**Deer Creek Wetland Design Charrette**

**Wetland Information[[1]](#footnote-1)**

**Ways that constructed wetlands work to reduce NPS pollution:**

* Soils in mature wetlands retain and infiltrate water.
* Basins can provide storage capacity.
* Area for water to spread out reduces velocity.
* Frictional resistance of vegetation reduces water velocity.
* Nutrients become trapped by burial in sediments, chemical breakdown, or assimilation by aquatic plants or bacteria.

**Ways to enhance the functioning of constructed wetlands:**

* Proper wetland sizing reduces high loading rates.
* Keep velocities low by
	+ restricting the size of wetland outlet(s) to retain water onsite longer.
	+ limiting the gradient (slope) through the wetland,
	+ creating snake-like sinuous edges
	+ planting persistent emergent vegetation.
* Undisturbed soils, fine-textured clay soils and soils with high organic matter content have more adsorption sites for retaining nutrients.
* Water depths less than 40 inches result in greater resistance to flow.
* Water depths greater than 40 inches maximize sediment deposition.
* Very gradual slopes reduce erosive effects.
* A pre-sedimentation basin can trap sediments and large particulates before they enter the wetland.
* Vegetation with persistent stems provide year-round resistance to water flow.

**Site Specific Background Info**

The site is located at the corner of Brentwood and Marshall Avenues in Brentwood, Missouri. The wetland is located in the FEMA floodway and has hydric soils. The wetland plus riparian corridor is approximately 5 acres in size. The wetland receives water from approximately 25.1 square miles or 16,064 acres of the watershed. An ideal constructed wetland is 1-5% the area of the watershed that drains to it. This wetland is .03% the size of the area that drains to it. The linear feet of riparian corridor along Deer Creek at this site is approx. 1,134 ft.

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**Strengths, Weaknesses, Challenges and Opportunities**

**Site Strengths**

* Soil on the site has been undisturbed since the 1970’s.
* Site is easily accessible from a major thoroughfare.
* Site will be easily accessible from the new GRG Deer Creek Trail extension.
* Site has had cattails that filter water to improve water quality.
* Site can receive water from Deer Creek without constrictions.

**Site Weaknesses**

* Location in lower Deer Creek means the site is handling water from about two-thirds of the watershed.
* If the wetland is sized too small, water flow through the system can be too rapid for effective treatment.
* An undersized wetland has high water velocity which discourages plant growth.
* High water velocity can wash out rooted vegetation and scour deposited sediments.
* An undersized wetland has high loading rates which lowers nutrient removal efficiency.
* Suburban location limits ability to attract wildlife to the site.

**Project Challenges**

* Will compacting, disturbing and/or removing soil have a negative effect on water quality?
* Will the use of herbicides to combat Johnsongrass and other invasives have a negative impact on water quality?
* Will the hydric nature of the soil limit the ability to improve water quality via an increase in soil infiltration rates?
* How can the design ensure that new plantings will not be swept away in a site that is designed to flood?
* Would wetland pools designed to attract aquatic life and encourage sedimentation to improve water quality in Deer Creek also become mosquito magnets? How can this best be prevented?
* Will the use of pesticides to combat mosquitos degrade water quality?
* Would pools need to be dredged periodically due to heavy sedimentation?
* How will new plantings be maintained so that the site can be an attractive community amenity?

**Project Opportunities**

The site provides an opportunity to create a project that will:

* *Improve water quality.*
* Increase the ecological value of the site.
* Improve soil health.
* Enhance the aesthetics of the site.
* Restore the riparian corridor.
* Incorporate long-term stewardship into the project design.
* Increase public engagement and education with a raised boardwalk & signage.​​
1. Design Features of Constructed Wetlands for Nonpoint Source Treatment www.indiana.edu/~clp/.../Const%20**Wetland**%20booklet.pdf [↑](#footnote-ref-1)