

Geologic Site of the Month

March 2016

Ice Jam on the Kennebec River in Augusta on Wednesday, February 17, 2016



44° 18' 50.10" N, 69° 46' 21.50" W

By

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Introduction

In the morning of Wednesday, February 17, an ice jam formed on the Kennebec River near the Memorial Bridge in Augusta, damming the river flow and raising the water level (stage) at the Calumet Bridge by about five feet in the three hours between 8:30 and 11:30 am. The peak stage of 14.3 feet was well above the 12-foot flood stage (USGS, 2016).

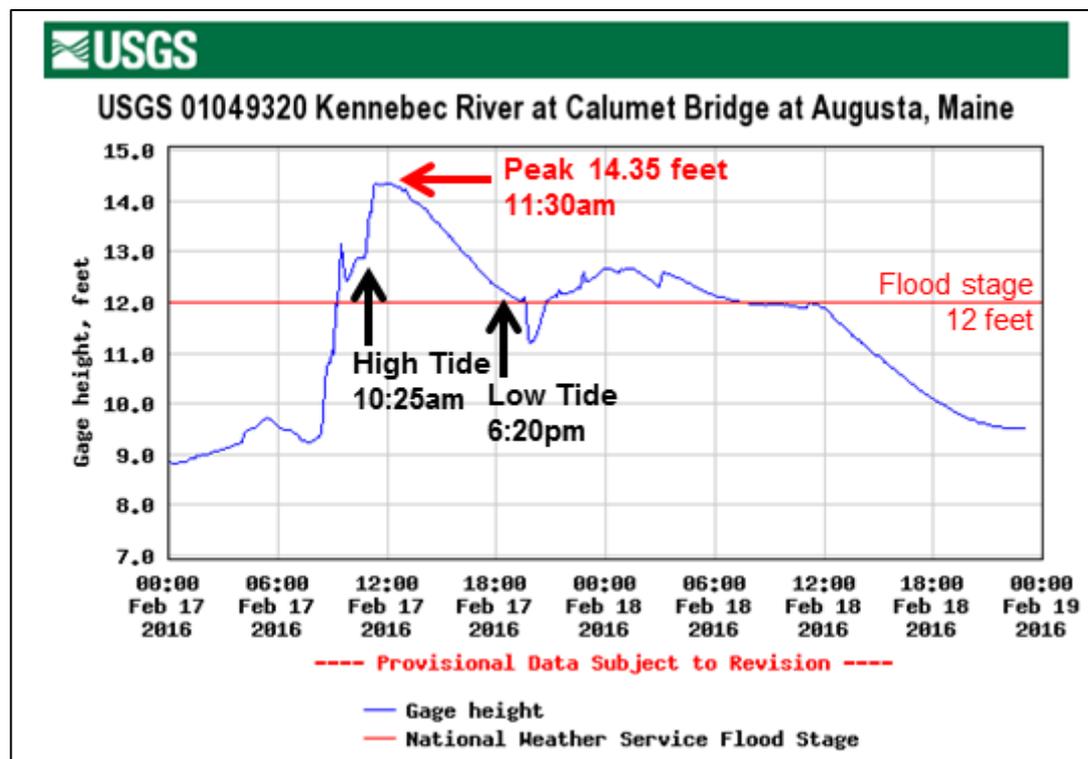


Figure 1. USGS river gage data showing the height of the river and the timing of tides during the ice jam and flood.

Conditions

In the two weeks preceding the event, enough ice formed downstream from Augusta to block floating ice from moving farther towards the ocean. On Tuesday, February 16, the Kennebec River watershed received up to 1.5 inches of warm rain on top of several inches of snow. The increased runoff into the river from rain and snowmelt combined with the breakup of ice in upstream channels caused the flooding on Wednesday. As of mid-day Thursday, the ice jam was still in place, but the river stage had receded to 12.0 feet.



Photo by Amber Whittaker

Figure 2. MGS Hydrogeologist Ryan Gordon investigating the ice jam.

Front Street Flooding

The peak stage was high enough to cover a section of the parking lot along Front Street with water and floating ice. It was reported that several cars that were parked in harm's way were removed just in time to avoid being damaged (Edwards, 2016). The river in Augusta has exceeded flood stage 22 times since 2008, and the highest recorded stage was 34.1 feet on April 2, 1987, although the flood of 1936 was likely even higher (USGS, 2013).



Figure 5. Flood waters in the Front Street parking lot at noon on Wednesday, February 17, 2016.

Augusta Webcam

The US Geological Survey , in cooperation with the Maine Emergency Management Agency and the Maine River Flow Advisory Commission, maintains a webcam on the Kennebec River at Augusta. The webcam captured the entire event in a series of still images.



Figure 3. The webcam image on the left shows the river at 7:15am, before the ice jam and flood. The image on the right shows the river at peak height around 11:30am.

