

**State of Maine
River Flow Advisory Commission
Report on Current Hydrologic Conditions
March 4, 2010**

Overview:

The spring meeting of the River Flow Advisory Commission took place Thursday, March 4, 2010. 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*, despite a winter that has seen less than normal snowfall in many parts of the state.

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:

Globally, 2009 was warmer than normal, but in Maine, below normal temperatures were recorded for winter and summer with near normal temperatures for spring and fall. Maine had normal precipitation except for the summer, and 2009 ended up the 91st wettest year on record (with 115 being the wettest).

Temperatures for 2010 so far have been well above normal. Snowfall totals for the winter of 2009-2010 so far are well below average measured at Caribou and Portland, but near average as measured at Bangor and Augusta.

According to the National Weather Service, Maine's weather is being affected by the El Niño phenomenon (for more information on El Niño, see <http://www.elnino.noaa.gov/>). Generally speaking the El Niño effect brings higher temperatures and lower precipitation to the Northeast, which is borne out by the weather patterns this winter. Numerous storms have brought increased precipitation to the mid-Atlantic and southern states, going out to sea south of New England.

Current Conditions and Flood Potential:

Stream Flow and Headwater Storage Levels:

Stream flows across the state are in the normal to slightly above normal range.

River basin managers report headwater storages at above normal pre-spring drawdown levels. However, 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

Ground water conditions remain normal to high in most areas of the State.

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	me.water.usgs.gov (Hydrologic Conditions Section)
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Ice Conditions:

According to the USGS, ice thickness statewide is below normal with open channels on many rivers and streams in southern, central, and eastern Maine. Observed ice conditions are:

- Southern Maine (very thin to no ice)
- Central Maine (less than 1' to no ice)
- Eastern Maine (less than 1' to no ice)
- Northern Maine (less than 2.0' to no ice)

Factors including elevated stream flows, above normal temperatures and little snow cover contributed to below normal ice thickness in Maine rivers.

The rain event in late January lifted and moved ice, causing a major jam in the Kennebec River near Augusta, and also jams on the Saco, Piscataquis, and Sandy Rivers and other smaller streams. The ice in the Saco is now gone, but ice in areas of Piscataquis and Franklin Counties will continue to be monitored as the spring continues. River ice is also still in place in Aroostook County, although somewhat less than thick than normal for the time of year.

The ice jam on the Kennebec caused a river rise of 3.2 feet in a 30-minute period. This is striking compared to an open water flood which would typically see this amount of rise over several hours.

During the January event, the State requested the assistance of the US Coast Guard to break ice in the lower Kennebec. The Coast Guard's effort involved three ice-breaking vessels and continued January 28 through 31. The USCG planned to return to the Kennebec starting March 8. However, weather conditions during February, including slowly warming temperatures and little to no precipitation, slowly eroded the ice. The storm the last week in February lifted and moved the last major amounts of river ice, so ice-breaking will not be necessary.

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. As was evidenced on the Kennebec in January, ice jam formation or movement can result in rapid water rise and necessitate quick action to protect life and safety.

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	www.weather.gov/nerfc
USGS Maine Water Science Center	me.water.usgs.gov

Snowpack:

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

There are 5 to 7 inches of water in the snow throughout western and northern Maine, including in the headwaters of Maine's major rivers. This puts the snowpack in the normal range for water content for the time of year. Although there is virtually no snow in coastal areas, snow depths in the north and west range from 18 to over 36 inches, with locally higher amounts. .

The snowpack density is generally less than 28% in the north and west, including the headwaters areas. 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 up.

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	www.maine.gov/rfac/rfac_snow.shtml
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Weather Outlook:

According to the National Weather Service, the general outlook for the next 8 to 14 days calls for above normal temperatures and below normal precipitation. This is in line with the El Niño effect previously noted.

However, even if continued trends call for below normal precipitation, this does not preclude rainstorms from affecting the state. The severe storm the last week in February brought locally very heavy rainfall to southern Maine, and caused serious flooding.

Flood Potential:

As of March 4, flood potential in Maine was near normal for the time of year. Although snow in southern parts of the State is almost gone, snowpack water content in the headwaters areas is in the normal range for the time of year. Stream flows are in the normal to above normal range. Ice remains in rivers in northern Maine.

Rainfall is the most significant risk factor in Maine flooding. However, snowpack, frozen or saturated ground, and river ice are additional risk factors present in the spring. These risk factors are present this year despite the common conception that the risk is much reduced from lack of snow.

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 5.

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

NWS Gray	www.weather.gov/gray
NWS Caribou	www.weather.gov/caribou
NWS Flood Forecasts/MEMA site	www.maine.gov/mema/weather/flood.shtml

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 8,780 flood insurance policies in effect in Maine as of the end of February, 2010. There is over \$1.7 billion in flood coverage in Maine. The average annual premium is \$882.

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 287-3261.

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	http://www.state.me.us/spo/flood
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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.

For more information on flood preparedness and safety:

Maine Prepares	www.maineprepares.com
NWS Caribou	www.weather.gov/caribou
NWS Gray	www.weather.gov/gray
County Emergency Management Agencies	www.maine.gov/mema/about/mema_county.shtml

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:

Gages on the Kennebec River in Madison, and the Kenduskeag Stream and Penobscot River in Bangor have been added to the stream gage network in the past year. These gages were procured through FEMA's Hazard Mitigation Grant Program. Maintenance costs will be contributed by private sector partners and the City of Bangor.

Conclusion:

The River Flow Advisory Commission found that as of March 4, 2010, spring flood potential is near normal for the time of year, taking into account snowpack, river flows, reservoir storages and ice conditions.

The current conditions information in this report represents a "snapshot" of conditions throughout the state as of March 4, 2010. 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, northern 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 Commission members will continue to share information through the spring.

Information Resources:

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

Rob McAleer/Lynette Miller , Maine Emergency Management Agency	Flood preparedness and mitigation	207-624-4400
Bob Lent/Greg Stewart , USGS	Stream flow, ice conditions, snow survey	207-622-8201
Tom Hawley , National Weather Service, Gray, Maine	Flood potential for central and southern Maine; flood forecasting	207-688-3216
Mark Turner , National Weather Service, Caribou, Maine	Flood potential for northern and eastern Maine; flood forecasting	207-492-0180
Bob Marvinney , Maine Department of	Snow survey	207-287-2801

Conservation, Maine Geological Survey		
Sue Baker , State Planning Office, Floodplain Management Program	Floodplain management, flood insurance and mitigation	207-287-3261

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

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

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