

Reach 3b (Concrete Dam at Thompson House to CR 79 Church Street)

Reach 3b begins at the concrete dam structure discussed in reach 3a above, and ends at the county bridge on Church Street in the hamlet. The reach is approximately 1.4 miles in length and includes three bridge crossings. The reach is located in valley zone 3 and has an average valley slope of 0.7% (**Figure V-11**). The contributing drainage area ranges from 24mi² at the upper end of the reach to 28.7mi² at Church Street. The reach includes Mad Brook and an unnamed tributary, which are both influenced by flood control structures.

Stream Morphology/Stability

Reach 3b is characterized by B stream types, primarily influenced by increased entrenchment associated with a high terrace that impinges the stream channel along the entire reach. The sediment regime of the reach falls predominantly into the small cobble category, with small sections of the stream channel dominated by large gravel. The reach is impacted by the influence of two additional flood control structures located on the major tributaries within the reach. These structures, in combination with the C.D. Lane Park dam, control runoff from 33% of the total drainage area at reach 3b. The reduction in sediment supply caused by these structures is evident in the scarcity of depositional features in reach 3b.

The floodplain through reach 3b is relatively narrow in comparison to upstream and downstream reaches, and is heavily influenced by valley topography (**Figure VI-33a photo B,C,F,H**). The lower extent of the reach is encroached on the north by the Windham business district, but it appears that the existing floodplain width is adequate for the stream type present. The topography along the south bank is characterized by a high steep terrace that limits lateral channel migration, making it critical to maintain the available floodplain width along the north bank.

During the Phase I assessment, the GCSWCD identified a section of the reach that was highly stable, and appropriate for use as a reference reach. The reference reach is located in the middle of reach 3b, with some instability located above and below this section. The Phase I assessment indicated that the reach has an average of 2.2ft² of exposed bank for every linear foot of stream bank, with 13% of the reach length containing actively eroding streambanks. The exposed banks are located in the first 0.5 miles of the reach, occurring primarily on the golf course property (**Figure VI-33a photo I**). The upper section of reach 3b has numerous signs of past channel modifications, primarily efforts to provide stabilization of the high terrace on the Thompson House and Windham Golf Course Property. Rock rip rap and steel piling and cribbing have been used in the past to address eroding streambanks. In the 1970's, the GCSWCD worked with the Town of Windham and local landowners to stabilize a large failure of the high terrace on the golf course property.

An aerial photography analysis of the reach indicated that no significant lateral channel migration had occurred since 1959, and for the most part the channel planform has little

opportunity for adjustment due to local topography. The aerial photographs were used to calculate a moderate sinuosity of 1.3 through the reach. The stream channel in the upper third of the reach contains an irregular meander pattern, changing to regular meanders as the reach progresses with no evidence of channel debris blockages, avulsions, or channel braiding.

The field assessment of reach 3b focused on monitoring a potential reference area located upstream of the Windham-Ashland-Jewett school bus garage. This section of the stream was selected in 1997 for further evaluation as a reference reach based upon its physical appearance and apparent physical health following the January 1996 flood event. The reference area (Church Street reference reach) was initially topographic surveyed in July of 1997, with data collected from nine cross sections and approximately 1,040 feet of longitudinal profile. Dominant particle analysis was performed for the stream channel and bank erodibility hazard index rating scores taken along both stream banks. The reference reach was re-surveyed in July 1998 by the NYCDEP Stream Management Program and included eight monumented cross sections and an additional 570 feet of longitudinal profile. The reach was documented as having maintained a stable condition between 1997 and 1998.

The reference reach has been classified as a B3c stream type, indicating a moderately entrenched channel with a gradient of less than two percent. The channel bed is dominated by small cobble material, and is characterized by a series of rapids and unevenly spaced scour pools. The stream's energy is dissipated in these bed features and has very little erosion occurring along the streambed and banks. The bank erodibility hazard index averaged 16.1 through the site, showing a low potential for stream bank erosion, with such a high score due to the moderate bank and bankfull height because of the high terrace along the left bank.

Riparian Vegetation

The condition of the riparian area within reach 3b is somewhat variable, but overall is in good condition and has remained relatively constant through the past 40 years. Review of aerial photographs from 1959 to present indicate that the riparian condition has not changed significantly. In most cases, the riparian area consists of a narrow band of hardwood, conifer or mixed forest, with some sections along the golf course property lacking woody vegetation. Along the steepest portion of the high terrace, conifer forest is the dominant cover (**Figure VI-33b photo C,D**) and it plays a critical role in maintaining stability of the steep slopes. The lower banks and channel bottom are frequently characterized by dense stands of sedges and forbes, and while present in small patches, knotweed does not appear to be a significant problem.