Time Lapse Video

We combined the water level data and the webcam images to produce [a video spanning the entire event](#). The video steps through the webcam images and highlights the associated river gage height at the same time as the image. The sequence clearly shows the formation of the ice jam, the rise of the river, and the flooding of the Front Street parking lot.

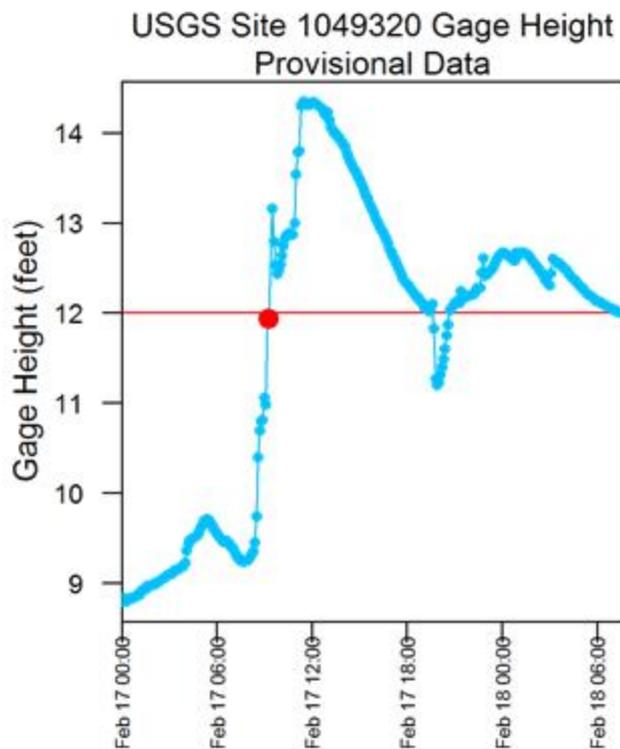


Figure 4: This still image from the video shows the hydrograph on the left with a red dot highlighting the gage height at the time of the webcam image shown on the right. The image shows the river just as it reached flood stage at 9:25 am.

Flooding

Flooding on large rivers in Maine can be caused by a combination of several factors. High amounts of precipitation in a short time, lots of melting snow, and ice dams can all cause rivers to rise suddenly (Loiselle, 1997). Most floods in Maine occur during the late winter or early spring, when a combination of all three factors is most likely. The lower Kennebec River is historically prone to ice-jam flooding, typically downstream of Augusta around Swan Island near Richmond or Brown's Island near Farmingdale. More recently, several ice jams have formed in Augusta, as well (USGS, 2013).



Figure 6. April Fool's Day flood of the Kennebec River at Augusta, 1987.

Flooding Potential

Notwithstanding the ice jam this week, the overall potential for flooding on Maine rivers has been relatively low this winter due to unusually warm temperatures, thin ice, and below-average snow cover. Temperatures in December and January this winter were 5 to 10 degrees above normal and many rivers that are usually ice covered by this point are mostly free of ice. The snow pack has been well below normal with less than 2 inches of water equivalent (the depth of water that would result if all the snow melted) reported throughout most of the state on the survey before the flood ([February 3, 2016, equivalent water content map](#)). The Maine Geological Survey is the lead agency in the Maine Cooperative Snow Survey and one of the cooperating partners in the Maine River Flow Advisory Commission.

References and Additional Information

Edwards, Keith, 2016, "Kennebec River in Augusta Floods Downtown Parking Lot." Kennebec Journal Augusta, Maine, 18 Feb. 2016. <http://www.centralmaine.com/2016/02/17/kennebec-river-in-augusta-spills-over-banks/>.

Loiselle, Marc C., 1997, Water, Water Everywhere ..., Geologic Site of the Month, March, Maine Geological Survey, Department of Agriculture, Conservation, and Forestry.
<http://www.maine.gov/dacf/mgs/hazards/floods/sites/mar97.pdf>

U.S. Geological Survey, 2013, Kennebec River Ice Monitoring. Accessed February 18, 2016.
<http://me.water.usgs.gov/kenmon.html>

U.S. Geological Survey, 2016, USGS Current Conditions for USGS 01049320 Kennebec River at Calumet Bridge at Augusta, Maine. Accessed February 18, 2016. http://waterdata.usgs.gov/me/nwis/uv?site_no=01049320.

Maine Cooperative Snow Survey:

http://www.maine.gov/rfac/rfac_snow.shtml

Maine Emergency Management Agency:

<http://www.maine.gov/mema/>

Maine Geological Survey flood information page:

<http://www.maine.gov/dacf/mgs/hazards/floods/index.shtml>

Maine River Flow Advisory Commission:

<http://www.maine.gov/rfac/>

U.S. Geological Survey River Ice Monitoring System:

<http://me.water.usgs.gov/rims.html>