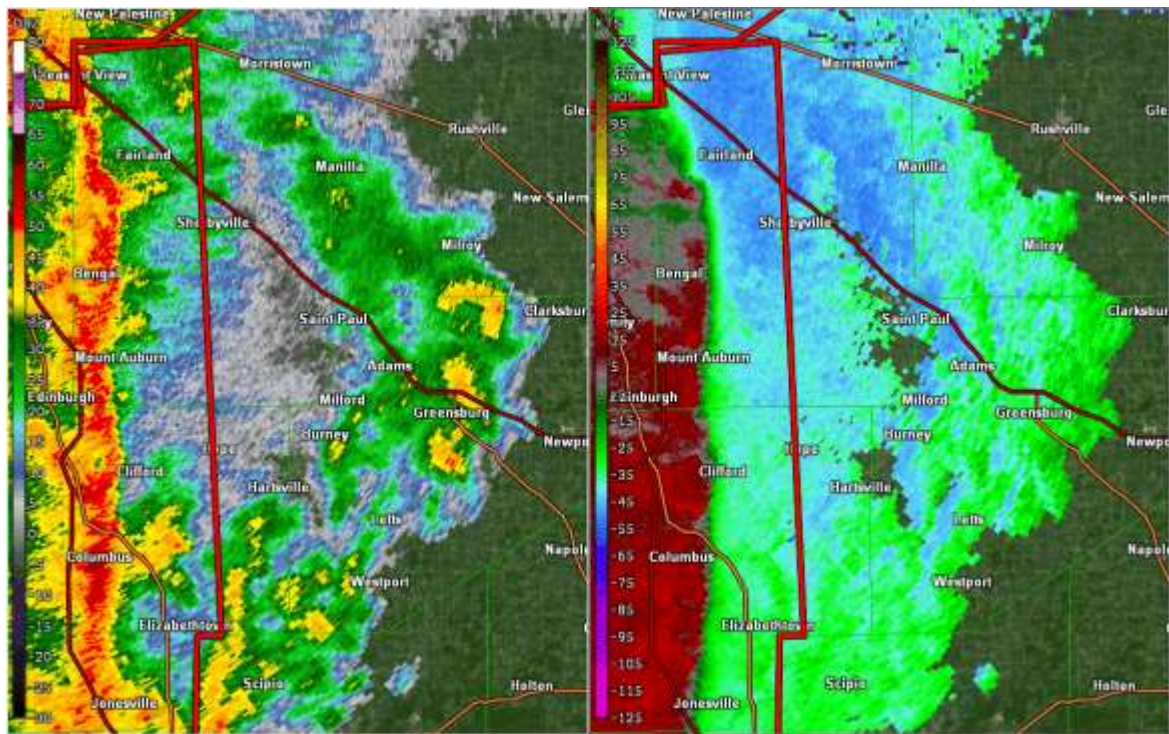






# Don't Forget Severe Weather!

Severe Thunderstorms, Tornadoes and Heavy Rain Can All Occur in the Winter



December 23rd, 2015 - Early Evening

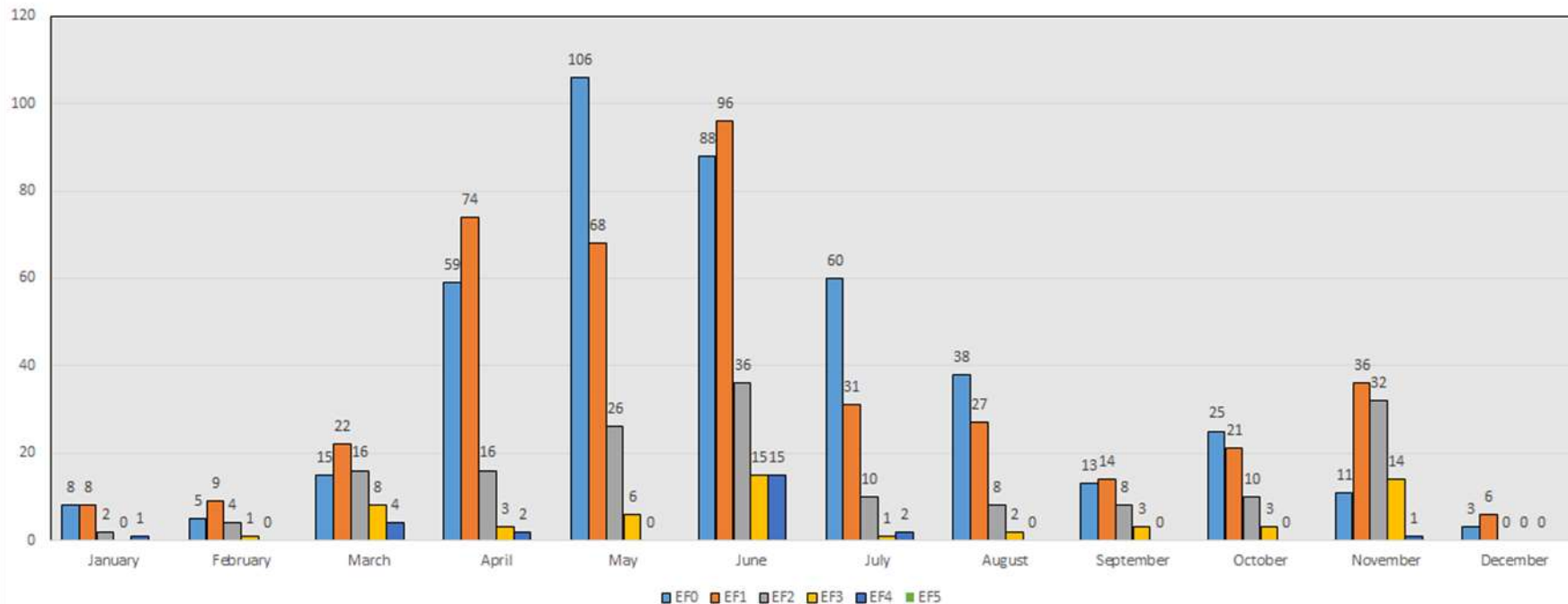
- Strong winter storms can bring mild temperatures, heavy rain and even severe storms to Indiana
- Low pressure usually tracks near or just to our north
- Strong wind shear can lead to tornadoes
- A “Thin Line” of thunderstorms is the most likely scenario (sometimes no thunder)



# Don't Forget Severe Weather!

Severe Thunderstorms, Tornadoes and Heavy Rain Can All Occur in the Winter

