
IV-G: Aquatic & Terrestrial Wildlife

Both terrestrial and aquatic wildlife habitat is characterized by an intricate complex of living (biotic) and non-living (abiotic) variables present in the natural land form. Habitat conditions, on the land and in the water, must be present in the right form, quantity, and location to support self-sustaining populations of wildlife species.

Stream and riparian habitat provide important shelter, breeding grounds, corridors for movement, and food sources for wildlife. Stream and riparian habitat is dynamic in nature and may change due to the forces of weather, climate, fire, forest succession, or development pressure.



1. TERRESTRIAL HABITAT

The GCSWCD has not specifically conducted inventories or studies of terrestrial habitat or flora/fauna surveys in the watershed, nor have any pre-existing studies been identified, however several general observations can be made. A simple windshield survey of the watershed area indicates that the watershed is very heavily forested in mature or developing forests and that adequate cover for large and small animals is present. In the watershed, common wildlife includes white-tailed deer, black bear, coyote, rabbit, squirrel, beaver, and others. However, based on discussions with the Greene County Federation of Sportsman and others, there is a strong feeling that forage for these species is inadequate and still declining. This is often attributed to the loss of farms and open fields in which the deer browse.



Figure IV-25: Black Mink such as this one have been observed on the Batavia Kill (NYSDEC).

In the immediate stream corridor, the GCSWCD has observed a healthy population of beavers located at various places along the entire watershed length. In past restoration projects, beaver activity has been temporarily suspended during construction. The beavers return to the stream and initiate new dams often within 1-2 days of the equipment being moved off site. On several occasions, the GCSWCD has also encountered muskrats and mink along the stream corridor, and on one occasion, during the

construction of a restoration project, mink were observed exploring the voids in a recently built rock structure. These rock structures may serve a secondary benefit by providing mink with new opportunities for building homes in protected areas. Additional observation and study would be required to confirm this activity.

2. FISH POPULATIONS

The Batavia Kill is primarily a cold-water fishery. In order to thrive, a fish population needs spawning beds, nursery and rearing areas, food supply, and migration routes between various habitat areas. Survival of cold-water species is dependent on a range of habitat characteristics which will vary with the life stage of the species, the season, and even the time of day.



Figure IV-26: Brown trout are the most abundant trout species in the Batavia Kill, with both native and stocked populations

In the Batavia Kill watershed, the most recent work on evaluating aquatic habitat was completed in 1994 by the NYSDEC Region 4 Fisheries Office. At that time, DEC examined data from fisheries sampling surveys completed between 1954 to 1989, and developed a management plan for the fishery in the Batavia Kill watershed. (*A Management Plan for the Batavia Kill and Batavia Kill Reservoir Trout Fisheries*, 1994[1995 revised] Walter Keller, Region 4 Fisheries Office, NYSDEC) ^[11]. New fisheries assessments are underway in the watershed with NYCDEP sampling macroinvertebrates and the

USGS under contract with GCSWCD to conduct fisheries habitat assessments on selected sites associated with ongoing restoration efforts.

During sampling activities, the NYSDEC found various minnow species (including shiners, daces and chubs), white suckers, northern hog suckers, rainbow trout, brown trout, brook trout, slimy sculpin, pumpkin seed sun fish, small mouth bass, and tessellated darters (a type of perch) present in the watershed. The dominant trout species in the main stem Batavia Kill has been found to be brown trout, with a wild brook trout population above the C.D. Lane Reservoir and a stocked rainbow trout population in the reservoir itself.

Detailed fisheries surveys in 1987 and 1989 indicated that brown trout growth rates in the 0+ and 3+ year classes were above the regional average, with the 1+ year class equal to the regional average and the 2+ year class below average. ^[11] Wild brook trout, only found in the upper watershed, were found to be above average in growth rate for the 0+ year class and below average for the 1+ class. In their management plan, DEC also estimated the trout biomass and carrying capacity for the Batavia Kill. As reported by NYSDEC, the ratio of trout (wild & hatchery) to their carrying capacity averaged 1:2 in the watershed but ranged from 0:15 to 2:1. Average trout standing crop was measured in 1966 and 1987 and it was found to be 37.9 lbs/Ac in 1966 (ranges from 0-156) while in 1987 the standing crop averaged 20.9 lbs/Ac (range 4.3-36.3).

