onondaga creek

CONCEPTUAL REVITALIZATION PLAN

appendix I: SUNY ESF Restoration Proposals

Onondaga Environmental Institute

SUNY College of Environmental Science and Forestry

Onondaga Creek Habitat Restoration Demonstration Initiative

Restoration Proposals

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and students

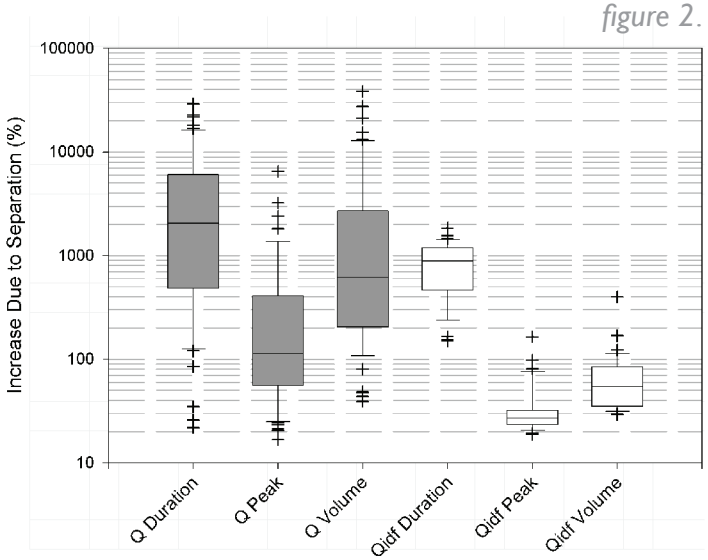
Project Description :

The purpose of this project is to design community responsive restored channel, riparian, or watershed habitat in or along the Onondaga Creek corridor. The subordinate goals are summarized as: a) Coordinate with the Onondaga Environmental Institute (OEI) community visioning, b) Implement ecohydrology models report on channel and watershed connections and advance community visioning, c) Employ service learning techniques to highlight current conditions and advance community visioning, and d) Utilize ecological engineering design methods to develop restored habitat. Constraints on restoration are: 1) Maintaining acceptable flood conveyance risk, 2) Improving creek aquatic habitat and water quality, and 3) Enhancing riparian structure and function.

Current Status:

Several components of this project have been finalized, and were published or submitted for publication. The project has been extended at no-cost for an additional year, however, to continue coordination with OEI and the community visioning, as well as finalize certain model and design components. The service learning has been completed by SUNY ESF graduate students and faculty, with support from OEI and ESF Office of Outreach. Community visioning has established a watershed and channel restoration goal along several sections of Onondaga Creek. Field exploration and modeling of stormwater impacts on channel runoff, and how sewer separation may impact channel restoration, were explored in CSO 050 (see Figure 1) using data mining, capture, and SWMM and MODFLOW simulations. Separation of sewers may significantly increase the volume of water discharged to Onondaga Creek (Figure 2, grey historic storms, white design storms). MODFLOW simulations have indicated street-side stormwater capture with bioretention basins will reduce peak loads, and not cause unwanted watertable mounding. TR-20 simulations indicate that increased flow release of 10-yr frequency events from the Onondaga Dam would likely overtop the current channel. HEC-RAS simulations have shown that channel redesign using compound geometry could contain these 10 to 100 yr frequency flows and provide envisioned restoration structure.

figure 2.