## Indiana Tornadoes by Month and Rating 1980-2020







# Don't Forget Severe Weather!

Severe Thunderstorms, Tornadoes and Heavy Rain Can All Occur in the Winter

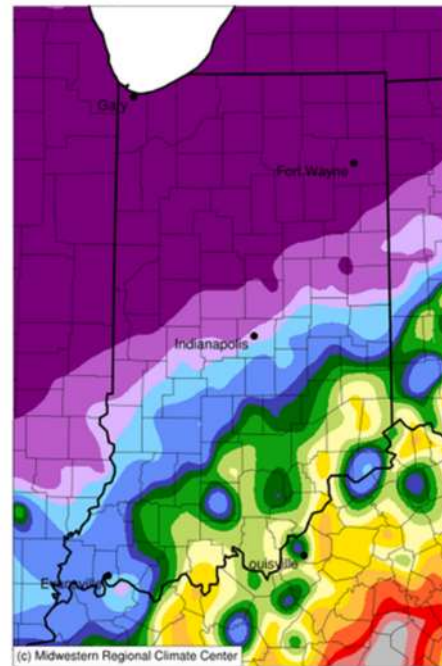
Accumulated Precipitation (in)

February 19, 2018 to February 21, 2018



Accumulated Precipitation (in): Percent of 1981-2010 Normals

February 19, 2018 to February 21, 2018



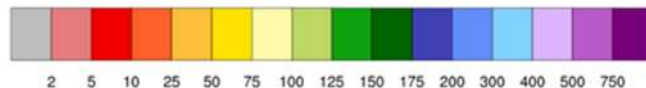
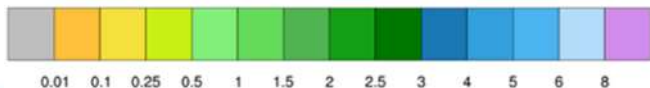
## Extreme Rainfall and Flooding Events February 19<sup>th</sup> – 21<sup>st</sup> 2018

2" to 7.5" Rainfall Statewide

400-800 percent of normal monthly  
rainfall in just 3 days!

