Preliminary Peak Stage and Streamflow Data at Selected U.S. Geological Survey Streamgages for Flooding in the Central and Southeastern United States during December 2015 and January 2016

Open-File Report 2016–1092

U.S. Department of the Interior
U.S. Geological Survey

Cover. U.S. Geological Survey (USGS) hydrographers and hydrologist making a measurement of streamflow on the Mississippi River at St. Louis, Missouri near the crest of the flood on December 31, 2015. Photograph by Jennifer LaVista, USGS.

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Conversion Factors

U.S. customary units to International System of Units

Multiply	By	To obtain
	Length	
inch (in)	2.54	centimeter (cm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
square mile (mi^2)	259.0	hectare (ha)
square mile (mi^2)	2.590	square kilometer (km^2)
	Flow rate	
foot per second (ft/s)	0.3048	meter per second (m/s)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)

Preliminary Peak Stage and Streamflow Data at Selected U.S. Geological Survey Streamgages for Flooding in the Central and Southeastern United States during December 2015 and January 2016

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Abstract

Flooding occurred in the central and southeastern United States during December 2015 and January 2016. The flooding was the result of more than 20 inches of rain falling in a 19 day period from December 12 to December 31, 2015. U.S. Geological Survey streamgages recorded 23 peaks of record during the subsequent flooding, with a total of 172 streamgages recording peaks that ranked in the top 5 all time for the period of record.

Introduction

Excessive heavy rainfall resulted in major flooding in parts of the central and southeastern United States (fig. 1) during December 2015 and January 2016. During the month of December, there were widespread areas where more than 10 inches of rainfall fell in large parts of the central and southeastern United States with bands of as much as 20 inches of rain in certain locations (fig. 2). The flooding in the southeastern United States was mainly caused by heavy rainfall from December 22 to December 26, 2015, whereas the flooding in the central United States (Mississippi River Basin) was driven by the heavy precipitation occurring from December 27 to December 29, 2015. Total damages from these floods has not been determined at this time (March 2016), but will be in the millions of dollars, particularly in Missouri (fig. 3), which had 16 fatalities caused by flooding and 37 counties and the City of St. Louis declared Federal Disaster Areas (http://www.missourinet.com/2016/02/10/fema-approves-nixons-request-to-expand-missouris-federal-disaster-declaration/, accessed February 10, 2016).

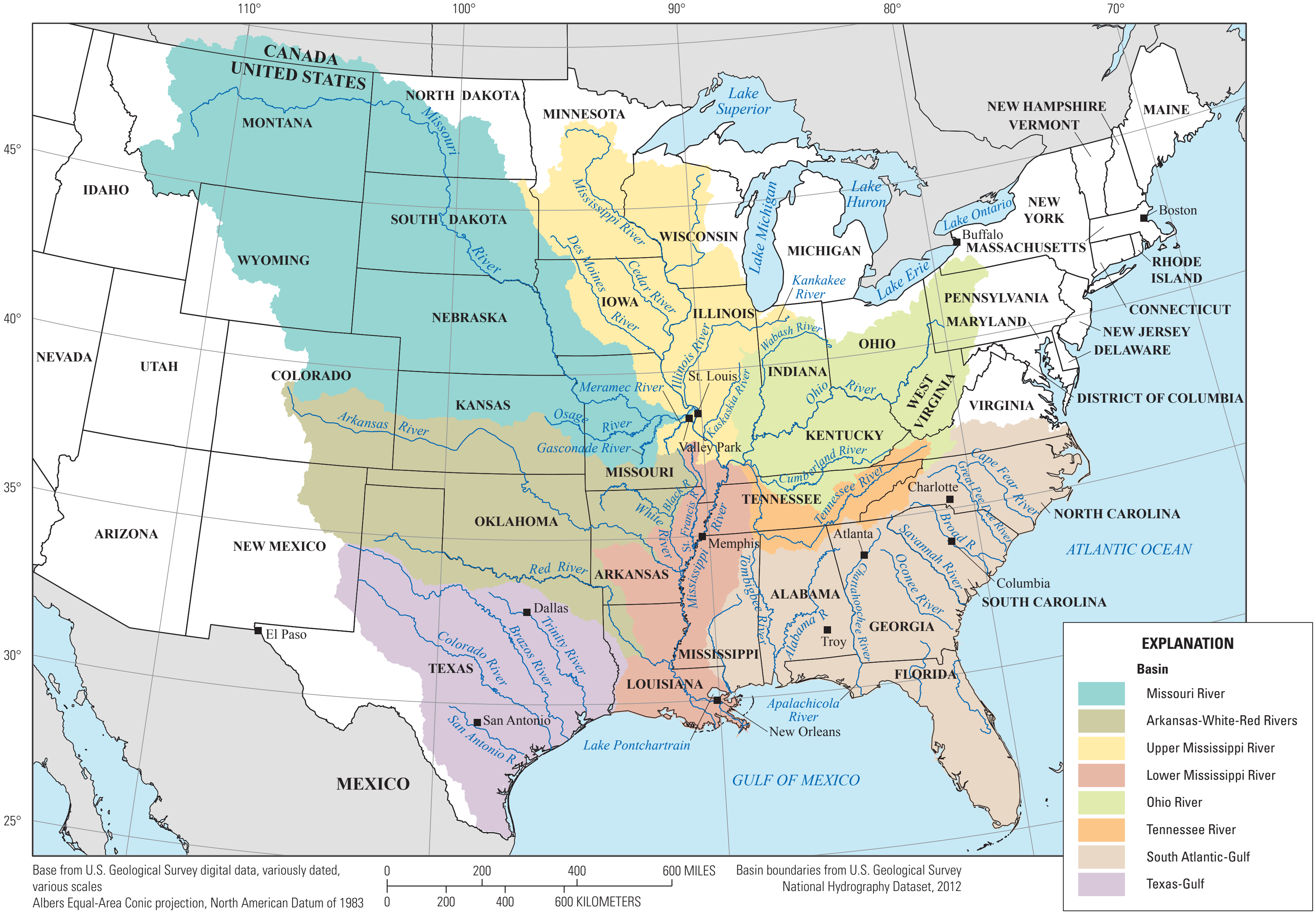
The U.S. Geological Survey (USGS) collects and disseminates streamflow data at more than 8,100 streamgages nationwide. Streamflow data collection serves a variety of purposes including understanding, forecasting, and documenting flooding. Leading up to and during flooding, streamflow data are vital for flood warning, forecasting, and emergency management. The long-term systematic streamflow data are used to mitigate for the impacts of floods in the design or repair of infrastructure (for example, roads, bridges, reservoirs, and pipelines), houses, and buildings.

Purpose and Scope

The purpose of this report is to document the peak streamflows and stages for rivers and streams in the central and southeastern United States impacted by flooding during December 2015 and January 2016. This includes USGS streamgages as well as selected non-USGS streamgages. The flood peak flows are placed into context by ranking each flood peak flow with the annual peak floods for the period of record at each streamgage, as well as historic floods that might precede the systematic records.

Study Area

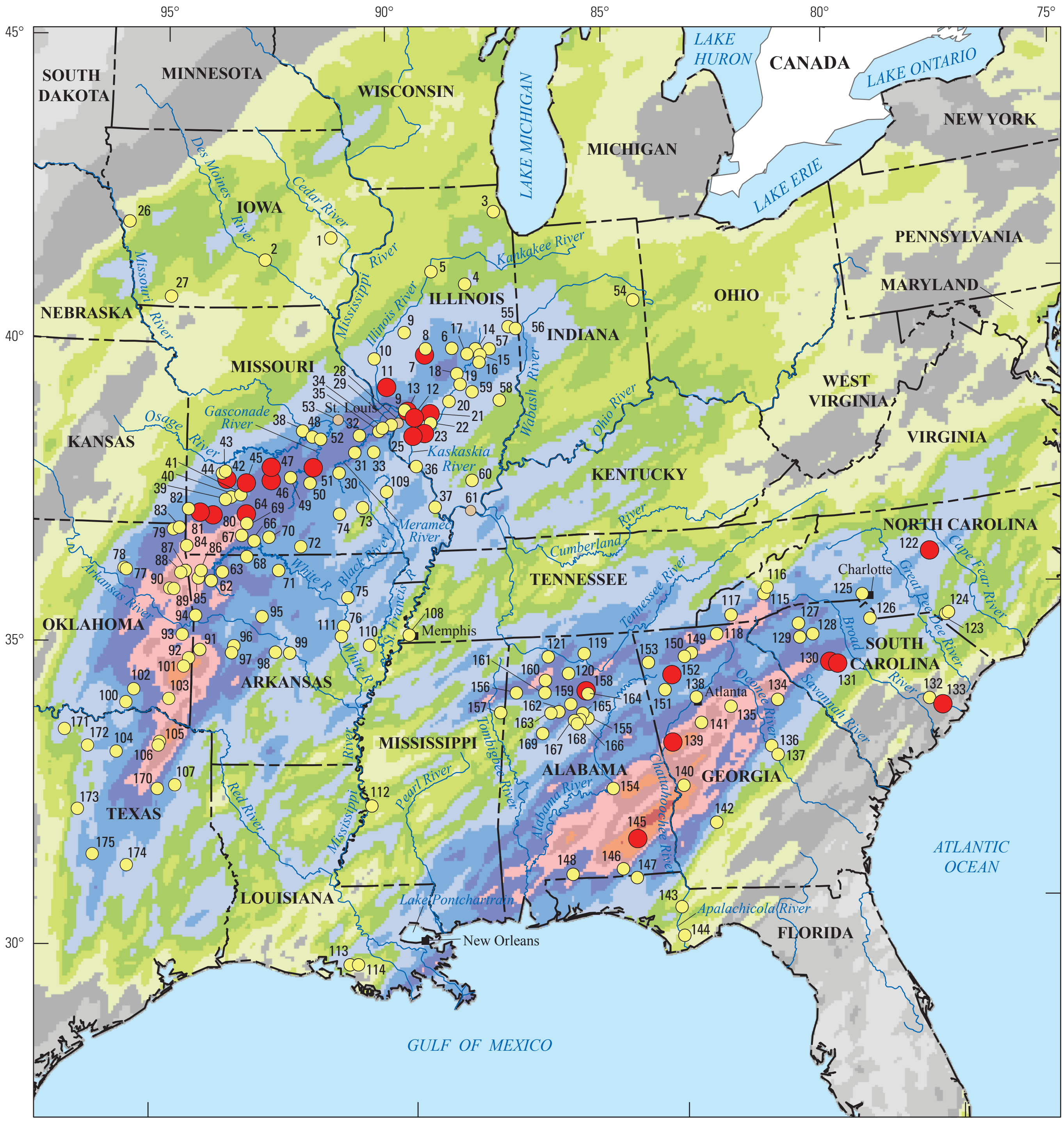
The streamgage data (peak stage and streamflow) documented in this report are located in the Missouri, upper Mississippi, Ohio, lower Mississippi, Arkansas-White-Red, and Tennessee River Basins (fig. 1) along with smaller river basins in eastern Texas that are referred in the report as the Texas-Gulf region and the south and southeast United States that are referred in the report as the South Atlantic-Gulf region (fig. 1). Most of these rivers drain into the Gulf of Mexico, with the remaining rivers in the southeast United States draining into the Atlantic Ocean.



Base from U.S. Geological Survey digital data, variously dated, various scales
Albers Equal-Area Conic projection, North American Datum of 1983

Basin boundaries from U.S. Geological Survey National Hydrography Dataset, 2012

Figure 1. Major river basins in the central and southeast United States along with other selected locations affected by flooding streams in December 2015 and January 2016.



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Universal Transverse Mercator projection, zone15N

0 100 200 MILES
0 100 200 KILOMETERS

Precipitation data from National Oceanic and Atmospheric Administration, National Weather Service, 2015

EXPLANATION

Precipitation, in inches—Interval 1, 2, and 4 inches (National Weather Service, 2015)

0 to 1 | 1 to 2 | 2 to 3 | 3 to 4 | 4 to 5 | 5 to 6 | 6 to 8 | 8 to 10 | 10 to 12 | 12 to 14 | 14 to 16 | 16 to 20 | 20 to 24

Rank of peak streamflow among all peak streamflows in streamgage period of record—Labeled with map site number from table 1

1 | 2 to 5 | Greater than 5

Figure 2. The eastern United States with cumulative rainfall from 7:00 AM, December 12 to 7:00 AM, December 31, 2015, along with selected streamgages with more than 20 years of record that recorded a peak flow in December 2015 or January 2016 ranked in the top 5 in the period of record. (Source: Rainfall data from National Oceanic and Atmospheric Administration 2016a).

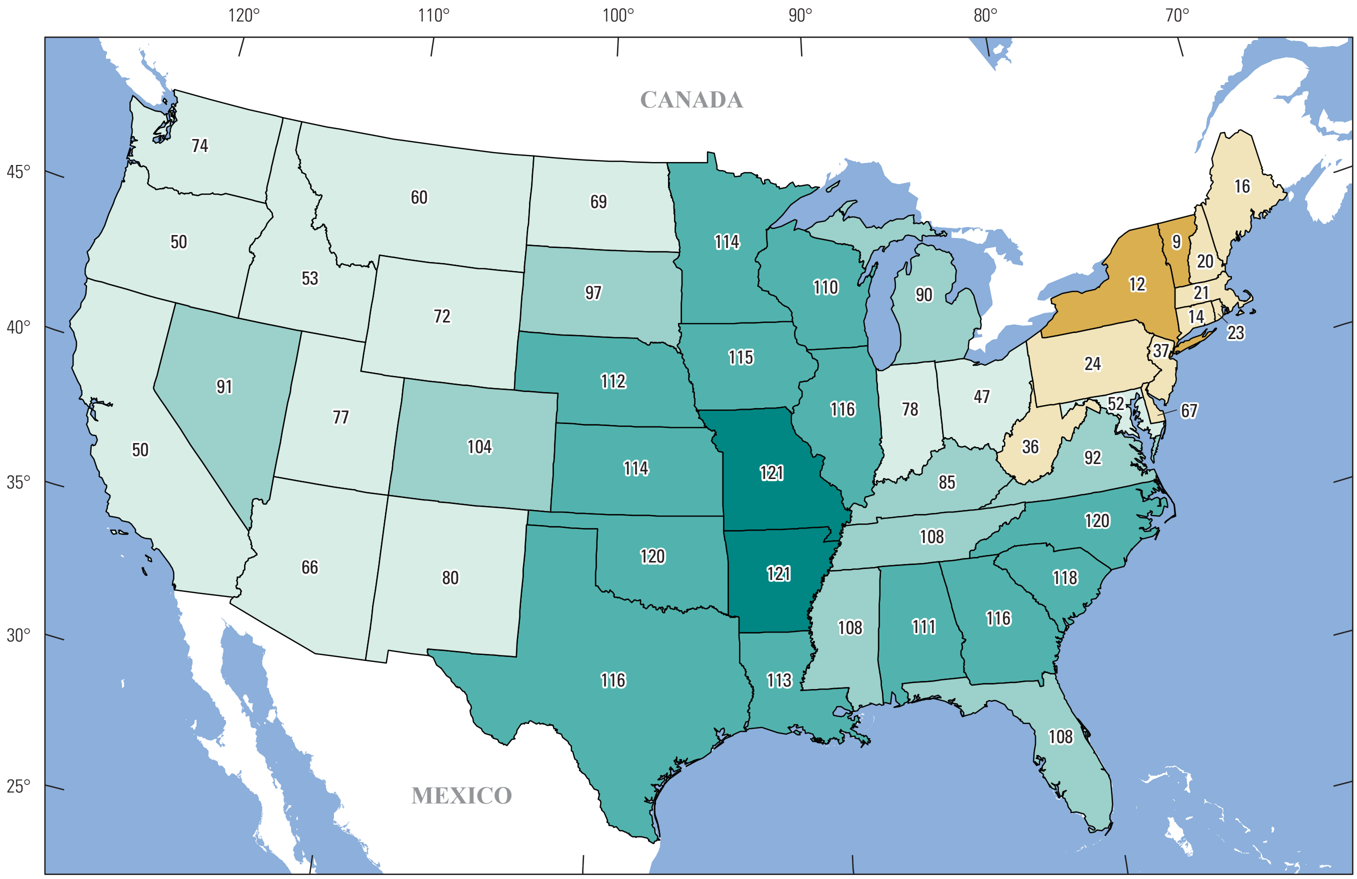
Figure 3. Looking north at flood water from the Meramec River (background) inundating both the east-west Interstate 44 and north-south Highway 141 in Valley Park, Missouri on December 31, 2015. (Photograph source: Civil Air Patrol, 2015).

