

## **Floods and more floods get our attention**

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The spring transition from deep snow to new growth came especially fast this April. After a very snowy winter, it was a delight to see the daffodils open within 2 weeks of snowmelt. By the first of May, I was mowing my lawn – the part that wasn't under water - and by the end of the month torrential storms and hot weather had arrived. It has been extremely wet. The soil was saturated by snowmelt, and the frequent storms gave some of the highest flood levels I have seen on the Otter Creek below my house.

Further north Lake Champlain reached a new record level of 103 ft — the highest in 150 years of records — as heavy rains flooded the basin. The lake has been above flood stage for 2 months. Severe storms and tornado warnings have affected Vermont, although these are just faint downstream echos of the devastating tornados that have killed so many across the United States this spring.

Some floods are sudden, like the Barre flood that shut down the Rutland Herald and Times Argus printing press last month. Some floods are slow moving, as in the rise of Lake Champlain and the rolling disaster down the mighty Mississippi, which also lasted for weeks. For the first time, three sets of flood spillways had to be opened to save cities and oil refineries downstream, but hundreds of thousands of acres of farmland were flooded instead. While many states, including Vermont, have had record precipitation this spring, Texas has experienced a record drought.

All floods get our attention. The floods along the Mississippi again show the challenge of managing both rivers and risk. The floodplain is of course good farmland, but why do we build in floodplains? We ignore the risks and try to manage the river, rather than human behavior. After the 1927 Mississippi flood, the Army Corps of Engineers was given the task of river management. Yet in recent years, the frequency of severe flooding along the Mississippi has greatly increased. Robert Criss, a hydrologist at Washington University in St. Louis comments: “We had a 500-year flood in 1993, a 70-year flood in 2001, and a 200-year flood in 2008, and every year since then, we have had another 10-year flood.” And now 2011 will be a year of another 200- or 500-year flood. Perhaps this will convince us that our twentieth century statistics should be relegated to history.

Two things are happening. As we try to control the river by confining it within levees, the water level rises. And as the climate warms, precipitation rates are increasing rapidly. Vapor pressure goes up steeply with temperature, and the energy released when vapor condenses in clouds intensifies storms. One year the Mississippi will break its banks and carve out a new channel.

Here you can see some of the fantasies that run through our society. We are powerful, and our engineers can control the river. We are a free nation, and we can build where we like. We are not responsible for the changing climate that is accelerating the water cycle. The 100-year floods every few years must be acts of God, because we don't “believe” in climate change.

These floods will wash away our fantasies, and sometime this century we will come to a more honest and humble understanding of our relationship to the Earth. We will have to, because another very slow moving flood is quietly underway: the accelerating rise of sea level. There was record melt of the Greenland icecap in 2010, and the best estimate of sea level rise is now 3 to 5 feet this century. Lake Champlain may subside in a few weeks, but sea level rise will flood coastal development everywhere, and this will continue for many centuries.

*Mississippi floods:* [http://en.wikipedia.org/wiki/2011\\_Mississippi\\_River\\_floods](http://en.wikipedia.org/wiki/2011_Mississippi_River_floods)