Winter months can have more runoff  
due to frozen ground and lack of  
growing vegetation

**MRCC**  
Midwestern Regional  
Climate Center



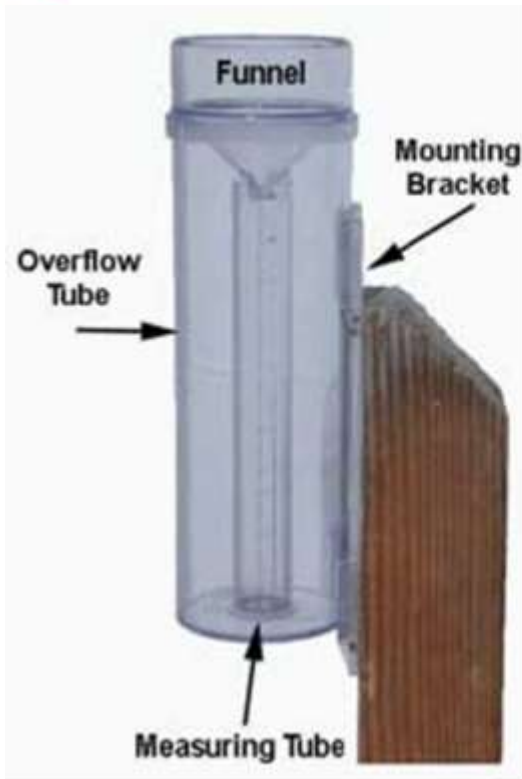


# How to Measure and Report Winter Precipitation



# *Obtain a Quality 4" Rain Gauge*

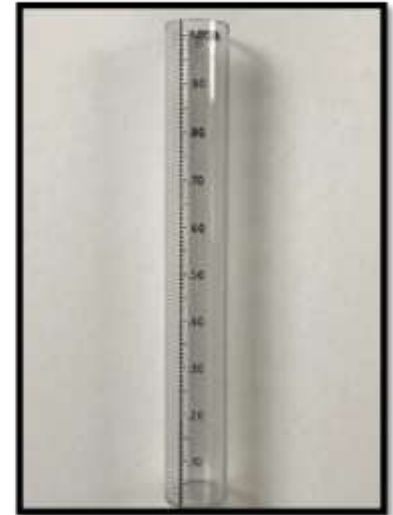
Not required but helpful. More info at [www.cocorahs.org](http://www.cocorahs.org)



Overflow Catch Tube



Funnel Top



Inner Measuring Tube



# Properly Install Your Rain Gauge

[www.cocorahs.org](http://www.cocorahs.org)

- Location, accuracy & consistency are important
- Install in an open area, away from trees, buildings and any obstructions. “Twice the height” of nearest building or trees
- Make sure top of gauge is several inches above top of post to avoid “splattering”
- Refer to [cocorahs.org](http://cocorahs.org) for more information







# ***Properly Maintain Your Rain Gauge***

**Most important step if you have a 4" rain gauge!**



**Remove the funnel and inner tube, otherwise snow will clog the funnel.  
We recommend leaving the inner tube inside all winter, it can freeze and break!**



# How to Measure Snowfall

Snow that has recently fallen

- Use a ruler or yardstick! Measure to nearest **tenth of an inch**
- Ideally, use a snowboard to measure on. Any flat light colored board about 2ft x 2ft will do
- After you measure the snow on the board, clear it off and place the board on top of the snowpack
- Only measure and clear the board off a maximum of once every 6 hours, to allow for compaction of the snow as it falls
  - If you can't measure every 6 hours, you can measure once per day