General Weather Conditions and Precipitation Causing Flooding

November and early to mid-December 2015 saw above average precipitation in a large part of the eastern United States, with November 2015 ranking as the wettest November on record in Arkansas and Missouri (fig. 4) (National Oceanic and Atmospheric Agency, 2016b). As a result of this above average precipitation, streamflow was well above normal conditions at many streamgages leading into the latter part of December 2015 (fig. 5) when the intense rains began, which resulted in most of the major flooding. Over the 19 day period from 7:00 AM December 12 to 7:00 AM December 31, more than 20 inches of rain fell in parts of the central and southeastern United States (fig. 2).

A surface low pressure system located in southeast Iowa on December 21, 2015, moved north into the Great Lakes by December 22, 2015, while the attached cold front was positioned from middle Kentucky and Tennessee to northern Louisiana (figs. 6*A* and 6*B*). A strong push of moist, warm air from the Gulf of Mexico surged ahead of the cold front causing the cold front to become stationary and eventually wash out over central South Carolina, central Georgia, and southeastern Alabama by December 23, 2015 (fig. 6*C*). During this period, the jet stream was meridional (flowing at sharper angles to the latitude lines of the earth or flowing more in a north-south orientation), with persistent flow parallel to the old frontal boundary and provided enough instability at the upper levels of the atmosphere for areas of the southeast to receive precipitation for 4 consecutive days. Two-day precipitation totals for Columbia, South Carolina (December 22–23, 2015) and Atlanta, Georgia (December 23–24, 2015) were 4.19 inches and 5.19 inches of rain, respectively, while Troy, Alabama received a total of 7.66 inches of rain December 22–24, 2015.

By December 24, 2015 (fig. 6*D*), the jet stream became slightly more zonal (flowing more parallel to the latitude lines of the earth or flowing more in an east-west orientation) and a new surface low pressure center developed in eastern Kansas, which ushered in a new push of cold air that moved southeast, setting up another frontal boundary that stretched into the southeast United States. To the southeast of this frontal boundary, the flow of warm air to the north continued, where Boston, Massachusetts, recorded a high temperature of 69 Fahrenheit on Christmas Eve, while heavy rain fell in western Virginia, western North and South Carolina and northern Georgia. As



Base from U.S. Geological Survey digital data,
variously dated, various scales
Albers Equal-Area Conic projection

0 200 400 600 MILES
0 200 400 600 KILOMETERS

Precipitation data from National Aeronautic
and Atmospheric Administration, 2015

EXPLANATION

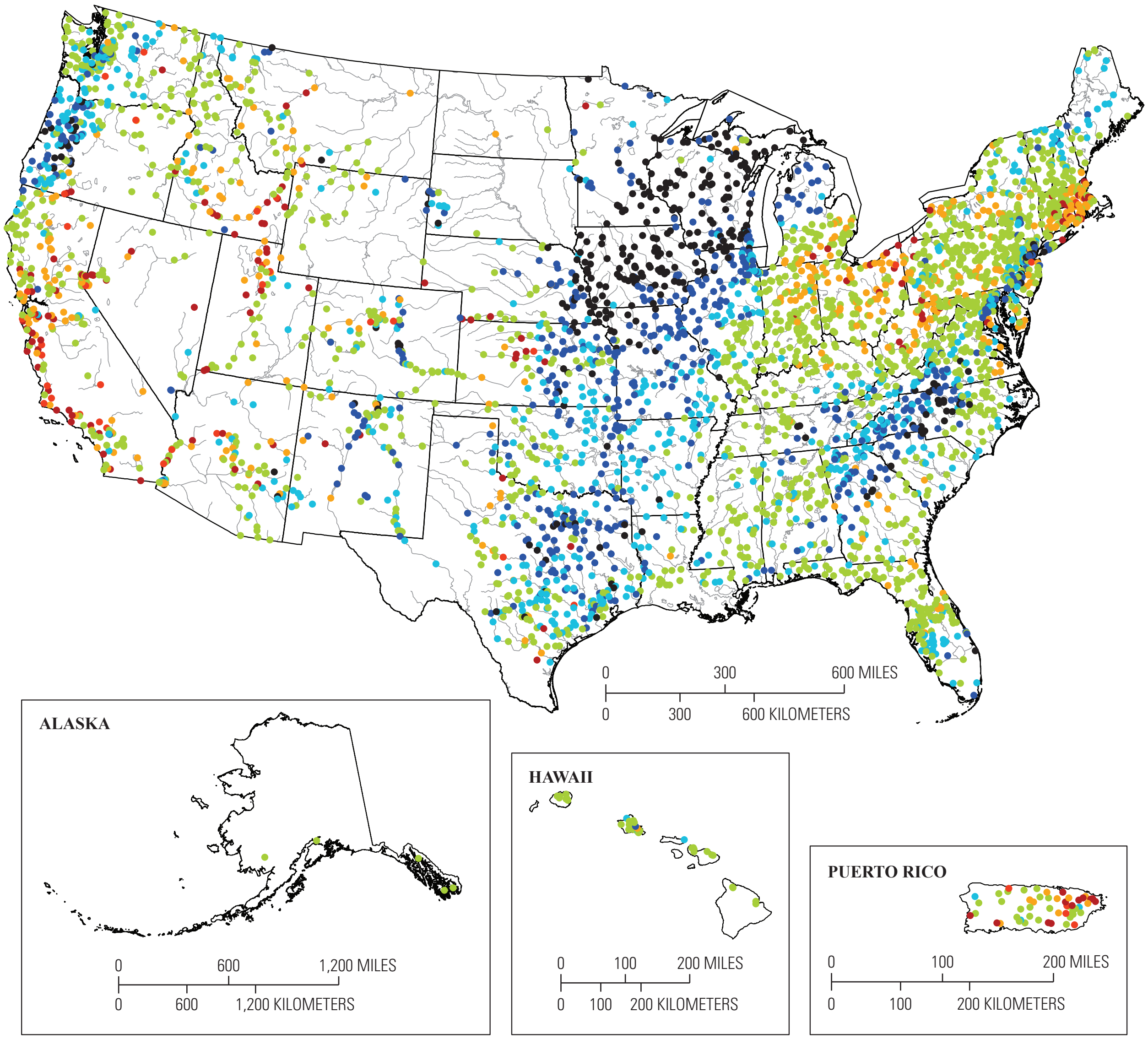
Statewide precipitation rank

- Record wettest (121)
- Much above average
- Above average
- Near average
- Below average
- Much below average

Figure 4. Statewide precipitation ranks for November 2015 (National Oceanic and Atmospheric Administration, 2016b).

the frontal system, originating on December 24, 2015, stalled once again, another low pressure system, centered in north central Arizona on Christmas Day, 2015 (fig. 6*E*) intensified and moved into western Texas and southern New Mexico by December 26, 2015 (fig. 6*F*). A frontal boundary located from northern Louisiana through central Kentucky on December 24–26 and ahead of the low pressure, was aided by deep moisture from the Gulf of Mexico to produce heavy rain. Rain amounts recorded on at 7:00 AM Central Time on December 26, 2015, over northern Alabama were as much as 6 inches more than the previous 24-hour period, with widespread 5-inch amounts over the northern one-third of the State. The upper level low pressure in western Texas and southern New Mexico was cut off from the main upper level flow around December 26 and continued to move slowly east across Texas over the next 24 hours, while a surface stationary front established itself from San Antonio, Texas, northeastward to Buffalo, New York. A series of surface low pressure systems rode along the stationary boundary for approximately the next 36 hours (fig. 6*F*–6*G*).

Ahead of the stationary front, a direct flow of warm moist air at the Earth's surface stretching from Texas to Florida clashed with arctic air that extended below the southern border of the United States. Additionally, the upper level low, already cut off from the main atmospheric flow, was being fueled by the subtropical jet stream that brought in additional moist air at the upper levels from the abnormally warm eastern Pacific Ocean (fig. 7). The differences in these two air masses was dramatic as temperatures were in the low 80s from southern Texas to extreme southern South Carolina, whereas El Paso, Texas, was getting 8 inches of snow and blizzard conditions with drifts as much as 10 feet were prevalent in the Texas panhandle and eastern New Mexico (National Weather Service, 2016b). Severe weather along the diffluent upper level windflow of northeast Texas produced an Enhanced Fujita scale 4 (EF4) tornado that ripped through the Dallas, Texas,



EXPLANATION

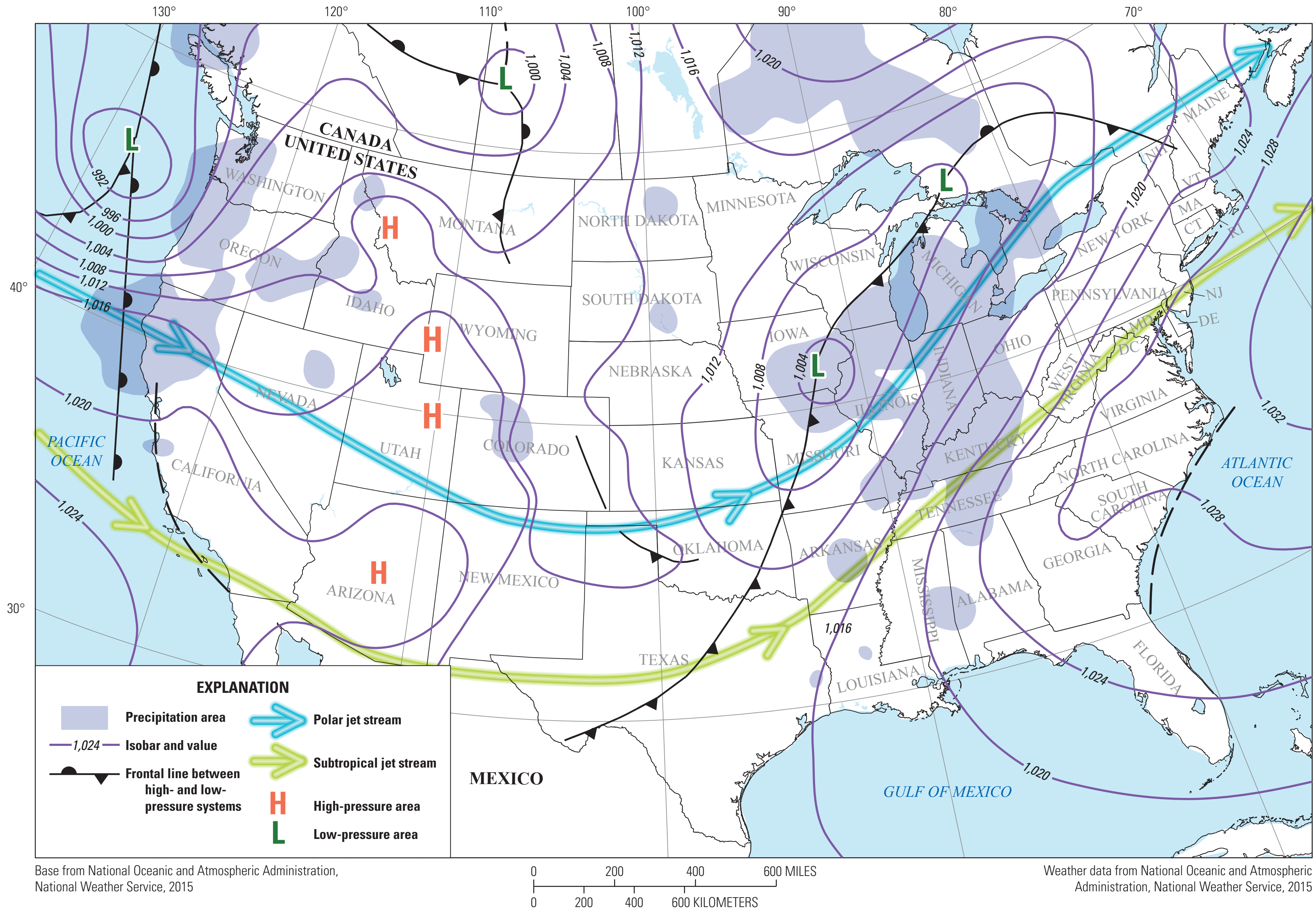
Percentile classes						
Low	Less than 10	10 to 24	25 to 75	76 to 90	Greater than 90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

Figure 5. Streamflow conditions at U.S. Geological Survey streamgages across the United States on December 17, 2015 (U.S. Geological Survey, 2015).

suburbs. Further north, the convergence of warm moist air and arctic air caused torrential rain in northeastern Oklahoma, Missouri, and northwest Arkansas, with areas across southern Missouri receiving 9 to 12 inches of precipitation in less than 48 hours from mid-day December 26 to early morning December 28, 2015. Total rainfall over the 72 hour period from 7:00 AM December 26 to 7:00 AM December 28, 2015, is shown in figure 8.

The arctic air pushed the entire system slowly east so that by the morning of December 29, 2015, the cold front evolving from the stationary front was located from the central panhandle of Florida to western North Carolina (fig. 6*I*). Precipitation amounts of 2 to 3 inches were reported in east central Alabama, west central Georgia through the Atlanta area, and into the mountains of South and North Carolina. For the next 24 to 36 hours, the front became stationary and actually retrograded back west dumping an additional 3 to 4 inches of precipitation over parts of Florida, Alabama, and South Carolina. By January 1, 2016, the colder air eventually pushed the front into central Florida and precipitation finally ended for the southeastern States.

