

## ***Flood Impacts to Wild Trout Populations in Vermont***

Vermont Department of Fish and Wildlife

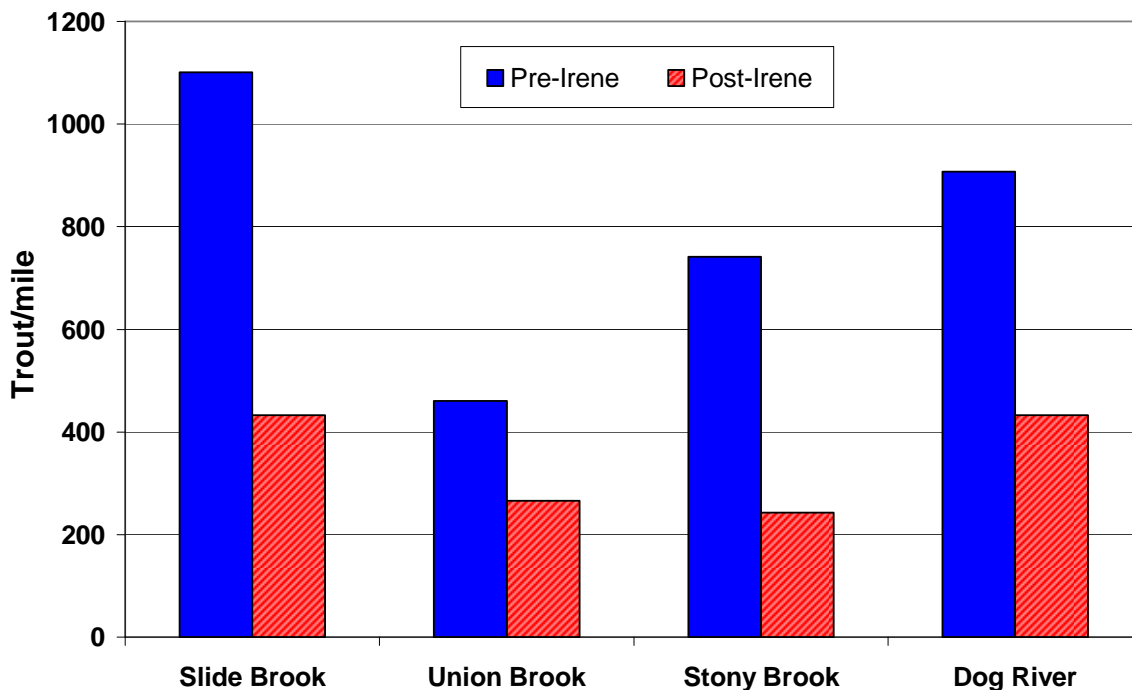
Trout and other fish populations inhabiting Vermont streams and rivers have evolved to survive and quickly recover from the effects of severe flooding. While physical trauma associated with large scale movement of streambed material and debris, displacement, stranding and physiological stress will take a toll in the short term; these populations will quickly rebound when quality aquatic habitat remains intact.

The Vermont Department of Fish and Wildlife routinely monitors wild trout populations throughout Vermont. This information clearly illustrates the impact of severe flooding from tropical storm Irene in several watersheds, as well as what we can expect from these populations in the future.

### **Impacts of Irene on Wild Trout Populations:**

Stream surveys conducted in 2011 prior to the Irene flood were repeated in several streams within the Mad River and Dog River watersheds, which had experienced severe flooding. Following the flood, wild trout populations in these streams were reduced to 33-58% of pre-flood levels. Young fish were particularly affected (0-37% of pre-flood levels) while older trout fared better (41-64% of pre-flood levels).