The NYSDEC study also examined the population of wild trout in the watershed and their impact on fish stocking needs. At the time of the management plan's development, DEC reported late season sampling consisted of a range of 0-100% wild brown trout, with an average of 63%, depending on the sampling site. Wild trout biomass comprised 64% of the total biomass for an average of 21 lbs/Ac of wild trout. DEC also found wild brook trout only in those samples at the uppermost watershed, above C.D.Lane Park. Wild brook trout comprised 89% of the total brook trout caught in the 1966 sampling. Since NYSDEC discontinued brook trout stocking on the Batavia Kill in 1983, all brook trout caught in the 1987 sampling are wild. [11]

Provisional, unpublished data from an on-going USGS study of the Batavia Kill was collected in July and August 2000 from demonstration project site locations. Fish sampling was done on 100 meter reaches in the Big Hollow area of the watershed with samples taken at the Big Hollow restoration project site, at an upstream stable reference site and at an unstable control site. The fish community at the stable reference site upstream was typical of headwater streams of the Catskills, with mature and juvenile brook trout common and brown trout rare. Slimy sculpin were also common in the reference reach with lesser numbers of black nose dace. The community at a sampling site within the reach proposed for restoration was unusual in that it contained almost equal numbers of sculpin and dace with no brook or brown trout sampled. An unstable control reach immediately upstream from the restoration site was intermediate between the project and reference sites, with low numbers of brown and brook trout and large numbers of sculpin and dace present (Personal communication, B. Baldigo).

3. TROUT STOCKING

As reported by NYSDEC, stocking on the Batavia Kill has been on-going since 1942. Between 1942 and 1958, brown, rainbow and brook trout were all stocked at a ratio of 2.7:1:1.9. [11] The average stocking rate was 227 fish/mile (69 fish/Ac). From 1961 to 1998, only brown and brook trout were stocked at a ratio of 2.3:1 with an average rate of 345 fish/mile (79 fish/Ac). The NYSDEC discontinued brook trout stocking after 1983 based on superior brown trout performance. The DEC treats the C.D.Lane Reservoir as a special case and management is done in accordance with Department policy for trout ponds. Stockings in the reservoir include 700 fall fingerling rainbow trout, as well as 300 spring fingerling rainbow trout.

To develop stocking rates for streams in NYS, DEC relies on a guidance document developed in 1990 titled Guidelines for Stocking Trout Streams in NYS (Engstrom), which uses fishing pressure along with assessments of wild trout population and habitat conditions to determine the amount of hatchery fish to stock. This guidance provides for developing a fisheries management classification based on biology, physical habitat and fishing pressure patterns of the stream system.

Table IV-3: Trout Stocking Program on the Batavia Kill

Segment Description	Length (miles)	Habitat Conditions	Stocking strategy
Schoharie confluence to Ski Windham intake	10.9	Average fertility, moderately deficient habitat, insufficient stream overstory and in-stream shelter. Average 12 wild brown trout/Acre, biomass average 5 lbs/Ac. All Browns in sample	*Stock in two increments * 5,500 Brown Trout yearlings 4500 late April 1000 late May * 1117/Ac or 505/mile * Stocked Biomass = 24.6 lbs/Ac
From Ski Windham intake to dam above NYS 296 at Thompson House	1.8 Miles 47 Acres	* Stream shelter & overstory somewhat deficient, *fertility and competitor abundance average. *Wild trout averaged 74/Ac with biomass of 8 lbs.Ac.	* Wild trout reduces stocking need by 20% * Stock Brown trout yearlings * 94/AC or 333/mile * Stocked biomass 19.7 lbs.Ac
296 Dam to C.D.Lane Park Dam	4.8 miles 10.5 Acres	* Moderately fertile * Severely habitat deficient * Competitors moderately scarce * wild trout all Brown, yearlings averaged 215/Ac w/biomass of 16 lbs/ac.	* Stock with Brown trout yearlings * 24/Ac or 82/mile * stock in Late April
Above C.D.Lane reservoir to headwaters	4.4 miles 9.1 Acres	* In-stream shelter average * Extensive overstory * Fertility moderately low and competitors low * Wild trout averaged 50 Brown and 38 Brook/Ac with a biomass of 23 lbs/Ac. * Biomass 56% Brook and 44% Brown.	* Stocking rate 66 Brown trout yearlings/Ac or 136/mile * Stocked biomass = 13.8 lbs/Ac * Stock in 2 increments, 83% in late April and remaining 17 % in late May.
C.D.Lane Park Lake	26 Acres	* maintained as a Trout Pond	Stocking rate of 27 Rainbow and 18 Brook trout per Acre. Rainbows stocked as both spring and fall fingerlings.

