Product/Service Description Document
Winter Weather Probabilistic Experiment
Winter 2017-2018

Part I - Mission Connection

a. Product/Service Description – Experimental probabilistic storm total snowfall graphics will be posted to the web indicating the official snowfall forecast as well as probabilities for low and high end amounts based on the WPC ensembles. The probability of various snowfall thresholds such as ≥ 0.1", 1", 2", 4", 6", 8", 12", 18"; plus a table showing the probability of snow falling within specified ranges and the probability of exceeding specified snowfall amounts are also included.

b. Product Type – Experimental

c. Purpose - The purpose of these experimental probabilistic internet-based snowfall products is to provide customers and partners a range of snowfall possibilities, better communicate forecast uncertainties, and enhance Decision Support Services (DSS) during winter weather events. The probabilistic snowfall products will complement existing NWS deterministic snowfall graphics, indicating areas of low and/or high uncertainty. The offices involved will produce 10% and 90% exceedance percentile graphics represented as the "Low End Amount - 9 in 10 Chance (90%) of Higher Snowfall" and "High End Amount - Only a 1 in 10 Chance (10%) of Higher Snowfall" along with an "Official Forecast Amount." Winter weather coordination calls with partners and customers frequently involve requests regarding forecast uncertainty, forecaster confidence, and best/worst case scenarios. These experimental probabilistic snowfall products will convey this critical information and enhance DSS. These probabilistic products were initially introduced to the WFO Washington DC/Baltimore emergency management community during the winter of 2012/2013 with overwhelmingly favorable feedback. Additional expansion has occurred each winter since, and during 2017/2018 a total of 81 WFOs in all four CONUS regions will participate and 64 offices will display the images on their websites and use them externally in partner briefings and social media.

d. Audience - The target audiences for this experimental product are customers and partners such as emergency managers, state and local officials including School Superintendents, DOT, media and the general public. The forecast offices involved for the 2017-18 winter experiment include: Aberdeen, SD, Albany, NY, Albuquerque, NM, Atlanta, GA, Baltimore, MD-Washington, DC, Binghamton, NY, Bismarck, ND, Blacksburg, VA, Boulder, CO, Buffalo, NY Burlington, VT, Caribou, ME, Charleston, SC, Charleston, WV, Cheyenne, WY, Chicago, IL, Cleveland, OH, Columbia, SC, Detroit, MI, Des Moines, IA, Dodge City, KS, Duluth, MN, Eastern North Dakota, Elko, NV, Flagstaff, AZ, Gaylord, MI, Glasgow, MT, Goodland, KS, Grand Junction, CO, Grand Rapids, MI, Gray, ME, Great Falls, MT, Green Bay, WI, Greenville/Spartanburg, SC, Hanford, CA, Hastings, NE, Indianapolis, IN, Jackson, KY, Jackson, MS, Kansas City, MO, LaCrosse, WI, Lincoln, IL, Louisville, KY, Lubbock, TX, Marquette, MI, Medford, OR, Milwaukee, WI, Minneapolis, MN, Missoula, MT, Morristown, TN, Mt. Holly, NJ, Newport/Morehead City, NC, New York, NY, Norman, OK, North Platte, NE, Northern Indiana, Omaha/Valley NE, Paducah, KY, Pendleton, OR, Pittsburgh, PA, Pueblo, CO, Raleigh, NC, Rapid City, SD, Reno, NV, Riverton, WY, Sacramento, CA, Salt Lake City, UT, San Diego, CA, Seattle, WA, Sioux Falls, SD, Spokane, WA, Springfield, MO, St. Louis, MO, State College, PA, Taunton, MA, Topeka, KS,

Tulsa, OK, Quad Cities IA/IL, Wakefield, VA, Wichita, KS, Wilmington, NC, Wilmington, OH.

