

Established regenerative step pool storm conveyance in Anne Arundel County, MD

Joe's Branch Watershed Restoration – Potential Kickoff for Restoration of D'Olive Watershed

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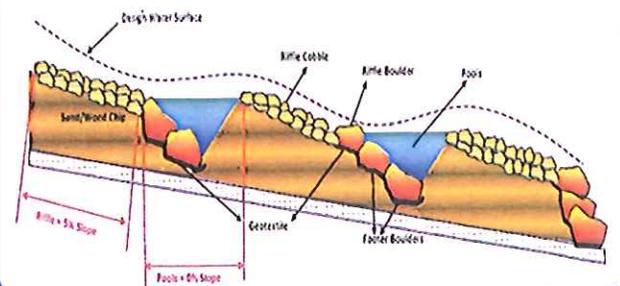
If Clean Water Act Section 319 funding is approved, restoration of an impacted stream and wetlands on Westminster Village property in Spanish Fort, along with upstream management efforts as part of an education/outreach campaign, could kick off measures recommended in the Watershed Management Plan for D'Olive Creek, Tiawasee Creek and the Joe's Branch Watersheds (WMP). This downcut stream has been impacted by stormwater concentration from a highway culvert and sheet flow from park and school facilities (to the north) and Faith Family Fellowship (to the east) onto a once-pristine wooded natural slope. Since at least 2005, severe erosion and mass wasting have accelerated with every significant rainfall event, as the

flowing water seeks to create a stable floodplain at a lower elevation. The broadening and deepening channel has deposited tons of sediment into downstream wetlands, Joe's Branch, D'Olive Creek and Bay, and ultimately into Mobile Bay. Section 319 funds provide federal support through the Alabama Department of Environmental Management (ADEM) for non-point source pollution issues, including sedimentation.

The D'Olive Watershed has been plagued by excessive erosion and sedimentation since the 1970s. Five of its stream segments – D'Olive Creek, Tiawasee Creek, Joe's Branch and unnamed

tributaries to D'Olive Creek and Tiawasee Creek – are on the 2010 303(d) list of impaired water bodies for siltation/habitat alteration from land development. Of almost 23 miles of streams in the Watershed, two miles have been substantially degraded by runoff and sedimentation, four miles are currently being degraded, and six miles

Functional Components of Step Pool Storm Conveyance (SPSC)



Schematic diagram of regenerative step pool storm conveyance components.

have the potential for future degradation. This proposed stream restoration will alleviate sedimentation in both Joe's Branch and D'Olive Creek. Another factor that made this project a target for 319 funding was the hiring by Westminster Village of Thompson Engineering (who headed the team that developed the WMP) to design a plan to restore natural hydrologic function, prevent further damage, and reduce transport of non-point source pollutants (primarily sediment) via the impaired Joe's Branch stream. Thompson developed a plan to install regenerative step pool storm conveyance (SPSC). This open-channel conveyance structure converts surface runoff to shallow groundwater flow through a linear series of shallow, surface ponds with riffle grade control overlying a sand/woodchip seepage filter installed within the channel. This cutting-edge methodology, also known as a coastal plains outfall, was designed using guidelines provided by Anne Arundel County in Maryland. The riffled pools interrupt the development of water depth and velocity along the flow path and maintain non-erosive flows during larger volume storms to limit development of stream energy. A native plant community will "knit" the site together, producing native habitat, serving as a carbon sink for the system, and complementing the pleasing aesthetic value of the SPSC.

Additionally, approximately 1.0 to 1.5 acres of impacted wetlands down slope of the SPSC will be restored to improve the hydrological, biological, and chemical health of Joe's Branch; reduce pollutant loadings; and prevent further pollutant impacts downstream. Native wetland plants (including groundcover and trees) will be reestablished throughout the project site to create a functional riparian floodplain; stabilize stream banks; reduce erosion and sedimentation; and provide food, habitat, and passage corridors for invertebrates, fish, and wildlife. This native vegetation will serve as an aesthetic enhancement to the project area by providing shade and visual interest.



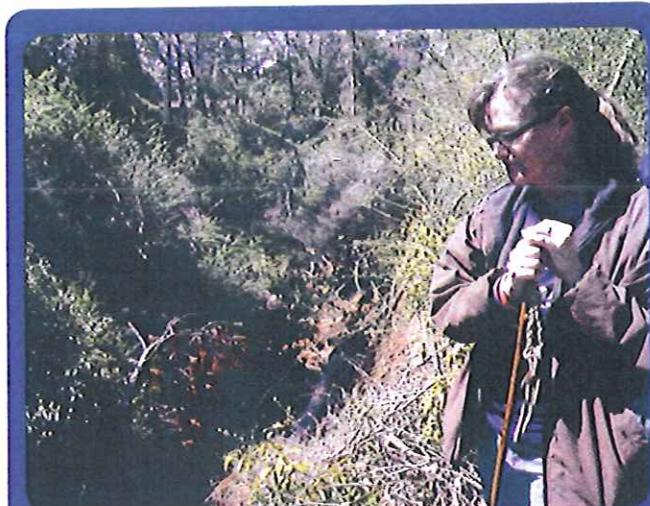
ADEM Director Lance LaFleur discusses plans with Thompson Engineering's Emery Baya on impacted wetlands in Joe's Branch Watershed.

An education and outreach component will be implemented to help increase public and private sector knowledge of watershed and water quality protection, engage stakeholder in innovative technologies and thought processes, and promote investments of human and financial capital needed to accommodate future watershed management goals and objectives. Upstream best management practices, like bioretention swales, rain gardens, and rain barrels, will be installed in nearby public areas like ball fields, parking lots, and the campus of SpanishFort Elementary School to provide demonstrations of low-impact development measures. Other proposed outreach activities include brochures, videos, presentations,

artistic projects, an oral history initiative, public service announcements, and workshops.

The impending widening of Highway 31 by the Alabama Department of Transportation (ALDOT) provided another incentive to secure 319 funding for this project. Concerns over threats to the integrity of Highway 31 by the widening gully that runs parallel to and only feet from it stimulated ALDOT to offer \$200,000 necessary to extend and expand stormwater conveyance to be used as non-federal match for 319 project funding.

A consensus of project partners, including the Cities of Spanish Fort and Daphne, Baldwin County, Westminster Village, the Mobile Bay National Estuary Program (MBNEP), ALDOT, and Thompson targeted this sub-watershed as a kickoff for restoration efforts within the D'Olive Creek Watershed. The cost of comprehensively restoring this impacted Watershed is estimated at around \$44 million, so the necessity of addressing this worsening situation, plans by and need for ALDOT to protect Highway 31 from stormwater impacts, and availability of potential 319 funding make this a logical first step in the process. MBNEP and Thompson prepared the 319 Grant proposal that was submitted to ADEM in early August. A decision by the funders is expected later in fall, 2011.



Ashley Campbell of the City of Daphne examines severely impacted stream on the property of Westminster Village in Spanish Fort.