

Lesson #7 Constructed ponds can pose a hazard

Many rural properties are dotted with constructed ponds, built as watering holes for livestock or for the aesthetic enjoyment of the homeowner. Ponds have also been developed for stormwater management and to provide water for snow-making. Ponds can be a great amenity, but when built too close to a river they are also a hazard.

Shrewsbury resident Lee Wilson described what happened to his pond during Irene,



This Mt. Holly pond (top of photo) was constructed in the floodplain. During Irene the stream captured the pond releasing a surge of water and sediment downstream. Photo by Mike Winslow.

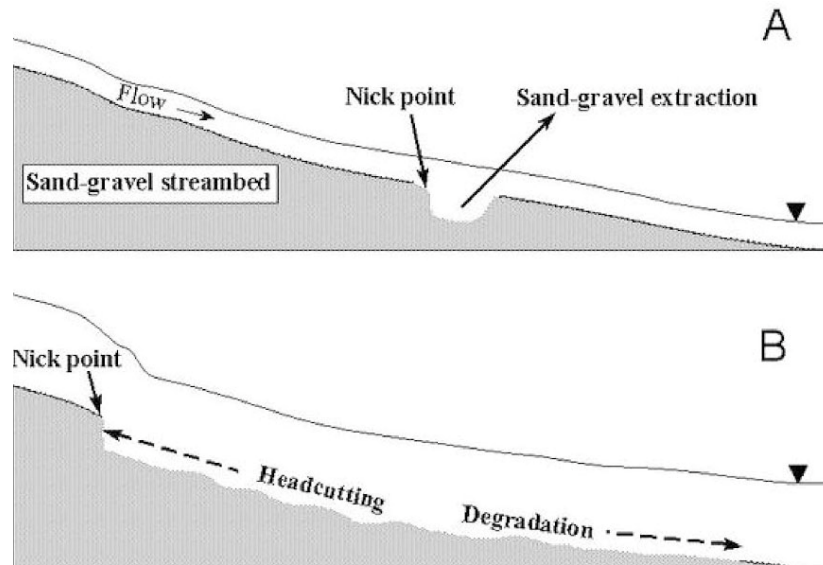
“With a startling suddenness, the stream overlapped the Old Plymouth Road Bridge opposite the house and a flood of water began crossing the road, pouring into and out of our small pond on the other side of the road. Debris had jammed under the bridge turning it into a dam. The force of water through the pond knocked a hole in the embankment between pond and stream, and the pond was no more. Shortly after, the Old Plymouth Road Bridge collapsed from the rushing water destroying its abutments.”

In 1995, Sugarbush Ski Resort built a new snow-making pond. Since then it has been captured by floods in 1995, 1998, 2001 and 2011. The 10-acre pond is adjacent to the Mad River mainstem, just downstream from Clay Brook. When it is breached, large sediment loads enter the river and move downstream so that deep pools downstream are almost entirely filled by loose unconsolidated sediment. During Irene, the pond collected tons of dirt and gravel.



Sugarbush Ski Resort’s snow-making pond along Route 100 in Warren has been captured multiple times by the Mad River.

Streamside ponds represent an extreme form of gravel dredging in the way that they promote instability in streams. In all streams the force of flowing water transports sediment. When gravel is removed from a stream the water’s force takes sediment from either the stream bed or banks. This creates a head-cut which over time migrates upstream as it erodes further.



A pond's impact on a stream is similar to sand or gravel extraction. The pond creates a nick point in stream channels. If the pond fails, the river erodes at the head of the pond while the downstream area degrades. Diagram by San Diego State University.

Ponds can be “captured” by flooding streams. Digging a hole next to a river leaves a depression lower than the river bed, and water will always seek the lowest point. During high water a river may flow into or capture an adjoining pond, and change its course. Over time, fine sediments accumulate in ponds. When ponds get captured by a flooding stream, those sediments wash out, accentuating any downstream debris jams. Gravel pits and golf course sand traps and water features are also susceptible. Care must be taken when planning, approving or constructing any depressions like ponds within a river corridor.



This sand trap on a central Vermont golf course was captured by the nearby river during Irene. Note the sand that has been delivered downstream at the top of the photo. Photo by Mansfield Heliflight.