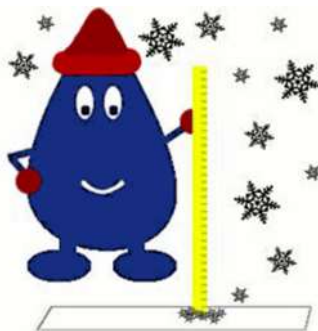




# How to Measure Snowfall

Snow that has recently fallen

- If snow falls and melts on contact, never sticking, there is a Trace of snow (T)
- If snow falls and sticks, then melts, snowfall is the maximum depth reached before it begins to melt
- Sleet (ice pellets) count towards snowfall, freezing rain (glaze) does not
- If there is significant drifting, take numerous measurements including some low and high areas, and take an average





# How to Measure Snow Depth

Snow that has fallen over time and remains on the ground

- Snow depth is total amount of snow on the ground, measured once per day, usually at 7am
- Report snow depth to the nearest **half inch**
- Take about 10 different measurements around your yard and average
  - Avoid un-natural high and low areas (drifts created by buildings)
- **Do Not** always stick ruler all the way to base of ground if in grassy areas
- Snow depth can decrease even with temperatures below freezing - “settling”







# How to Make a Report

Reporting often is encouraged

- Become a CoCoRaHS observer and report via their website, [cocorahs.org](http://cocorahs.org)
- Share your report on Facebook or Twitter via your local NWS office (@NWSIndianapolis)
- Send measurements and pictures to our email: [nws.indianapolis@noaa.gov](mailto:nws.indianapolis@noaa.gov)
- Call our spotter hotline - **Reports Only!**
  - **1-800-499-2133**





# *When to Make a Report*

Reporting often is encouraged

- Storm Total Snowfall after the storm tapers off, especially for events of 3 inches or more
- Snowfall increases of two inches or more during the storm or significant impacts observed
- Precipitation type changes that persist
- Sleet that persists for more than 30 minutes
- Ice accretions every tenth of an inch
- Thundersnow is observed
- Heavy rainfall and significant flooding





# **Winter Weather Safety Information and Online Resources**



# Before Wintry Weather: Prepare!

Postpone Travel, Have a Preparedness Kit Ready and Available



## What to Include in Your Winter Weather Preparedness Kits



### Home

- Extra Food, Water
- First Aid Supplies
- Extra Medicine and Baby Items
- Extra Pet Supplies
- Portable Charger
- Emergency Heat Source  
(Used properly and safely)
- Smoke Alarm
- Carbon Monoxide Detector

### Car

- Full tank of gas
- Snow Shovel and Brush
- Water, Snacks
- Blankets, Warm Clothes
- Jumper Cables
- First Aid Kit
- Phone Charger
- Sand or Kitty Litter
- Flashlight







# One or Two Inch Snowfall Can Create Havoc

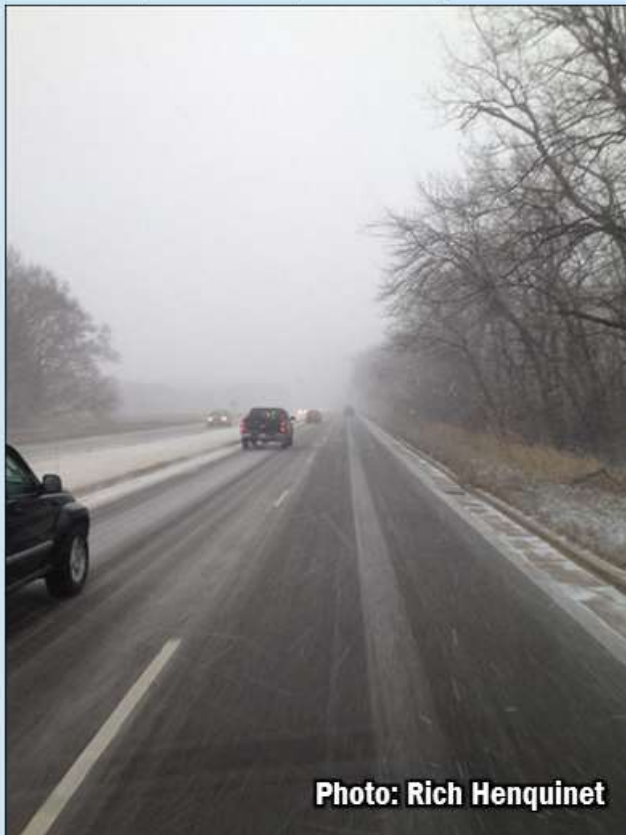
**“Minor” winter events are more deadly on  
Midwestern roadways than notable winter storms.  
- Stephen Strader, Walker Ashley (NIU)**

