

What to do with all this rain!

Alan Betts (<http://alanbetts.com>)

Vermont is not subject to coastal flooding, but as the Earth's climate warms we still need to think ahead and plan how to manage water resources. The global water cycle is changing quite rapidly. This October my garden in Pittsford had an astonishing eleven inches of rain, and the Otter Creek flooded several times. A big storm early in the month gave widespread flooding across Vermont.

Throughout the Northeast annual precipitation has increased by 15-20 percent in the past 50 years, and very heavy precipitation is up more than 60 percent. Streamflows in Vermont have also risen substantially in recent decades in fall and early winter. All our models tell us that these trends will continue in coming decades, and indeed they will accelerate — until we finally make the shift away from fossil fuels as our primary energy source.

What can we do? We must plan ahead when we build infrastructure that lasts for decades. We need to install larger culverts and build larger storm water systems. Design capacities based on old standards from the 1960s are far too small for the heavy rains we now face. We must redesign our urban environment to allow more rainfall to infiltrate into the soil — with porous parking lots, for example! Building in floodplains, which has always been foolish, is now even more so.

Precipitation in Vermont will increase in every season except summer. In summer, total rainfall is likely to change little, but one-to-three month droughts between heavy rain events will become more frequent. Heavy rain runs off quickly and can wash away soil and still more fertilizer into rivers and lakes. Faster runoff increases streamflow and the likelihood of flooding; but it also leaves less water to soak into the ground and replenish the soil and the deep water reservoirs. One bright side of increasing streamflow is that we could judiciously renovate some old hydro-facilities to provide some badly needed local renewable power.

How can we slow runoff so that more soaks into the ground? Keeping our forest cover on the hills is critical. In the early part of the 20th century when Vermont had far less forest cover, the state experienced many devastating floods. Richer organic soils help retain water, as does contour farming on hillsides. Evaporation increases with warmer temperatures, and there will often be longer dry periods between rain storms — so we need to store more water in the ground or in ponds as a buffer. We may also have to plant crops that have deeper roots.

In the coming decades Vermont will probably have enough water on an annual basis, but we will need to maximize seasonal water storage to carry us through more frequent droughts in the crucial summer growing season. Just as we need to use energy as efficiently as possible, we will have to use water more prudently during the warm season.

Precipitation during the winter season will likely shift from dry snow toward more wet snow and freezing rain. The very cold winter period with lying snow is shrinking surprisingly quickly. In the past forty years, the length of time when our small lakes are frozen has shrunk by seven days each decade. Ski areas will make snow whenever it is cold enough, but cross-country skiing and snowmobiling will come to depend ever more on fresh snowfall.

Fresh water is precious to all of life on land. As the drier zones spread northward from the subtropics into the southern United States in summer, we Vermonters will consider ourselves fortunate to have more rather than less water for much of the year. Let us be grateful and make plans to use it wisely.

National Weather Service: <http://www.erh.noaa.gov/btv/climo/MonthlySummary/>