

**State of Maine  
River Flow Advisory Commission  
Report on Current Hydrologic Conditions  
March 5, 2009**

**Overview:**

The spring meeting of the River Flow Advisory Commission took place Thursday, March 5, 2009. The Commission meets annually in late winter to share information, examine potential for spring flooding and to renew operational protocols. Such factors as stream flow, long-term weather forecasts, snowpack, river ice conditions and reservoir levels are reviewed. This report summarizes the information presented on current hydrologic conditions as of this date.

After reviewing all hydrologic conditions, the Commission found that spring flood potential is near normal for the time of year, but that flood potential could become elevated later in the spring if, as expected, current snowpack remains in place for several weeks.

Throughout this report, Internet addresses are listed for each category of information. The River Flow Advisory Commission web site provides a portal to all these different sites at <http://www.maine.gov/rfac>. This site provides a connection to the ever-changing information critical to monitoring flood potential in the state.

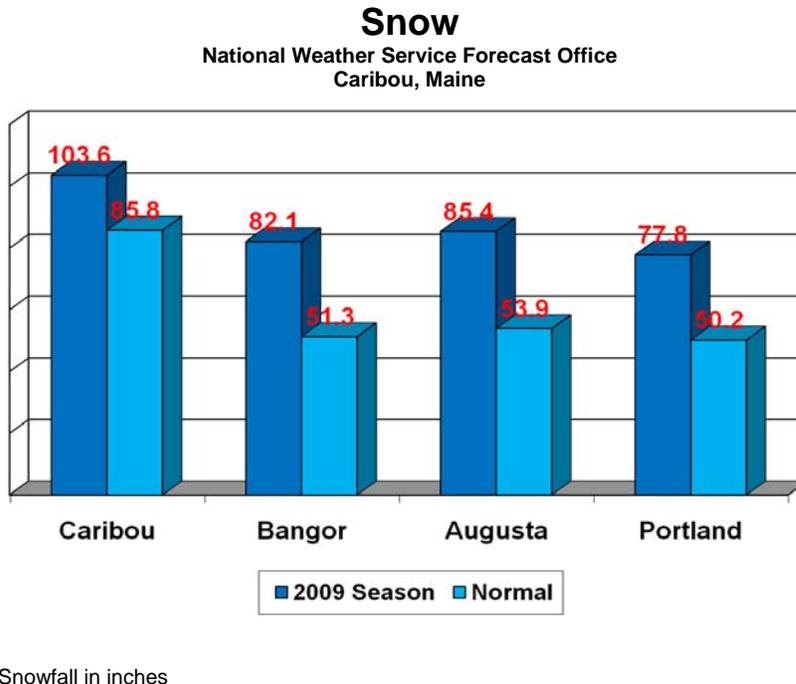
At the end of the report, additional sources are provided for further information.

**Background Climatology:**

2009 globally tied with 2001 as the 8<sup>th</sup> warmest on record, except in Maine, where near-normal temperatures were recorded for winter, summer and fall and slightly below normal temperatures for spring

2008 saw above to much above normal precipitation across the Midwestern and Northeast U.S., while persistent drought nagged the Southeast and Western regions of the country. However, Maine experienced a relatively wet winter, near normal spring and wet summer and fall.

Snowfall totals for the 2008-2009 season are above average, but not to the extent of the 2007-2008 season, when snowfall records were shattered in northern Maine, and Portland saw double its normal snowfall.



**Current Conditions and Flood Potential:*****Stream Flow and Headwater Storage Levels:***

Stream flows across the state were in the normal to slightly above normal range. Stream flows were above normal in October and November after a wet summer and fall, but have moderated into the normal range as of the end of February. These base flow conditions are not likely to influence flooding in the near term.

River basin managers report headwater storages at above normal pre-spring drawdown levels, with the exception of Moosehead Lake, which is drawn down a bit more than normal. However, most basin managers are anticipating bringing storages into line with long term averages by the end of March.

River basin managers draw down storage levels at this time of year, to make room for spring rains and snowmelt. This allows them to “catch” excess runoff in regulated basins during spring flooding events, somewhat moderating river levels.

**Ground Water**

Above average rainfall last summer and fall contributed to above average ground water levels going into the winter. Though these levels have moderated somewhat, ground water conditions remain normal to slightly above normal at this time.

Ground water recharge usually peaks later in the spring, as snow melts, before slowly falling through the summer.