A. December 21, 2015

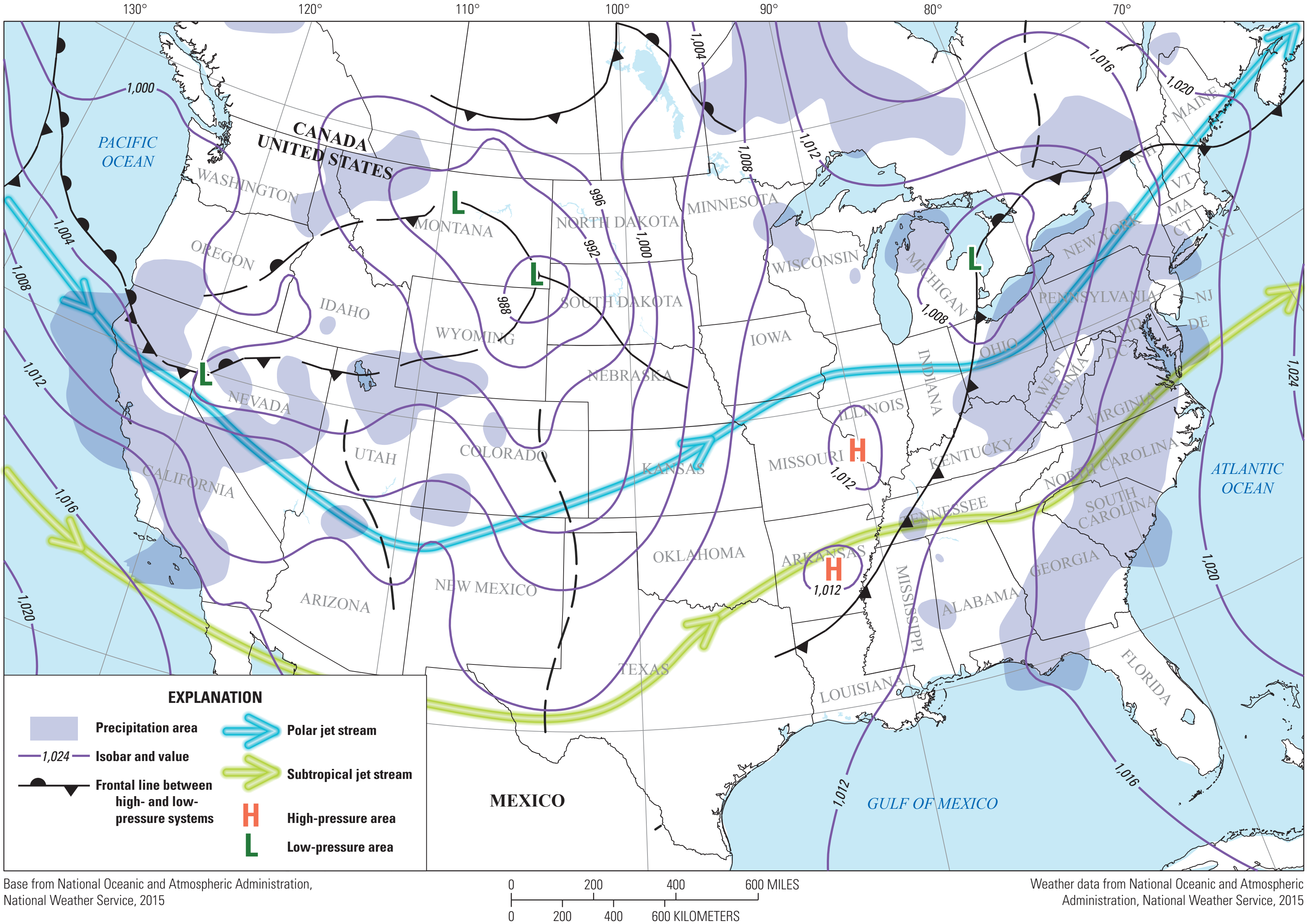


Base from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Weather data from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Figure 6. Daily surface weather maps at 7:00 AM Eastern Standard Time from December 21 to December 29, 2015 (National Oceanic and Atmospheric Administration, 2016c).

B. December 22, 2015

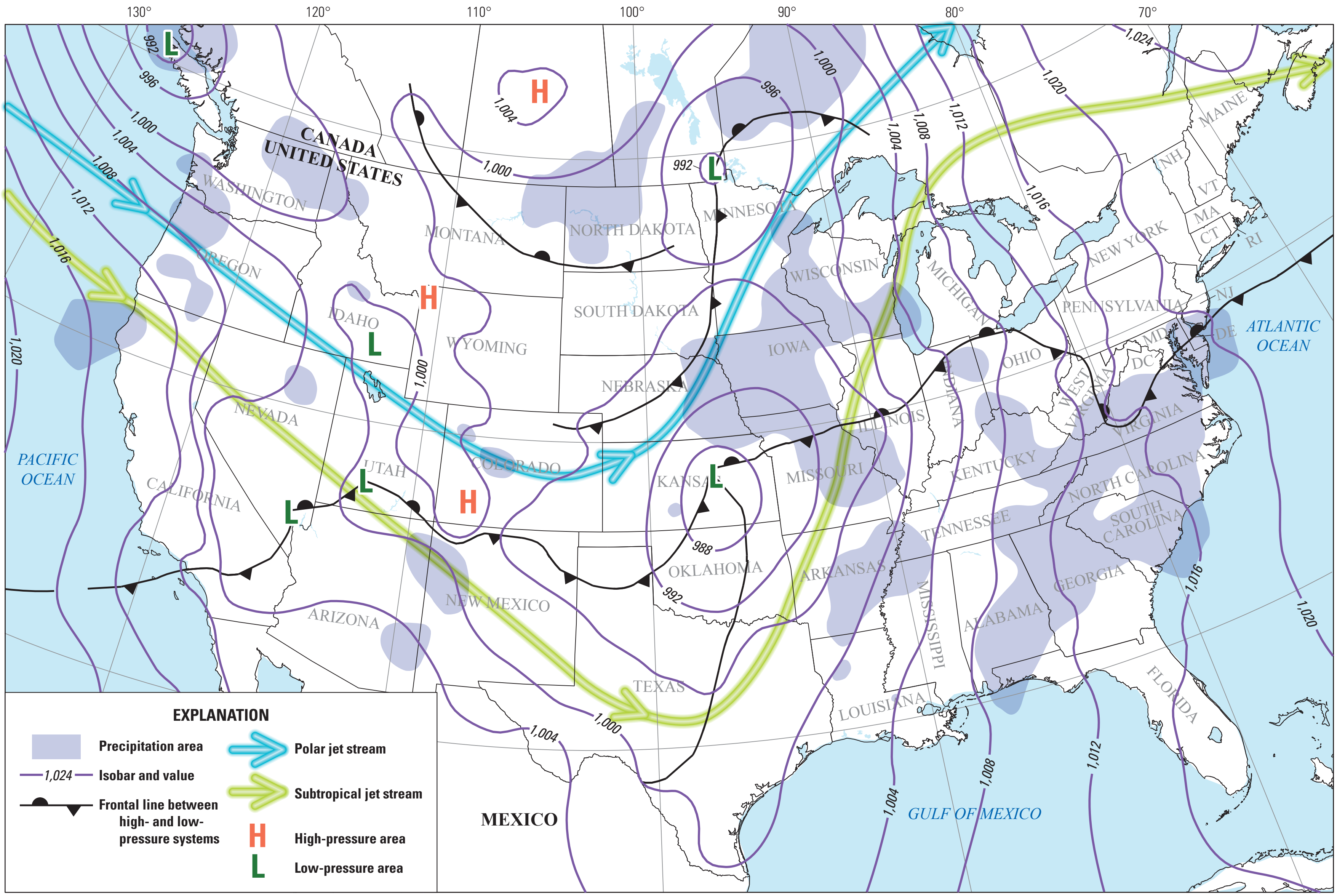


Base from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Weather data from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Figure 6. Daily surface weather maps at 7:00 AM Eastern Standard Time from December 21 to December 29, 2015 (National Oceanic and Atmospheric Administration, 2016c).—Continued.

C. December 23, 2015



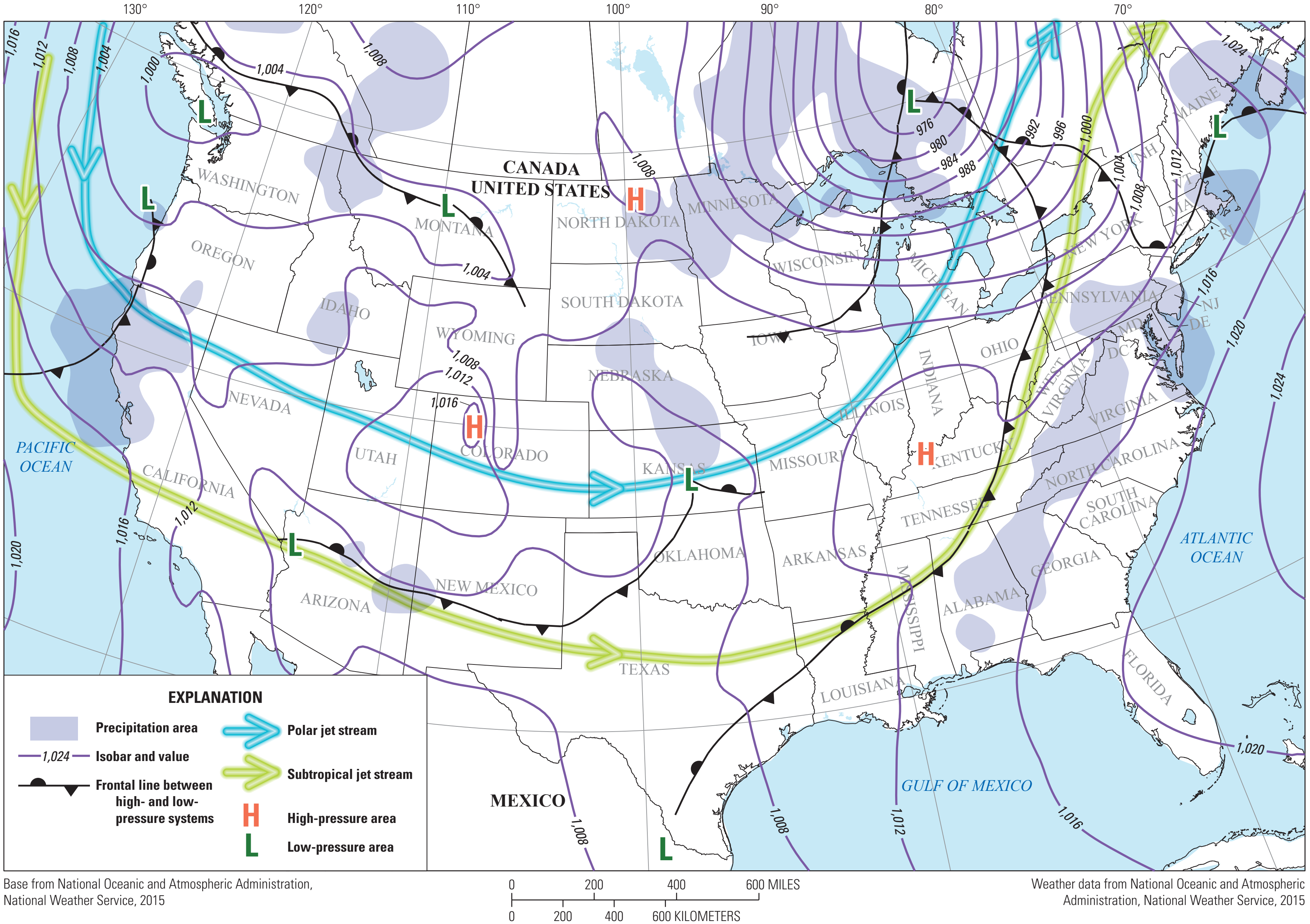
Base from National Oceanic and Atmospheric Administration, National Weather Service, 2015

0 200 400 600 MILES
0 200 400 600 KILOMETERS

Weather data from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Figure 6. Daily surface weather maps at 7:00 AM Eastern Standard Time from December 21 to December 29, 2015 (National Oceanic and Atmospheric Administration, 2016c).—Continued.

D. December 24, 2015

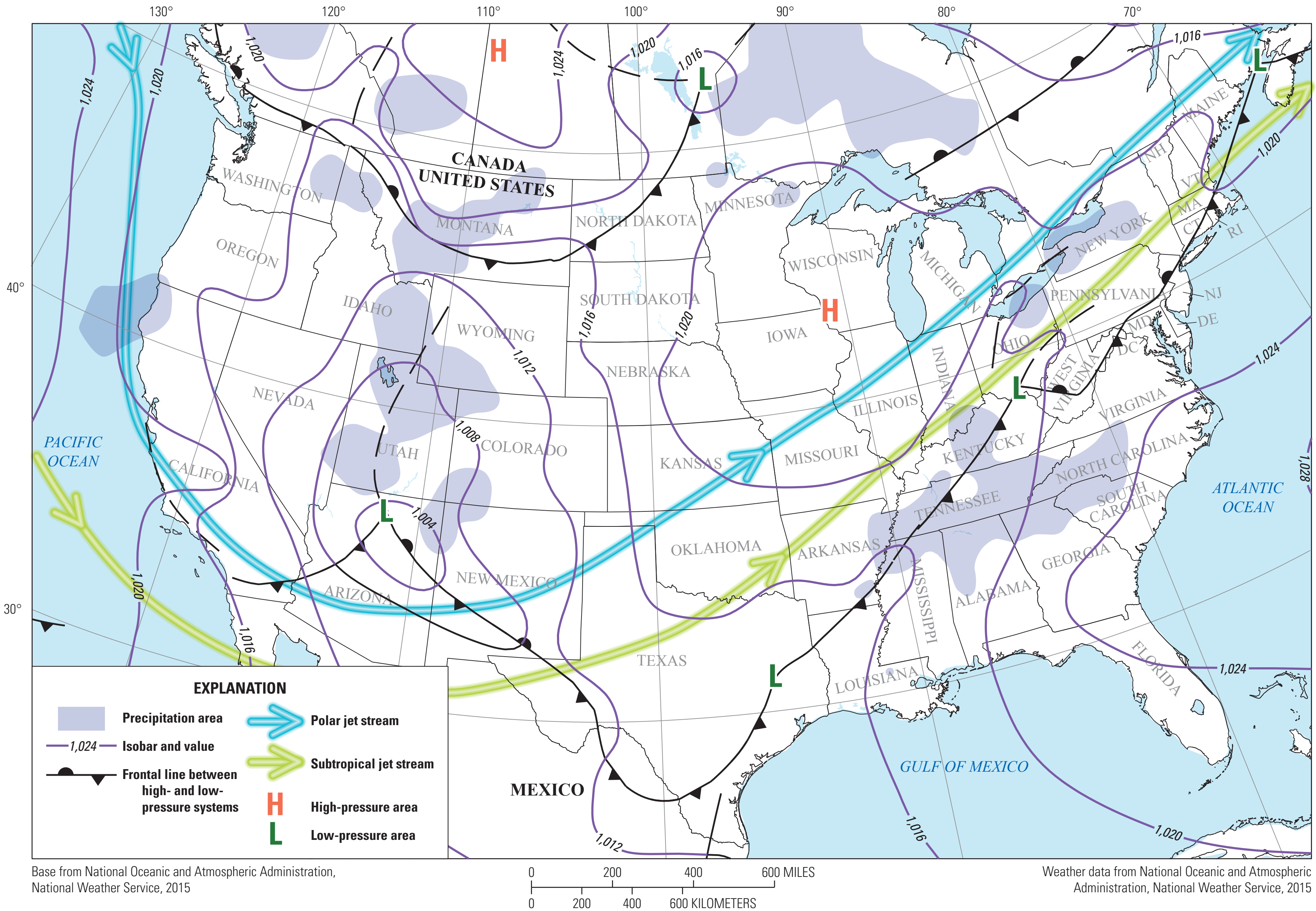


Base from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Weather data from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Figure 6. Daily surface weather maps at 7:00 AM Eastern Standard Time from December 21 to December 29, 2015 (National Oceanic and Atmospheric Administration, 2016c).—Continued.