The following offices will display the data on their web pages:

Aberdeen, SD:	http://www.weather.gov/abr/winter
Albany, NY:	http://www.weather.gov/aly/winter
Albuquerque, NM:	http://www.weather.gov/abq/winter
Atlanta, GA:	http://www.weather.gov/ffc/winter
Baltimore,MD-Washington, DC:	http://www.weather.gov/lwx/winter
Binghamton, NY:	http://www.weather.gov/bgm/winter
Bismarck, ND:	http://www.weather.gov/bis/winter
Blacksburg, VA:	http://www.weather.gov/rnk/winter
Boulder, CO:	http://www.weather.gov/bou/winter
Burlington, VT:	http://www.weather.gov/btv/winter
Caribou, ME:	http://www.weather.gov/car/winter
Charleston, SC:	http://www.weather.gov/chs/winter
Charleston, WV:	http://www.weather.gov/rlx/winter
Cheyenne, WY:	http://www.weather.gov/cys/winter
Chicago, IL:	http://www.weather.gov/lot/winter
Columbia, SC:	http://www.weather.gov/cae/winter
Detroit, MI:	http://www.weather.gov/dtx/winter
Des Moines, IA:	http://www.weather.gov/dmx/winter
Dodge City, KS:	http://www.weather.gov/ddc/winter
Duluth, MN:	http://www.weather.gov/dlh/winter
Eastern North Dakota:	http://www.weather.gov/fgf/winter
Gaylord, MI:	http://www.weather.gov/apx/winter
Goodland, KS:	http://www.weather.gov/gld/winter
Grand Junction, CO:	http://www.weather.gov/gjt/winter
Grand Rapids MI:	http://www.weather.gov/grr/winter
Gray, ME:	http://www.weather.gov/gyx/winter
Green Bay, WI:	http://www.weather.gov/grb/winter
Greenville/Spartanburg, SC:	http://www.weather.gov/gsp/winter
Hastings, NE:	http://www.weather.gov/gid/winter
Indianapolis, IN:	http://www.weather.gov/ind/winter
Jackson, KY:	http://www.weather.gov/jkl/winter
Kansas City, MO :	http://www.weather.gov/eax/winter
LaCrosse, WI:	http://www.weather.gov/arx/winter
Lincoln, IL:	http://www.weather.gov/ilx/winter
Louisville, KY:	http://www.weather.gov/lmk/winter
Lubbock, TX:	http://www.weather.gov/lub/winter
Marquette, MI:	http://www.weather.gov/mqt/winter
Milwaukee, WI:	http://www.weather.gov/mkx/winter
Minneapolis, MN:	http://www.weather.gov/mpx/winter
Mt. Holly, NJ:	http://www.weather.gov/phi/winter
New York, NY:	http://www.weather.gov/okx/winter
Newport/Morehead City, NC:	http://www.weather.gov/mhx/winter
Norman, OK:	http://www.weather.gov/oun/winter
North Platte, NE:	http://www.weather.gov/lbf/winter
Northern Indiana:	http://www.weather.gov/iwx/winter
Omaha/Valley NE:	http://www.weather.gov/oax/winter
Paducah, KY:	http://www.weather.gov/pah/winter
Pittsburgh, PA:	http://www.weather.gov/pbz/winter
Pueblo, CO:	http://www.weather.gov/pub/winter
Quad Cities, IL:	http://www.weather.gov/dvn/winter
Raleigh, NC:	http://www.weather.gov/rah/winter
Rapid City, SD:	http://www.weather.gov/unr/winter

Reno, NV:	http://www.weather.gov/rev/winter
Riverton, WY:	http://www.weather.gov/riw/winter
St. Louis, MO:	http://www.weather.gov/lsx/winter
Sioux Falls, SD:	http://www.weather.gov/fsd/winter
Springfield, MO:	http://www.weather.gov/sgf/winter
State College, PA:	http://www.weather.gov/ctp/winter
Taunton, MA:	http://www.weather.gov/box/winter
Topeka, KS:	http://www.weather.gov/top/winter
Tulsa, OK:	http://www.weather.gov/tsa/winter
Wakefield, VA:	http://www.weather.gov/akq/winter
Wichita, KS:	http://www.weather.gov/ict/winter
Wilmington, NC:	http://www.weather.gov/ilm/winter
Wilmington, OH:	http://www.weather.gov/iln/winter

e. Presentation Format – The format for the first probabilistic snowfall graphic is: Low End Amount - 9 in 10 Chance (90%) of Higher Snowfall, Official Forecast, High End Amount - Only a 1 in 10 Chance (10%) of Higher Snowfall. The second graphic shows snowfall threshold amounts in whole inches with color curve probabilities from zero to 100 percent; the third product is a text-based range probability/exceedance probability table for specific locations. Please see examples in Part II.

