

Prattsville Berm Removal Project

1.0 Project Location

The project site is located between the New York State Route 23 Bridge over the Schoharie Creek and the Schoharie Reservoir. The restoration plan encompassed approximately 2,200 feet of streambank along the western floodplain of the Schoharie Creek. The project was located on lands of the New York City Department of Environmental Protection.

2.0 Project Background

In 1979, a 10ft high gravel berm had been constructed along the left streambank of the Schoharie Creek. This berm restricted flood water from accessing available floodplain beyond the berm and appeared to exacerbate ice jamming on the Schoharie Creek, causing flooding problems within the hamlet of Prattsville. This berm had caused stream channel to be uncharacteristically entrenched. A high channel width to depth ratio in the reach promoted deposition in the channel. Deposition can promote lodging and adhesion of ice to the bed and formation of ice jams. The top of the berm was at an elevation higher than the road and homes on the east side of the stream causing flood water to encroach on the adjacent homes and roadway before flowing onto its natural floodplain on the east side of the creek.



*Prattsville flood remediation project
pre-construction*

3.0 Project Description

The Town of Prattsville had experienced recurrent ice jamming on the Schoharie Creek, causing flooding problems within the hamlet of Prattsville. A gravel berm located along the left streambank of the project area restricted flood water from accessing the available flood plain. It is also noted that the top of the berm was at an elevation higher than the road and homes on the east side of the stream. Flood water encroached on the adjacent homes and roadway before flowing onto its natural flood plain on the east side of the creek. The proposed project included re-grading the berm to match the elevation of the existing floodplain in order to allow flood water to access the natural floodplain. There are no buildings, utilities or other significant structures located within the floodplain area.

4.0 Problem Assessment

The 10' high berm constructed in 1979 along the left bank downstream of the bridge had entrenched the stream channel while increasing the width to depth ratio. The altered channel geometry promoted the deposition of sediments, which in turn encouraged lodging and adhesion of ice to the bed and formation of ice jams. The backwater curve of the Schoharie Reservoir also appeared to be contributing to deposition and ice lodging because of the lower slope which was apparently caused by the backwater transition curve of the reservoir, although no quantitative data was available to confirm the existence of this effect.

A geomorphic assessment was conducted through the reach by The Bioengineering Group, Inc. in 1997. A topographic survey of the project area was procured by Lamont Engineers and supplemented with additional surveyed cross sections and channel profile. Geomorphic reference data was collected from three stream reaches located along the Schoharie Creek for application to the project reach.

Several conceptual plans were generated for the project area, including a proposal for complete geomorphic restoration of the area. After reviewing the conceptual plans, constructability, and corresponding cost estimates for construction, a simplified alternative of removing the berm and regrading the material was selected as the most appropriate and cost effective alternative.

A flood flow frequency analysis was performed for the USGS gaging station # 01350000 Schoharie Creek at Prattsville, located immediately upstream of the project area at a drainage area of 237mi². The results were incorporated into a hydraulic model (HEC RAS) for the project area in order to model existing conditions and to analyze several berm removal options. The evaluated alternatives included complete removal of the berm to the floodplain elevation with the excavated material hauled off site, and complete removal of the berm to the floodplain elevation with the excavated material regraded on site.

Due to the relatively recent construction of berm and subsequent disturbance to the area, an archeological investigation was not initiated for the project site. The area of disturbance for the project lay completely on lands which had been disturbed and re-graded several times in the recent past. Therefore no disturbance to existing archeological resources was expected.

4.0 Restoration Strategy

The final restoration strategy included removing the existing berm to the corresponding elevation of the natural floodplain located behind the berm. The material generated from the berm removal was graded toward the stream channel to the corresponding elevation of the floodplain and seeded with a conservation mixture. The removal of the berm assisted in reducing flood water

surface elevations during higher flow events by re-connecting the natural floodplain with the active stream channel. The natural floodplain can also act as an ice storage area during large seasonal flow events and provide a release for flood water in the event of a localized ice jam. Additionally the graded material does not significantly raise the flood surface elevations during lower flow recurrence intervals.

Based upon detailed design cross sections the approximate volume of material excavation was outlined as follows:

Estimated cut material - 18,000 yds³
Estimated fill material - 18,000 yds³
Total fill below OHWM - 10,100 yds³

5.0 Project Construction

In 2004, GCSWCD and the Prattsville Highway Department completed the project by re-grading the berm to match the elevation of the existing floodplain, in order to allow flood water to access the natural floodplain. The natural floodplain can also act as an ice storage area during large seasonal flow events and provide a release for flood water in the event of a localized ice jam. Construction encompassed approximately 2,200 feet of streambank along the western floodplain of the Schoharie Creek



*Prattsville flood remediation project
post construction*

Construction Schedule

Construction of the project commenced in September of 2004 and continued for approximately two weeks. Grading of the berm took approximately one week, which was followed immediately by the application of seed and mulch over all disturbed areas.