E. December 25, 2015

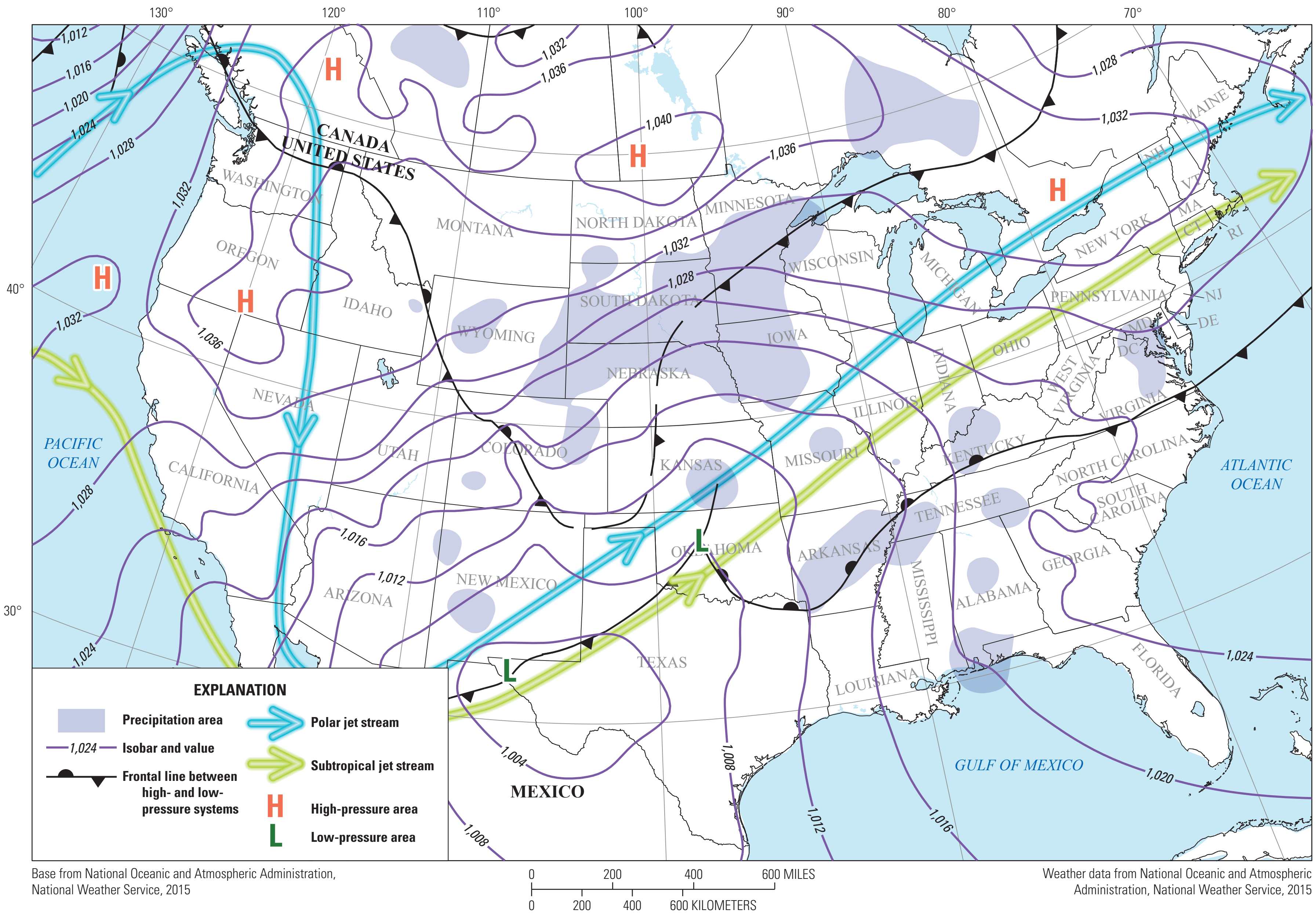


Base from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Weather data from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Figure 6. Daily surface weather maps at 7:00 AM Eastern Standard Time from December 21 to December 29, 2015 (National Oceanic and Atmospheric Administration, 2016c).—Continued.

F. December 26, 2015

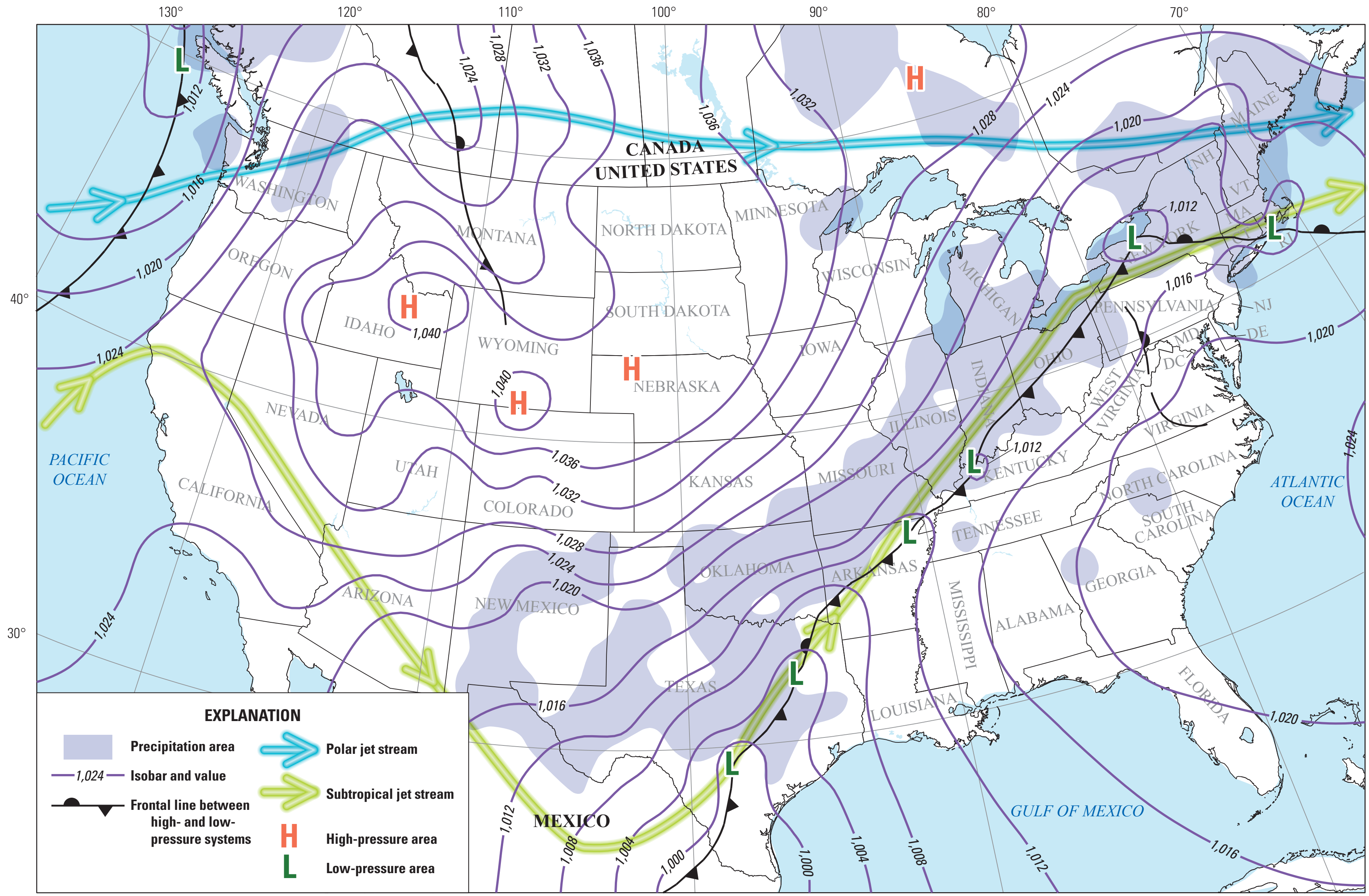


Base from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Weather data from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Figure 6. Daily surface weather maps at 7:00 AM Eastern Standard Time from December 21 to December 29, 2015 (National Oceanic and Atmospheric Administration, 2016c).—Continued.

G. December 27, 2015

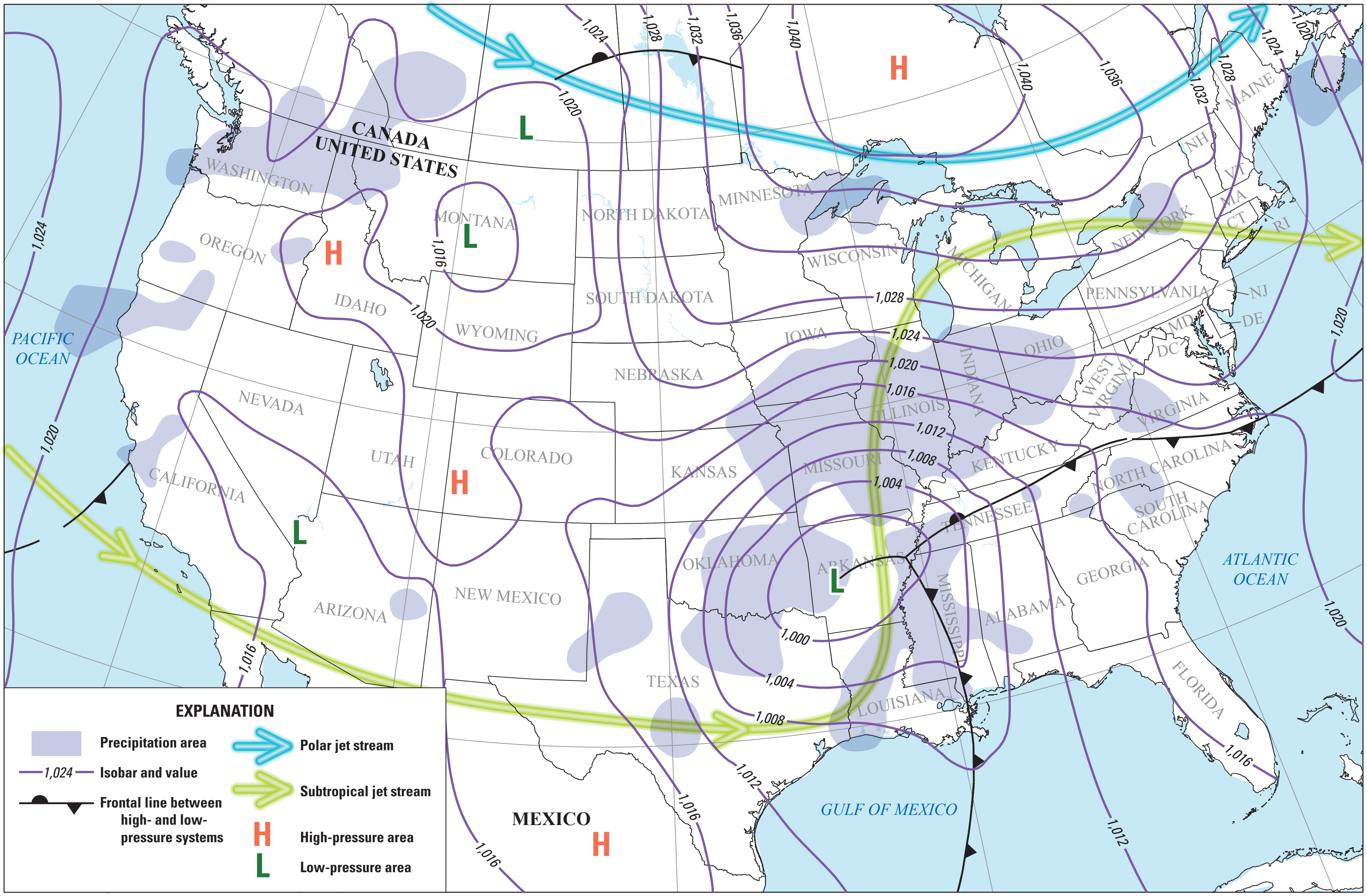


Base from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Weather data from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Figure 6. Daily surface weather maps at 7:00 AM Eastern Standard Time from December 21 to December 29, 2015 (National Oceanic and Atmospheric Administration, 2016c).—Continued.

H. December 28, 2015



Base from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Weather data from National Oceanic and Atmospheric Administration, National Weather Service, 2015

Figure 6. Daily surface weather maps at 7:00 AM Eastern Standard Time from December 21 to December 29, 2015 (National Oceanic and Atmospheric Administration, 2016c).—Continued.