f. Feedback Method – Feedback will be gathered from representatives from federal, state, county, and local government agencies and broadcast media during scheduled customer review meetings and via a web-based survey linked to the product page:

www.nws.noaa.gov/survey/nws-survey.php?code=NWS/PSTS/FY16

Customer comments or questions on the Probabilistic Snowfall products may be addressed to:

Jeff Waldstreicher
National Weather Service (NWS) Eastern Region HQ
E-mail:Jeff.waldstreicher@noaa.gov
Phone: 631-244-0131

Derek Deroche
National Weather Service (NWS) Central Region HQ
E-mail: derek.deroche@noaa.gov
Phone: 816-268-3145

Walt Zaleski
National Weather Service (NWS) Southern Region HQ
E-mail: Walt.Zaleski@noaa.gov
Phone: 817-978-1100 x106

Steve Apfel
National Weather Service (NWS) Western Region HQ
E-mail: Steven.Apfel@noaa.gov
Phone:801-524-5137x260

Dave Soroka
National Weather Service (NWS) Headquarters
E-mail: David.Soroka@noaa.gov

Phone: 301-427-9346

The customer comment period runs from approximately Dec 1, 2017 through April 30, 2018.

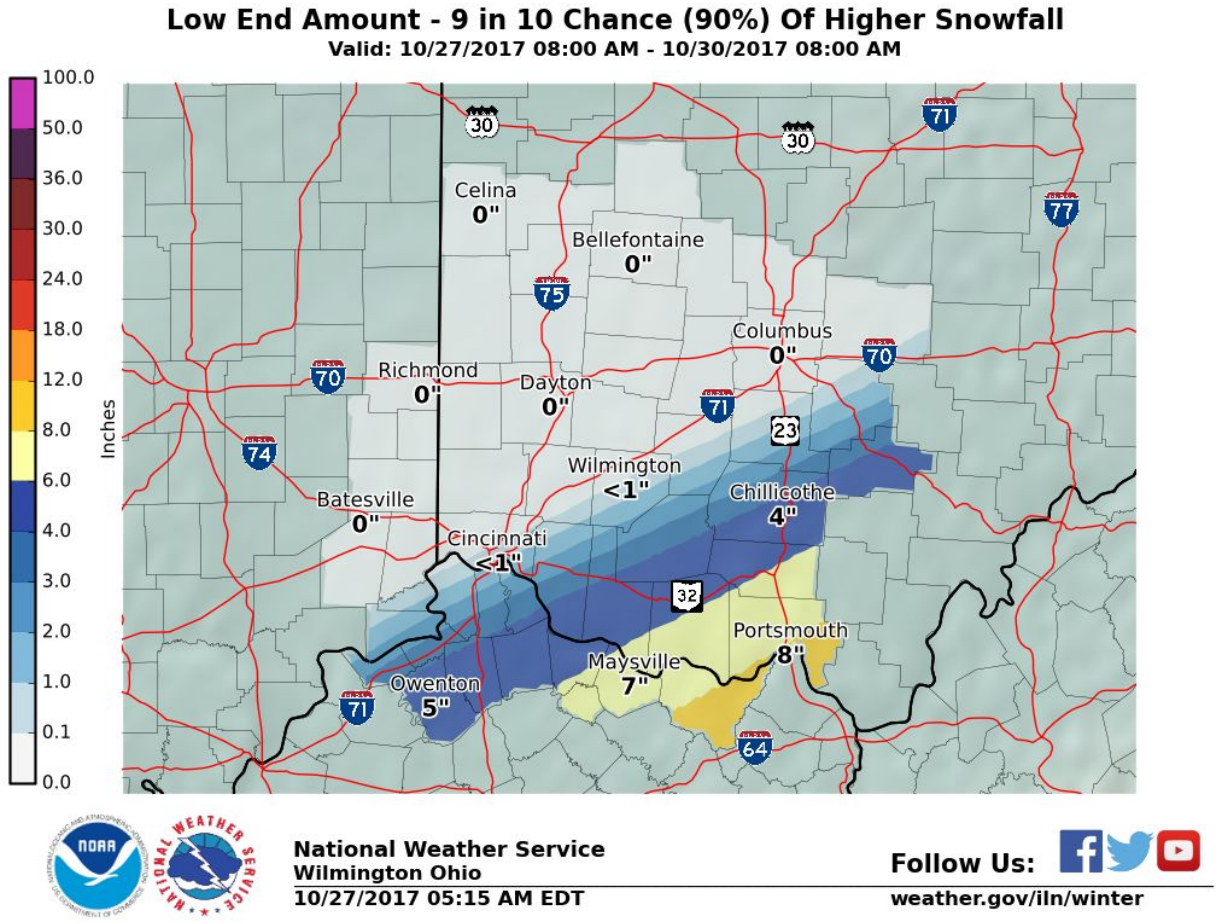
Part II – Technical Description

a. Format and Science Basis – The format is described in Part I under "Presentation Format." A 46 member multi-model ensemble will serve as the basis for computing the 5^{th}, 10^{th}, 25^{th}, 50^{th}, 75^{th}, 90^{th} and 95^{th} percentile boundaries of expected accumulation, with forecasters adjusting the most likely snowfall amount based on experience. A probability density function (PDF) will be created automatically based on these eight reference points, with range interval and exceedance probabilities derived from the PDF.

b. Availability – These products will be available at all times during the winter season.

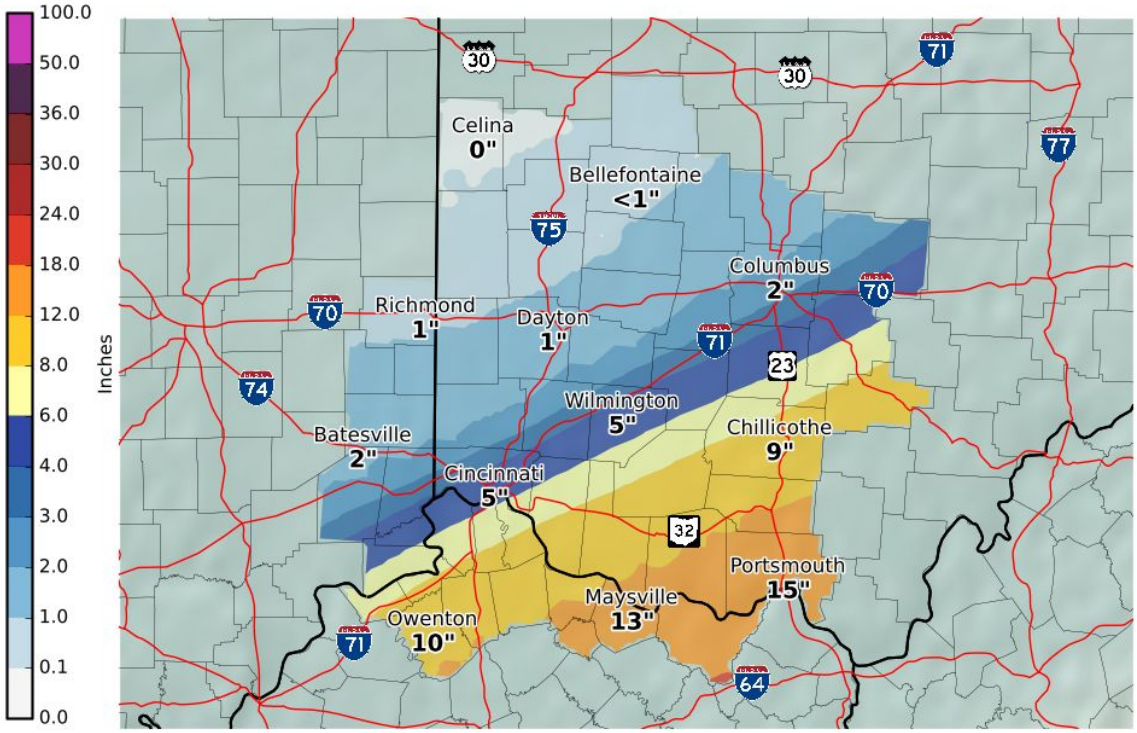
Probabilistic Storm Total Snowfall Product examples:

1. The graphics below depict the Low End Amount, Expected Snowfall (Official Forecast), and High End Amount in the mid Ohio Valley region for a particular event.