## **Due to:**

- **Heavier motor vehicle traffic.**
- **Possibly more dangerous road and visibility conditions than perceived by drivers in these situations.**

## **When roads are wet, slushy, ice or snow covered:**

- **SLOW DOWN**
- **Increase following distance**



**Photo: Rich Henquinet**



# Know What to Do When on the Road

## WINTER DRIVING WHILE ON THE ROAD

### Don't crowd the plow.

The road behind an active plow is safer to drive on. Give them plenty of room to work and only pass when it is safe to do so.



### Change the way you drive.

Drive slower than normal and leave more room between you and surrounding vehicles when roads are wet, snowy or icy. **DO NOT** use cruise control, brake quickly or take sharp turns.



### Stay alert.

Make sure you keep your gas tank over half full and keep a close eye on road conditions, which can change rapidly. On road trips, take breaks often so you can stay focused on the road.





# After Wintry Weather: Clean-Up

**Take it easy when shoveling:**

- **Take frequent breaks**
- **Stay hydrated**
- **Stay warm and dry**
- **Have someone check on you**

**The weight of snow varies between every storm!**



**Heavy Snow** can be a **Health Risk**

- ❄ Heavy wet snow can put a big strain on the heart
- ❄ Stay hydrated and take frequent breaks
- ❄ Only move small amounts with each shovel pass



*Take it slow when shoveling snow*

[weather.gov/winter](https://weather.gov/winter)







# www.weather.gov

**NATIONAL WEATHER SERVICE**  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HOME FORECAST PAST WEATHER SAFETY INFORMATION EDUCATION NEWS SEARCH ABOUT

Local forecast by  
"City, ST" or ZIP code  
Enter location:  Go  
[Location Help](#)

**Customize Your Weather.gov**

City, ST  
Enter Your City, ST or ZIP Code  
☐ Remember Me  
[Get Weather](#)  
[Privacy Policy](#)

**NWS Forecast Office Indianapolis, IN**  
Weather.gov > Indianapolis, IN

Current Hazards Current Conditions Radar Forecasts Rivers Lakes Climate

Click on the map below to zoom in.

[Watches, Warnings & Advisories](#)  
[Hazardous Weather Outlook](#)

Last Map Update: Tue, Aug. 25, 2015 at 10:53:17 am EDT

[Story](#) [Radar](#) [Map](#)

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**NATIONAL WEATHER SERVICE**  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HOME FORECAST PAST WEATHER SAFETY INFORMATION EDUCATION NEWS SEARCH ABOUT

Change location:  Go

[View Location Summary](#)

Your local forecast office is **Indianapolis, IN**  
LAT: 39.77°N, LON: 86.16°W, Elev: 728 ft

Current conditions at Indianapolis International Airport (KIND)  
LAT: 39.77°N, LON: 86.29°W, Elev: 757 ft

**Extended Forecast for 2 Miles WSW Warren Park IN**

Today	Tonight	Thursday	Thursday Night	Friday	Friday Night
High: 72°F, Low: 55°F	High: 77°F, Low: 57°F	High: 81°F, Low: 62°F			

**Detailed Forecast**

Today: Mostly cloudy, with a high near 72. Calm wind becoming north-northeast around 5 mph in the afternoon.

Tonight: Partly cloudy, with a low around 55. North wind around 5 mph becoming calm in the evening.

