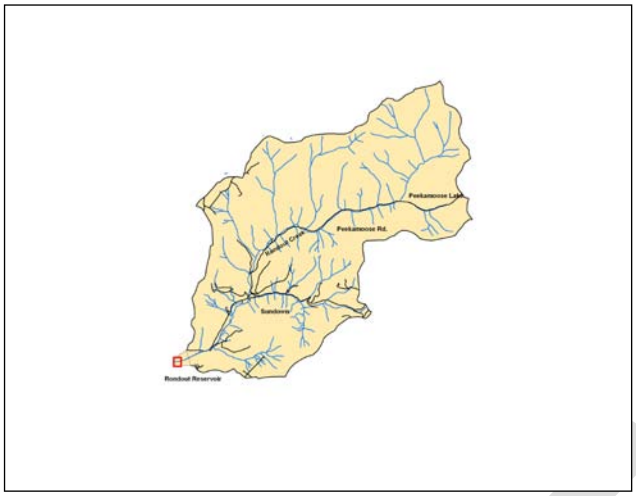
Rondout Creek Management Unit 1



Stream Feature Statistics

0 % of stream length is experiencing erosion

0 % of stream length has been stabilized

0.15 acres of inadequate vegetation within the 100 ft. buffer

50 ft. of stream is within 50 ft. of the road

0 houses located within the 100-year floodplain boundary

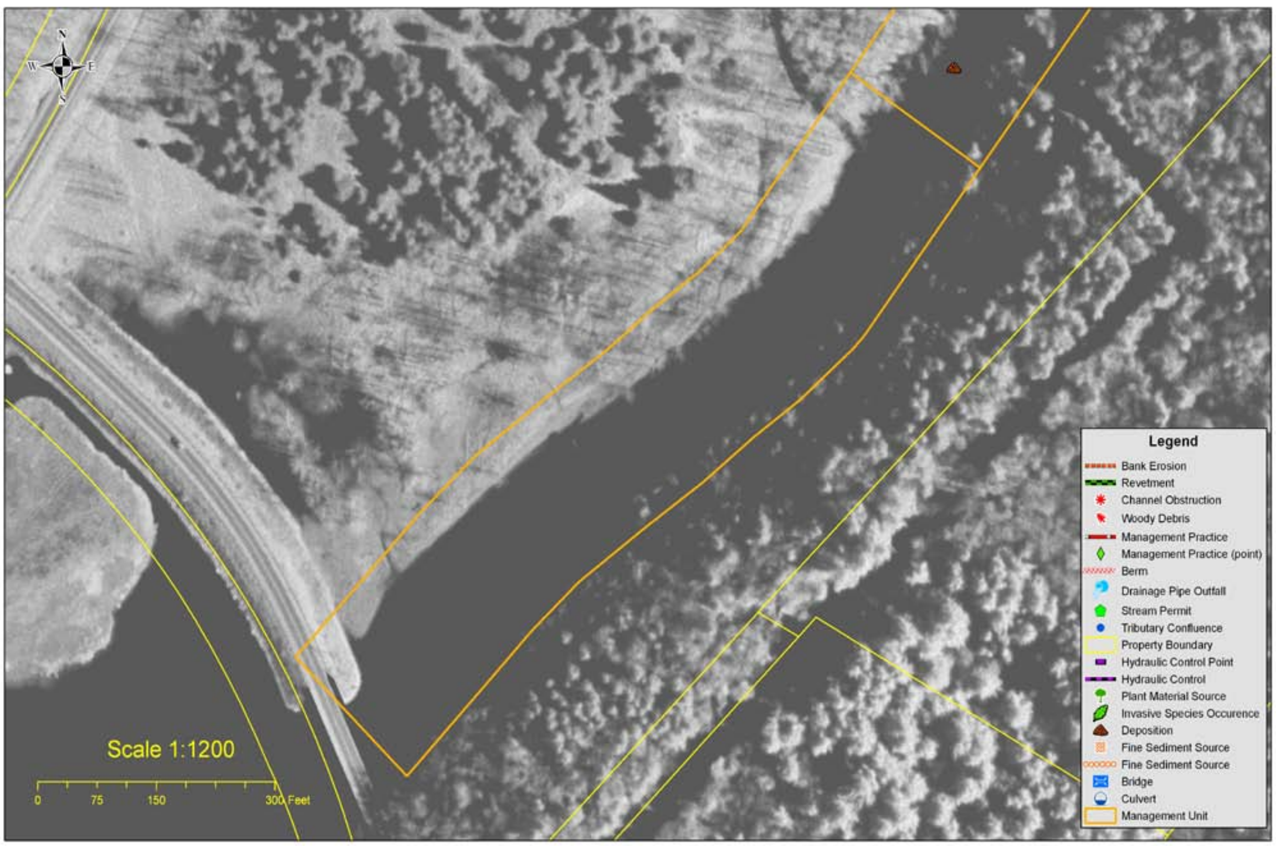


Figure 1 Stream feature inventory MU1

Management Unit 1
Between Station 1100 and Station 100

Management Unit Description

This management unit begins at a confluence with Sugarloaf Brook, continuing approximately 1,017 ft. to the Route 55A bridge crossing above the Rondout Reservoir. The drainage area ranges from 47.7 mi^2 at the top of the management unit to 39.7 mi^2 at the bottom of the unit. The valley slope is 0%. The average valley width is 896.2 ft.

Summary of Recommendations Management Unit 1	
Intervention Level	Preservation
Stream Morphology	None
Riparian Vegetation	None
Infrastructure	None
Aquatic Habitat	None
Flood Related Threats	None
Water Quality	None
Further Assessment	Watershed-wide fish population and habitat study

Historic Conditions

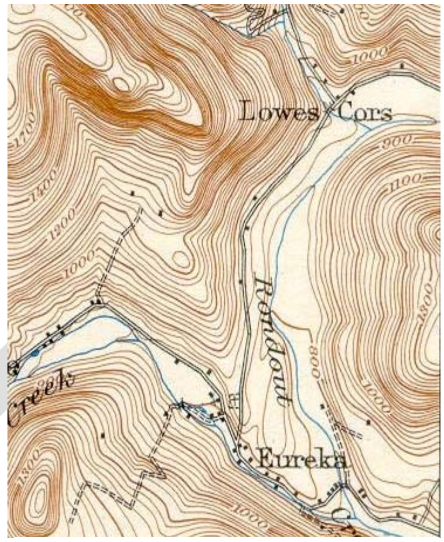


Figure 2 Excerpt of 1905 USGS topo

As the glaciers retreated about 12,000 years ago, they left their “tracks” in the Catskills. See Section 2.4 *Geology of Upper Rondout Creek*, for a description of these deposits. As the glaciers retreated about 12,000 years ago, they left their “tracks” in the Catskills. See Section 2.4 *Geology of Upper Rondout Creek*, for a description of these deposits. These deposits make up the soils in the high banks along the valley walls on the Rondout mainstem and its tributaries. These