Expected Snowfall - Official NWS Forecast

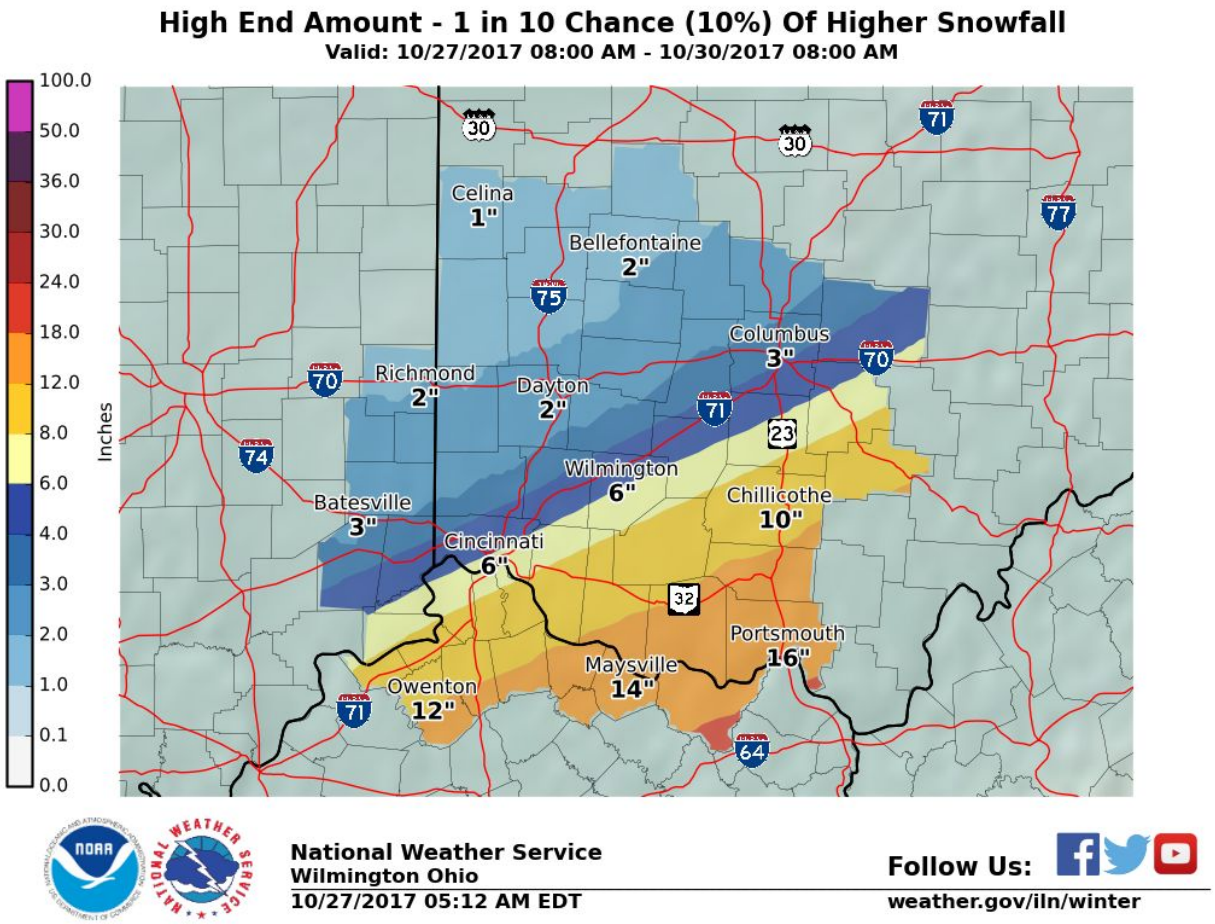
Valid: 10/27/2017 05:00 PM - 10/28/2017 11:00 PM



