

# The Outside Story



## Wetlands Filter and Enrich the Landscape

By: Declan McCabe

One spring, following heavy rain, I visited the Saint Michael's College Natural Area hoping to capture exciting photographs of the rushing Winooski River. Rather than raging floodwaters, however, I found the river's floodplain was efficiently – and slowly – accommodating the onslaught of rainwater.

News reports of floods typically show catastrophic events, with rivers carrying away possessions and leaving tragedy in their wakes. I have witnessed floods moving soil, debris, tree limbs, and even whole trees. An oxbow in the Natural Area marks a dramatic change in river course, likely caused by a flood and confirmed by 1940s aerial photographs showing the former river channel.

In contrast, the spring flood I observed was a gradual event lacking drama. There was a nearly

imperceptible rise in water level as the floodplain slowly became submerged. Streams of bubbles rose from flooded soil as insect burrows yielded air to the advancing water.

I followed the looping flood line across the landscape as it relentlessly, patiently found all low-lying land. Where the river reached depressions, it overflowed, creating ponds that would outlast the flood. I marked these overflows with my GPS and revisited them a few days later, as the river receded. The temporary floodwater ponds provided habitat for amphibians, macroinvertebrates, and a few stranded fish, making easy prey for herons and kingfishers.

On my return trip, every leaf, blade of grass, and stalk in the floodplain wore a coat of fine silt. Summer rains would eventually wash the silt into the soil, nourishing the vegetation at the base of the riparian food web. These floodplain wetlands had intercepted and stored nutrient-rich material from upstream, material that otherwise would have reached Lake Champlain and caused eutrophication and algal blooms.

Rather than wreaking havoc, this flood had replenished the wetland ecosystem.

In a way, my walkabout in the floodplain replenished my psyche and revamped my teaching approach in ways that no stale scientific journal could rival. I have always taught my students that wetlands are the kidneys of the landscape, filtering and converting nutrients to plant material. My stroll showed me what this looks like in reality – and offered vivid details to add to lectures.

Previously, I had assumed that sediment-bound nutrients simply settled into pond-like wetlands.

But if that were true, we could control nutrient pollution with concrete basins: flood water in; silt deposited, accumulated, pumped out; repeat. This approach is often implemented – including in a stream leading from a paved parking lot onto Saint Michael’s College property – although the necessary pumping is frequently neglected. Absent pumping, these basins fill to capacity with sediment, and new sediment simply heads downstream, entirely negating the structure’s purpose.

But true wetlands, and even wetlands constructed to better treat storm water, capture floodwater, providing an overflow mechanism for rivers. The captured water evaporates or is slowly released back to the river.

Tropical Storm Irene in 2011 provided a graphic example of the value of wetlands. When flood waters reached Rutland, Vermont, Otter Creek was hemmed in between concrete barriers with no place to go but up and over those barriers. The results were devastating, with sections of Route 4 between Rutland and Killington undermined, the bridge over Otter Creek South of Rutland closed due to flood damage, and many homes flooded.

As Otter Creek flowed downstream, it had accumulated rainwater as the stalled storm inundated already saturated soils. The river swelled and grew. Intuition would suggest that Middlebury, downstream of Rutland, would have been laid waste, but Middlebury was largely spared. No mysterious force prevailed upon the river; the water simply spread out into Addison County wetlands, enriching soils as flood waters have for millennia. University of Vermont’s Keri Watson estimated that wetlands reduced Irene’s economic damage to Middlebury by about 80 percent.

Many wetlands have been drained, filled, and built upon, compounding the effects of flooding. Thankfully, however, wetlands are gaining the protections they deserve, allowing these important areas to help improve water quality and reduce flooding. There’s more to learn, and more wetlands to protect, restore, and create *de novo*. Climate change has increased flooding in the Northeast, but with forethought and wetland protections, floods can be quiet affairs to watch with fascination, rather than devastating and destructive events.

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