soils are eroded by moving water, and are then transported downstream by the creek. During the periods when the forests of the Rondout watershed were heavily logged for bark, timber, firewood and to make pasture for livestock, the change in cover and the erosion created by timber skidding profoundly affected the Rondout hydrology and drainage patterns.

The valley floor here continues to broaden; in the early centuries of the glacial retreat, the Rondout Valley here was a proglacial lake created by the impoundment of meltwater by an ice dam downstream. On top of lake deposits have been laid alluvial deposits; the floodplain on the right is an *alluvial fan* created by the material eroded out of Sugarloaf Brook and that deposited by the Rondout when, during large flood events, the quantity of *bedload* from upstream tributaries –particularly Stone Cabin Brook, High Falls Brook and Sundown Creek-- overwhelmed the Rondout’s ability to transport it. Alluvial fans at confluences such as this tend to reduce channel slopes in the mainstem and back water upstream, causing aggradation and building the floodplain. In the roughly one hundred and twenty centuries since the retreat of the glaciers, the position of Rondout Creek has moved back and forth across this floodplain numerous times.

No Article 15 stream disturbance permits have been issued for this management unit.

Stream Channel and Floodplain Current Conditions

Revetment, Berms and Erosion

The 2009 stream feature inventory revealed that 0% (0 ft.) of the stream length exhibited signs of active erosion along 1,017 ft. of total channel length (Fig.1). No revetment or berms were identified in this management unit at the time of the stream feature inventory.