National Weather Service
Wilmington Ohio
10/27/2017 05:06 AM EDT

Follow Us:

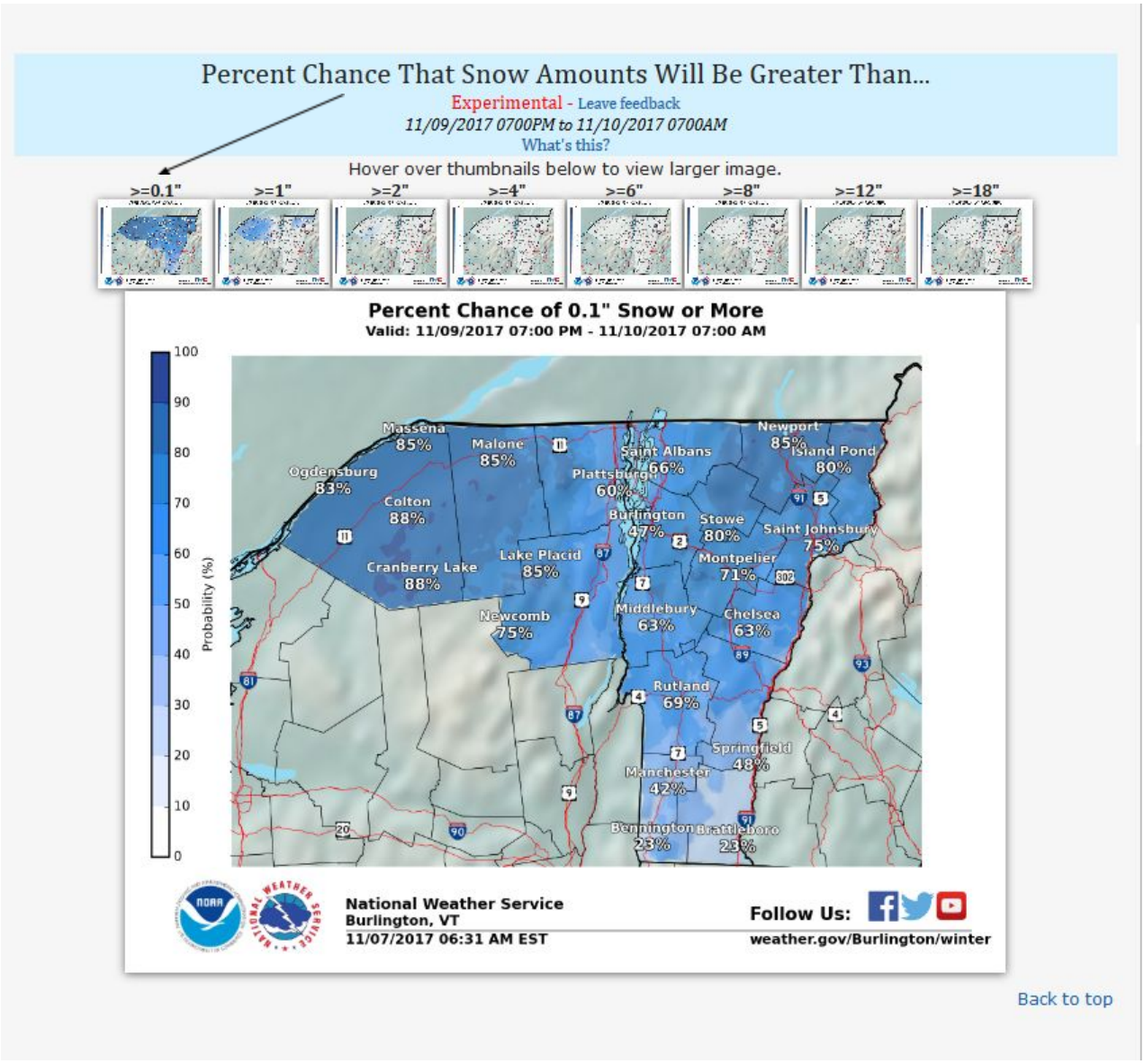
weather.gov/iln/winter



A description of each of these graphics will be available by clicking on the link, and a pop-up window will appear with the descriptive text for that graphic/section.