I. December 29, 2015

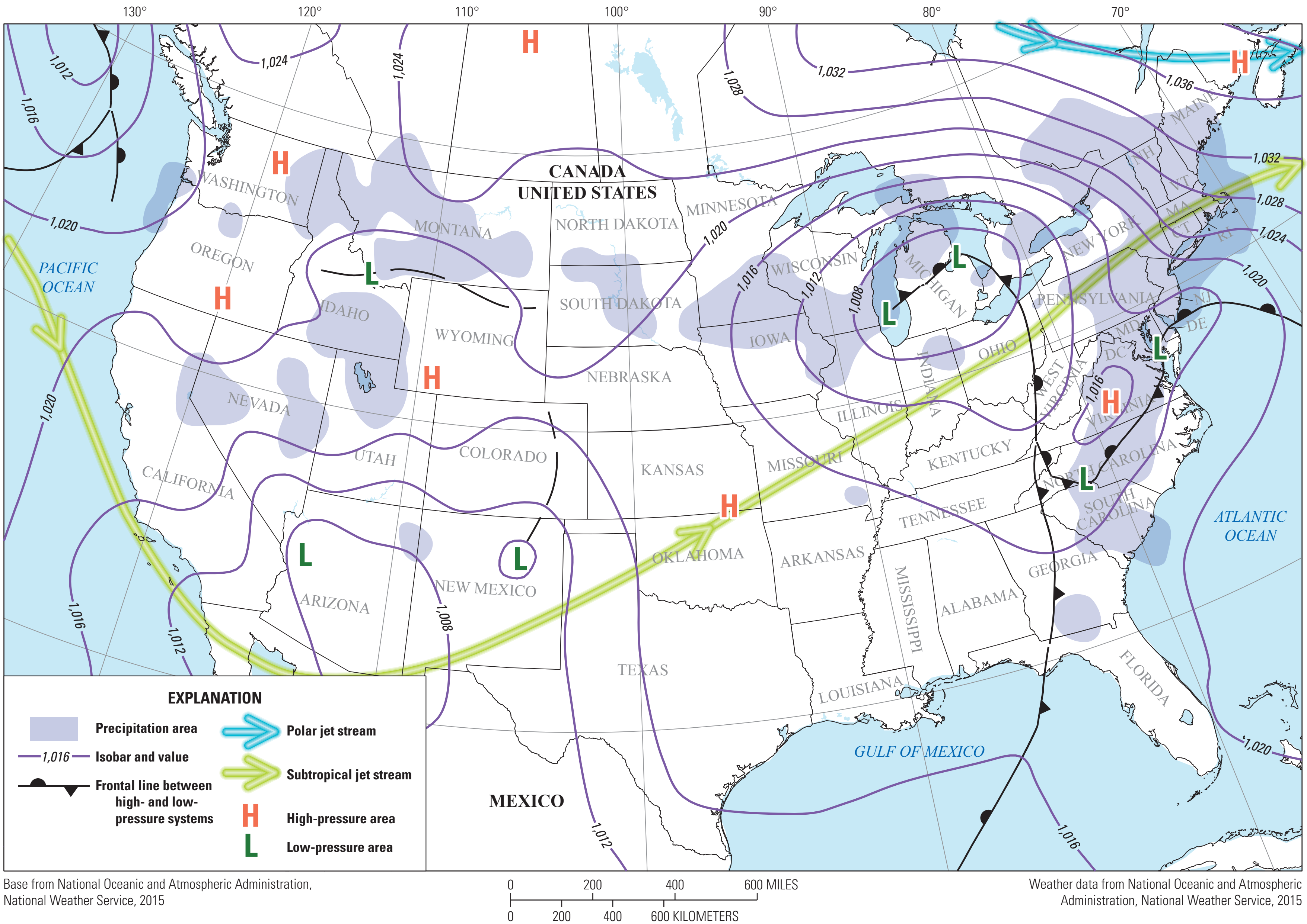


Figure 6. Daily surface weather maps at 7:00 AM Eastern Standard Time from December 21 to December 29, 2015 (National Oceanic and Atmospheric Administration, 2016c).—Continued.

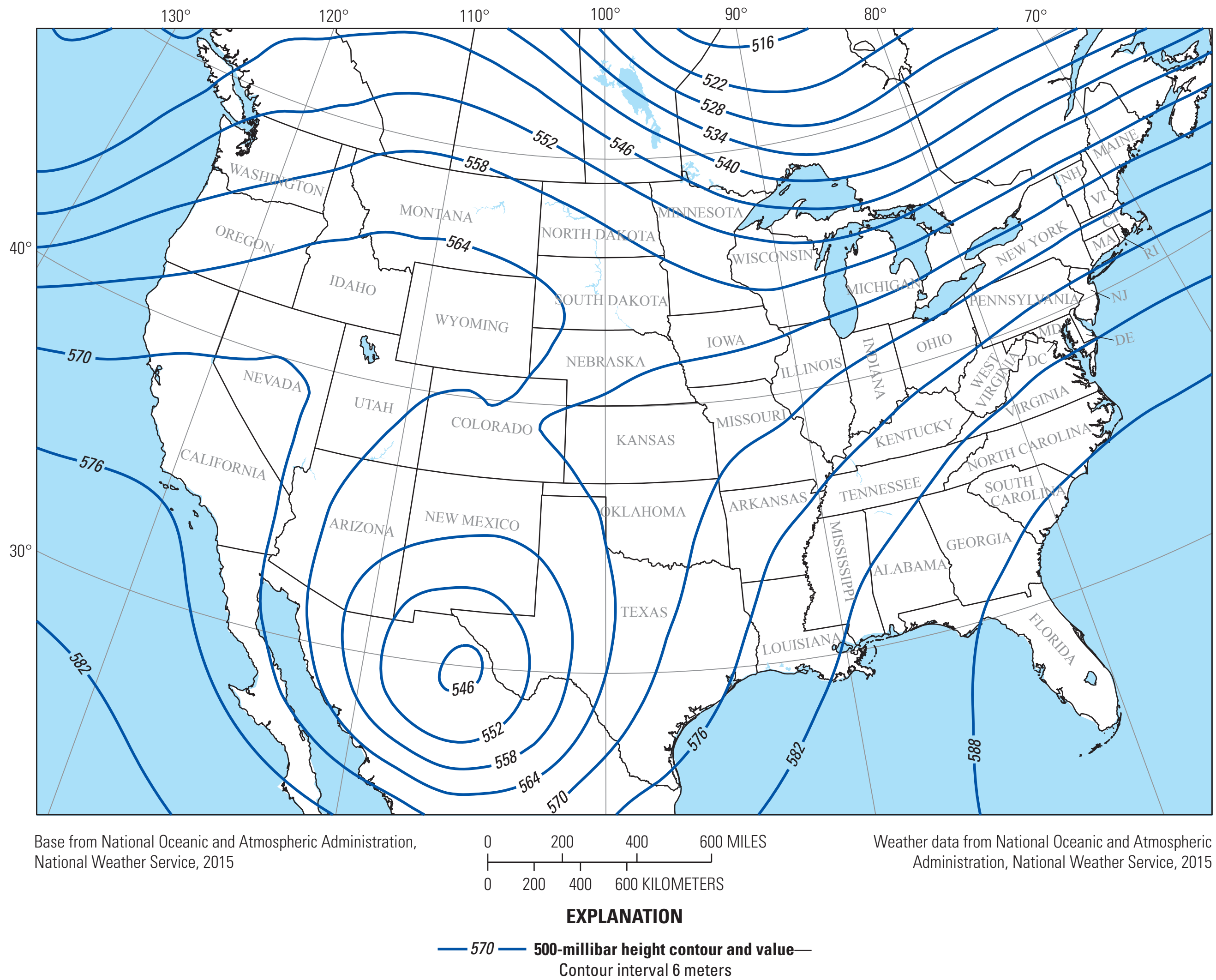
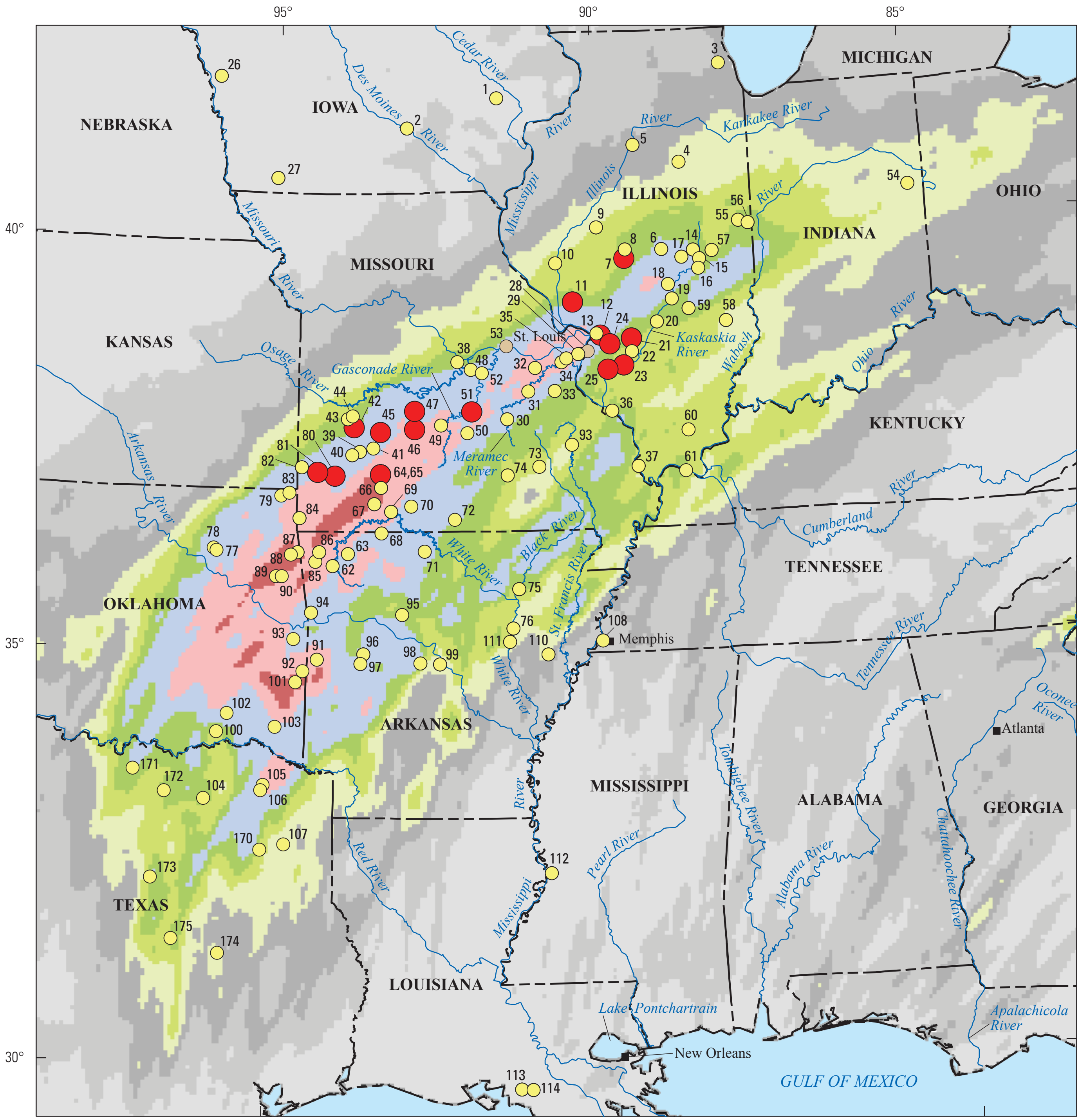


Figure 7. 500-millibar height contours at 7:00 AM Eastern Standard Time on December 27, 2015, demonstrating cut off upper level low in west Texas allowing for flow of moist air coming from the Pacific Ocean (National Oceanic and Atmospheric Administration, 2016c).



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Universal Transverse Mercator projection, zone15N

0 50 100 150 MILES
0 50 100 150 KILOMETERS

Precipitation data from National Oceanic and Atmospheric Administration, National Weather Service, 2015

EXPLANATION

Precipitation, in inches—Interval 1, 2, and 3 inches (National Weather Service, 2015)

0 to 1
1 to 2
2 to 3
3 to 4
4 to 5
5 to 6
6 to 8
8 to 10
10 to 13

Rank of peak streamflow among all peak streamflows in streamgage period of record—Labeled with map site number from table 1

1
2 to 5
Greater than 5

Figure 8. Cumulative precipitation totals from 7:00 AM December 26 to 7:00 AM December 29, 2015, and locations of selected U.S. Geological Survey streamgages by rank of peak streamflow reported in December 2015. (Source: Rainfall data from National Oceanic and Atmospheric Administration 2016a).

Methods

In this report, streamflow data refer to both stage and volumetric streamflow (streamflow). These data were collected either systematically at streamgages or from periodical/intermittent field observations of streamflow at locations where no streamgage was present.

U.S. Geological Survey streamgages operate autonomously by collecting data at some frequency (typically either 5 or 15 minutes) dependent on watershed size and concomitant flashiness of the stream. The typical streamgage automatically makes observations of stage data. The stage data are collected using a variety of methods (float, submersible pressure transducer, nonsubmersible pressure transducer, or noncontact radar). Although stage data are important, streamflow is commonly more important for such purposes as streamflow forecasting, water quality loading, flood frequency analysis, and flood mitigation planning. Derivation of streamflow from stage data at a streamgage requires periodic measurements of streamflow to develop a relation that will convert the stage data to streamflow data.

All rivers and streams have some form of hysteresis (loop effect) in the relation between stage and discharge (referred to generally as rating complexity), whereby for the same stage, the streamflow is greater on the rising limb of the hydrograph (as the flood wave approaches) than on the falling limb of the hydrograph (as the flood wave has passed and the flood recedes). The presence of hysteresis is particularly apparent when overbank storage is large, but this hysteresis occurs even in prismatic channels with no floodplain simply because of the hydrodynamics of an unsteady flood wave passing through. Natural channels often have mobile beds, which cause additional complexity because of the bed changes. In many cases, the complexity is small enough that the relation between stage and discharge can be represented by a monotonic single-valued stage-streamflow rating curve (rating curve) (fig. 9). On site direct measurements are done by USGS personnel (fig. 10) making physical observations of stream velocity and stream depth to determine streamflow (Turnipseed and Sauer, 2010) and develop rating curves. After construction of the rating curve, continued periodic measurements of streamflow are required at various stages to calibrate and validate the accuracy of the rating curve. The rating curve allows for the determination of the streamflow from the stage data when USGS personnel are not physically present at the streamgage to make a streamflow measurement.

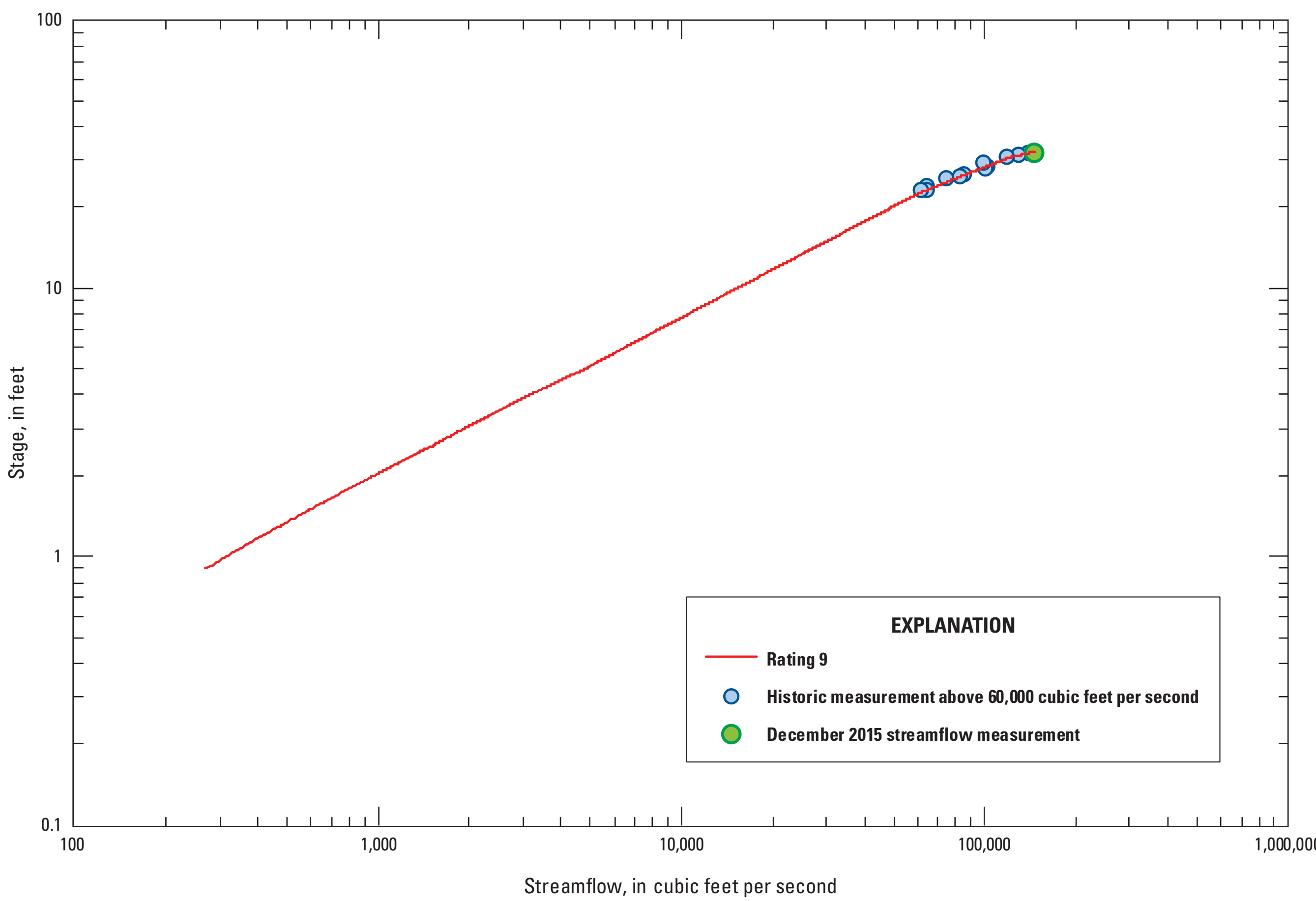

Figure 9. Rating curve for Gasconade River at Jerome, Missouri (USGS streamgage 06933500).