For further information on stream flow and ground water:

USGS Maine Water Science Center	<a href="http://me.water.usgs.gov">me.water.usgs.gov</a> (Hydrologic Conditions Section)
---------------------------------	--

***Ice Conditions:***

In most areas of the state, river ice thickness is below normal, except for far northern Maine, where thickness is slightly above normal. According to the USGS, observed ice conditions are:

- Southern Maine: very thin to no ice
- Central Maine: less than 1.5 foot to no ice
- Eastern Maine: less than 1 foot to no ice
- Northern Maine: 1.5 to 2.5 feet

There are open channels on many rivers and streams in southern, center and eastern Maine.

Stream flows were high early in the winter, which may have discouraged formation of thick ice. In addition, snow cover has insulated the ice. The snow cover may assist in ice erosion, if temperatures do not warm rapidly and ice can erode in place. However, ice conditions will need to be monitored closely throughout the spring because of the unpredictability of ice movement.

Ice jams can form and release rapidly during a rain or warm-up event. Emergency managers are urged to report observed ice jams or ice movement to the National Weather Service and MEMA. Ice jam formation or movement can result in rapid water rise and necessitate quick action to protect life and safety.

The State plans to request the assistance of the US Coast Guard to break ice on the lower Kennebec River later in the month. Opening the lower Kennebec can mitigate the effects of ice flowing from further upstream.

The USCG has indicated that conditions will be optimal for ice-breaking around March 23 and 30. They will coordinate with the USGS, who will be taking core ice samples next week, as well as other river interests, before making final operational plans.

The USGS maintains a live web camera on the Kennebec River in Augusta to provide remote “eyewitness” observation of ice and water movement. The web cam images are accessible on the Internet at <http://me.water.usgs.gov>.

For more information on ice conditions:

Northeast River Forecast Center	<a href="http://www.weather.gov/nerfc">www.weather.gov/nerfc</a>
USGS Maine Water Science Center	<a href="http://me.water.usgs.gov">me.water.usgs.gov</a>

### ***Snowpack:***

A full statewide snow survey was conducted March 1 through 3.

There are 9 to 10 inches of water in the snow throughout western and northern Maine, including in the headwaters of Maine’s major rivers. In central Maine, the water content ranges from 6 to 7 inches, with less along the coast.

This represents a lesser concern than last year, when 10 to 12 inches of water were found in the mountains and foothills. Statewide, this year’s totals are less than last, with the exception of the Acadia National Park area, where water content is higher.

Snow depths range from 30 to 40 inches, with lesser amounts along the coast. Last year at this time, depths of over four feet were recorded in northern Maine.

The snowpack density is generally less than 25% across the state. This indicates the snowpack can absorb some amount of additional water.

Snowpack density is a measurement of water as compared to depth of snow. Snowpack densities in this current range indicate the snowpack can absorb additional water from melting or rainfall. Snowpack density in the 35% to 45% range would indicate the snowpack is “ripe”, or ready to release water when it rains, or temperatures warm.

The Maine Cooperative Snow Survey conducts surveys at sites across Maine from January until the snowpack is gone from the headwaters of our major rivers. Cooperators measure snow depth and water content at specific sites. The critical measurement “snow water equivalent” quantifies the amount of water that could potentially run off into the river basins. Snowmelt alone does not generally cause flooding in Maine, but can add to the runoff caused by rainfall.

Contributors to the Maine Cooperative Snow Survey include Federal and State agencies, hydroelectric power and paper companies and Canadian and New Hampshire environmental agencies.

For more information on snow survey data, updated weekly with every survey through the spring:

Maine Cooperative Snow Survey	<a href="http://www.maine.gov/rfac/rfac_snow.shtml">www.maine.gov/rfac/rfac_snow.shtml</a>
-------------------------------	--

### ***Weather Outlook:***

A short warm-up will take place this week, with a minor snow-rain event expected for the weekend. Looking out 8 to 14 days, temperatures are expected to turn colder, and precipitation is expected to be in the normal range.

Any rainfall this weekend will likely be absorbed by the snowpack, and would not be a risk for major flooding. However, this will likely increase snow density.

It is also likely that additional snow will be received over the next 2 to 3 weeks, which will add to the existing snowpack.

***Flood Potential:***

As of March 5, flood potential across the state was near normal for the time of year. Although snowpack water content is in the upper 25% of historic measurements in many areas, stream flows are in the normal range, and ice thicknesses are below normal across much of the state.

However, the snowpack is not expected to decrease over the next few weeks, and may increase in depth, water content and density. This would likely result in an increase in flood potential. The longer Maine goes into the spring with a significant snowpack, the more likely a sudden warm-up or significant rain event could occur and trigger flooding.

The most important single factor in determining the severity of flooding is **rainfall**, how much and in how short a period of time. Major flooding on Maine rivers does not generally occur from snowmelt alone.