A wide range between minimum and maximum snow amounts indicates large uncertainty in the forecast. Conversely, a narrow range indicates high confidence in the forecast.

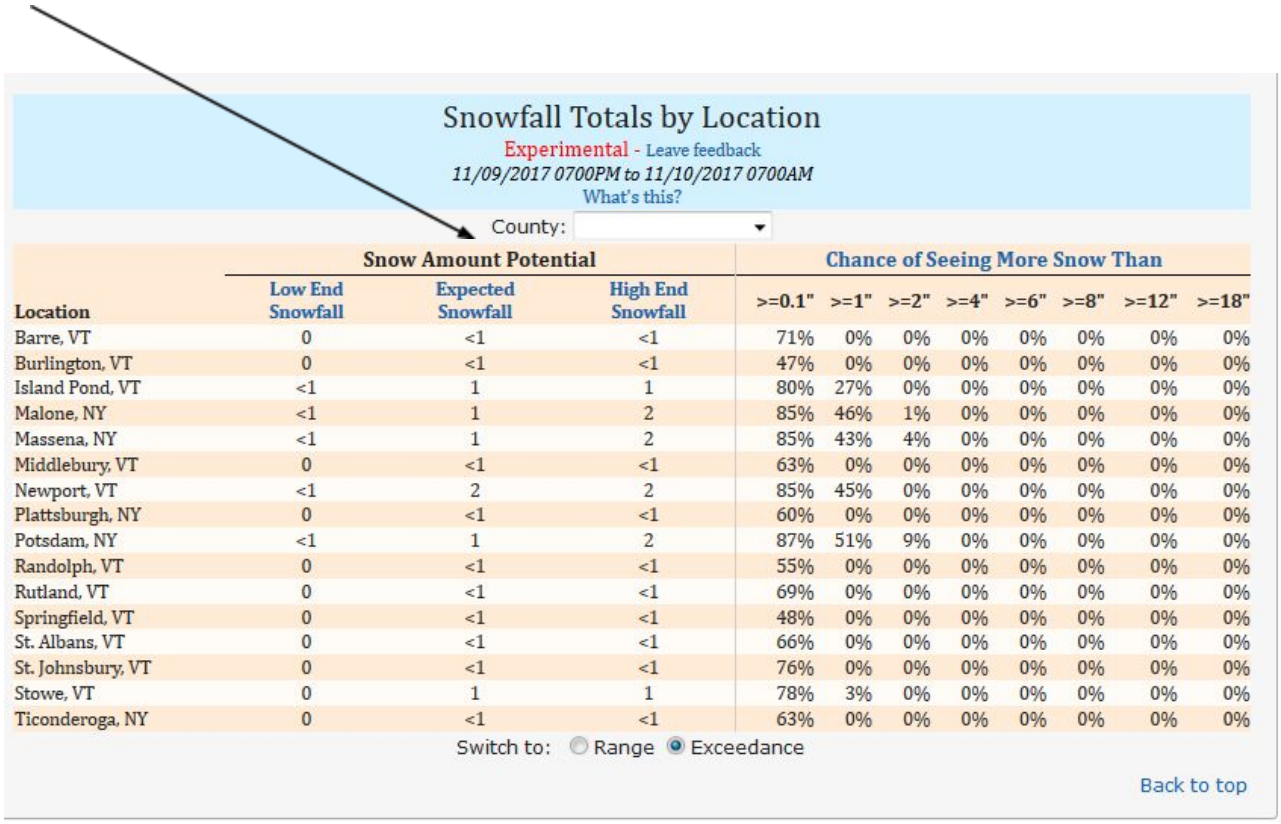
2. The next graphic shows the probabilities of exceeding certain snowfall threshold amounts in whole inches with color curve probabilities from zero to 100 percent in northern NY and VT.



In this example, clicking on the thumbnail picture with the >= .1" threshold at the top displays an enlarged image of that frame below, for the period ending at 7 AM November 10, 2017.

3. The final product is a text-based exceedance probability table for cities in upstate New York and Vermont:

Select County:



Snowfall Totals by Location

Experimental - Leave feedback

11/09/2017 0700PM to 11/10/2017 0700AM

What's this?