From: A Management Plan for the Batavia Kill and Batavia Kill Reservoir Trout Fisheries (1995) Walter T. Keller, Region 4 Fisheries Office, NYSDEC

Under NYSDEC policy, stocking rates are based on achieving a desired catch rate of 0.5 trout per hour in the stocked reach. On the Batavia Kill, the NYSDEC has subdivided the watershed for fisheries management purposes based on dams, diversions or water withdrawals. Resident populations of wild trout are measured to determine what additional stocked fish must be provided to achieve this goal. **Table IV-3** summarizes the stocking program under the 1995 Management Plan.

4. TROUT HABITAT

Currently, there is limited published data available on the status of fisheries habitat on the Batavia Kill besides the general characterization provided in the NYSDEC management plan. As a component of the Batavia Kill Stream Corridor Management Pilot Project, the GCSWCD has contracted with the U.S. Geological Survey (USGS) to conduct a study on the impact of restoration projects on fish habitat in the Batavia Kill. While the USGS focus is on limited reaches of the stream, their findings may be extrapolated to the rest of the watershed where the stream demonstrates characteristics similar to the study area.



Figure IV-27: Vegetative cover and in-stream structure provided by large boulders provides excellent physical habitat for trout.

General observations made during stream assessment work conducted by the GCSWCD indicate several limitations to fish habitat are prevalent on much of the stream system. In-stream structures such as large boulders and deep stable pools is limited, and it is speculated that many boulders fell prey to bulldozers long ago. Another general problem with habitat is the absence of good stream cover or shading, with most of the watershed characterized as having only fair to poor mature vegetation which is required for good cover. Large depositional areas and rip-rap act as heat sinks, and are also present throughout the watershed. Restoration of aquatic habitat is covered later in this SMP.

5. BIOLOGICAL CHARACTERISTICS

As with fish populations and habitat factors, there is limited up-to-date information on the biological condition of the Batavia Kill. Sampling of macroinvertebrates can be an extremely useful measure of a stream's water quality based on the sensitivity of various insect species to pollution or degradation of water quality.

The last published macroinvertebrate study on the Batavia Kill was completed in 1989 by NYSDEC Region 4 Fisheries Office . To assess the quality of water of the Batavia Kill, NYSDEC sampled macroinvertebrate populations on the main stem as well as several major tributaries in the reach running from just above Hensonville to County Route 17 in Ashland. The study involved kicknet sampling in riffle reaches with collection and identification of sub-samples with 100 specimens.



Figure IV-28: Caddisfly larvae (shown here) are sensitive to degradation of water quality and are a good indicator species.

The NYSDEC reported that the Batavia Kill and the sampled tributaries demonstrated excellent water quality, and were assigned a designation of non-impacted. It was noted that the sampling site just below the hamlet of Windham exhibited higher populations of aquatic worms that are often associated with enriched conditions from

conventional pollution sources such as on-site waste systems. It would be reasonable to assume that construction of the proposed wastewater treatment system for the hamlet areas would mitigate this condition.

In conjunction with the GCSWCD's restoration work on the Batavia Kill, NYCDEP has been conducting extensive macroinvertebrate sampling at the restoration project sites (pre and post construction), as well as at reference and control sites in the watershed. This work was commenced in 1998, and will continue through upcoming restoration projects. Also, The Catskill Center for Conservation and Development has been working with the Windham-Ashland school to undertake macroinvertebrate sampling on the Batavia Kill behind the school.