Ice jam flooding cannot be forecast. Local observation is critical as ice begins to break up and move. Ice jams can cause sudden flooding above the jam, as the water backs up, and below the jam if it breaks and releases a large amount of water.

The National Weather Service Forecast Offices in Caribou and Gray will issue Flood Potential Statements every two weeks throughout the spring. These reports will examine all current hydrologic factors and give an overall assessment of flood potential. Both offices are scheduled to issue Flood Potential Statements on Friday, March 6.

For more information on flood potential and for flood watches and warning should they arise:

NWS Gray	<a href="http://www.weather.gov/gray">www.weather.gov/gray</a>
NWS Caribou	<a href="http://www.weather.gov/caribou">www.weather.gov/caribou</a>
NWS Flood Forecasts/MEMA site	<a href="http://www.maine.gov/mema/weather/flood.shtml">www.maine.gov/mema/weather/flood.shtml</a>

**Preparedness and Mitigation:**

***Flood Insurance and Floodplain Management:***

The Maine Floodplain Management Program (MFMP) of the State Planning Office stresses that flooding is always a threat to properties located within a floodplain, but even more so during winter's river ice and spring rains. Many people believe that their homeowner's or business owner's insurance policy will cover any flood related losses but unfortunately, these insurance policies DO NOT cover flood related damages.

In order to receive insurance protection related to flood damage, property owners and renters are urged to purchase flood insurance. For more details on the policies available, contact your insurance agent. There is a **30-day waiting period** before the policy goes into effect.

March and April are historically when flooding occurs in Maine, but heavy rains can cause flooding any time of the year. Those who are worried about potential flooding should not wait to buy flood insurance. Those who wait may be left without any flood coverage when it is needed most. It is estimated that up to 75% of homes and businesses in floodplains in Maine are NOT covered by flood insurance.

There are 8,944 flood insurance policies in effect in Maine as of the end of January, 2009. Maine's flood insurance policy base averages about 3-4% annual growth. Increases are likely due to increased flood insurance awareness from major flooding events in the news around the country and increased agent and lender training. There is over \$1.7 billion in flood coverage in Maine. The average annual premium is \$775.

As long as a community participates in the National Flood Insurance Program, residents, renters and business owners can buy flood insurance no matter where in the community they are located.

Additional assistance is available through the Maine Floodplain Management Program at the State Planning Office by calling 287-8934.

The MFMP and the Maine Emergency Management Agency (MEMA), in partnership with the Federal Emergency Management Agency (FEMA) have ongoing programs stressing "mitigation", or the reduction of risk from disasters. Flood mitigation can be as simple as moving perishable items out of a basement, elevating a furnace or improving drainage for a road that always floods. It can be as far-reaching as moving entire neighborhoods out of the floodplain.

Flooding is Maine's most costly hazard, affecting some community in the state every year, sometimes with disastrous results. Mitigation measures can not only save repair dollars in the long term, but may even make a community more attractive to development and business investment.

For more information on floodplain management and mitigation:

Maine Floodplain Management Program, State Planning Office	<a href="http://www.state.me.us/spo/flood">http://www.state.me.us/spo/flood</a>
--	---

### ***Preparedness and Safety:***

Preparedness is key to minimizing the impact of flooding or any emergency. Individuals and families, businesses, schools and communities benefit from reviewing their vulnerability to flooding and ensuring that they have workable plans for dealing with the event. Everyone should stay aware of National Weather Service forecasts as the spring progresses, and talk to local officials and County Emergency Management Agencies if they have questions about flood preparedness in their communities, or how to build an emergency plan for family, business or school.

**It is also critical during a flood event that all residents heed official warnings.** The primary public safety concern during flood events is people driving through flooded roadways. During a flood no one should drive on submerged roads, as the stability of the road may have been severely damaged by flood waters. Highway crews will place signs and barricades to warn of flooded sections of road. Motorists who ignore these warnings and drive through flooded areas are gambling with their own safety and that of their passengers.

**Nationwide, most flooding deaths occur when vehicles are caught in flood water.** According to the National Weather Service, even 6 inches of fast-moving flood water can knock a person off his feet, and a depth of two feet will float a car.

The National Weather Service Forecast Offices in Caribou and Gray will incorporate this information, along with other preparedness tips, in statements issued during the New England flood awareness week later in March.

The Maine Floodplain Management Program, FEMA Region One, and MEMA have separately and collaboratively provided information to the media and the public over the last month, stressing the importance of flood insurance.

