

Lesson #1 Berms create a false sense of security

Irene's rains swelled the Neshobe River on August 28, 2011. The river raced down from the western face of the Green Mountains before reaching the relatively level ground around the hamlet of Forestdale. There a six-foot high berm of stone had been built to constrain the river and protect homes and businesses in the hamlet. It was not enough.

Where the river channel narrowed, Irene's waters crashed through the berm. Portions of the Vermont Tubbs furniture factory were destroyed. The river carved two-foot ditches on either side of Newton Road, and gouged channels through corn fields, tearing away topsoil and leaving only gravel deposits. Basements filled with river water.



The Neshobe River flows from the west face of the Green Mountains before passing through Forestdale.

Berms like the one in Forestdale give communities a false sense of security. Prior to Irene, residents believed berms protected them from floodwaters. Yet berms often exacerbated Irene's flood damage. Once breached they trapped rivers on the populated side of the berm rather than keeping floodwaters away from property. In a few cases, communities learned from these failures and abandoned the berms, increasing a river's access to its floodplain. Unfortunately in other locations berms remain, increasing the risk of future floods to homes and property.



The former Vermont Tubbs furniture factory in Forestdale. The factory was destroyed when the Neshobe River escaped a berm on the left bank. Photo by Lori Fisher.

Evening Song Farm sits in the picturesque valley of the Mill River along Route 103 in Cuttingsville. The Mill River has been bermed at least three times to protect Route 103 and the railroad tracks that traverse the valley. During Irene, the river breached the berm upstream of Evening Song Farm. The main current of the Mill River roared across the farm's vegetable field, destroying the year's crop and leaving a boulder-strewn expanse. Farm owner Kara Fitzgerald told Vermont Public Radio, "the river just eminent-domained my farm."

For river scientists, the destruction at Evening Song Farm was not a complete surprise. A river corridor management plan prepared prior to Irene noted how the river had been straightened and forced against the valley wall. The plan recommended removing the berm.

In some places, Irene's flooding inspired local residents to allow a river to access its floodplain rather than rebuilding destroyed berms. That's what happened in Forestdale. A farmer offered conservation easements on two parcels, totaling 14 acres. The river can now spread across his farm fields instead of being confined to the stream channel by a berm. This also happened along Freeman Brook in Mt. Holly. The river escaped its berms during Irene, threatening Freeman Brook Road, one of the main routes

between Mt. Holly and Shrewsbury. Instead of rebuilding the berm, the town decided to let the river reclaim its floodplain. Now the floodplain can store more water during future floods.



The Mill River (right) broke through its berm wiping out prime agricultural land at Evening Song Farm. Photos by Mike Winslow.

Other communities insist on rebuilding berms. Homer Stone Brook in Wallingford drops over 1,200 feet along its approximate two-mile length from its origins at Little Rock Pond on Green Mountain to its confluence with the Otter Creek. In the last one-sixth of that route, the brook's course flattens. Here berms were constructed to prevent the brook from fanning out to homes and railroad tracks that cross it downstream.

Like the Mill River, Homer Stone Brook escaped from its berms during Irene, carving a new route to the Otter Creek. Once outside the berm, the river could no longer access its old channel. The new channel paralleled the railroad tracks for a few hundred feet before cutting underneath them to a new outlet. The railroad incurred hundreds of thousands of dollars in damage as a result. Despite this failure, the berms were reconstructed and heightened after the storm, and the river channel was narrowed even more.

In East Middlebury the river also left its course, streaming down Route 125. Fortunately, damage was minor, even though there are nine houses located in known erosion hazard zone and eight in the 100-year floodplain. The state has been working with FEMA seeking federal funding approval for a hazard mitigation project to restore floodplain in this area.



Homer Stone Brook drops over 1,200 feet between Little Rock Pond and the Otter Creek.



Berms along Homer Stone Brook gave local residents a sense they were safe from the water, but the brook escaped the berms during Irene. Photo by Mike Winslow.

Rivers naturally meander across valley bottoms, particularly as streams reach more level ground at the toe of mountain slopes, as in Forestdale, Wallingford and East Middlebury. When we place roads, railroad and homes in these locations, conflicts with rivers ensue. Berms to protect structures and roads offer false security. Berms can only temporarily constrain the river to a narrow channel in such locations. They are always at risk of failing in the next inevitable flood.