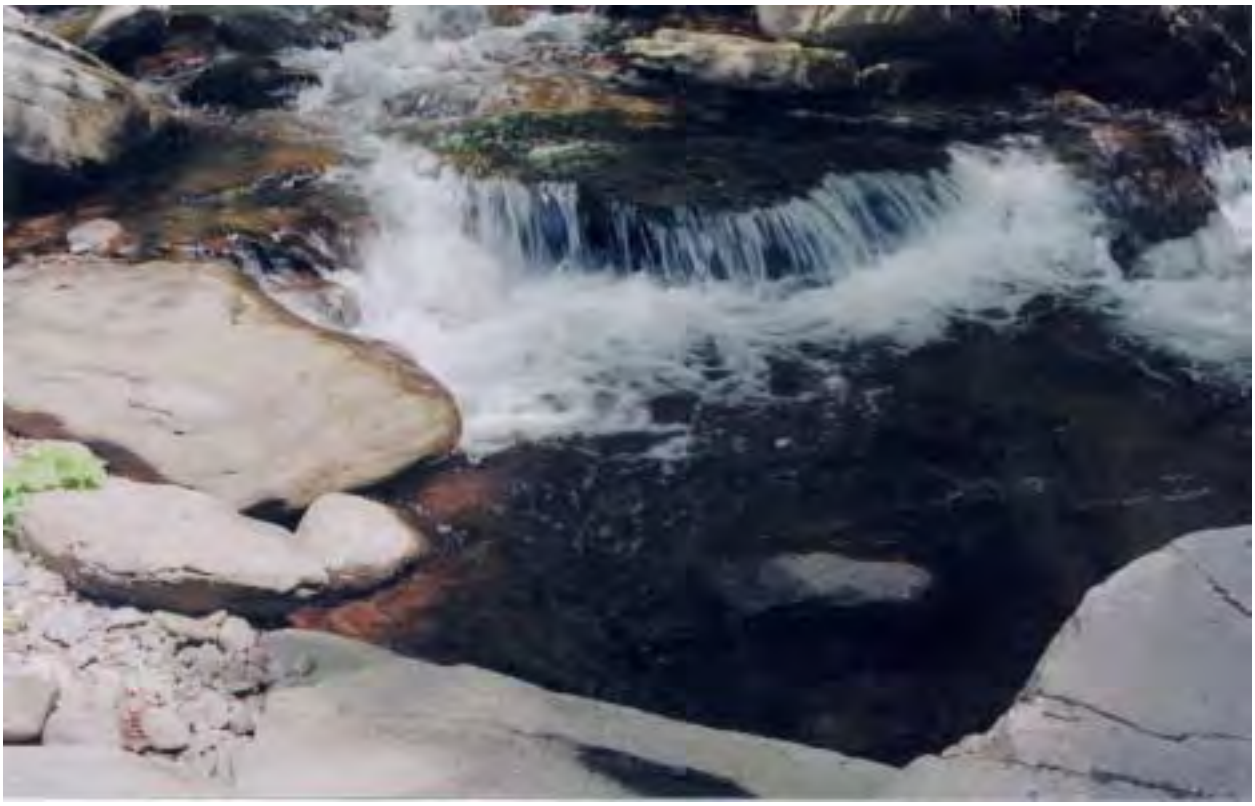
3.5 Fisheries and Wildlife



Mark McCarroll, 2003

Stream and Floodplain Ecology

Despite the important protections of the Clean Water Act, in the three decades since its passage, the biological integrity of our waters continues to decline (Karr and Chu, 1999). Because of this, healthy, rocky, headwater streams like Broadstreet Hollow are all the more precious. Increasingly, we recognize that our quality of life is linked to the quality of many other lives around us, and that it is in our own interest to take an active role in the stewardship of the ecological web in which we all live.

The Broadstreet Hollow maintains a diverse coldwater fish community, and also supports diverse riparian and upland plant and animal species. Fish communities, benthic (bottom-dwelling) aquatic (in water) macroinvertebrate (insect) communities and riparian forest communities are described in greater detail below. Trees and fish are at the opposite ends of the food chain…leaves falling into the stream provide the captured solar energy for the aquatic food chain, and are processed in turn by micro-organisms and benthic insects and other invertebrates that spend part of their life in the stream, and which in turn become the preferred menu items for the fish. Both bears and birds play critical roles in the dispersal and propagation of certain riparian plant species. There are many such stories played out on the stage provided by the stream. Among the other residents of Broadstreet Hollow who rely on the stream or floodplain in some way or another are: mink, and muskrat; salamanders, wood turtles, snakes, frogs, and toads; white-tailed deer, porcupine, bobcat, fisher, coyote, black bear, and perhaps catamount; piliated woodpecker, Carolina wren, Great Blue heron, turkey and wood duck. Broadstreet Hollow is probably also home to catamount and river otter.

