



GIS Parcel, Contour and Wetland coverages are edited and provided by NYC DEP, 2000, UTM NAD 27, Zone 18 North, meters. Aerial Photography provided by UCSWCD & NYC DEP November 2001. All other coverages were developed using GPS in the UTM, Zone 18 North projection, NAD CON (Conus), datum. GPS data collected 2001, by UCSWCD & NYC DEP SMP.

Note: G.I.S. data are approximate according to their scale and resolution. Data may be subject to error and are not a substitute for on-site inspection or survey. Parcel coverages are based on Ulster County Real Property tax maps 2000 and may not reflect actual surveyed property boundaries.

## Broadstreet Hollow Management Unit 13

Contour Interval 20 feet  
 50 0 50 100 150 200 Feet  
 Scale 1:2,400

### LEGEND

- |     |                         |  |                         |
|-----|-------------------------|--|-------------------------|
| 247 | Street Address/911 code |  | Clay exposure           |
|     | Greene parcels          |  | Revetment               |
|     | Ulster parcels          |  | Eroding bank            |
|     | Land fill               |  | Tributary               |
|     | Management units        |  | Behi pin                |
|     | Stream Center (Thalweg) |  | Bridge                  |
|     | Culvert                 |  | Broadstreet Hollow Road |
|     | Wetland                 |  | Knotweed                |

# Broadstreet Hollow Management Unit 13

## General Description:

Management Unit 13 (MU13), is a unique section of split-channeled stream (both in nature and in Broadstreet Hollow), located in Ulster County, NY. MU13 begins approximately 170 feet below County Bridge 3-34671-0, at the property at 108 Broadstreet Hollow Road, (Photo 1). MU13 extends approximately 965 feet downstream, to where the stream returns to a single-thread channel, opposite the end of a long section of guiderail on Broadstreet Hollow Road (Photo 2). The stream flows well away from the road through most of the unit, with no development on either bank<sup>1&2</sup>.



Photo 1. Looking upstream near the top of MU13, in the main channel.



Photo 2. Looking upstream into the bottom of MU13, where two channels rejoin. The main channel is to the left.

The structural shape, or *morphology*, of the stream (i.e., slope, width and depth) is uniform in this unit, having a distinct morphologic character, or *stream type*<sup>5</sup>. This stream in this unit is very unique and highly stable (in good, healthy condition). The valley is wide compared to other units, with excellent streamside, or *riparian*, vegetation and ample, well-developed stream banks formed into low benches, or *discontinuous floodplains*, that function as small overflow areas during floods.

The stream in MU13 contains numerous interconnected channels, termed a *braided* stream. Each individual channel is a stable side stream with unique flow characteristics (Photo 3). This type of stream is very complex, providing valuable riparian and aquatic habitat for fish, insects, birds and other animals, and produces conditions for excellent water quality and stream channel stability, with large trees holding banks in place, and floodplain areas with a variety of plant species.



Photo 3. Looking downstream into one of the side channels in MU13. Note large riparian trees to the left, vegetated floodplain bench area to the right, and large dead wood in the foreground providing habitat for fish and other animals.

## I. Flooding and Erosion Threats

### A. Infrastructure and Private Property

There are three properties (land parcels) associated with MU13 (at 108, 72 and 83 Broadstreet Hollow Road), with three separate property owners.

Two parcels completely contain the stream in MU13, from the road to the west through to the valley wall on the east side of the stream<sup>2</sup>. The other parcel is opposite the road from the stream.

The centerline of Broadstreet Hollow Road ranges from approximately 40 to 255 feet from the deepest part of the stream, or *thalweg*, in MU11<sup>1&2</sup>.

### B. History of Stream Work

A large boulder berm was constructed near the top of MU13, to protect the 108 Broadstreet Hollow road property from flood-related erosion damages at the base of the hillside adjacent to a side channel. No further known stream bank or channel work has been done in MU13 (Photo 4).



Photo 4. Looking upstream into the top of the main side channel at the top of MU13, the 108 Broadstreet Hollow Road hillside is to the left outside the frame, boulder berm in the center background.

### MU13 Culverts

Two culverts were documented draining to the stream in MU13 during the stream assessment survey conducted in 2001. They both had flowing water in them at the time of the survey, during the lowest yearly flow, or *summer base-flow*, condition. This indicates a good groundwater supply and shows the stream is spring fed year round. Culvert flow under flooding conditions was not documented, and though the upstream-most culvert required replacement in 2002 with a black corrugated pipe, both culverts drain roadside ditches to well-vegetated floodplain areas away from the stream, so the stream does not receive concentrated flow directly from culverts.