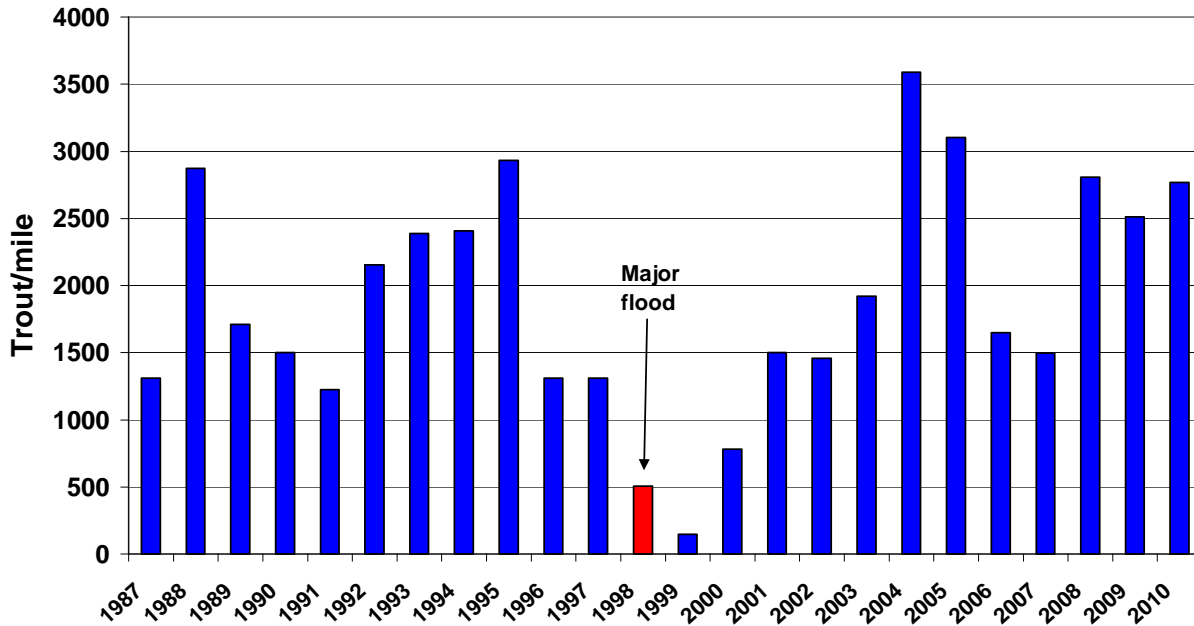
### **Wild Trout Populations - Before and After Irene** Vermont Department of Fish and Wildlife Surveys



**Long-term Impacts of Flooding on Wild Trout Populations:**

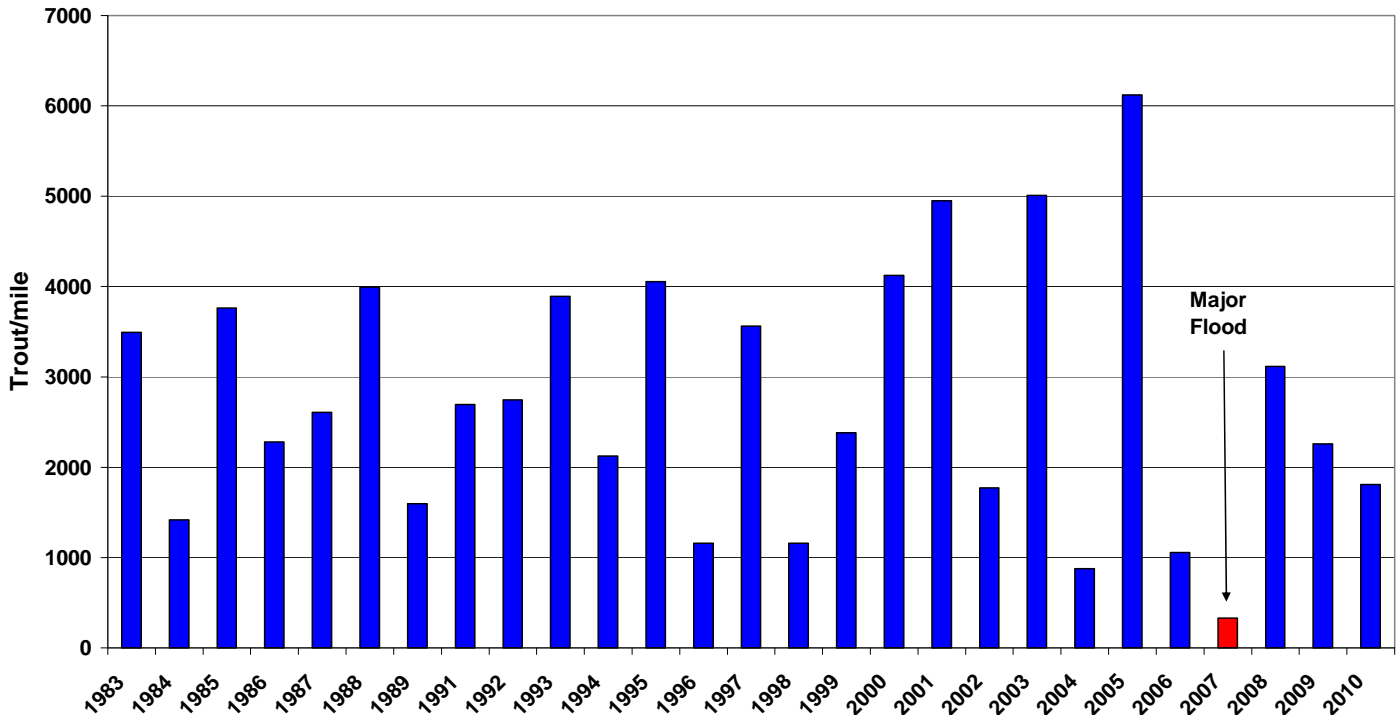
Long-term monitoring of wild trout populations affected by extreme flood damage provides insight into the future of Vermont’s wild trout populations. In 1998, the Mad River valley and surrounding areas were hit by a devastating flood resulting in severe damage to public and private infrastructure. The wild brook trout population in Clay Brook, a tributary of the Mad River in Warren, was reduced to a fraction of its previous levels. Significant recovery was noted in 2000 and by 2001 the population was within its normal pre-flood range where it remained for the next decade.