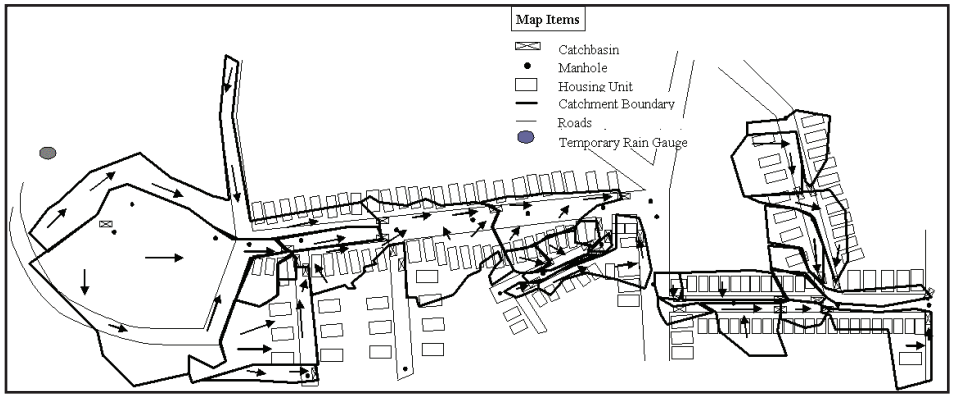


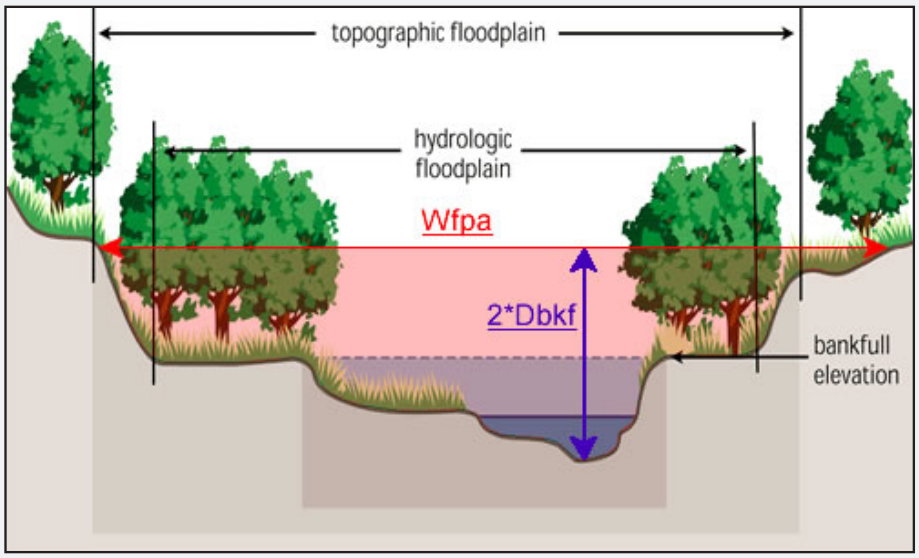
figure 1.

Location:

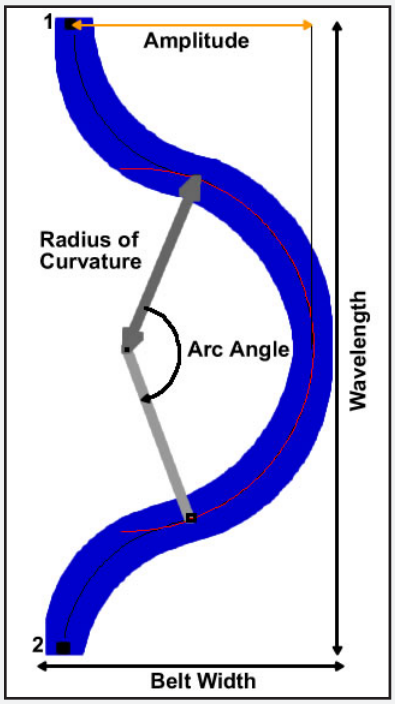
Onondaga Creek watershed, with an emphasis on urban and suburban drainage areas and channels, is the location of this project.

Project Sponsor:

United States Environmental Protection Agency and the US Department of Housing and Urban Development are the federal sponsors of this project.

