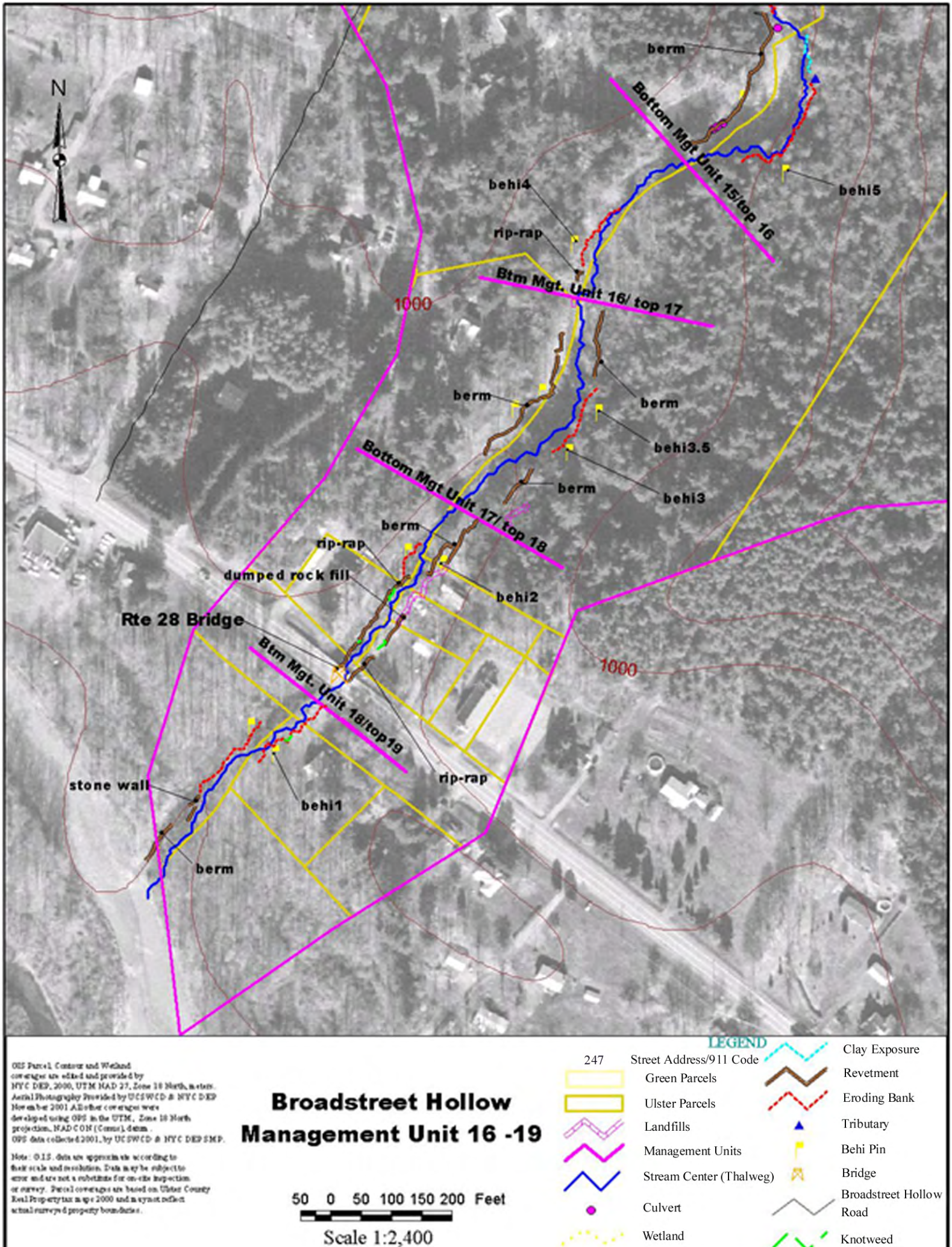
N
berm
Bottom Mgt Unit 15/top 16
behi5
behi4
rip-rap
Btm Mgt. Unit 16/ top 17
1000
berm
berm
behi3.5
Bottom Mgt Unit 17/ top 18
berm
behi3
berm
rip-rap
dumped rock fill
behi2
Rte 28 Bridge
Btm Mgt. Unit 18/top19
1000
rip-rap
stone wall
behi1
berm
GIS Parcel Contour and Wetland coverages are edited and provided by NYC DEP, 2000, UTM NAD 27, Zone 18 North, in feet. 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 16 -19
50 0 50 100 150 200 Feet
Scale 1:2,400
LEGEND
247 Street Address/911 Code
Green Parcels
Ulster Parcels
Landfills
Management Units
Stream Center (Thalweg)
Culvert
Wetland
Clay Exposure
Revetment
Eroding Bank
Tributary
Behi Pin
Bridge
Broadstreet Hollow Road
Knotweed

Broadstreet Hollow Management Unit 16

General Description:

Management Unit 16 (MU16), is located in Ulster County, NY, beginning just below the small pond outlet MU15 and extending approximately 330 feet downstream to the pond inlet at the abuting northeasterly property boundary (Photo 1) [1&2].

Photo 1. Looking upstream into the top of MU16, showing healthy riparian vegetation on both banks, and vegetated floodplain to the right.