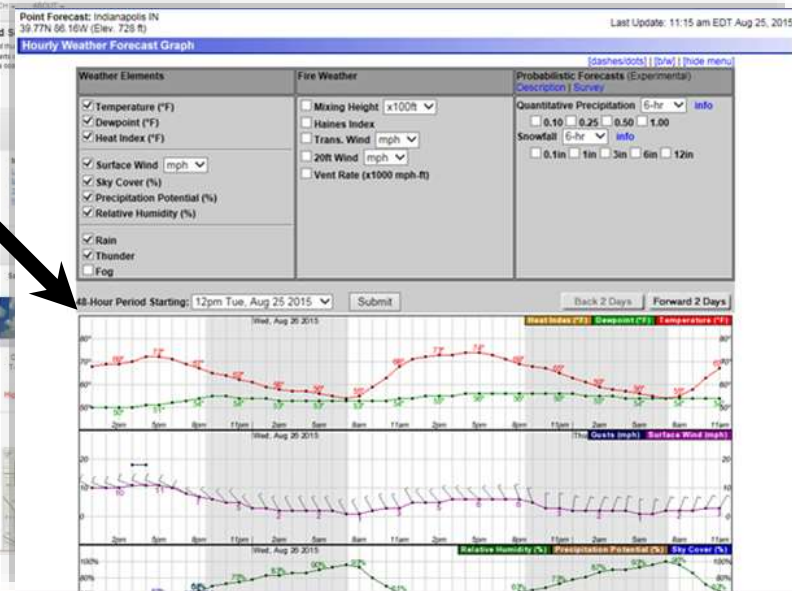
Thursday: Mostly sunny, with a high near 77. Light northeast wind.

Thursday Night: Mostly clear, with a low around 57. Light east wind.

Friday: Mostly sunny, with a high near 81. Calm wind becoming south around 8 mph in the afternoon.

Friday Night: Mostly cloudy, with a low around 62.

lot for NWS Chicago  
iwx for NWS Northern Indiana  
iln for NWS Wilmington OH  
lmk for NWS Louisville KY  
pah for NWS Paducah  
ind for NWS Indianapolis







## Briefing for Indiana

[Weather.gov](#) > [Indianapolis, IN](#) > Briefing for Indiana

[Current Hazards](#) [Current Conditions](#) [Radar](#) [Forecasts](#) [Rivers and Lakes](#)



### Current Hazards/Conditions for NWS offices serving Indiana

#### NWS CHICAGO - [Active Watches/Warnings/Statements](#)



There are no watches, warnings, or advisories.

[Latest Storm Reports](#)

#### NWS NORTHERN INDIANA - [Active Watches/Warnings/Statements](#)



There are no watches, warnings, or advisories.

[Latest Storm Reports](#)

#### NWS INDIANAPOLIS - [Active Watches/Warnings/Statements](#)



There are no watches, warnings, or advisories.

[Latest Storm Reports](#)

#### NWS WILMINGTON, OH - [Active Watches/Warnings/Statements](#)

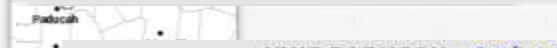


There are no watches, warnings, or advisories.

[Latest Storm Reports](#)

[Hazardous Weather Outlook](#)

#### NWS LOUISVILLE - [Active Watches/Warnings/Statements](#)



[Latest Storm Reports](#)

#### NWS PADUCAH - [Active Watches/Warnings/Statements](#)



[Hazardous Weather Outlook](#)

[Latest Storm Reports](#)

[Hazardous Weather Outlook](#)





## Experimental CWA and State Level Snow and Ice Forecasts

### Most Likely/Expected



## High End Potential (1 in 10 Chance)



### Low End Potential (9 in 10 Chance)





## Snowfall Totals by Location

Experimental - Leave feedback

11/14/2022 0700AM to 11/17/2022 0700AM

What's this?

