

Impacts of Severe Flooding on Trout Populations and Streams in Southeast Minnesota

Minnesota Department of Natural Resources – Lanesboro Fisheries Office

A series of thunderstorms moving along a stalled frontal boundary dropped extremely heavy rain on much of southern Minnesota on August 18, 19, and 20, 2007. A National Weather Service climate observer near Hokah (Houston county) reported 15.10 inches of rain by the morning of August 19th. Officially, this is the largest 24-hour rainfall event ever recorded in Minnesota for the past 116 years, surpassing the old record of 10.84 inches (Fort Ripley, 1972). The State Climatology Office estimates the rainfall measured at Hokah represents a return period of somewhat over 2,000 years (0.05% probability). In the end, as much as 20.85 inches of rain was reported falling in this multi-day event.

Approximately 50 streams were severely impacted across the region, including larger systems such as the Root River. Water levels on streams reached as much as 50 feet above normal, causing damage such as: erosion, extensive deposition of rock, rubble, and woody debris in the floodplain, significant channel alterations, loss of aquatic plants, and loss of aquatic invertebrates and other trout food. Prioritizing appropriate agency response to the extent of this damage presents challenges in allocating limited financial and professional resources. It will require DNR staff to focus on the necessary assessment tools, cost-effective restoration techniques, partnerships to leverage funding, and communications outreach that results in public understanding and support for the course of action.

As could be assumed by the changes that occurred with many stream channels from such a large rain event, trout populations must have been devastated; however, this is not the case. Trout populations in southeast Minnesota are in good shape and we should not assume that large changes to stream channels reflect large negative impacts to the corresponding trout populations, at least immediately. As an example we will use the South Branch Whitewater River, a very popular destination for trout anglers.

The Lanesboro Fisheries Office assesses the coldwater fish communities in 22 streams on an annual basis in 23 stations as part of our Long-Term Monitoring (LTM) program. “Stations” are sections of streams, usually between 500-1500’ in length, which are representative of the aquatic habitats available to fish in a stream. Some of these stations have been assessed since the early 1970’s. With the information collected during these assessments we can then examine the condition of the fish community and prepare for what may happen in the future.

Trout populations fluctuate greatly from year to year (see Figure 1). This is driven mostly by environmental conditions, such as spring floods. Streams with wild trout populations tend to fluctuate less than streams requiring stocking because of the associated water quality and better habitat conditions. Also, the adaptive behavioral traits of wild trout allow them to better withstand intense flooding.

The adult brown trout population in the South Branch Whitewater River was already on its natural decline before the flood occurred (see Figure 1). As you can see in Figure 2, adult brown trout numbers in 2007 (post-flood) were actually higher in the station relative to the assessment from 2006 (pre-flood). However, notice the difference in abundance of young trout (hatched spring 2007) compared to 2006. Spring runoff/flooding is likely the cause of the missing young trout. What is important to understand is that although many trout populations fared the floods well, the significant stream channel and trout habitat alterations have the potential to significantly affect trout populations in coming years.

Figure 1

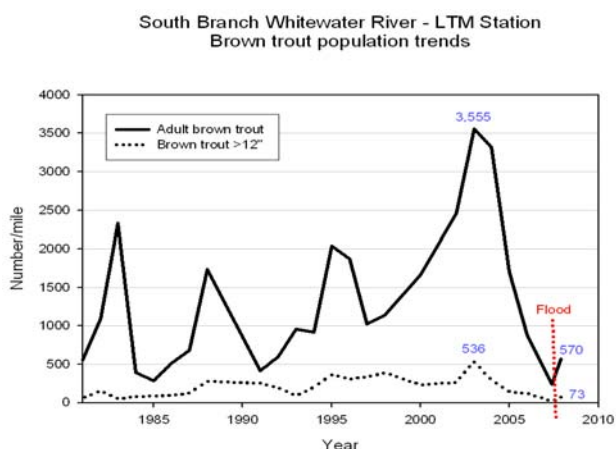
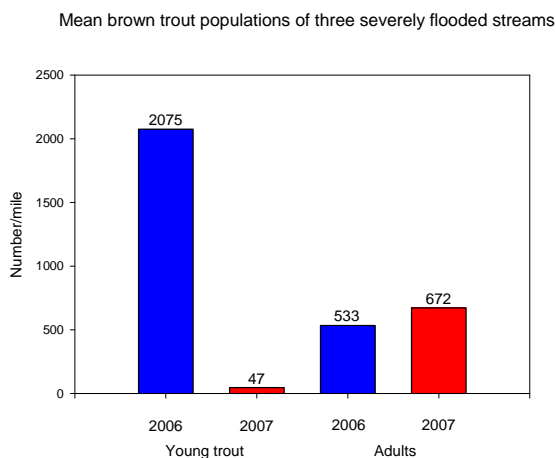


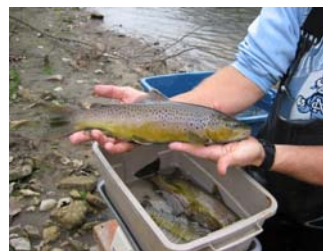
Figure 2



The Lanesboro Fisheries Office habitat improvement crew works on thousands of feet of stream bank on several streams each year to improve trout habitat conditions. Current techniques used include some of the latest concepts for stream channel design and habitat improvement. Streams with recent habitat improvement projects stood up very well in the floodwaters, usually much better than unimproved streams. These techniques will be used in the future to rehabilitate flood-damaged streams.



Brown trout (18.6") - Rush Creek



Brown trout (15.6") - South Branch Whitewater River

Some priorities in planning include:

- 1) Continue to inventory and assess fish communities monitoring for long-term changes
- 2) Promote wild trout populations
- 3) Increase evaluation of factors influencing trout stream communities, such as: land use practices within watersheds, water quality, stream flow, and condition of stream channel
- 4) Continue habitat improvement projects
- 5) Identify 1-3 streams with potential for comprehensive habitat restoration (watershed and channel) using the LASER concept (Lanesboro Area Strategic Ecosystem Restoration).
- 6) Develop partnerships with private landowners and local agencies (SWCD, NRCS, MPCA, MDA, etc.) on stream/watershed projects.
- 7) Explore new funding sources (Trout Unlimited Driftless Area Restoration Effort, USFWS, etc.)
- 8) Develop communication tools for public consumption (e.g., landowners, county boards, trout constituent groups, and legislators)