Stream Morphology

The following description of stream morphology references insets in the foldout Figure 5. “Left” and “right” references are oriented looking downstream, photos are also oriented looking downstream unless otherwise noted. Stationing references, however, proceed upstream, in feet, from an origin (Station 0) at the confluence with the Rondout Reservoir. Italicized terms are defined in the glossary. This characterization is the result of surveys conducted in 2009.

Figure 3 Management Unit 1

With the confluence from the right of Sugarloaf Brook, a major tributary (8 mi.^{2}) comprising 20% of the total Rondout Creek contribution to the reservoir, the mainstem in Management Unit 1 broadens. Sandy soils here give evidence of frequent floodplain inundation, as illustrated in Fig. 3 above. The left bank is controlled by bedrock ledge; the floodplain on the right is well-connected with the channel; the channel gradient is nearly unmeasurable in this reach at base flow when the reservoir is at near capacity (<0.01%). As a result, channel morphology is in seasonal flux through this short unit; bed aggradation results from backwatering when reservoir levels are high, which is rescoured when larger flow events occur when reservoir levels are lower. No recommendations are given for this management unit.

Figure 4 Aggradation due to backwatering from the reservoir

Sediment Transport

Streams move sediment as well as water. Channel and floodplain conditions determine whether the reach aggrades, degrades, or remains in balance over time. If more sediment enters than leaves, the reach aggrades. If more leaves than enters, the stream degrades. (See Section 3.1 for more details on Stream Processes).

As stated above, sediment transport is largely controlled by reservoir levels in this Management Unit.

<u>Riparian Vegetation</u>

One of the most cost-effective methods for landowners to protect streamside property is to maintain or replant a healthy buffer of trees and shrubs along the bank, especially within the first 30 to 50 ft. of the stream. A dense mat of roots under trees and shrubs bind the soil together, and makes it much less susceptible to erosion under flood flows. Mowed lawn does not provide adequate erosion protection on stream banks because it typically has a very shallow rooting system. Interplanting with native trees and shrubs can significantly increase the working life of existing rock rip-rap placed on stream banks for erosion protection. Riparian, or streamside, forest can buffer and filter contaminants coming from upland sources or overbank flows. Riparian plantings can include a great variety of flowering trees and shrubs, native to the Catskills, which are adapted to our regional climate and soil conditions and typically require less maintenance following planting and establishment.

Some plant species that are not native can create difficulties for stream management, particularly if they are invasive. Japanese knotweed (Fallopia japonica), for example, has become a widespread problem in recent years. Knotweed shades out other species with it's dense canopy structure (many large, overlapping leaves), but stands are sparse at ground level, with much bare space between narrow stems, and without adequate root structure to hold the soil of stream banks. The result can include rapid stream bank erosion and increase surface runoff impacts.

An analysis of vegetation was conducted using aerial photography from 2001 and field inventories (Fig. 6). In this management unit, the predominant vegetation type within the 100 ft. riparian buffer is deciduous-open tree canopy (49%) followed by mixed-closed tree canopy (38%). *Impervious* area (2%) within this unit's buffer is primarily a Bureau of Water Supply road which runs along the northern portion of the Rondout Reservoir. No occurrences of Japanese knotweed were documented in this management unit during the 2009 inventory.

There is 1 wetland within this management unit mapped in the National Wetland Inventory (see Section 2.5, *Wetlands and Floodplains* for more information on the National Wetland Inventory and wetlands in the Rondout watershed). Wetlands are important features in the landscape that provide numerous beneficial functions including protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters, and maintaining surface water flow during dry periods (See Section 2.5 for wetland type descriptions and regulations). This wetland is 2,029.5 acres in size, and is classified as lacustrine, limnetic, unconsolidated bottom, and permanently flooded/diked/impounded (L1UBHh).

Flood Threats

Inundation

As part of its National Flood Insurance Program (NFIP), the Federal Emergency Management Agency (FEMA) performs hydrologic and hydraulic studies to produce Flood Insurance Rate Maps (FIRM), which identify areas prone to flooding. No houses are located in the 100-year floodplain here. The upper Rondout Creek is scheduled to have its FIRMs updated with current surveys and hydrology and hydraulics analysis in the next few years, and the mapped boundaries of the 100-year floodplain are likely to change.