Water Quality

During the GCSWCD's assessment of reach 3b, no specific water quality problems were noted. The Phase I Inventory and Assessment did not indicate the presence of any glacial clay exposures, but based on observations in other areas of the watershed, the GCSWCD suspects clay layers are only a short distance below the streambed, and any instability that results in channel degradation would expose the clay lens. As noted in reach 3a, the GCSWCD did not observe any direct impacts from on-site waste water treatment systems, but the scheduled construction of the Windham municipal sewer project will eliminate on-site septic systems and protect the stream from potential impacts from failing or sub-standard on-site septic systems.

While not specifically investigated by the GCSWCD, the Windham Country Club may present some opportunities to work cooperatively to protect water quality. During implementation of this stream management plan, the GCSWCD will further assess any impacts from the golf course, and work with the Windham Country Club to investigate management practices that could protect water quality. Reach 3b may also present opportunities for future projects related to stormwater retrofits. The lower part of the reach receives runoff from the denser hamlet area, with several outfalls from NYS Route 23 drainage systems located in the lower reach. The GCSWCD has been working with the Town of Windham and CWC to implement a stormwater retrofit project that is located in this reach. The GCSWCD is also aware that the upcoming reconstruction of NYS Route 23 in conjunction with the Windham sewer project, will include a number of stormwater treatment practices that will protect water quality, as well as reduce the impact of stormwater in stream erosion.

The Windham-Ashland-Jewett bus garage located in the lower end of the reach has also been noted as a potential risk to water quality and requires further evaluation. While observations by the GCSWCD indicate that the Windham-Ashland-Jewett facility is very well maintained, and operates in a clean manner, the location of a fleet of buses so close to the stream could potentially impact water quality in the event of a fuel leak or similar incident. The GCSWCD will seek to work with the Windham-Ashland-Jewett school district to investigate possible funding opportunities and strategies to minimize or eliminate the potential for the facility to impact the stream in the future.

Infrastructure

While reach 3b contains three stream crossings and a well house for the Town of Windham water system, the GCSWCD did not note any particular concerns with any of these features. The public road system is located a safe distance from the stream, and does not appear to have any direct impacts on the stream. In regard to bridges, the reach has three, with a bridge at State Route 296 located at the top of the reach, and two private bridge crossings located on the Windham County Club property. The State Route 296 bridge spans the entire floodplain, and even though the channel becomes somewhat entrenched

as it passes under the bridge, there are no obvious signs of having a negative impact on the stream system.

The two smaller bridges located on the golf course property (**Figure VI-33a photos A,B,J**) are primarily used by golf carts and service vehicles. While the bridges are currently stable, the presence of old steel sheet piling and rip rap indicate past channel modifications, and there are some signs that the lower bridge may not effectively pass sediment during larger flood events. Reach 3b also contains a well house for the Town of Windham water system. The well house is located on the floodplain, near the Windham-Ashland-Jewett bus garage. While the well is located far enough from the stream to be protected from significant damage by flooding, the Town of Windham would benefit from development of a Wellhead Protection Plan.

Habitat

Again, while the GCSWCD did not conduct a detailed fisheries assessment of the reach, observations have indicated that habitat quality is fair to good. In most places, the stream has some vegetative cover, and while the riffle pool structure is dominated by riffles with infrequent scour pools, the reach does present some areas for holding larger fish in the warm summer months. Further habitat assessments could identify improvements that may improve fisheries habitat.

Flooding Issues

The most significant issue with flooding in reach 3b is related to those structures located on the right floodplain near the bottom of the reach. While current flood mapping indicates that several structures are located within the 100 year floodplains, the flood control structures at Big Hollow and Narvou Road appear to adequately mitigate flooding impacts. During the larger floods in 1996 and 1999, the GCSWCD did not receive any notice of flood damaged structures, though several landowners reported minor erosion problems. The bridges have withstood many large floods without significant damage.

As the reach is already constrained by its entrenchment, any future activities should be undertaken so as to avoid fill in the floodplain. The NYSDEC digital flood mapping project for the Schoharie basin will be very useful in conducting additional assessments of flooding risks to the structures located within the hamlet area. A recurring flooding problem associated with an old mill race system located in this reach is being addressed by a GCSWCD and Town of Windham project under the CWC Stormwater Retrofits program.