Project Site Access

Access to the area was gained through an existing gravel utility road located along the southeast portion of the project area.

Vegetation

The entire project area encompassed approximately 8 acres along the floodplain boundary with the Schoharie Creek. The vegetation located within the project boundary was primarily grass. There was no disturbance to the surrounding forested floodplain and forested wetlands.

Wetlands

A small wetland encompassing 0.21 acres was located along a portion of the boundary of the stream channel with the berm. The wetland area was filled with material generated from the berm removal. The wetland loss was mitigated by the removal of the berm which re-connected nearly 115 acres of forested floodplain; most of which was listed as forested wetland. There was no disturbance to the surrounding forested floodplain and wetland.

Sediment and Erosion Control

Due to the size of the Schoharie Creek in the project reach it was not feasible to pump or passively divert the stream flow during project construction. It was therefore proposed that the removal of the berm and grading of the material be done completely above the low flow water surface so as not to create a disturbance in the active channel. The over-widened condition of the pre-existing stream channel provided ample room for construction activities without the need for entering or disturbing the active channel. A combination hay-bale and silt fence barrier was constructed, as necessary, to prevent any overland runoff of sediment from entering the watercourse in the event of inclement weather during construction.

6.0 Project Status: Flood Event Inspection (April 22, 2005)

On April 3, 2005, the Schoharie Creek watershed experienced several inches of rain on snow resulting in a peak flow through the stream channel exceeding the bankfull flood stage. The peak flow recorded at the USGS Gage Station (#01350000) at Prattsville equaled or exceeded 42,000cfs. The Prattsville Project was inspected several times during and after the flow event to document the flow conditions and project performance. The following written description is a summary of the inspected project components. Attached are images of the site taken after the flood event.



*Prattsville flood remediation project
post-flood*

Floodplain Area

Flood flow crested the left streambank and former berm area to a stage several feet above the floodplain elevation. Extensive amounts of debris and large woody material were deposited throughout the floodplain. Numerous tree tops, which remained from the recent logging operation, were intermixed with the flood debris and remain piled throughout the floodplain.

Small isolated areas containing rill type erosion were noted along the top surface of the former berm area. The rill erosion was present only in limited areas where grass had not completely established. In larger sections of the former berm area, a thin layer of sand was deposited.

The streambank experienced minor scour as a result of the flood flow. It is presumed that the bank erosion would have been partially if not entirely mitigated if the vegetation had been able to establish prior to the increased stresses caused by the flood event.

The existing defined floodway, which bisects the access road, had significantly deeper flows which resulted in the deposition of coarse gravel and cobble near the entrance to the project. There were no signs of erosion or scour present in the floodway upstream of downstream from the access road.

There were no reports of flooding in the hamlet area of Prattsville as a result of the flood flow.

Recommendations and proposed repair/modification

- As-built surveys have not been completed for the project site. The as-built survey should be completed to document the post construction site topography, as a basis of comparison to the design, as well as for use in future floodplain modeling.
- Thought should be given to establishing monitoring cross sections at the site to document the stability and dimension of the stream channel.
- Repair to the project site should include reseeding and mulching all exposed areas as well as areas where vegetative establishment has been poor.
- The gravel stockpile should be removed from the project area. Upon removal, the area should be graded as outlined in the project design, seeded and mulched.
- The treetops remaining from the floodplain logging should be removed from the floodplain so as not to exacerbate debris buildup or cause the accumulation of ice. Thought should be given to grinding or chipping the slash material as well as selected woody debris deposited by the flooding.

- Large quantities of Japanese knotweed stems are present in the flood debris. Additionally, active established colonies are located along the downstream section of floodplain. The ability of knotweed to grow or become established from previously cut stems is unknown. The potential re-growth from the cut and dry knotweed should be researched and incorporated into any strategy for reuse of the woody flood debris to prevent the transport and establishment to other areas.
- It is not recommended that former flood channels be connected between the floodplain and stream channel. Excavation of such channels through the former berm area will result in increased velocity and stress within the flood channel requiring the potential need for increased stabilization. It is presumed that these channels would provide an insignificant reduction in flood stage. If required, existing floodplain modeling could be used to determine the impact of constructed channel on the floodwater surface as well as determine the stress in the bypass channels and resultant required stabilization.