Figure 10. U.S. Geological Survey hydrographer making a direct streamflow measurement on December 30, 2015, on Spring River at Carthage, Missouri (USGS streamgage 07185765) (photograph by Rose Freeman, USGS).

In some cases, direct measurements of streamflow during a flood are not possible or are impractical. In those instances, indirect measurement methods are used (Benson and Dalrymple, 1967), whereby water surface profiles determined by high water marks and channel geometry are used in hydraulic equations based on the principles of conservation of energy, conservation of momentum, and continuity to compute the peak streamflow for that particular flood. The high water marks and channel geometry are determined by field survey. The USGS assigns uncertainty/accuracy estimates to each indirect measurement based on the hydraulic and channel geometry conditions found at each field site (Benson and Dalrymple, 1967; Matthai, 1967; Bodhaine, 1968; Dalrymple and Benson, 1967; and Hulsing, 1967).

All rivers have rating complexity to some degree. For many locations, the complexity is minor and can largely be ignored; however, for lower gradient rivers, the rating complexity can sometimes be too large to ignore. The Mississippi River at St. Louis, Missouri, streamgage demonstrates rating complexity (fig. 11). For two separate periods (period 1 is summer 2015 and period 2 is December 2015 and January 2016), direct measurements of streamflow made on the rising limb of the hydrograph plot to the right of those direct measurements made on the falling limb of the hydrograph. To accommodate for the complexity at this location, numerous measurements are made to allow the monotonic single-value Rating 17 to be shifted to match the measurements on the rising and falling limbs for both floods.

Figure 11 shows that the rising limb measurements for the December 2015 and January 2016 flood plot to the right of the falling limb measurements for the summer 2015 flood, meaning for the same stage, more water is conveyed through the channel (channel is more efficient) for the winter flood than the summer flood. This increased efficiency is likely due to the bedforms being smaller in the December 2015–January 2016 flood compared to the summer 2015 floods, which is likely due to the colder water temperatures for the later flooding. Shen and others (1978) demonstrated this same phenomenon on the Missouri River and attributed the cause to the colder water having higher viscosity enabling more suspended-sediment transport, which in turn dampened the magnitude of the bedforms.

Peak Streamflows and Stages

Peak streamflow and stage data during the December 2015–January 2016 flooding for 175 locations in the central and eastern United States are listed in table 1 (at the end of this report), with their locations shown in figure 2. The streamgages and periodic/intermittent sites included in table 1 were chosen because (1) the December 2015–January 2016 peak streamflow for those locations ranked in the top 5 peak flows for the period of record, (2) the site was a periodic/intermittent location where the peak streamflow was determined, or (3) the site was included to allow comparison with past major floods.

The rank for the December 2015–January 2016 streamflow peak at selected streamgages for the period of record are presented in table 1. Of the 175 locations listed, 23 USGS streamgages had peaks of record for streamflow and 172 had peaks that ranked in the top 5 for the period of record.

The peak stage and streamflow are not always coincident in time for the locations in this report, particularly for those streams and rivers that have complexity in the relation between stage and streamflow.

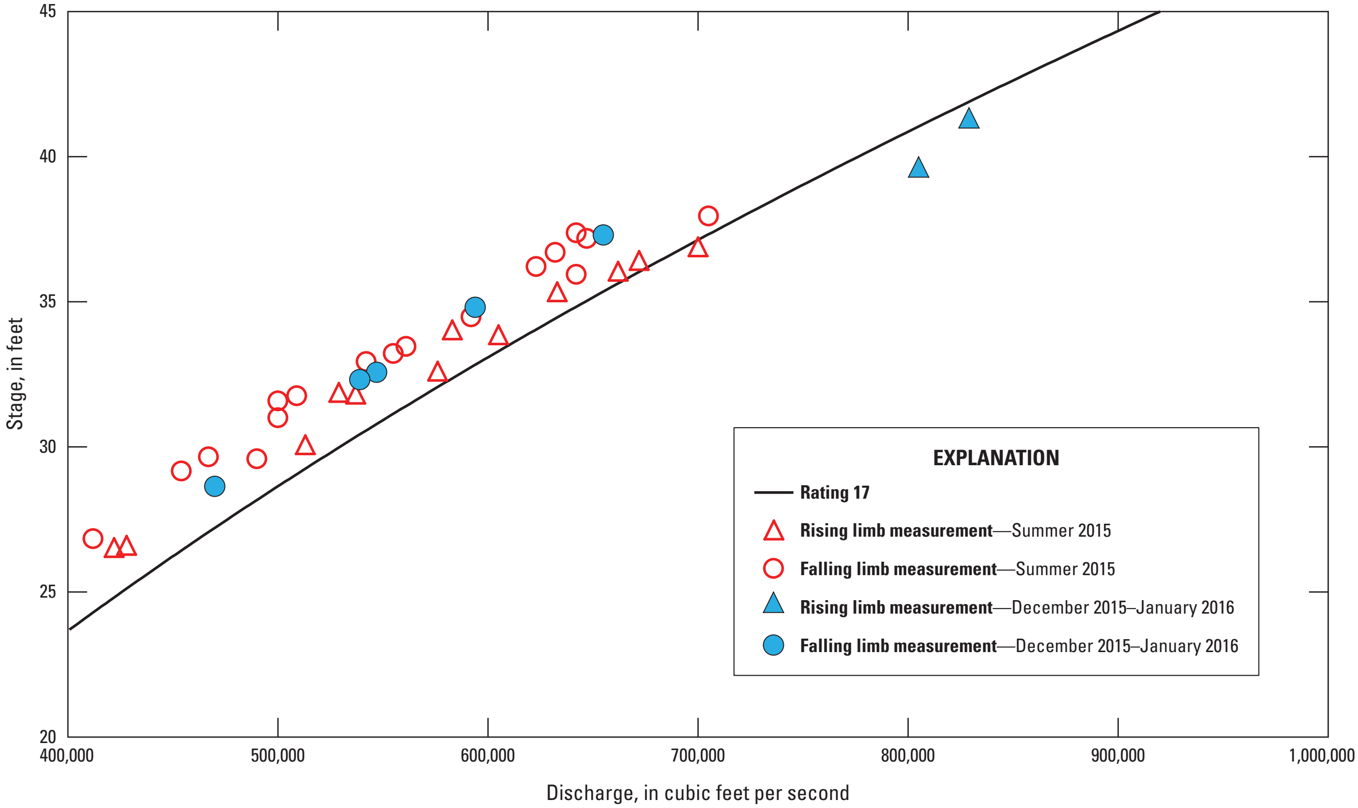

Figure 11. Streamflow measurements made during the summer 2015 and December 2015–January 2016 floods at the Mississippi River at St. Louis, Missouri (USGS streamgage 07010000).

Summary

During December 2015 and January 2016, flooding on numerous streams and rivers in the central and southeastern United States resulted in at least 16 fatalities and millions of dollars in damages. The floods were the result of excess rainfall, with rainfall amounts of more than 20 inches in a 19 day period from December 12 to December 31, 2015.

Peak streamflow and stage data are documented in this report. Peak streamflow records were broken at 23 USGS streamgages, with 172 USGS streamgages having peaks in the top 5 for the period of record.

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Dalrymple, Tate, and Benson, M.A., 1967, Measurement of peak discharge by the slope-area method; U.S. Geological Survey Techniques of Water Resources Investigations, book 3, chap. A2, 12 p. [Also available at http://pubs.usgs.gov/twri/twri3-a2/.]

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Table 1. Preliminary peak stage and streamflow data at streamgages in the central and southeastern United States for the floods of December 2015 and January 2016.

[mi², square mile; ft, foot; ft³/s, cubic foot per second; ---, data not available]

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Upper Mississippi River Basin													
1	05453520	Iowa River below Coralville Dam near Coralville, Iowa	3,115	06/15/2008	68.09	[3]39,900	1993–2014	5/22	12/23/2015	56.14	[3]10,600	--	Date of peak streamflow 12/22/2015; regulated, below U.S. Army Corps of Engineers dam.
2	05488110	Des Moines River near Pella, Iowa	12,330	07/12/1993	109.71	[3]105,000	1993–2014	4/22	1/10/2016	96.37	[3]32,200	--	Regulated, below U.S. Army Corps of Engineers dam.
3	05530000	Weller Creek at Des Plaines, Illinois	13.2	06/10/1967	15.09	1,590	1951–2014	4/64	12/19/2015	18.51	1,410	--	
4	05554500	Vermilion River at Pontiac, Illinois	579	01/09/2008	19.18	[4]13,200	1933–2014	4/72	12/29/2015	17.36	11,100	14	
5	05558300	Illinois River at Henry, Illinois	13,544	04/20/2013	[5]30.86	[6]161,000	1982–2014	5/33	12/31/2015	29.78	107,000	--	Date of peak stage 1/2/2016.
6	05573540	Sangamon River at Route 48 at Decatur, Illinois	938	09/14/2008	24.43	[4,6]21,500	1983–2014	3/32	12/29/2015	23.13	18,400	--	
7	05576000	South Fork Sangamon River near Rochester (base), Illinois	867	04/14/1994	32.40	[7]20,300	1950–2014	1/65	12/29/2015	36.68	24,400	--	
8	05576500	Sangamon River at Riverton, Illinois	2,618	05/19/1943	31.52	68,700	1908–2014	2/101	12/31/2015	30	57,600	23	
9	05583000	Sangamon River near Oakford, Illinois	5,093	05/20/1943	25.63	123,000	1910–2014	4/97	1/1/2016	24.84	74,100	18.12	
10	05586100	Illinois River at Valley City, Illinois	26,743	05/26/1943	[8]28.61	[7]123,000	1921–2014	3/93	1/5/2016	25.72	116,000	14	Date of peak stage 1/4/2016.
11	05587000	Macoupin Creek near Kane, Illinois	868	04/12/1994	28.32	40,100	1921–2014	1/87	12/29/2015	28.87	42,700	--	
12	05587900	Cahokia Creek Edwardsville, Illinois	212	05/26/2009	23.07	9,280	1969–2014	1/46	12/27/2015	27.17	16,100	--	
13	05588000	Indian Creek at Wanda, Illinois	37	08/15/1946	20.41	9,340	1941–2014	5/74	12/27/2015	17.98	5,770	--	
14	05590800	Lake Fork at Atwood, Illinois	149	03/05/1979	14.03	4,030	1973–2014	5/42	12/29/2015	15.76	3,660	--	
15	05590950	Kaskaskia at Chesterville, Illinois	358	06/07/2008	46.64	10,800	1995–2014	2/20	12/29/2015	46.61	10,100	--	
16	05591200	Kaskaskia River at Cooks Mills, Illinois	473	06/07/2008	20.41	14,100	1971–2014	2/44	12/29/2015	19.28	12,400	--	
17	05591700	West Okaw River near Lovington, Illinois	112	05/08/1996	16.40	10,300	1980–2014	5/35	12/28/2015	15.45	7,700	--	
18	05592050	Robinson Creek near Shelbyville, Illinois	93.1	06/28/1957	16.80	[9,10]26,400	1957–2014	3/36	12/27/2015	14.92	10,700	--	
19	05592100	Kaskaskia River near Cowden, Illinois	1,330	05/12/2002	20.36	[6]25,300	1971–2014	2/44	12/28/2015	19.8	21,700	15	
20	05592500	Kaskaskia River at Vandalia, Illinois	1,940	06/29/1957	[5]25.67	62,700	1908–2014	4/104	12/29/2015	27.8	41,900	18	Date of peak stage 12/27/2015
21	05593945	Shoal Creek near Pierron, Illinois	678	05/08/2002	60.85	24,000	1995–2014	1/20	12/29/2015	63.09	40,800	--	
22	05594000	Shoal Creek near Breese, Illinois	735	05/19/1943	25.60	[10]52,000	1910–2014	2/74	12/29/2015	24.82	37,300	--	
23	05594100	Kaskaskia River near Venedy Station, Illinois	4,393	05/19/1995	25.79	[6]50,300	1970–2014	1/45	12/30/2015	26.21	61,900	--	
24	05594450	Silver Creek near Troy, Illinois	154	04/12/1979	17.52	10,600	1967–2014	1/48	12/27/2015	20.32	14,700	--	
25	05594800	Silver Creek near Freeburg, Illinois	464	05/19/1995	25.38	15,300	1971–2014	1/44	12/30/2015	26.00	19,600	--	
26	06607500	Little Sioux River near Turin, Iowa	3,526	06/22/1996	26.99	32,000	1940–2014	3/75	1/11/2016	29	31,400	25	
27	06817000	Nodaway River at Clarinda, Iowa	762	06/05/2008	26.61	47,900	1903–2014	3/88	12/14/2015	24.83	36,400	23	
28	07010000	Mississippi River at St. Louis, Missouri	697,000	08/01/1993	49.58	[7]1,080,000	1844–2015	12/154	1/1/2016	42.52	833,000	30	
29	07010086	Deer Creek at Maplewood, Missouri	37	09/14/2008	21.53	10,300	1996–2015	2/20	12/26/2015	17.51	6,820	--	
30	07010350	Meramec River at Cook Station, Missouri	199	02/10/1966	17.74	34,900	1966–2015	4/24	12/28/2015	15.74	18,100	--	
31	07014500	Meramec River near Sullivan, Missouri	1,475	08/01/1915	33.50	[10,11]90,000	1915–2015	5/85	12/29/2015	31.46	66,000	11	
32	07016500	Bourbeuse River at Union, Missouri	808	12/05/1982	33.80	73,300	1897, 1915–2015	2/102	12/29/2015	34.31	64,000	15	
33	07018100	Big River near Richwoods, Missouri	735	09/23/1993	30.33	59,800	1950–2015	4/66	12/28/2015	28.73	51,400	--	

