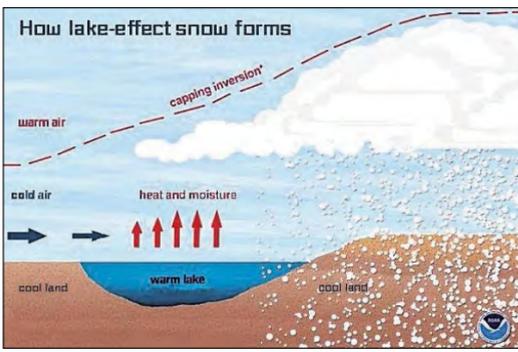




Connect with your environment

Learn about environmental issues, in your community and how you can get involved.



Lake-effect snow forms when cold, dry air passes over a large warm lake and picks up moisture and heat.

Ideal conditions lead to lake-effect snow

By ANNA McCARTNEY
Contributing writer

The following conditions are required for lake-effect snowstorms:

- Large temperature difference between the lake and air/land
- Essentially ice-free water

A high pressure cell (rising barometer) following a low pressure cell (falling barometer) provides favorable conditions for lifting the warm, moisture-filled air for cooling and ice crystal formation.

- A long “fetch” (distance the air passes over open water). A longer

fetch increases the amount of heat and moisture that may be acquired from the lake. A northwest wind travels almost 130 miles across Lake Superior, 150 miles across Lake Huron, but only about 30 miles across Lake Erie. But a west-southwest wind travels 30 miles across Lake Michigan, 60 miles across Lake Huron and nearly 130 miles across Lake Erie (look out, Buffalo).

ANNA McCARTNEY, a communications and education specialist for Pennsylvania Sea Grant, can be reached by e-mail at axm40@psu.edu.



ANNA McCARTNEY

The Great Lakes region, especially the eastern and southern shorelines, experiences a winter weather phenomenon called lake-effect snow. Snow cloud bands form when cold air masses move over warmer lake water. Erie and Buffalo often make national headlines for these legendary snowstorms that can dump many feet of snow as early as October and as late as April.

Fetch the water

Why lake-effect snow varies from place to place

By ANNA McCARTNEY
Contributing writer

How can many feet of snow paralyze one area in 24 hours but just a few inches cover the ground?

Erie and other cities on the southern and eastern shores of the Great Lakes often make national headlines for legendary snowstorms that can strike as early as October and as late as April. However, research has shown that November storms produce the highest amount of precipitation in lake-effect events. The Nov. 17-19 event before Thanksgiving 2014 that blasted some areas of western New York with over seven feet of snow will be remembered as one of the most crippling.

The Great Lakes may produce lake-effect snow downwind if they remain essentially ice-free in winter. Because winds accompanying arctic air masses generally originate from a southwest-to-northwest direction, snow events are most common along their eastern and southern shores and heaviest in Buffalo, Syracuse, and Rochester in New York, the Erie region in Pennsylvania, Muskegon in Michigan and South Bend in Indiana.

When the wind changes direction, north and west shorelines can be hit if the air traversing the lake is cold enough and the distance the air passes over open water (known as the fetch) is large enough.

As this cold air streams across the warm lakes, the air warms, becomes more humid and less dense, and it rises. As this moist air rises, it cools and forms clouds. Once over land, moisture in the air condenses into lake-effect snow. As the warmed air reaches the shoreline, additional lifting may occur as the air begins to “pile up” because air moves more slowly over land than over

water, due to increased friction. Hills and high lands on down wind lakeshores force air upward, further cooling the air, encouraging more cloud formation and greater snowfall.

Snow clouds most often form in narrow bands, where the size and orientation are determined by the shape of the body of water and the prevailing wind direction. In the most extreme cases, the heaviest bands of snowfall may be 20 to 30 miles wide and extend over 100 miles inland from the lake.

Within the band, snowfall rates may exceed 5 inches an hour and be accompanied by lightning and thunder. In addition, a band of snow can hover over one location for several hours, dropping several feet of snow while 10 to 15 miles on either side of that narrow band, skies may be sunny with no snow at all.

In the past, predicting such intense small storms posed challenges to weather forecasters. Current research, the availability of high quality data, numerical weather modeling and improved computer capabilities have produced surprisingly detailed projections of larger lake-effect snow bands.

Because detailed forecasts of lake-effect snow squalls are extremely important for the safety of the people who live and travel throughout the Great Lakes region, the National Weather Service provides alert and warning information through the following official sources: NOAA Weather Radio (www.nws.noaa.gov/nwr/); NOAA Weather Wire Service (www.nws.noaa.gov/nwWS/) and www.weather.gov/.

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NOAA

The severity of this snow band benefited from a long fetch of southwesterly winds oriented along the long axis of Lake Erie, which created an extraordinary amount of moisture. Radar shows heavy snow (green) in some areas while others nearby are spared.



JOSEPH DeBENEDICTIS/Contributed photo

A perfect example of lake effect was captured in downtown Buffalo on Nov 18. Access the link to the time-lapse video at www.paseagrant.org to watch the ominous snow clouds roll into western New York.



MARK SCHREIBER/Contributed photo

While snow fell at rates of five inches per hour Nov. 17-18 dumping more than five feet in the heaviest hit areas of western New York, nearby regions of Buffalo only received a total of one to six inches.



CONTRIBUTED PHOTO

Neighborhood Art House students adopt trees in their neighborhood to minimize stormwater pollution.

Students learn to serve as watershed stewards

We are the watershed class at the Neighborhood Art House and we are part of the Great Lakes Great Stewards program with PA Sea Grant. We started our class with an inventory of the neighborhood. We used a work sheet and listed the resources and environmental issues.

After studying the results of our inventory, we decided to adopt seven trees on East 10th Street; our goal is to improve water quality. The area next to the trees is a parking lot that has lots of oil, gasoline and other things that come from cars on its surface. We adopted the seven trees to stop runoff from the parking lot; if the runoff doesn't go down the storm drains, it helps the water quality in Mill Creek, Presque Isle Bay and Lake Erie. Healthier trees will also improve

the air quality and it will beautify our neighborhood.

We made a list of strategies to help us with our project. We agreed to meet with Sarah Galloway, the arborist from the city of Erie, to get quotes for the bulbs we are going to plant in the spring. We also decided to contact Mark Kwitowski from the Wastewater Treatment Plant to get the mulch and plan the delivery date, and to contact Scott Sesler to explain what we are doing; he works at the Sesler & Sesler law firm, which is next door to our project.

In the second semester of our watershed class, we will continue to care for the trees and to see what other improvements can be made in our project area.

— Rickaylaha Bryant and Sarah Graham

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Check out these websites to learn more:

www.weather.gov/
www.nws.noaa.gov/nwr/
www.paseagrant.org/

The Erie Times-News weather page can help you determine if the conditions are right for lake-effect snow. Use it to find the current water temperature of the lake, wind direction and speed and air temperature. Can you predict if the wind direction across the lake will produce a greater or lesser fetch and if the difference in water and air temperature will increase moisture, thus producing snow clouds responsible for lake-effect snow?