The point is that the healthy, intact stream and floodplain habitats in the Broadstreet Hollow that are connected to the more remote, wild uplands of the Catskills support a truly incredible biodiversity, which likely includes species that are regionally rare, and which definitely includes species that are foundational for the functioning of the entire ecosystem.

Fish Population Monitoring Project Status: Fisheries and Habitat 2002

Preliminary findings listed below were provided by the U.S. Geological Survey, Troy, NY (B.P. Baldigo, personal communication, December 2002). The data are from an ongoing study to assess the response of habitat and fish populations and communities to channel restoration in streams of the Catskill Region.

Results:

The U.S. Geological Survey (USGS) in cooperation with the New York City Department of Environmental Protection (NYCDEP) and the Greene County Soil and Water Conservation District (GCSWCD) inventoried fish communities in stable and unstable reaches from several streams in southeastern New York State as part of a stream restoration-demonstration program. Major objectives of the fishery monitoring effort were to determine (1) if fish populations and communities differed between stable (reference) and unstable (control and project/treatment) stream reaches and (2) if fish populations and communities in restored reaches reflected improved channel-stability and habitat conditions. The 100-m long treatment reach

was located at the project reach in management unit (MU) 3, immediately upstream from the Timberlake Road. The stable reference reach was located approximately 0.7 km upstream from the treatment reach in MU 1. The control reach was located about 0.4 km upstream from the Esopus River and 3.4 km downstream from the treatment reach in MU 16. Fishery inventories were done at the two project/treatment and reference reaches in the summer of 1999 and at all three reaches (project/treatment, reference, and control) in 2000 to characterize pre-restoration conditions. The treatment reach was restored in the fall of 2000. Fisheries in all three study reaches were surveyed again in the summer of 2002. The results of fish surveys done in the three study reaches are summarized in Table 1.

Table 1. Fish-community indices from Broadstreet Hollow study reaches,1999-2002.

Community Index	Treatment	Control	Reference
1999			
Community richness (number of species)	5	na	4
Community density (number of fish/m^2)	1.21	na	1.25
Community biomass (grams of fish/m^2)	9.03	na	15.40
Species diversity (log10 (richness/total catch))	1.87	na	1.60
2000			
Community richness (number of species)	3	9	4
Community density (number of fish/m^2)	0.52	0.71	0.53
Community biomass (grams of fish/m^2)	5.49	6.71	8.46
Species diversity (log10 (richness/total catch))	1.25	3.51	1.73
2002 (restored treatment)			
Community richness (number of species)	4	8	4
Community density (number of fish/m^2)	1.53	3.18	0.89
Community biomass (grams of fish/$m|^2$)	16.45	15.91	7.32
Species diversity (log10 (richness/total catch))	1.44	2.60	1.51

Summary of Findings

Fish-community data from the 1999, 2000, and 2002 surveys show the stable Broadstreet Hollow reference reach had comparable richness (number of fish species) and diversity throughout the three samples. Density remained relatively stable and biomass decreased from 15.4 g/m2 in 1999 to 7.3-8.5 g/m2 in 2000 and 2002. Brown trout and slimy sculpin were abundant and brook trout and rainbow trout were common during all collections. Richness (8-9 species) and diversity (2.6-3.4) of the fish community at the control reach were greater than that at both the reference and treatment reaches during 2000 and 2002. Additional fish species at this site included white and longnose suckers, longnose and blacknose dace, cutlips minnow, and creek chub. Density and biomass at the control reach were comparable or greater than that at the reference and treatment reaches during both years. The fish community at the control reach was probably influenced by its proximity to the Esopus Creek, thus, it is not directly comparable to communities observed at the treatment reach. At the treatment reach, richness and diversity were similar to that at the reference reach and remained relatively constant during the three inventories. Total community density and biomass, however, increased between 2000 and 2002 (after restoration in the fall of 2000). After restoration of the treatment reach, brook trout became more common, slimy sculpin became less common, and the biomass of the three trout species, especially rainbow trout, increased dramatically. Though annual variations in fishery indices occur naturally at all sites, changes in species richness and the proportions of sculpin and trout in the project/treatment reach after restoration suggest that restored channel stability and habitat alterations could have affected resident fish populations and the overall fish community. Additional fishery and habitat surveys and more complete data analyses are needed to verify conclusions based on these findings.