Bank Erosion

The stream banks within the management unit are considered stable, as there was no evidence of significant erosion during the stream feature inventory.

Infrastructure

This management unit has not been treated with any form of revetment.

Aquatic Habitat

Aquatic habitat is one aspect of the Rondout Creek ecosystem. While ecosystem health includes a broad array of conditions and functions, what constitutes "good habitat" is specific to individual species. When we refer to aquatic habitat, we often mean fish habitat, and specifically trout habitat, as the recreational trout fishery in the Catskills is one of its signature attractions for both residents and visitors. Good trout habitat, then, might be considered one aspect of "good human habitat" in the Rondout Creek valley.

Even characterizing trout habitat is not a simple matter. Habitat characteristics include the physical structure of the stream, water quality, food supply, competition from other species, and the flow regime. The particular kind of habitat needed varies not only from species to species, but between the different ages, or life stages, of a particular species, from eggs just spawned to juveniles to adults.

In general, trout habitat is of a high quality in the upper Rondout Creek. The flow regime above the reservoir is unregulated, the water quality is generally high (with a few exceptions, most notably low pH as a result of acid rain; see Section 3.1, *Water Quality*), the food chain is healthy, and the evidence is that competition between the three trout species is moderated by some *partitioning* of available habitat among the species (M. Flaherty, personal communication). Management Unit 1 has been given an "A" class designation, supporting drinking water, swimming and fishing.

Historical channel and floodplain management of this management unit, however, have modified the physical structure of the stream in some locations, resulting in the filling of pools, the loss of streamside cover and the homogenization of structure and hydraulics. As physical structure is compromised, interspecies competition is increased. It is recommended that a population and habitat study be conducted on the upper Rondout Creek, with particular attention paid to temperature, salinity, riffle/pool ratios and quality and in-stream and canopy cover.

Water Quality

The primary potential water quality concerns in the Rondout as a whole are the contaminants contributed by atmospheric deposition (nitrogen, sulfur, mercury), those coming from human uses (nutrients and pathogens from septic systems, chlorides (salt) and petroleum by-products from road runoff, and suspended sediment from bank and bed erosion. Little can be done by stream managers to mitigate atmospheric deposition of contaminants, but good management of streams and floodplains can effectively reduce the potential for water quality impairments from other sources.

Storm water runoff can have a considerable impact on water quality. When it rains, water falls on roadways and flows untreated directly into the upper Rondout Creek. The cumulative impact of oil, grease, sediment, salt, litter and other unseen pollutants found in road runoff can significantly degrade water quality. Road drainage from Sundown

Road in Management Unit 5 is carried by two piped outfalls that outfall directly into the Rondout Creek in this management unit.

Sediment from stream bank and channel erosion poses a potential threat to water quality in the upper Rondout Creek. Clay and sediment inputs into a stream may increase *turbidity* and act as a carrier for other pollutants and pathogens. There are no bank erosion sites in MU5.

Nutrient loading from failing septic systems is another potential source of water pollution. Leaking septic systems can contaminate water making it unhealthy for swimming or wading. One house is located in relatively close proximity to the stream channel in this management unit. These homeowners should inspect their septic systems annually to make sure they are functioning properly. Each household should be on a regular septic service schedule to prevent over-accumulation of solids in their system. Servicing frequency varies per household and is determined by the following factors: household size, tank size, and presence of a garbage disposal. Pumping the septic system out every three to five years is recommended for a three-bedroom house with a 1,000 – gallon tank; smaller tanks should be pumped out more often.

The New York City Watershed Memorandum of Agreement (MOA) allocated 13.6 million dollars for residential septic system repair and replacement in the West-of-Hudson Watershed through 2002, and the program was refunded in 2007. Systems eligible include those that are less than 1,000-gallon capacity serving one-or-two family residences, or home and business combinations, less than 200 feet from a watercourse. Permanent residents are eligible for 100% reimbursement of eligible costs; second homeowners are eligible for 60% reimbursement. For more information, call the Catskill Watershed Corporation at 845-586-1400, or see http://www.cwconline.org/programs/septic/septic_article_2a.pdf