**Clay Brook Wild Brook Trout Population Estimates**  
Vermont Department of Fish and Wildlife Surveys  
1987-2010



A similar situation occurred in the White River watershed in 2007, when Lilliesville Brook and nearby tributaries of the White River were severely impacted by flooding. Several bridges, culverts and homes were lost on Lilliesville Brook Road. The wild trout population was reduced to its lowest level recorded in 24 years. However, the following year, the wild trout population rebounded to pre-flood levels and has sustained itself since.

**Lilliesville Brook Wild Trout Populations**  
Vermont Department of Fish and Wildlife Surveys  
1983-2010



While significant changes to the physical habitat occurred in both streams following the flood, the overall quality and diversity of aquatic habitat remained in tact. With sufficient habitat quality, wild trout populations were able to rebound quickly and sustain themselves at pre-flood levels.

**Impacts of Instream Flood Recovery Activities on Aquatic Habitat:**

Instream flood recovery activities such as channelization, excessive streambed excavation and large scale natural wood removal greatly reduces the quality and diversity of aquatic habitats necessary to sustain fish and other aquatic populations. Different species and lifestages require a variety of habitat conditions to complete their life cycle. When aquatic habitats are degraded and homogenized, it requires many years or decades to recover, as these materials (cobbles, boulders, trees, etc.) must move in from upstream areas during high flows, and the river must slowly recreate pools, bends and other habitat features.

The magnitude, extent and timing of instream flood recovery activities will ultimately determine the degree and longevity of the impacts to aquatic habitats and the populations they support. The ability of these populations to recover will depend upon successful reproduction and survival to older age classes. This can only occur if habitat conditions are in place to support these biological processes. The Vermont Department of Fish and Wildlife and its state, federal and private partners have invested a great amount of time and resources to protect, enhance and restore aquatic habitats. While restoration techniques can be successful, they are very expensive. A more ecologically sustainable and cost effective approach is to avoid unnecessary habitat degradation in the first place.



*A section of stream with a diversity of natural habitat conditions created by large boulders, fallen trees, cobbles, gravels and forested shoreline.*



*The same stream in a downstream location has been channelized, removing large materials from the channel and lining the streambanks, creating a homogeneous stream channel with poor aquatic habitat value.*





*West Branch of the White River following post-flood channelization activities.  
This over-widened, shallow, featureless streambed provides very poor aquatic habitat and will  
take many years, if not decades, to recover.*



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10/2011