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						Upper Mississippi River Basin—Continued							
34	07019000	Meramec River near Eureka, Missouri	3,788	08/22/1915	40.20	[10]175,000	1904–2015	2/98	12/30/2015	46.06	162,000	18	
35	07019120	Fishpot Creek at Valley Park, Missouri	10	04/11/1979	12.00	6,200	1972–2015	2/27	12/31/2015	14.21	5,460	--	Peak stage is backwater impacted
36	07020500	Mississippi River at Chester, Illinois	708,600	04/27/1927	34.40	[7,12]1,060,000	1844, 1926–2015	4/91	1/1/2016	45.99	953,000	27	
37	07022000	Mississippi River at Thebes, Illinois	713,200	07/04/1844	--	[6,10]1,075,000	1844, 1933–2015	2/84	1/2/2016	47.74	1,050,000	33	
						Missouri River Basin							
38	06910750	Moreau River near Jefferson City, Missouri	561	02/22/1985	30.61	33,000	1949–2015	2/56	12/28/2015	33.52	32,700	17	
39	06918440	Sac River near Dadeville, Missouri	257	09/25/1993	27.56	36,100	1965–2015	2/51	12/27/2015	25.07	25,900	--	
40	06918460	Turnback Creek above Greenfield, Missouri	252	09/25/1993	26.34	42,700	1966–2015	4/50	12/27/2015	23.37	27,100	--	
41	06918740	Little Sac River near Morrisville, Missouri	237	08/20/2007	25.54	33,700	1969–2015	3/47	12/27/2015	23.61	28,600	--	
42	06919020	Sac River at highway J below Stockton, Missouri	1,292	09/25/1993	23.71	[6,12]13,300	1974–2015	1/42	12/27/2015	23.86	13,700	--	
43	06919500	Cedar Creek near Pleasant View, Missouri	420	07/17/1958	27.35	37,000	1909–2015	4/73	12/28/2015	26.65	32,600	20	
44	06919900	Sac River near Caplinger Mills, Missouri	1,810	04/12/1994	30.95	[6]61,500	1975–2015	3/41	12/28/2015	30.83	49,600	16	
45	06921070	Pomme de Terre River near Polk, Missouri	276	09/24/1993	27.1	34,300	1969–2015	1/47	12/27/2015	27.81	38,200	--	
46	06923500	Bennett Spring at Bennett Springs, Missouri	100	05/26/2009	9.27	13,600	1929–2014	1/51	12/26/2015	10.06	17,800	5	Date of peak stage 12/27/2015
47	06923950	Niangua River at Tunnel Dam near Macks Creek, Missouri	598	03/19/2008	17.06	32,600	1996–2015	1/20	12/27/2015	23.45	51,200	--	
48	06927000	Maries River at Westphalia, Missouri	257	09/26/1998	24.84	[10]56,000	1937–2015	3/61	12/27/2015	23.35	43,100	10	
49	06928000	Gasconade River near Hazelgreen, Missouri	1,250	01/01/1916	30.6	[10,11]90,000	1915–2015	5/71	12/28/2015	33.72	82,900	21	
50	06930000	Big Piney River near Big Piney, Missouri	560	12/04/1982	24.5	81,200	1922–2015	3/86	12/29/2015	23.18	57,700	8.5	
51	06933500	Gasconade River at Jerome, Missouri	2,840	08/07/2013	31.81	138,000	1897–2015	1/98	12/29/2015	31.92	140,000	15	
52	06934000	Gasconade River near Rich Fountain, Missouri	3,180	08/08/2013	34.39	135,000	1922–2015	3/76	12/30/2015	34.56	143,000	20	
53	06934500	Missouri River at Hermann, Missouri	522,500	07/31/1993	36.97	[7]750,000	1844–2015	12/88	12/29/2015	34.84	469,000	21	
						Ohio River Basin							
54	03324200	Salamonie River at Portland, Indiana	85.6	07/02/1993	16.21	4,190	1960– 1993	3/34	12/27/2015	14.07	3,400	--	
55	03336645	Middle Fork Vermilion River above Oakwood, Illinois	432	03/01/1939	--	[9,10,11]29,000	1939, 1956, 1979–2014	5/38	12/29/2015	15.83	12,100	10	
56	03339000	Vermilion River near Danville, Illinois	1,290	03/13/1939	28.59	[7]48,700	1915–2014	5/93	12/29/2015	26.65	37,500	18	
57	03343400	Embarras River near Camargo, Illinois	186	04/12/1994	17.33	8,040	1961–2015	4/55	12/29/2015	17.08	6,910	--	
58	03345500	Embarras River at Ste. Marie, Illinois	1,516	06/07/2008	28.06	60,400	1908–2014	3/104	12/29/2015	26.85	40,500	19	Date of Peak stage 12/30/2015
59	03378635	Little Wabash River near Effingham, Illinois	240	05/12/2002	24.27	[7]31,500	1967–2014	3/48	12/27/2015	21.06	15,200	16	
60	03382100	South Fork Saline River near Carrier Mills, Illinois	147	03/19/2008	18.41	24,300	1966–2014	4/49	12/29/2015	16.04	7,210	--	
61	03611500	Ohio River at Metropolis, Illinois	203,000	02/01/1937	--	[6,12]1,850,000	1913–2013	29/86	12/30/2015	49.46	[6,12]978,000	--	Date of peak stage 1/4/2016

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Arkansas-White-Red River Basin													
62	07048550	West Fork White River east of Fayetteville, Arkansas	123	04/24/2004	26.33	59,900	1938–2014	5/22	12/27/2015	24.61	33,100	--	
63	07049000	War Eagle Creek near Hindsville, Arkansas	263	05/10/1943	28.1	[10]50,000	1943–2014	3/56	12/27/2015	26.73	43,100	--	
64	07052000	Wilson Creek at Springfield, Missouri	17.8	07/12/2000	12.7	6,750	1933–2015	4/24	12/26/2015	11.24	4,240	13	
65	07052100	Wilson Creek near Springfield, Missouri	31.4	06/13/2008	9.99	6,410	1973–2015	1/27	12/26/2015	10.16	6,710	7	
66	07052250	James River near Boaz, Missouri	462	03/19/2008	23.55	[7]41,900	1973–2015	3/22	12/27/2015	22.1	37,100	--	
67	07052500	James River at Galena, Missouri	987	03/19/2008	35.96	85,100	1922–2015	2/94	12/28/2015	34.1	78,100	15	
68	07053250	Yocum Creek near Oak Grove, Arkansas	52.8	06/06/2014	16.12	12,900	1994–2014	3/21	12/27/2015	14.7	10,300	--	
69	07053810	Bull Creek near Walnut Shade, Missouri	191	05/08/2002	14.41	32,200	1995–2015	5/20	12/27/2015	16.49	24,000	9.5	
70	07054080	Beaver Creek at Bradleyville, Missouri	298	04/25/2011	19.63	36,400	1995–2015	3/21	12/28/2015	18.64	31,100	--	
71	07055607	Crooked Creek at Kelly Crossing at Yellville, Arkansas	398	05/03/1990	25.2	38,500	1985–2015	5/31	12/27/2015	33.63	34,000	--	Date of peak stage 12/28/2015
72	07057500	North Fork River near Tecumseh, Missouri	561	11/19/1985	28.1	133,000	1945–2015	3/71	12/28/2015	24.59	81,100	20	
73	07061900	Logan Creek at Ellington, Missouri	139	10/30/2009	13.75	18,400	1994–2015	5/22	12/28/2015	12.56	14,000	--	
74	07065495	Jacks Fork at Alley Spring, Missouri	298	11/14/1993	21.97	48,700	1994–2015	4/22	12/28/2015	14.67	25,400	9	
75	07074420	Black River at Elgin Ferry, Arkansas	8,420	04/28/2011	[5,13]33.66	212,000	1982–2014	3/29	12/31/2015	30.46	120,000	--	
76	07074850	White River near Augusta, Arkansas	20,500	05/05/2011	40.7	[6]262,000	1933–2014	3/76	01/01/2016	36.69	175,000	26	
77	07178000	Bird Creek near Owasso, Oklahoma	1022	05/11/1993	26.94	[7]29,200	1909–2015	3/38	12/28/2015	24.01	23,100	18	
78	07178200	Bird Creek at State Highway 266 near Catoosa, Oklahoma	1103	05/11/1993	33.22	[7]27,400	1989–2015	3/27	12/28/2015	29.33	22,600	--	
79	07185095	Tar Creek at 22nd Street Bridge at Miami, Oklahoma	44.7	09/25/1993	14.7	[7]12,400	1984–2015	5/21	12/27/2015	13.96	4,790	--	
80	07185700	Spring River at La Russell, Missouri	306	11/01/1972	17.58	22,500	1957–2015	1/33	12/27/2015	15.7	27,800	--	
81	07185765	Spring River at Carthage, Missouri	425	03/19/2008	18.38	29,000	1967–2015	1/28	12/28/2015	20.33	40,600	10	Date of peak stage 12/27/2015
82	07186000	Spring River near Waco, Missouri	1,164	09/26/1993	34.06	151,000	1923–2015	3/93	12/28/2015	30.82	81,100	19	
83	07188000	Spring River near Quapaw, Oklahoma	2510	09/26/1993	46.6	[7]230,000	1935–2015	3/77	12/29/2015	39.84	151,000	20	
84	07189000	Elk River near Tiff City, Missouri	872	04/19/1941	28.4	137,000	1940–2014	2/75	12/27/2015	27.37	107,000	15	
85	07194800	Illinois River at Savoy, Arkansas	167	04/25/2011	24.66	86,900	1980–2014	4/21	12/27/2015	19.65	30,200	--	
86	07195000	Osage Creek near Elm Springs, Arkansas	130	04/25/2011	18.7	[4]38,000	1950–2014	2/49	12/27/2015	16.84	23,900	--	
87	07195855	Flint Creek near West Siloam Springs, Oklahoma	59.8	04/25/2011	13.88	[6]15,900	1985–2014	3/27	12/27/2015	14.05	6,990	--	
88	07196000	Flint Creek near Kansas, Oklahoma	110	06/08/1974	19.42	44,400	1956–2015	2/56	12/27/2015	16.04	23,700	11	
89	07196500	Illinois River near Tahlequah, Oklahoma	959	05/10/1950	27.94	150,000	1916–2015	2/83	12/28/2015	30.69	120,000	11	
90	07197000	Baron Fork at Eldon, Oklahoma	307	04/25/2011	28.51	[7]63,400	1945–2015	5/69	12/27/2015	25.44	48,300	18	
91	07247000	Poteau River at Cauthron, Arkansas	203	05/20/1960	23.76	32,200	1935–2014	5/77	12/28/2015	22.83	26,100	--	
92	07247250	Black Fork below Big Creek near Page, Oklahoma	74.4	11/21/2011	23.64	36,000	1993–2015	4/23	12/27/2015	23.16	33,500	--	
93	07249413	Poteau River near Panama, Oklahoma	1767	05/03/1990	41.59	[7]74,600	1990–2015	2/26	12/30/2015	43.69	52,400	29	
94	07250085	Lee Creek at Lee Creek Reservoir near Van Buren, Arkansas	432	04/26/2011	27.2	[6]75,900	1993–2015	2/23	12/28/2015	26.99	72,400	401	

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		Arkansas-White-Red River Basin—Continued											
95	07257500	Illinois Bayou near Scottsville, Arkansas	241	12/03/1982	27.49	130,000	1943–2014	5/67	12/28/2015	23.2	67,300	--	
96	07260000	Dutch Creek at Waltreak, Arkansas	81.4	11/22/2011	20.9	26,000	1927–2014	4/70	12/28/2015	20.41	21,200	--	
97	07261500	Fourche LaFave River near Gravelly, Arkansas	410	05/31/2013	32.6	195,000	1939–2014	2/76	12/28/2015	31.65	170,000	24	
98	07263295	Maumelle River at Williams Junction, Arkansas	46.1	09/03/2008	13.67	12,800	1990–2013	5/24	12/28/2015	10.86	7,240	--	
99	07263300	Maumelle River at Maumelle Dam at Natural Steps, Arkansas	137	12/25/2009	93.27	[6]5,770	1990–2014	5/24	12/28/2015	92.61	3,880	--	
100	07335300	Muddy Boggy Creek near Unger, Oklahoma	2,273	05/06/1990	55.27	[7]76,700	1983–2015	2/33	12/31/2015	51.28	53,200	--	
101	07335700	Kiamichi River near Big Cedar, Oklahoma	40.1	05/19/1990	19.6	27,400	1966–2015	2/50	12/27/2015	18.43	22,600	--	
102	07336200	Kiamichi River near Antlers, Oklahoma	1,138	05/03/1990	42.65	[7]62,300	1973–2015	2/43	12/28/2015	37.39	57,300	25	
103	07337900	Glover River near Glover, Oklahoma	315	12/10/1971	29.72	98,600	1961–2015	4/55	12/27/2015	26.4	71,600	16	
104	07342465	South Sulphur River at Commerce, Texas	150	03/19/2008	29.58	15,100	1992–2015	3/24	12/28/2015	28.27	13,500	--	
105	07343200	Sulphur River near Talco, Texas	1,405	12/18/2001	30.99	[6]79,800	1957–2015	5/59	12/29/2015	30.26	56,900	--	
106	07343500	White Oak Creek near Talco, Texas	494	12/11/1971	21.2	48,000	1950–2015	2/66	12/28/2015	20.39	41,100	16	
107	07346050	Little Cypress Creek near Ore City, Texas	383	04/24/1966	20.2	23,500	1963–2015	5/53	12/29/2015	15.62	13,200	13	
		Lower Mississippi River Basin											
108	07032000	Mississippi River at Memphis, Tennessee	932,800	02/08/1937	[14]50.4	[6,15]2,020,000	1872– 1994	4/123	01/07/2016	39.59	[6]1,660,000	34	Date of peak stage 1/8/2016.
109	07035800	St. Francis River near Mill Creek, Missouri	505	11/14/1993	33.1	130,000	1987–2015	5/27	12/28/2015	22.24	43,900	16	
110	07047950	Languille River at Palestine, Arkansas	786	12/18/2001	[16]27.48	[9]23,000	1933–2014	3/69	01/11/2016	27.96	15,900	25	
111	07076750	White River at Georgetown, Arkansas	22,400	12/08/1982	28.87	[6]179,000	1913–2014	4/100	01/02/2016	27.97	138,000	21	
112	07289000	Mississippi River at Vicksburg, Mississippi	1,140,500	05/17/2011	57.17	[6,12]2,310,000	1858, 1885, 1897–98, 1903–2014	5/103	01/15/2016	50.23	[6]1,910,000	--	Date of peak stage 1/16/2016.
113	07381590	Wax Lake outlet at Calumet, Louisiana	[17]--	05/27/2011	[5]10.81	323,000	--	4/73	01/18/2016	8.43	249,000	--	
114	07381600	Lower Atchafalaya River at Morgan City, Louisiana	--	05/29/2011	[18]10.33	512,000	1977–2014	4/38	01/18/2016	8.05	404,000	6	
		Tennessee River Basin											
115	0345577330	West Fork Pigeon River near Retreat, North Carolina	33.5	09/17/2004	14.15	[19]15,600	1989–2014	5/26	12/29/2015	8.02	5,920	10	
116	03456991	Pigeon River near Canton, North Carolina	130	09/17/2004	22.8	[19]48,000	1984–2014	5/31	12/29/2015	11.56	13,700	10	
117	03504000	Nantahala River near Rainbow Springs, North Carolina	51.9	06/16/1949	9.7	6,300	1940–2014	4/75	12/24/2015	8.36	5,010	10	
118	03550500	Nottely River near Blairsville, Georgia	74.8	08/23/1967	21.04	12,900	1943–2014	5/65	12/24/2015	14.88	6,840	13	
119	03575950	Huntsville Spring Branch at Johnson Road, Huntsville, Alabama	41.8	05/06/2003	17.31	[4]14,900	1972–2014	5/26	12/25/2015	15.41	10,900	--	
120	03576500	Flint Creek near Falkville, Alabama	86.3	12/23/1991	19.28	[9,10]30,000	1953–2014	2/32	12/25/2015	17.15	14,300	--	Date of peak streamflow 12/26/2016.
121	03586500	Big Nance Creek at Courtland, Alabama	166	03/16/1973	24.97	26,500	1936–2014	3/68	01/04/2016	24.2	21,900	14	
		South Atlantic-Gulf Region											
122	0210166029	Rocky River at State Route 1300 near Crutchfield Crossroads, North Carolina	7.42	09/06/1996	11.91	1,670	1989–2015	1/25	12/30/2015	9.86	1,760	--	
123	02132320	Big Shoe Heel Creek near Laurinburg, North Carolina	83.3	09/10/2004	5.52	1,200	1988–2014	5/25	12/25/2015	5.35	690	14	