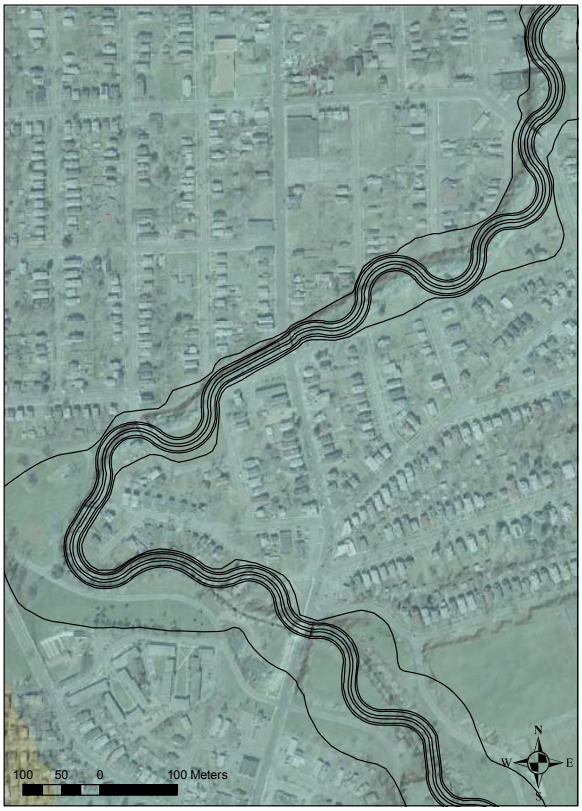


Bankfull Geometry: Cross-section illustration of a channel and floodplain, showing the active channel (dark blue), the bankfull channel (light blue, dashed line), and the floodplain (forested). The proposed design for Onondaga Creek used field surveys of reference reaches, known as non-degraded sections of the stream, to obtain values for these geometrical features. The bankfull depth and width, at pools and riffles, along with the width of the floodplain, are not random values, but are interacting, with the change in one value requiring a compensating adjustment in the others.



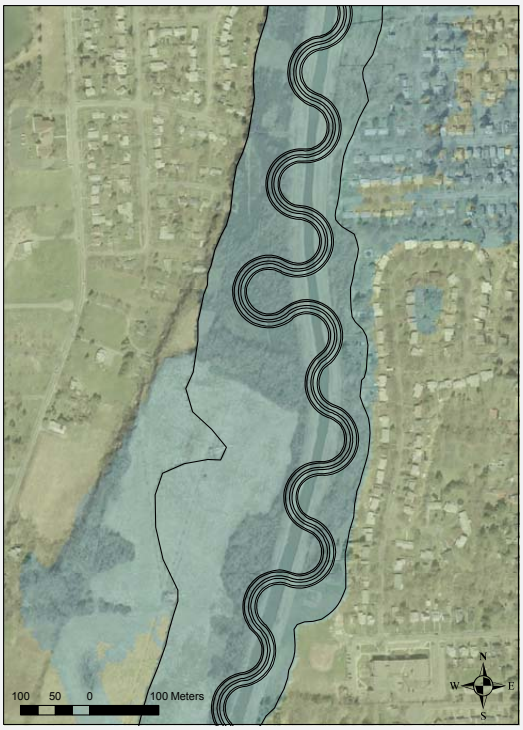
Meander Geometry: Planform illustration of a meander bend, showing the radius of curvature, wavelength, and belt width. The proposed design for Onondaga Creek used field surveys of reference reaches, known as non-degraded sections of stream, to obtain values for these geometrical features. The wavelength, radius of curvature, and belt width are not random values, but are interacting, with the change in one value requiring a compensating adjustment in the others.

South Avenue: Proposed restoration north of South Ave., bounded by Kirk Park and Lower Onondaga Park Drive, showing an overlay of a transparent digital orthophoto, an elevation map, and several black lines denoting the Onondaga Creek upper floodplain, lower plain, active channel and fish passage thalweg. This restoration design illustrates the larger remaining historic meander on the Western edge, and the various vacant lots and buildings could be removed to expand creek meanders, which could be modified to exhibit other patterns.



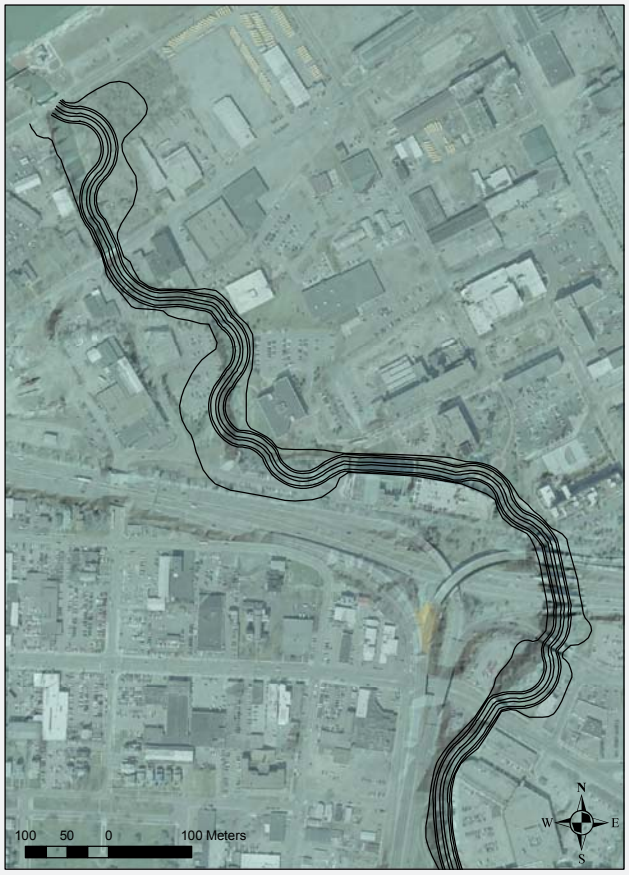
Armory: Proposed restoration crossing West Onondaga St., bounded by the Armory Square neighborhood and South West St, showing an overlay of a transparent digital ortho-photo, an elevation map, and several black lines denoting the Onondaga Creek upper floodplain, lower floodplain, active channel and fish passage thalweg. This restoration design illustrates a constriction by existing property to the south of West Onondaga St., and expansion to access the railway parking lot, which could be modified to exhibit other patterns.