For more information on flood preparedness and safety:

Maine Prepares	<a href="http://www.maineprepares.com">www.maineprepares.com</a>
NWS Caribou	<a href="http://www.weather.gov/caribou">www.weather.gov/caribou</a>
NWS Gray	<a href="http://www.weather.gov/gray">www.weather.gov/gray</a>
County Emergency Management Agencies	<a href="http://www.maine.gov/mema/about/mema_county.shtml">www.maine.gov/mema/about/mema_county.shtml</a>

### Important Factors for Springtime Floods (in order of relative importance):

- 1) **RAINFALL:** This is the most important factor in determining the magnitude of significant floods in Maine. If precipitation during April and May are normal and evenly distributed, then streamflow will be in the normal range. However, if significant rainfall occurs over a short period of time, flooding could result.
- 2) **SNOW COVER:** This is a secondary factor and can add to rainfall events. As the snow pack becomes more “ripe” (nearly saturated), it can melt quickly and significantly add to a flood peak. The most accurate measurement of snow cover is “snow water equivalent”. Snow water equivalent is the amount of liquid water contained in the snow. Snowmelt alone should not produce major floods.
- 3) **RIVER ICE:** Ice jams can cause increased damage by temporarily blocking rivers and streams and causing higher water levels behind the jam. Peak flows downstream increase when jams break up and quickly release stored water.
- 4) **TEMPERATURE:** Warm days with freezing night temperatures allow a gradual melting and runoff of the snowpack. A sudden warm up, especially when coupled with significant rainfall, can send large amounts of runoff into rivers and streams.
- 5) **RESERVOIR STORAGE:** Maine’s headwater storage reservoirs typically reach their annual low water levels in March. These reservoirs can moderate downstream flood peaks if rainfall occurs above the storage dams while the reservoir’s water levels are down. The reservoir systems have limited ability to moderate flood peaks in the lower parts of the river basins if large amounts of rain fall or if heavy rains fall downstream of the storage dams.

### Other Business:

The USGS has documented high water marks for the flooding in Aroostook and Penobscot Counties last May, and is working on a flood report for that event.

FEMA Region One has developed a riverine mapping system which combines maps of flood-prone communities with overlays of floodplains, vulnerable populations, and critical infrastructure. This data has been published on a limited-access web portal, and has been made available to emergency management and partners for planning purposes. The program is in BETA testing; MEMA and partners are providing feedback to FEMA on suggested enhancements to the system.

The USGS has added several stream gages made possible with monies from DOT and FEMA mitigation funds. However, three stream gages on small streams in Washington County have had to be discontinued due to lack of funding. The loss of these gages will not impact flood forecasting.

### Conclusion:

The River Flow Advisory Commission found that as of March 5, spring flood potential is near normal for the time of year across the state, taking into account snowpack, river flows, reservoir storages and ice conditions. This assessment may change as the season progresses, as cooler temperatures are expected to keep current snowpack in place for several additional weeks.

The current conditions information in this report represents a “snapshot” of conditions throughout the state as of March 5, 2009. However, many new factors will influence the flood potential in Maine as the spring progresses.

National Weather Service and emergency management reports should be watched throughout the spring, and local officials should monitor the flood-prone areas for each community. In particular, rivers should be monitored closely as ice begins to break up and move, as ice-jam related flooding can arise quickly and have locally devastating impact. Property owners, business owners and renters in flood-prone areas should check their insurance coverage to be sure that they are protected against flooding damages.

The Maine River Flow Advisory Commission is composed of representatives from major river basin management operations, state agencies, federal agencies and the University of Maine. The Commission was originally formed after the spring floods of 1983 to improve the exchange of hydrologic information collected by the members, to review the data, and to provide information to emergency action agencies and the public. It was created in statute by the Legislature in 1997.

No additional meetings for the Commission are planned. However, conditions will be closely monitored and the Commission will meet again later in the spring should the situation warrant.

### Information Resources:

For additional information on particular aspects of this report, please contact:

<b>Rob McAleer/Lynette Miller</b> , Maine Emergency Management Agency	Flood preparedness and mitigation	207-624-4400
<b>Bob Lent/Greg Stewart</b> , USGS	Stream flow, ice conditions, snow survey	207-622-8201
<b>Tom Hawley</b> , National Weather Service, Gray, Maine	Flood potential for central and southern Maine; flood forecasting	207-688-3216
<b>Mark Turner</b> , National Weather Service, Caribou, Maine	Flood potential for northern and eastern Maine; flood forecasting	207-492-0180
<b>Bob Marvinney</b> , Maine Department of Conservation, Maine Geological Survey	Snow survey	207-287-2801
<b>Sue Baker</b> , State Planning Office, Floodplain Management Program	Floodplain management, flood insurance and mitigation	207-287-8063

Links to further information on all sections of the report, updated as conditions change:

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