Table 1. Preliminary peak stage and streamflow data at streamgages in the central and southeastern United States for the floods of December 2015 and January 2016.—Continued

[mi², square mile; ft, foot; ft³/s, cubic foot per second; ---, data not available]

Map site number (figs. 2 and 8)	Station number	Station name	Contributing drainage area (mi²)	Flood data: Previous maximum streamflow: Date of peak streamflow	Previous maximum streamflow: Peak stage (ft)	Previous maximum streamflow: Peak streamflow (ft³/s)	Beginning and ending water year[1] for period of record	Flooding during December 2015 and January 2016: Rank[2]/Number of annual peak streamflows in record (unless otherwise noted in remarks)	Flooding during December 2015 and January 2016: Date of peak streamflow	Flooding during December 2015 and January 2016: Peak stage (ft)	Flooding during December 2015 and January 2016: Peak streamflow (ft³/s)	National Weather Service flood stage (ft)	Remarks
South Atlantic-Gulf Region—Continued													
124	02133624	Lumber River near Maxton, North Carolina	365	03/22/1998	13.52	3,380	1988–2015	2/26	12/27/2015	12.51	3,080	--	
125	0214295600	Paw Creek at Wilkinson Boulevard near Charlotte, North Carolina	10.8	07/11/2013	12.5	[4]3,625	1995–2014	5/20	12/30/2015	10.92	1,930	12.5	
126	02147020	Catawba River below Catawba, South Carolina	3,540	04/11/2003	22.69	[6]54,700	1993–2014	2/22	12/31/2015	21.69	50,500	58	
127	02160325	Brushy Creek near Greenville, South Carolina	9.05	07/07/2005	12.05	[4]2,470	1986–2014	4/28	12/24/2015	9.29	1,280	10	
128	02160390	Enoree River near Woodruff, South Carolina	249	08/27/1995	29.9	52,200	1994–2014	5/21	12/31/2015	16.1	7,510	18.5	
129	02164110	Reedy River above Fork Shoals, South Carolina	110	08/27/1995	21.77	8,200	1994–2014	2/21	12/30/2015	17.48	6,280	20	
130	02167450	Little River near Silverstreet, South Carolina	230	04/19/2003	15.73	[9]8,760	1991–2014	1/24	12/31/2015	17.56	11,700	11	
131	02167582	Bush River near Prosperity, South Carolina	115	01/15/1995	16.06	5,570	1991–2014	1/24	12/31/2015	17.96	6,860	11	
132	02171645	Rediv Canal at Santee River near St. Stephen, South Carolina	14,800	11/17/1989	28	[6,12]31,200	1987–2014	4/28	01/06/2016	29.85	29,400	--	
133	02171700	Santee River near Jamestown, South Carolina	10,750	03/09/1987	21.87	[6,12]89,500	1987–2014	1/27	01/06/2015	22.77	108,000	10	Date of peak stage 1/15/2016.
134	02193340	Kettle Creek near Washington, Georgia	33.9	10/01/1989	17.68	4,150	1987–2014	2/28	12/22/2015	16.76	3,780	14	
135	02208450	Alcovy River above Covington, Georgia	185	03/18/1990	14.49	7,620	1973–2014	5/42	12/25/2015	13.34	5,700	12	
136	02223056	Oconee River at Avant Mine, near Oconee, Georgia	3,100	03/07/2003	18.57	[6]11,200	1993–2013	2/21	12/19/2015	19.97	11,200	18	Date of peak stage 12/23/2015.
137	02223248	Oconee River near Oconee, Georgia	3,770	03/10/1998	29.9	96,900	1993–2014	2/22	12/26/2015	27.01	68,000	17	
138	02336410	Nancy Creek at West Wesley Road, at Atlanta, Georgia	37.7	03/08/1995	[20]11.96	[4]6,440	1961–2014	5/24	12/24/2015	13.28	3,970	12	
139	02338840	Yellowjacket Creek-Hammett Road, below Hogansville, Georgia	91	03/11/2010	10.45	4,240	1979–2014	1/21	12/26/2015	13.81	10,900	8	Date of peak stage 12/25/2015.
140	02341800	Upatoi Creek near Columbus, Georgia	342	03/17/1990	32.12	46,300	1969–2014	2/46	12/25/2015	21.65	18,500	--	
141	02344350	Flint River near Lovejoy, Georgia	130	07/05/1994	23.6	19,000	1986–2014	3/29	12/25/2015	16.94	8,490	12	
142	02350900	Kinchafoonee Creek at Pinewood Road, near Dawson, Georgia	527	07/07/1994	26.56	29,500	1943–2014	5/51	12/25/2015	21	11,800	13	
143	02358700	Apalachicola River near Blountstown, Florida	17,600	03/13/1998	27.23	[6,12]266,000	1929–2014	4/58	12/28/2015	25.55	169,000	15	Date of peak stage 12/29/2015.
144	02359170	Apalachicola River near Sumatra, Florida	19,200	03/24/1990	13.82	[6]179,000	1978–2014	3/37	01/01/2016	13.83	169,000	11	
145	02363000	Pea River near Ariton, Alabama	498	03/01/1929	25	[9,10,11]50,000	1929–2014	1/77	12/25/2015	25.39	50,100	14	
146	02364500	Pea River near Samson, Alabama	1,182	03/15/1929	45.3	[10]58,000	1905–2014	2/61	12/27/2015	42.02	45,800	35	
147	02365200	Choctawhatchee River near Pittman, Florida	3,209	01/28/1978	28.56	64,700	1977–2014	3/21	12/29/2015	28.99	59,700	21	
148	02374250	Conecuh River at State Highway 41 near Brewton, Alabama	2,661	12/20/2009	31.83	72,900	1929–2014	2/43	12/30/2015	30.36	59,400	27	
149	02381600	Fausett Creek near Talking Rock, Georgia	9.99	05/27/1973	16.96	3,160	1966–2014	2/49	12/24/2015	17.84	3,110	10	
150	02382200	Talking Rock Creek near Hinton, Georgia	119	07/16/2003	15.65	[9]19,000	1964–2014	4/49	12/24/2015	13.36	13,900	10	
151	02394820	Euharlee Creek at US 278, at Rockmart, Georgia	42.1	03/04/1979	15	[10]7,000	1961–2014	5/33	12/24/2015	10.75	3,300	9	
152	02395120	Two Run Creek near Kingston, Georgia	33.1	07/12/1999	8.65	4,300	1981–2014	1/34	12/24/2015	8.86	4,600	8	
153	02398000	Chattooga River at Summerville, Georgia	192	02/16/1990	22.63	30,100	1938–2014	5/76	12/26/2015	20.5	20,700	14	
154	02419890	Tallapoosa River near Mont.-Mont. Water Works, Alabama	4,646	03/10/1998	34.59	[7]90,800	1961–2014	3/43	12/26/2015	33.65	78,400	25	

Table 1. Preliminary peak stage and streamflow data at streamgages in the central and southeastern United States for the floods of December 2015 and January 2016.—Continued

[mi², square mile; ft, foot; ft³/s, cubic foot per second; ---, data not available]

Map site number (figs. 2 and 8)	Station number	Station name	Contributing drainage area (mi²)	Flood data: Previous maximum streamflow: Date of peak streamflow	Peak stage (ft)	Peak streamflow (ft³/s)	Beginning and ending water year[1] for period of record	Flooding during December 2015 and January 2016: Rank[2]/Number of annual peak streamflows in record (unless otherwise noted in remarks)	Date of peak streamflow	Peak stage (ft)	Peak streamflow (ft³/s)	National Weather Service flood stage (ft)	Remarks
South Atlantic-Gulf Region—Continued													
155	02423130	Cahaba River at Trussville, Alabama	19.7	05/07/2003	19	[4]7,350	1989–2014	3/26	12/25/2015	13.1	4,660	--	
156	02438000	Buttahatchee River below Hamilton, Alabama	277	03/16/1973	35.49	49,500	1951–2014	2/63	12/25/2015	32.73	40,100	--	
157	02439400	Buttahatchee River near Aberdeen, Mississippi	798	03/17/1973	23.48	80,000	1967–2014	2/48	12/27/2015	21.63	48,900	13	
158	02449882	Blue Springs Creek near Blountsville, Alabama	13	05/03/1997	11.37	2,470	1993–2014	1/22	12/25/2015	11.77	2,630	--	
159	02450180	Mulberry Fork near Arkadelphia, Alabama	487	02/16/1990	42.9	51,700	1977–2014	2/35	12/26/2015	45.43	44,900	--	
160	02450250	Sipsey Fork near Grayson, Alabama	92.1	03/16/1973	44.27	20,300	1967–2014	2/48	12/25/2015	41.36	17,100	--	
161	02450825	Clear Creek at New Hope Church near Poplar Springs, Alabama	101	01/23/1999	17.74	11,500	1946–2014	5/25	12/25/2015	20.77	11,700	--	Date of peak stage 12/26/2015.
162	02453500	Mulberry Fork at Cordova, Alabama	1,916	03/14/1909	41.5	[12]60,400	1900–2014	3/56	12/27/2015	23.83	50,200	22	
163	02454055	Lost Creek above Parrish, Alabama	143	03/28/1994	29.48	10,600	1993–2014	5/22	12/27/2015	25.72	5,820	--	
164	02455000	Locust Fork near Cleveland, Alabama	303	12/28/1942	19.2	34,000	1941–2014	2/74	12/26/2015	17.39	27,200	--	
165	02455980	Turkey Creek at sewage plant near Pinson, Alabama	27.4	03/11/2000	16.17	[4]10,100	1989–2014	2/26	12/25/2015	15.87	9,900	--	
166	02457000	Fivemile Creek at Ketona, Alabama	23.9	05/07/2003	19.14	[4]16,700	1954–2014	3/43	12/25/2015	16.61	7,090	9.5	
167	02457595	Fivemile Creek near Republic, Alabama	51.9	05/07/2003	25.41	24,200	1989–2014	5/26	12/25/2015	16.62	10,700	--	
168	02458300	Village Creek at 24th Street at Birmingham, Alabama	26	05/07/2003	14.15	[4]5,950	1989–2014	4/26	12/25/2015	13.76	5,680	--	
169	02464146	Turkey Creek near Tuscaloosa, Alabama	6.16	12/03/1983	11.98	3,500	1981–2014	2/32	12/25/2015	12.65	3,460	--	
Texas-Gulf Region													
170	08019500	Big Sandy Creek near Big Sandy, Texas	231	03/31/1945	24.1	24,000	1940–2015	4/76	12/29/2015	22.37	10,900	17	
171	08050800	Timber Creek near Collinsville, Texas	38.8	06/18/2007	14.96	21,900	1986–2015	3/30	12/27/2015	13.83	11,100	--	
172	08059400	Sister Grove Creek near Blue Ridge, Texas	83.1	05/13/1982	22.5	[6]13,300	1976–2015	3/40	12/28/2015	27.22	3,510	24	
173	08063800	Waxahachie Creek near Bardwell, Texas	178	02/09/1965	17.55	[6]2,960	1964–2015	3/52	12/22/2015	24.67	2,040	--	
174	08065350	Trinity River near Crockett, Texas	13911	05/10/1990	48.54	[6]109,000	1942–2015	5/53	01/02/2016	47.17	72,000	41	
175	08110430	Big Creek near Freestone, Texas	97.2	10/31/2013	19.88	23,200	1957–2014	4/37	12/28/2015	17.01	9,200	--	

[1]The U.S. Geological Survey water year begins October 1 of the previous calendar year and ends September 30 of the calendar year. Furthermore, in some cases, the peak data for water year 2015 was not updated at time of analysis, so 2014 is listed as the last year.

[2] Rank of the maximum instantaneous peak streamflow measured during 2011 event compared to all systematic and historic annual peaks. A rank of 1 indicates that the 2016 peak streamflow was higher than all other recorded annual peaks.

[3] Regulated, below U.S. Army Corps of Engineers dam.

[4] All or part of the record is affected by urbanization, mining, agricultural changes, channelization, or other.

[5] Gage height is not maximum for year.

[6] Discharge affected by regulation or diversion.

[7] Streamflow affected to unknown degree by regulation or diversion.

[8] Gage height was measured at a different site and (or) datum.

[9] Streamflow is an estimate.

[10] Streamflow is an historic peak.

[11] Month or day of occurrence is unknown or not exact.

[12] Streamflow is a maximum daily average.

[1]3 Stage is affected by backwater.

[14] Source: Mississippi River Commission, 1954, Annual highest and lowest stages of the Mississippi River and its outlets and tributaries to 1953, Vicksburg, Mississippi, 253 p.

[15] Source: Mississippi River Commission, 1955, Annual maximum and mean discharges of the Mississippi River and its outlets and tributaries to 1953, Vicksburg, Mississippi, 140 p.

[16] Gage height is an estimate.

[17] Major river diversions upstream cause these drainage areas to be indeterminate.

[18] Stage corresponds to maximum stage for the flood, not the stage when the peak streamflow occurred.

[19] Discharge affected by regulation or diversion, discharge due to snowmelt, hurricane, ice-jam or debris dam breakup.

[20] Gage datum changed during this year.

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