Dorwin: Proposed restoration north of Dorwin Ave., bounded by Valley Dr. and Salina St., showing an overlay of a transparent digital ortho-photo, an elevation map, and several black lines denoting the Onondaga Creek upper floodplain, lower floodplain, active channel and fish passage thalweg. This restoration design features in the middle section of a wider belt width, which could be modified to exhibit other patterns.



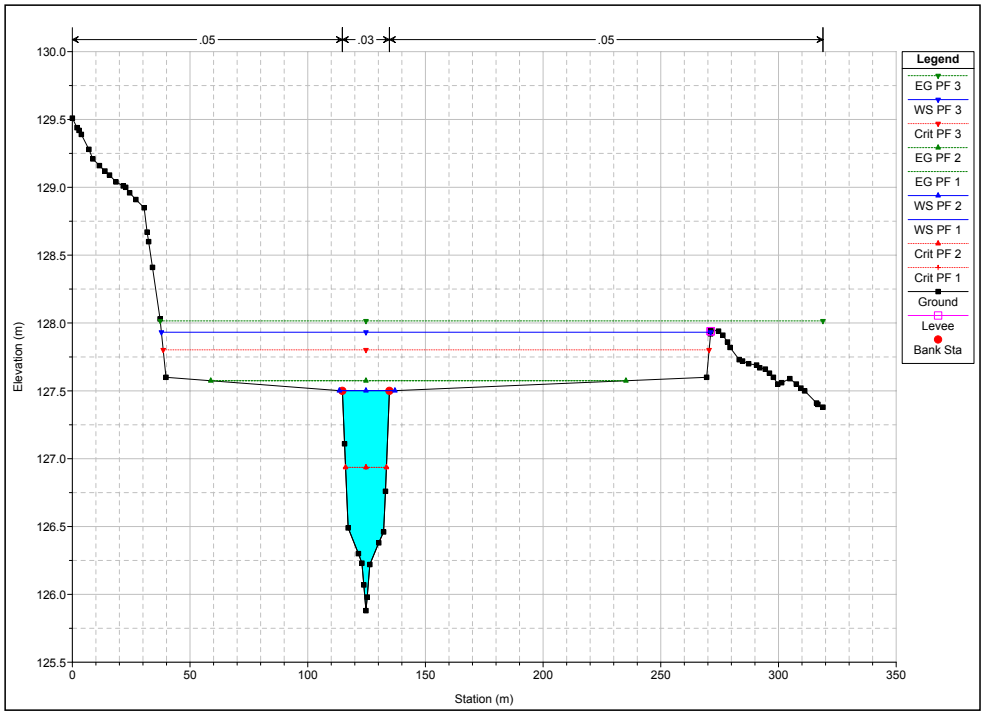
Ballantyne Road: Proposed restoration north of Ballantyne Rd., overlaying Onondaga Creek Boulevard, showing an overlay of a transparent digital ortho-photo, an elevation map, and several black lines denoting the Onondaga Creek upper floodplain, lower floodplain, active channel, and fish passage thalweg. This restoration design illustrates how the Onondaga Creek Blvd. could be removed to expand creek meanders, and how the creek meanders are narrowed to the north to pass through the W. Newell St. Bridge, which could be modified to exhibit other patterns.