### C. Exposed Banks

Stream assessment in 2001 showed one eroding bank in MU13, though it was not determined to be significant enough currently to warrant extensive stabilization or monitoring (Photo 5). No monumented monitoring cross-sections have been installed to document the extent or rate of potential erosion<sup>4</sup>. However, this section should be visually inspected periodically, as eventually this section could erode into road fill, or *embankment*, areas to the west. This bank may be more vulnerable to ongoing damage due to the presence of easily erodible glacial lake clays in the stream bed at the toe (base) of the stream bank, where stream energy in the main channel is concentrated.



Photo 5. Eroding right bank, with glacial lake clay exposure in the stream bed and some of the bank. Stream flow is from right to left.

## II. Water Quality

### A. Sediment

The stream assessment conducted in 2001 showed the eroding bank discussed above (see Photo 5) contains approximately 95 feet of stream bed and bank exposure of *glacial lake clay*. This clay exposure, comprising about 5% of the stream bank length in MU13, may cause increased *turbidity* in this reach from fine *sediment* (silt and clay) coming from stream bank and bed material, especially during high flow events, though this bank doesn't appear to be eroding very quickly, and contains large sediment and healthy riparian vegetation to hold bank materials in place<sup>4</sup>.

### B. Landfills/Dumping Sites

The stream assessment conducted in 2001 did not reveal any current *dumping sites* in or near the stream in MU13 that could contribute to water quality impairment from leaching of toxic materials.

### C. Other Water Quality Issues

Investigation of other possible sources of contamination was not part of the stream assessment conducted in 2001. However, no evidence was found for *nutrient* or *pathogen* contamination in the stream (i.e., odors or discolored water). Any runoff of water from the road and culverts that may contain salts or other pollutants was not specifically investigated, though in this unit the two culverts drain onto well-vegetated stream banks and floodplain areas, slowing the input of contaminants to the stream<sup>7</sup>.

## III. Stream Ecology

### A. Aquatic Habitat and Populations

No specific aquatic habitat or population monitoring was conducted in MU13 as part of the stream assessment survey in 2001. However, as part of the stream restoration demonstration project completed in MU3 in 2000, fish and aquatic insect population data have been gathered yearly since 1998 within the stable reference reach (MU1), the project site (MU3) and the control reach (MU17). These data show the Broadstreet Hollow self-supports, without stocking, populations of all three common trout species (rainbow, brook and brown) as well as a healthy and diverse community of aquatic insects<sup>6&9</sup>.

### B. Riparian Vegetation

The stream assessment conducted in 2001 did not investigate specific streamside (*riparian*) plant species or density, other than to note areas of insufficient or stressed vegetation that could affect stream stability, flooding or erosion threats, water quality or aquatic habitat for trout species. Based on these general, non-quantitative observations, riparian vegetation throughout MU13 appears healthy and dense, providing all the benefits of a functioning riparian zone (Photo 6).

Existing riparian vegetation between the road and the stream appears sufficient to absorb the impacts of road runoff, and to provide shade and nutrients to the stream, keeping water temperatures cool and providing instream cover from large wood recruitment

(when a tree falls into the stream, it provides valuable habitat, nutrients and cover for fish and insects, see Photos 2 and 3)<sup>9</sup>. Additionally, good riparian vegetation in this unit improves bank stability and reduces the need for any bank stabilization work that could cause or increase stream ecosystem disturbances<sup>3</sup>.



Photo 6. Looking upstream against the east valley wall, opposite the road. Note forested floodplain area and stable side channel morphology, densely shaded.

No *Japanese Knotweed*<sup>7</sup>, a non-native, *invasive* plant was noted in this unit at the time of the assessment survey, though source populations of this plant have been documented upstream, increasing the potential for colonization of any disturbed or under-vegetated areas in MU13.

<sup>1</sup>Broadstreet Hollow Management Unit 13 Map

<sup>2</sup> Volume II Appendix 3.1.5 Management Unit 13 Workbook.

<sup>3</sup> Volume II Section 2.2 Watershed Management Recommendations

<sup>4</sup> Volume II Section 2.2.1-Monitoring Cross Section and Summary Tables

<sup>5</sup> Volume I Sections 3.2.1&2 Stream Processes, Morphology and Classification

<sup>6</sup> Volume I Section 3.5 Fisheries and Wildlife

<sup>7</sup> Volume I Sections 3.4 & Volume II 2.2.2 Riparian Vegetation Issues and Recommendations

<sup>8</sup> Volume II 2.0 Stream Stability Restoration Projects, Techniques and Contact Information & Appendices

<sup>9</sup> Volume I Sections 3.4 & Volume II 2.2.2 Riparian Vegetation Issues and Recommendations

<sup>10</sup> Section 3.2.4.2 Broadstreet Hollow Geology