6. BASE-FLOW CONDITIONS

In the Batavia Kill watershed, there are two situations related to withdrawals and releases of water which must be addressed in any watershed management plan. First, where there are large volume water withdrawals for snow-making, the management of the stream water resource requires careful attention to maintain adequate stream flows for the aquatic community to survive. Second, watersheds with impoundments require that attention be given to release volumes and temperatures to provide for suitable aquatic habitat. In the Batavia Kill watershed both conditions are present, and both are managed under prior agreements with NYSDEC.

Water Withdrawals:

In their management plan for fisheries of the Batavia Kill, the NYSDEC utilized an interim U.S. Fish and Wildlife Survey standard that requires maintaining a base flow of 0.5 cfs per square mile of watershed, and 1 cfs per square mile for brown trout spawning and incubation. ^[11] Based on this standard, the minimum base flow at the Ski Windham infiltration gallery would be 20 cfs based on a 40 square-mile watershed, while minimum

flow for spawn and incubation would be 40 cfs

NYSDEC reported that based on sampling conducted during the 1990-91 and 1991-92 ski seasons, Ski Windham withdrawals rarely exceeded the 7 cfs limit in their permit, and stream flows exceeded the base requirement of 40 cfs on more than 90% of the days snow was made in 1990-91 and 69% of the days in 1991-92 [11]. The DEC management plan recommends use of these minimum flow standards in the permitting of future activities as well as modifications to snow-making operations which could take advantage of times when the conditions are more favorable.

Water Impoundments:

During the construction of the flood control structure at C.D. Lane Park in Big Hollow, NYSDEC and the Soil Conservation Service reached an agreement to retrofit the dam design to include a cold water siphon. There was concern that during very dry years when the stream flow was below normal, the evaporative losses from the lake's surface, combined with stream infiltration into the valley till, would result in no water release from the structure for extended periods.

In addition, if the structure was spilling low volumes of water from the lake's surface, this water would have an elevated temperature, and would impact the downstream biota. Integrated into the concrete drop spillway, the cold water release siphon flows a maximum of 4.5 cfs when the reservoir is full to the elevation of 1844.4' above sea level (which is the lip of the spillway) with the siphons flow reduced to a trickle when the reservoir surface elevation drops to 1842.2'. Assessments of the siphon's function in 1990 revealed a July stream flow of 3.7 cfs downstream of the dam which was adequate to cover the entire channel bottom and which seemed suitable to maintain trout.

If the US Fish & Wildlife Service standard of 0.5 cfs/mi² of watershed was possible with the siphon, it would require a release of 4.8 cfs based on the 9.9 mi² watershed. At this release rate, it was projected that the cold water layer in the lake would be depleted by mid-summer. If an average release of 2.9 cfs is maintained, the estimated cold water storage of 149 acre feet (in June) will last until mid September, which would be past the time that the surface waters of the lake begin to cool to a point satisfactory for release.



Figure IV-29: Cold water releases from the C.D.Lane lake help maintain aquatic conditions for trout.

7. FISHING ACCESS

Along the Batavia Kill, NYSDEC has obtained public fishing rights on 2.67 equivalent miles of the stream (an equivalent mile is one mile of stream with rights on both streambanks, or two miles of stream with rights on a single side of the stream). Access is provided through either 33' or 66' easements on 8 different parcels. The Batavia Kill is on the NYSDEC master list for purchase of additional Public Fishing Rights (PFR) and currently NYSDEC will purchase a PFR easement from landowners for a sum of \$11,200 per equivalent mile. Additional funding can be provided if landowners provide an area for parking.

Under the NYCDEP Land Acquisition Program, stream side properties are being purchased for long term water quality protection. During the purchase process, NYSDEC evaluates recreational use of the property, with fishing being allowed as a use on most of these sites. In recent years, NYCDEP has acquired a streamside parcel above Hensonville which is accessible to anglers with a permit, and there are several pending acquisitions lower in the watershed. It is expected that future DEP acquisitions in the Batavia Kill watershed will also be available for fishing access. It has been the observation of the GCSWCD that most of the Batavia Kill is fished, with limited amounts of posted lands and very good tolerance level by the landowners as long as the fisherman respect their property.