Urban Stream Restoration

Pheasant Branch Creek, Middleton, WI

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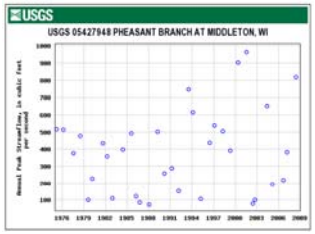
Pheasant Branch Creek drains 22.7 square miles of west-central Dane County and enters Lake Mendota from the west. Early settlers created the North Fork channel when they drained the area wetlands in the 1800s and redirected water into a straightened channel east of Highway 12.

The North Fork drainage area currently consists of mostly agricultural lands whereas the stream's South Fork is almost fully developed. It drains the rapidly urbanizing west side of Madison and the City of Middleton. The main channel of Pheasant Branch runs through the City of Middleton from Highway 12 downstream through Pheasant Branch Marsh to Lake Mendota.

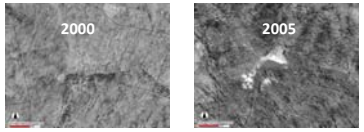
Cultivation of land draining to the creek, ditching, straightening, and urbanization have all increased the peak flows through the downstream section, accelerating channel and bank erosion.



Presently, erosion in the upper reach of the main channel valley threatens several structures. Since the late sixties, the City of Middleton has spent about a half million dollars for main channel stabilization. Yet, large storms in the past 10 years have caused extensive erosion throughout the stream corridor.

1- A Report From The North Fork Pheasant Branch Watershed Committee , March 1990. http://www.geology.wisc.edu/~maher/Pheasant_Branch.htm

Severe erosion is common in Pheasant Branch Creek. This slope located between Park Street and Century Avenue eroded approximately 25 feet over the five year period between 2000 and 2005.

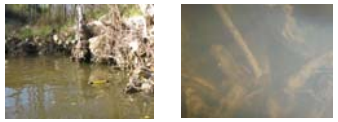


In 2008 and 2009 JFNew designed, and built or provided construction oversight for nearly 1,500 linear feet of bank stabilization and habitat enhancement projects on Pheasant Branch Creek between Park Street and Century Avenue.

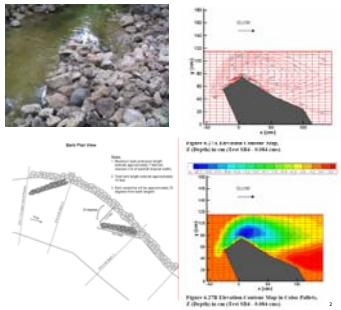
These projects were accomplished using matching funds from the WI DNR's Non-Point Source Pollution Grant Program, FEMA, and the American Recovery and Reinvestment Act (ARRA). Stabilization projects focused on the worst areas of erosion within the corridor, specifically those areas where existing infrastructure was threatened by erosion.

Severe erosion throughout the reach caused the loss of many trees which were utilized to stabilize banks through the use of rootwad composites.

Rootwads create pools increasing habitat complexity within the stream. Small spaces found within rootwad composites can provide cover for small fish, as well as reptiles, and small mammals found within the riparian habitat.



Flow deflection techniques were also used to move the thalweg away from eroding banks toward the center of the channel; creating variable flows across the channel cross section.



Stream barbs can create areas of slow-moving backwater that induce near-bank depositional features and accelerate mid-channel flows that promote scour pool development. As a result, these structures enhance beneficial habitat for fish, amphibians, reptiles, and aquatic insects. The rootwads and barbs built were all seeded with native species endemic to southern Wisconsin with deep extensive rooting systems.

2 - Example of barb effects on channel bed elevations. Papanicolaou, et. al. 2004.

In this corridor surface run-off from roof-top and parking lot storm water had caused two severely eroded gullies on side-slopes leading into Pheasant Branch Creek between Park Street and Century Avenue. JFNew designed and installed an infiltration bio-swale with gentle slopes filled with native vegetation at this location to cut-off surface run-off before entering the gullies. The gullies were graded to a 2:1 slope before stabilizing with native vegetation, and covering with erosion control blanketing to alleviate the problem.

The stability and fertility of streambanks consisting of primarily sands throughout this reach was problematic. Many sites were graded to a more stable angle of repose and then covered with top soil to provide a better growing medium before planted with native vegetation.

Special thanks to Herb Garn, Scientist Emeritus (USGS retired) for historical photos