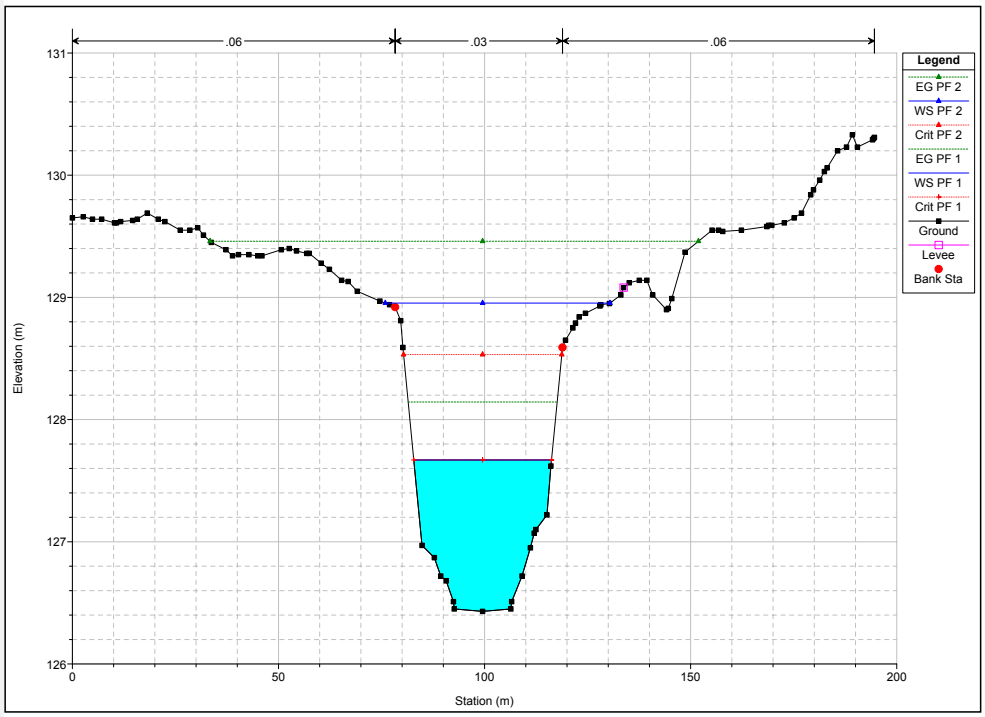
Inner Harbor: Proposed restoration south of the Inner Harbor, passing through downtown Syracuse, showing an overlay of a transparent digital ortho-photo, an elevation map, and several black lines denoting the Onondaga Creek upper floodplain, lower floodplain, active channel and fish passage thalweg. This restoration design illustrates a constriction by highway bridges, and expansion to access property occupied by vacant buildings and land, which could be modified to exhibit other patterns.



Nedrow: Proposed restoration at boundary of Onondaga Nation, showing an overlay of a transparent digital ortho-photo, an elevation map, and several black lines denoting the Onondaga Creek upper floodplain, lower floodplain, active channel, and fish passage thalweg. Historic meanders are shown along the eastern edge, and this restoration design could be modified to retract those meanders, or other patterns. The proposed creek is overlaying its current channel to minimize acquisition of new property.

a) Proposed Channel





b) current channel

These images show a section north of Dorwin Ave for the current and proposed creek (not absolute congruence, but near). Both are vertically exaggerated, and the proposed shows the fish passage thalweg, bankfull points (in red dots), the compounded floodplain (all features from the black lines on the Meander images). They illustrate how a bankfull flow (~30 cubic meters per second) would fill the proposed channel, but only partially fills the current, and how the 100 year flow would fill the upper floodplain in the compound proposed channel, but now fills the entire channel in the current status of the Creek.

Suggested Reading:

Black, J. and T. Endreny. 2006. Increasing Stormwater Outfall Duration, Magnitude and Volume through Combined Sewer Separation. Journal of Hydrologic Engineering 11:472-481.

Endreny, T. and M. Higgins. 2008. Adding Radar Rainfall and Calibration to the TR-20 Watershed Model to Improve Dam Removal Flood Analysis. Journal of Water Resources Planning and Management 134:314-317.

Endreny, T. 2004. Storm Water Management for Society and Nature Via Service Learning, Ecological Engineering and Ecohydrology. Water Resources Development 20:445-462.