Reach 3b Summary

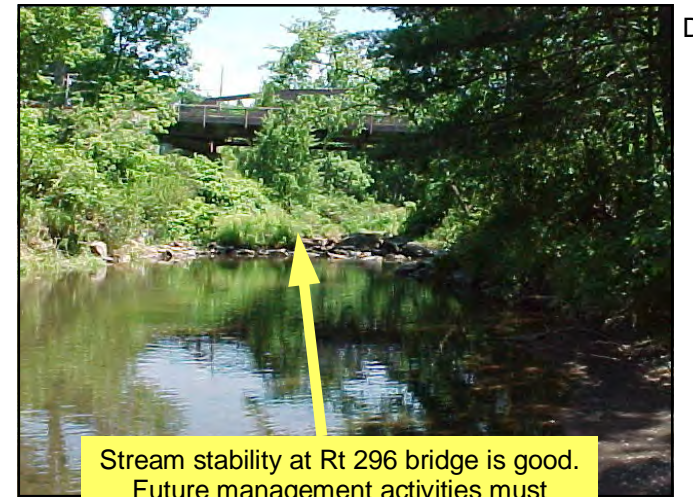
While reach 3b can currently be characterized as being relatively stable, the natural entrenchment of the stream channel, and the presence of development on the adjoining floodplain, are but two of the factors that can potentially influence long term stability. Management activities such as grading in the channel, additional fill on the floodplain, or even streambank protection, can initiate local instability that would have strong potential to migrate upstream and downstream. The GCSWCD would suggest that overall, the reach is sensitive to any activities that would increase entrenchment in the reach.

Table VI-9: Management Recommendations Reach 3b.

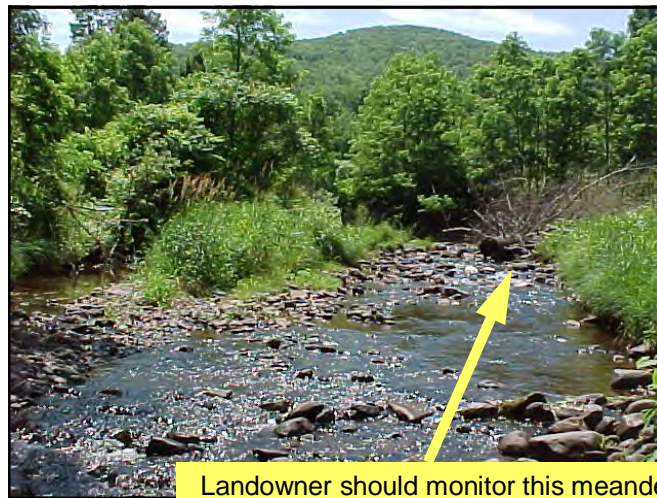
Reach 3b: NY Route 296 to Church Street.	
Intervention Level	Preservation
Stream Morphology	Stream channel morphology is basically stable, instability problems are small and localized. The reach is highly constrained by valley topography. Management activities must be conducted so as to protect the channel from further entrenchment. Continue to monitor Church Street reference reach for stability.
Riparian Buffers	The riparian condition in reach 3b is in fair to good condition through much of the reach. Opportunities may exist for increasing buffer widths, especially on the north bank. See General Recommendations
Water Quality	<ol style="list-style-type: none"> 1. Evaluate Windham-Ashland-Jewett bus facility for potential CWC Stormwater Retrofit funding. 2. Work with Windham Country Club to evaluate management activities that will preserve water quality. 3. Town of Windham should consider development of a Wellhead Protection Plan. 4. See General Recommendations
Infrastructure	<ol style="list-style-type: none"> 1. Future replacement/retrofit of the State Route 296 bridge, and the private bridges on the country club property, should be undertaken so as to maintain or increase the current spans. Center piers should be avoided. 2. Activities conducted in response to flood damage repairs should be done so as to prevent any changes in stream morphology. Emergency repairs should not result in entrenchment, over widening, or changes in stream slope. Repairs should not set conditions for long term instability.
Habitat	See General Recommendations
Flooding	<ol style="list-style-type: none"> 1. Priority must be given to avoiding future floodplain fills. 2. Work with Town of Windham to evaluate status of existing development in the floodplain. Assess threat to public/private property within the reach when more detailed flood maps become available. 3. See General Recommendations
Further Assessments	<ol style="list-style-type: none"> 1. Upon receipt of the new digital flood maps, evaluate flooding risks to structures at the bottom of the reach. 2. Continue to monitor Church Street reference reach. 3. Conduct detailed riparian assessment, evaluate need for buffer enhancements.