County:

Box Plots

Bar Plots



Location	Snow Amount Potential			Chance of Seeing More Snow Than							
	Low End Snowfall	Expected Snowfall	High End Snowfall	>=0.1"	>=1"	>=2"	>=4"	>=6"	>=8"	>=12"	>=18"
Columbus, IN	0	<1	<1	62%	7%	0%	0%	0%	0%	0%	0%
Frankfort, IN	<1	1	3	95%	65%	28%	1%	0%	0%	0%	0%
Muncie, IN	<1	1	2	92%	55%	15%	0%	0%	0%	0%	0%
Kokomo, IN	<1	1	3	92%	65%	30%	2%	0%	0%	0%	0%
Seymour, IN	0	<1	<1	46%	0%	0%	0%	0%	0%	0%	0%
Vincennes, IN	0	<1	<1	41%	3%	0%	0%	0%	0%	0%	0%
Bedford, IN	0	<1	<1	59%	4%	0%	0%	0%	0%	0%	0%
Anderson, IN	<1	1	2	90%	56%	18%	0%	0%	0%	0%	0%
Indianapolis, IN	0	<1	2	81%	43%	11%	0%	0%	0%	0%	0%
Crawfordsville, IN	<1	<1	3	90%	62%	31%	3%	0%	0%	0%	0%
Shelbyville, IN	0	<1	1	69%	16%	0%	0%	0%	0%	0%	0%
Lafayette, IN	<1	1	3	88%	62%	28%	1%	0%	0%	0%	0%
Terre Haute, IN	0	<1	2	71%	32%	6%	0%	0%	0%	0%	0%

Back to top





[www.wpc.ncep.noaa.gov/](http://www.wpc.ncep.noaa.gov/)



# WEATHER PREDICTION CENTER

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NCEP: AWG GPC EMG HGO NHC DPC SPC SWPC WPC

HOME ▾ FORECASTS & ANALYSES ▾ ARCHIVES ▾ VERIFICATION ▾ INTERNATIONAL ▾ DEVELOPMENT ▾ ABOUT ▾ SEARCH

HAZARD	SEP 30	OCT 01	OCT 02
EXCESSIVE RAINFALL	SLIGHT	SLIGHT	MARGINAL
HEAVY SNOW ( $\geq 4"$ )	MODERATE	SLIGHT	NO AREA
ICE ( $\geq 0.25"$ )	NO AREA	NO AREA	NO AREA

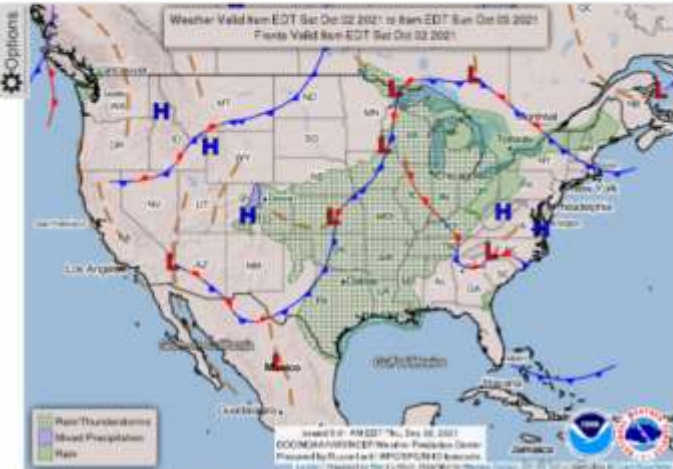
[WPC'S MEDIUM RANGE HAZARD FORECAST](#)  
[WINTER STORM SEVERITY INDEX](#)

Overview Surface Analysis Fronts QPF Excessive Rain Winter Wx Day 3-7 Forecast Tools

## National Forecast Chart

Day 1 Day 2 Day 3

Valid Sat Oct 2, 2021

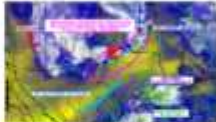


Weather Valid from EDT Sat Oct 02 2021 to Sun Oct 03 2021  
Fronts Valid from EDT Sat Oct 02 2021

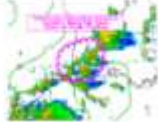
Legend:  
Heavy Thunderstorms  
Mixed Precipitation  
Rain

Interactive National Forecast Chart  
Additional Links


### WPC Top Stories:



Mesoscale Precipitation Discussion #1032 is currently in effect



Mesoscale Precipitation Discussion #1031 is currently in effect



Understanding WPC Excessive Rainfall Risk Category



## Winter Storm Severity Index (WSSI)

The WSSI does not depict official warnings and should always be used in context with official NWS forecasts and warnings. For a users guide and more information about the WSSI, please select from the dropdown menu below. [Click Me for Additional Information](#)

\*NEW\* Rolling 24 HR WSSI Display located [here](#)

Overall Impact | **Snow Amount** | Snow Load | Ice Accumulation | Flash Freeze | Blowing Snow | Ground Blizzard

Overall Impact: Maximum impact from any of the components.

