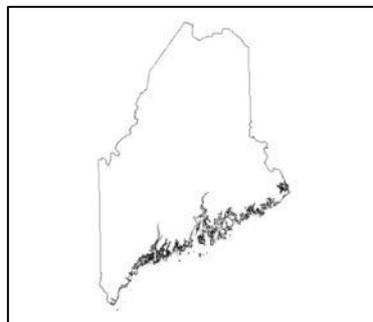


Geologic Site of the Month
March, 1997

Water, water everywhere.....



Text by
Marc C. Loiselle
Maine Geological Survey



Introduction

While rainfall in Maine is generally distributed evenly throughout the year (about 3-4 inches a month on average), a review of Maine's most damaging floods shows that most major floods occur in late winter and early spring - February through May.

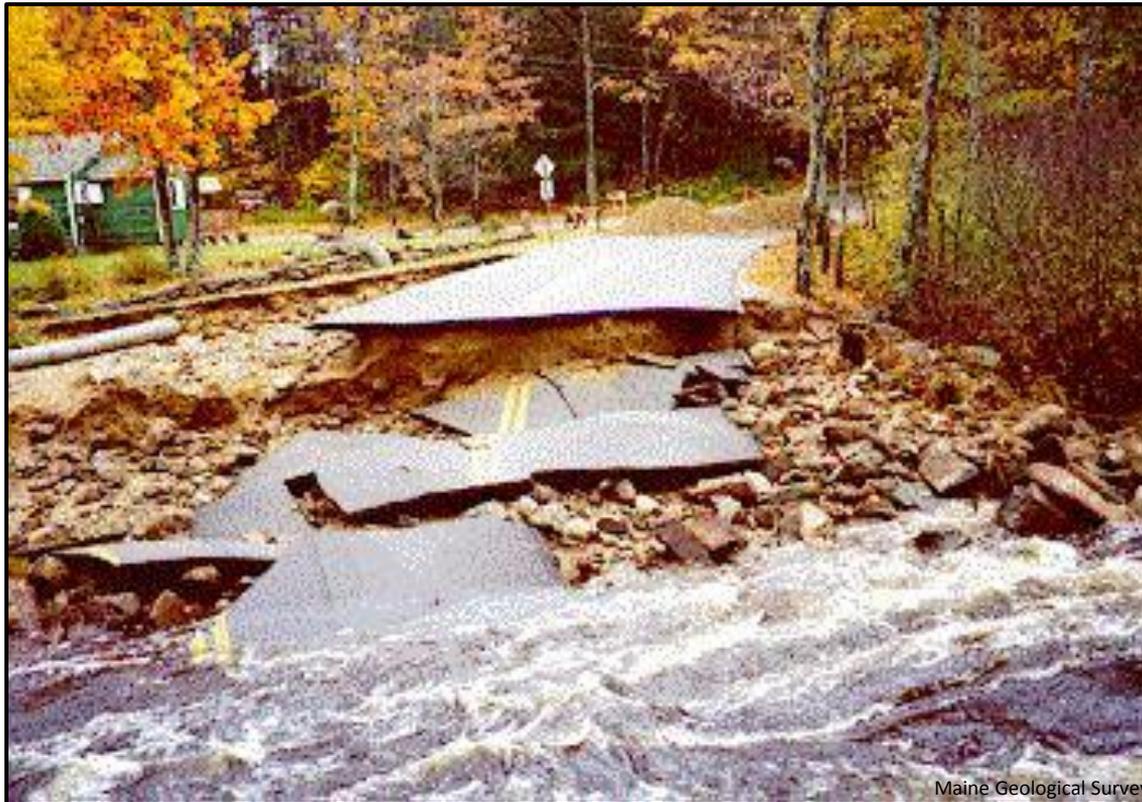


Photo courtesy of the Maine Emergency Management Agency



Flooding

A notable exception is the flooding last October in Southern Maine, where over 19 inches of rain fell in portions of York County over a 2-day period.



Photo courtesy of the Maine Emergency Management Agency

Maine Geological Survey



Flooding

Date	Area affected	Damage estimated (\$)
March 19, 1936	South-central Maine	25,000,000
March 27-30, 1953	Southwestern Maine	-no data-
May 28, 1961	Eastern Maine	1,000,000
April 30, 1979	Northern Maine (St. John River Basin)	650,000
April 1, 1987	Central and South-central Maine	100,000,000
April 10-12, 1991	Northern Maine (St. John River Basin)	14,400,000
October 20-22, 1996	Southwestern Maine	6,450,000*
Maine Geological Survey		*Preliminary Estimates

From USGS Water Supply Paper 2375; Maine Emergency Management Agency



Causes of Flooding

The occurrence of most major floods in the late winter and early spring is due to a combination of factors: abundant rainfall generated by warm frontal systems pushing north into the state, frozen ground that can absorb little or no rainfall, rivers near bankfull due to snowmelt, and the possibility of significant snowpack that may add to runoff. Floods during this time of year usually do not develop as quickly as summertime flash floods, but last longer and typically affect larger areas. When flooding occurs, it may be accompanied by ice jams, often with disastrous results. Ice jams on the Kennebec River produced some of the worst damage in the 1936 flooding, and an ice jam on the St. John River near Allagash in 1991 destroyed two bridges.

However, the three major factors contributing to significant flooding in Maine are

rain, rain, and more rain.



Causes of Flooding

In March, 1936, 15 inches of rain fell in 14 days. As much as 11 inches fell at locations in southwestern Maine in March 1953. More than 8 inches fell in a 4 day period in central Maine in 1987. And, an amazing 19 inches of rain fell in a 48-hour period last October in the Camp Ellis area, York County. Melting snowpack was a contributing factor to the flooding in 1936 and 1987, but melting snowpack alone could not have produced the flooding.

Because rainfall is the most significant factor in Maine's major spring floods, it is difficult to predict the potential for flooding more than ten days in advance. Accurate observations and forecasting tools can provide estimates of the magnitude and time of flooding during and following a major storm. They cannot predict a season's flood potential.

Other factors contributing to spring flooding in Maine are frozen ground, [melting snowpack](#), and ice. Ice jams produced some of the worst damage in the 1936 flood. In 1991, ice floes on the St. John River destroyed two major bridges and caused millions of dollars in damage. It is especially difficult to predict flooding caused by ice jams. The effects may be very local and the behavior of the ice during melting and rising river levels is not well understood.



Causes of Flooding

Several factors may help to reduce the effects of heavy rainfall on river flows. Sun and wind will combine to reduce the snowpack by sublimation (evaporation into the air without melting). The snowpack then contributes less to runoff and river flows. A period under these conditions just before a storm may produce lower-than-normal river flows, allowing the rivers to accept more runoff before reaching flood stage. Until the snowpack reaches a certain density it may actually absorb and hold rainfall, reducing the amount of runoff and subsequent flooding. Once the snowpack begins to melt, however, this precipitation is also released with the water that initially existed in the snowpack.

Dams in Maine were not constructed as flood control structures. However, those which impound significant areas can be useful if their reservoirs are below capacity. If the precipitation falls in regions of the basin below the dams (as in the 1987 flood), any available storage capacity is useless, however. Many dams in the lower reaches of Maine's rivers are run-of-river dams, and have little or no capacity to capture and hold runoff during floods.

National Weather Service flood potential statements and other flood-related weather products can be found on the [Maine Emergency Management Agency weather pages](#). The NWS [Northeast River Forecast Center](#) in Taunton, MA, has additional river condition information. Real-time stream flow data (river stages and, when available, discharge) can be found at the [USGS Augusta office web site](#).