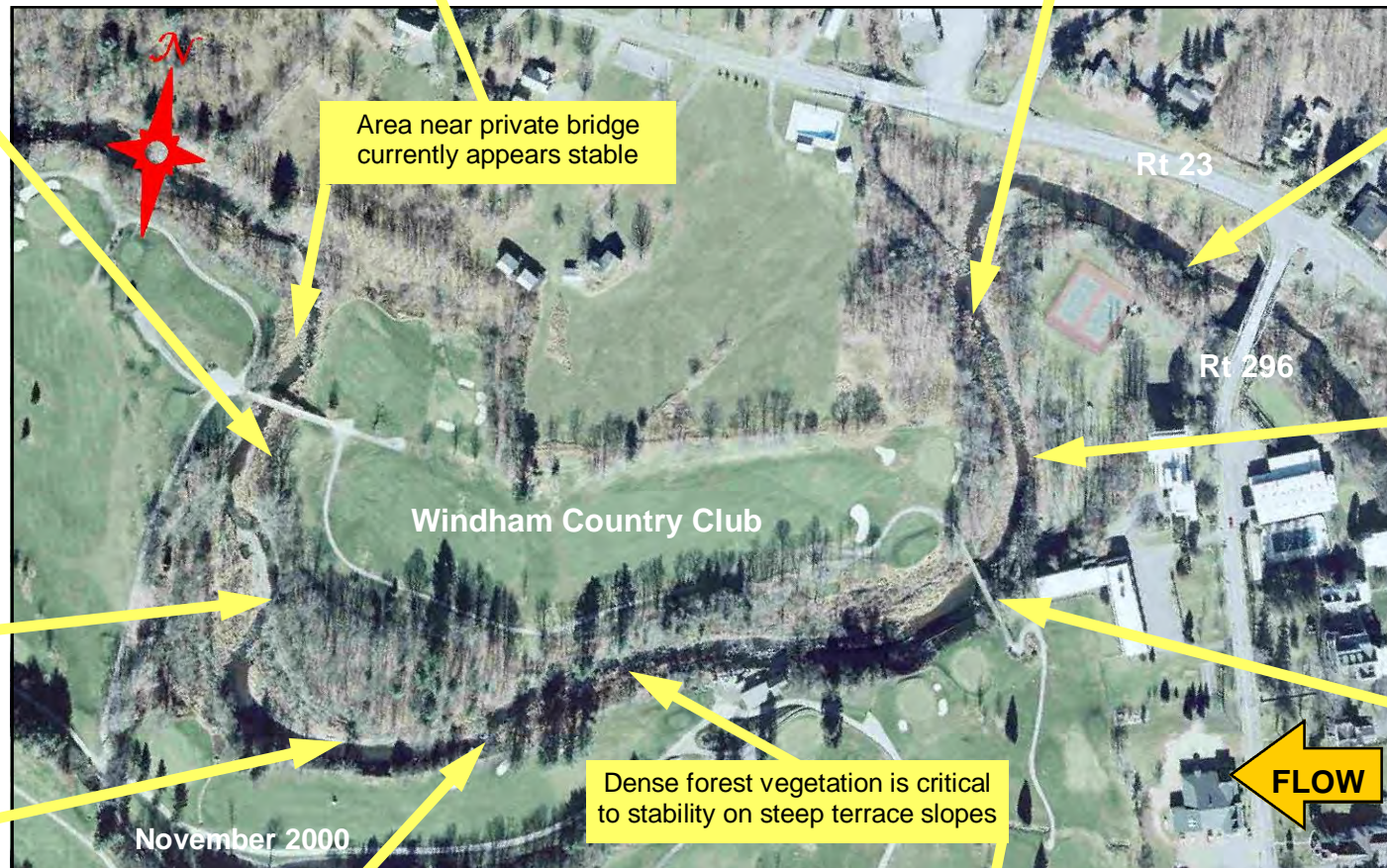
Steel piling streambank protection indicates past instabilities in this area



Stream stability at Rt 296 bridge is good. Future management activities must protect stream conditions



Landowner should monitor this meander for erosion. See GCSWCD for assistance prior to any management activities



Area near private bridge currently appears stable

Windham Country Club

Dense forest vegetation is critical to stability on steep terrace slopes



Private bridge exhibits good stability, and does not appear to be impacting the stream



Figure: VI-33a Reach 3b-Upper



Reach is moderately entrenched in the hamlet. Avoid additional floodplain fills.



B



C

Dense forest vegetation is critical to stability of steep slopes along the high terrace



D



E



F



G

A well armored stream bottom is critical to stability. Disturbance must be avoided



H

Figure: VI-33b Reach 3b-Lower