Days 1-3 | Day 1 | Day 2 | Day 3 | **EXPERIMENTAL** | **Day 4** | Days 1-4

Select Zoom Area: **[IND]** Indianapolis

[Print Map](#)

Winter Storm Severity Index - Effective From Thu, Sep 30, 2021 01 PM ET Through Sat, Oct 02, 2021 08 PM ET  
Last Updated: Thursday September 30, 2021 01:22 PM ET



Change image opacity:

### Map Overlays

- NWS County Warning Areas ☐ River Forecast Center Boundaries ☐  
FEMA Boundaries ☐ Counties Boundaries ☐  
State Boundaries ☒ NWS Public Forecast Zones ☐  
Urban Areas ☐ ARTCC/FIR ☐

### Retrieve Static Images

Select Zoom Area  
**CONUS**

- Select WSSI Element  
☒ WSSI Overall ☐ Blowing Snow ☐ Flash Freeze ☐ Ground Blizzard  
☐ Ice Accumulation ☐ Snow Amount ☐ Snow Load

To retrieve static images please select a zoom area and WSSI element.  
\*Please Note\* Static images only update at 01, 09, 13, 19 and 21 UTC

## WSSI Component

## Purpose

### Snow Amount Index

Impact to transportation from total amount of snow and snowfall rate

### Snow Load Index

Impact from weight of snow and potential damage to trees and powerlines

### Blowing Snow Index

Impact of blowing and drifting snow on transportation

### Ground Blizzard Index

Impact of pre-existing snow combined with very strong winds on transportation

### Flash Freeze Index

Impact on transportation in situations where temperature falls rapidly below freezing during or just after precipitation

### Ice Accumulation Index

Impact of ice accumulation on transportation and also tree and powerline damage



# Winter Storm Timeline Review

4-7  
Days

- Focused on general overview, trends and storm potential
- Hazardous Weather Outlook, Forecast Discussions

1-3  
Days

- Increasing confidence as storm track becomes clearer (watches if needed)
- Confidence, probabilistic, & potential amount graphics created & updated frequently

0-36  
hours

- Fine tune forecast & narrow down details
- Warnings & advisories if needed with details on location and timing
- Situation Reports, Social media posts, graphics and updates

After  
Event

- Data collection/quality control of reports & finalize snowfall maps
- Post summary information on local NWS webpages







# Weather Ready Nation Ambassadors

IT'S NOT ENOUGH TO KNOW THE WEATHER...  
WE MUST PREPARE FOR IT!

Building a Weather-Ready  
Nation is a team effort!



A Weather-Ready Nation  
understands the dangers of  
extreme weather, water, and  
climate events, and responds with  
wise decisions that save lives and  
prevent economic losses.

Your organization can help build  
a Weather-Ready Nation  
as an Ambassador!

Take the next step:

[www.weather.gov/wrn](http://www.weather.gov/wrn)

@WRNAmbassadors



READY  
RESPONSIVE  
RESILIENT







# How to Contact us

Thanks for Attending. Questions?

- Call us @ 1-800-499-2133
- Social Media
  - Twitter - @NWSIndianapolis
  - Facebook – @NWSIndianapolis
    - Hashtags - #INwx #NWSIND
- Email photos with details to:  
[nws.Indianapolis@noaa.gov](mailto:nws.Indianapolis@noaa.gov)



[Sam.Lashley@noaa.gov](mailto:Sam.Lashley@noaa.gov) - Warning Coordination Meteorologist NWS Indianapolis