The structural shape, or *morphology*, of the stream (i.e., slope, width and depth) is uniform in this unit, comprising one large section, or *reach*, with distinct structural character, or *stream type*[5]. The valley in MU16 is wider compared to other units, so the stream has more space in which to bend, or meander, within the valley walls. Typically stable stream types associated with this type of valley is are relatively wide, though somewhat steep, with riffles and pools, and broad, flat *floodplain* areas in addition to some stream banks formed into low benches, or *discontinuous floodplains*, that function as overflow areas during floods and provide areas for healthy streamside, or *riparian*, vegetation. Less steep valleys with more floodplain contain more space in which streams can evolve to maintain good condition, or *stability*, and better riparian vegetation to stabilize the banks and provide other habitat benefits. MU16 maintains a large section of floodplain between the valley wall and the stream on the left bank (looking downstream, on the east side of the stream). The wide, flat, level area between the road and the stream, that used to be the active floodplain, is now a *terrace*, which functions as a floodplain only during very high flows [5&7].

I. Flooding and Erosion Threats

A. Infrastructure and Private Property

There are two properties (land parcels) associated with MU16, with the stream course forming the boundary between them for the length of the unit[2].

The centerline of Broadstreet Hollow Road ranges from approximately 520 to 590 feet in distance from the deepest part of the stream, or *thalweg*. There are no bridges in this unit, and no culverts draining roadside ditches directly to the stream[1].

The only other structural development in this reach consists of a low pond inlet area on the right bank (looking downstream), on the boundary with MU17, though this has been stabilized with boulder rip-rap (see discussion below), and is not maintained as a functioning water diversion.

B. History of Stream Work

Currently only about 25 feet, or 4%, of the stream bank in MU16 has been hardened with large quarried boulder rip-rap, to protect a low pond inlet area that has experienced erosion during high flows, particularly as a result of the January 1996 flood (Photo 2). Large sycamore trees in the vicinity of this rip-rap are currently at some risk for becoming undermined and falling into the stream, in part due to eddy scour created as water moves and swirls around the boulders and impinges on the tree roots. Additional boulders placed carefully under the tree roots, in addition to added shrub and tree vegetation in between rip-rap rocks, could improve the chances for the survival of these important riparian trees[7].

Photo 2. Right bank quarried boulder rip-rap, stabilizing pond inlet area. Note sycamore tree, being undercut at the roots. Stream flow is from right to left.

C. Exposed Banks

Approximately 130 feet, or 20%, of the stream bank length in MU16 was documented as a single eroding bank area, along the right bank just upstream from the rip-rap bank. A representative location was chosen and permanently marked with metal rebar, or *monumented*, for future monitoring (designated as "monitoring cross-section 4") to determine erosion rates and priority for potential restoration (Photo 3)[3]. This site has been assessed and ranked based on calculation of a *Bank Erodibility Hazard Index* (BEHI) using data collected at the time of the stream assessment survey in 2001[4].

Photo 3. Eroding right bank terrace, at monitoring cross-section 4, showing healthy riparian forest. Stream flow is from right to

This bank comprises an eroding section of terrace, approximately five feet from top of bank to the toe, or base of the bank, in the stream channel (Photo 3). Fairly dense riparian forest trees hold the soil surface layer together, though roots do not penetrate deeply enough to hold the entire bank in place[7]. This bank received a BEHI rank of "high" potential for further erosion, though the concentration of stream energy away from this bank due to the shape of the stream channel may decrease this potential. No structures or other development are currently directly threatened by erosion at this site[4].

II. Water Quality

A. Sediment

Apart from the eroding bank at monitoring cross-section 4, stream assessment conducted in 2001 did not reveal any other significant areas of bank erosion, and no visible *glacial lake clay exposures* at the time of the survey in MU16 that could contribute to water quality impairment from clay and silt, or *sediment*, sources.[4] This bank could, however, continue to add some fine sediment to the stream, especially during floods.

B. Landfills/Dumping Sites

Approximately 7 feet (1%) of dumped materials, primarily glass and small metal objects, were mapped along the right bank in MU16 in 2001 (Photo 4). Planning efforts to organize cleanup of sites like this were initiated in 2002, and should continue, as labor and funding are available, though any water quality risk from this site is minor.

Photo 4. Small old dumping site, with glass and small metal objects, right bank. Stream is behind viewer, flow from right to left.

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. However, the long distance from the road, and the density and health of the riparian vegetation, definitely provides some protection from such runoff[7].

III. Stream Ecology

A. Aquatic Habitat and Populations

No specific aquatic habitat or population monitoring was conducted in MU16 as a part of the stream assessment in 2001. However, fishery 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) [6].

Analysis of these data shows 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[9].

B. Riparian Vegetation

Stream assessment conducted in 2001 did not investigate specific streamside (riparian) plant species or density condition, 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 observations, riparian vegetation throughout MU6 appears to be in good condition along both banks, sufficient to provide the full benefits of a healthy riparian zone[7].

No *Japanese Knotweed* [7], a non-native, *invasive* plant, was noted in this unit at the time of the assessment survey. Source populations of this plant have been documented upstream, increasing the potential for colonization of any disturbed or under-vegetated areas in MU14 such as the undercut bank areas associated with monitoring cross-section 4, though open disturbed areas, with less shade, are generally preferred by Knotweed.

[1]Broadstreet Hollow Management Unit 16 Map
[2] Volume II Appendix 3.1.5 Management Unit 16 Workbook.
[3] Volume II Section 2.2 Watershed Management Recommendations
[4] Volume II Section 2.2.1-Monitoring Cross Section and Summary Tables
[5] Volume I Sections 3.2.1&2 Stream Processes, Morphology and Classification
[6] Volume I Section 3.5 Fisheries and Wildlife
[7] Volume I Sections 3.4 & Volume II 2.2.2 Riparian Vegetation Issues and Recommendations
[8] Volume II 2.0 Stream Stability Restoration Projects, Techniques and Contact Information & Appendices
[9] Volume I Sections 3.4 & Volume II 2.2.2 Riparian Vegetation Issues and Recommendations
[10] Section 3.2.4.2 Broadstreet Hollow Geology