County:

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"
Barre, VT	0	<1	<1	71%	0%	0%	0%	0%	0%	0%	0%
Burlington, VT	0	<1	<1	47%	0%	0%	0%	0%	0%	0%	0%
Island Pond, VT	<1	1	1	80%	27%	0%	0%	0%	0%	0%	0%
Malone, NY	<1	1	2	85%	46%	1%	0%	0%	0%	0%	0%
Massena, NY	<1	1	2	85%	43%	4%	0%	0%	0%	0%	0%
Middlebury, VT	0	<1	<1	63%	0%	0%	0%	0%	0%	0%	0%
Newport, VT	<1	2	2	85%	45%	0%	0%	0%	0%	0%	0%
Plattsburgh, NY	0	<1	<1	60%	0%	0%	0%	0%	0%	0%	0%
Potsdam, NY	<1	1	2	87%	51%	9%	0%	0%	0%	0%	0%
Randolph, VT	0	<1	<1	55%	0%	0%	0%	0%	0%	0%	0%
Rutland, VT	0	<1	<1	69%	0%	0%	0%	0%	0%	0%	0%
Springfield, VT	0	<1	<1	48%	0%	0%	0%	0%	0%	0%	0%
St. Albans, VT	0	<1	<1	66%	0%	0%	0%	0%	0%	0%	0%
St. Johnsbury, VT	0	<1	<1	76%	0%	0%	0%	0%	0%	0%	0%
Stowe, VT	0	1	1	78%	3%	0%	0%	0%	0%	0%	0%
Ticonderoga, NY	0	<1	<1	63%	0%	0%	0%	0%	0%	0%	0%

Switch to: Range Exceedance

Back to top

Selecting a county displays a list of specific cities within that county and shows the probability of snow amounts exceeding a particular threshold for each location.

The table can be switched to portray the probability of snow amounts falling within specific range bins as well, as shown below:

Snowfall Totals by Location

Experimental - Leave feedback

11/09/2017 0700PM to 11/10/2017 0700AM

What's this?

County:

Location	Snow Amount Potential			Chance of Snow Within These Ranges								
	Low End Snowfall	Expected Snowfall	High End Snowfall	0"	0.1-1"	1-2"	2-4"	4-6"	6-8"	8-12"	12-18"	>18"
Barre, VT	0	<1	<1	29%	71%	0%	0%	0%	0%	0%	0%	0%
Burlington, VT	0	<1	<1	53%	47%	0%	0%	0%	0%	0%	0%	0%
Island Pond, VT	<1	1	1	20%	53%	27%	0%	0%	0%	0%	0%	0%
Malone, NY	<1	1	2	15%	39%	45%	1%	0%	0%	0%	0%	0%
Massena, NY	<1	1	2	15%	42%	39%	4%	0%	0%	0%	0%	0%
Middlebury, VT	0	<1	<1	37%	63%	0%	0%	0%	0%	0%	0%	0%
Newport, VT	<1	2	2	15%	40%	45%	0%	0%	0%	0%	0%	0%
Plattsburgh, NY	0	<1	<1	40%	60%	0%	0%	0%	0%	0%	0%	0%
Potsdam, NY	<1	1	2	13%	36%	42%	9%	0%	0%	0%	0%	0%
Randolph, VT	0	<1	<1	45%	55%	0%	0%	0%	0%	0%	0%	0%
Rutland, VT	0	<1	<1	31%	69%	0%	0%	0%	0%	0%	0%	0%
Springfield, VT	0	<1	<1	52%	48%	0%	0%	0%	0%	0%	0%	0%
St. Albans, VT	0	<1	<1	34%	66%	0%	0%	0%	0%	0%	0%	0%
St. Johnsbury, VT	0	<1	<1	24%	76%	0%	0%	0%	0%	0%	0%	0%
Stowe, VT	0	1	1	22%	75%	3%	0%	0%	0%	0%	0%	0%
Ticonderoga, NY	0	<1	<1	37%	63%	0%	0%	0%	0%	0%	0%	0%

Switch to: Range Exceedance

Back to top