

Stormwater Wetland

Stormwater wetlands are shallow pools constructed of a variety of wetland vegetation to maximize the pollutant removal from storm water runoff by five separate mechanisms:

- plant uptake
- settling
- absorption
- microbial breakdown of pollutants
- retention

Stormwater wetlands are among the most effective BMPs in terms of pollutant removal, and they are similar to traditional wetlands, except for the fact that they lack some of the ecological benefits of traditional wetlands. Stormwater wetlands do, however, provide flood control and pollutant removal benefits.

Advantages

- Biological uptake of pollutants by wetland vegetation
- Flow attenuation
- Reduction of peak discharges
- Reduction of BOD and bacteria
- Aesthetically pleasing for communities
- Low maintenance requirements

AT-A-GLANCE SUMMARY

<u>Benefit</u>	
Major	●
Secondary	◐
Minor/None	○

Flow attenuation ●

Runoff volume reduction ◐

Pollutant Removals

Total Suspended Solids ●

Floatables ◐

Heavy metals ◐

Oil and grease ●

Fecal coliform ●

BOD ●

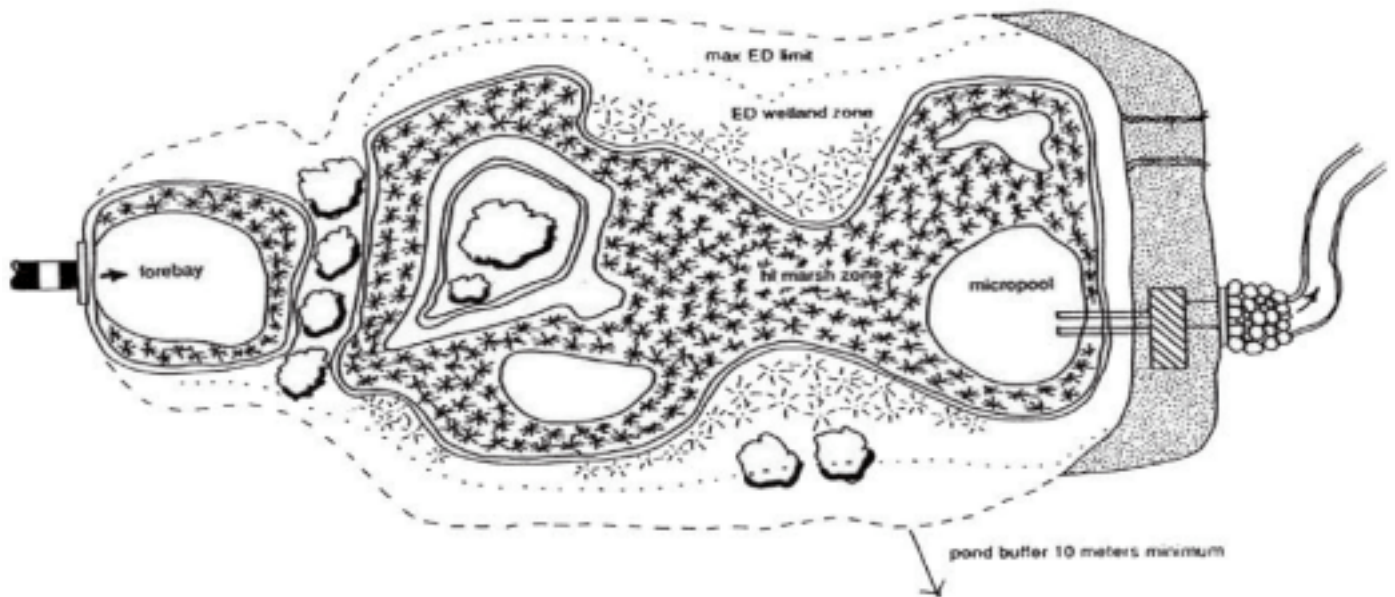
Total Phosphorous ◐

Nitrogen ◐

Costs ●

Maintenance ○

Wetland



Limitations

- Vegetation may be difficult to sustain under certain flow conditions
- Land requirement may be large, depending on design
- Higher initial construction costs
- Release of nutrients in the fall
- Geese may become undesirable year-round residents
- Has the potential to act as a heat sink, releasing warmer water to downstream water bodies
- While the potential for mosquitos may seem larger in wetland areas, studies have shown that this is not necessarily true, as mosquitos tend to prefer nutrient-rich areas with stagnant water. The residence time of water in wetlands is only a few days, and wetlands do not have the anaerobic, bacteria-rich conditions where mosquitos thrive.

Maintenance

Activity	Schedule
Replace wetland vegetation to maintain at least 50% surface area coverage in wetland plants after the second growing season	One-Time (after construction)
Inspect for invasive vegetation and remove where possible	Semi-annual Inspection
Inspect for damage to the embankment and inlet/outlet structures. Repair as necessary. Note signs of hydrocarbon build-up, and deal with appropriately. Monitor for sediment accumulation in the facility and forebay. Examine to ensure that inlet and outlet devices are free of debris and operational.	Annual Inspection
Repair undercut or eroded areas.	As Needed Maintenance
Clean and remove debris from inlet and outlet structures. Mow side slopes.	Frequent (3-4 times/year)
Supplement wetland plants if a significant portion have not established (at least 50% of the surface area). Harvest wetland plants that have been "choked out" by sediment build-up.	5 to 7 year Maintenance
Monitor sediment accumulations, and remove sediment when the pool volume has become reduced significantly, plants are "choked" with sediment, or the wetland becomes eutrophic.	20 to 50 year Maintenance

Costs

Wetlands are relatively expensive, compared with other treatment BMPs. Brown and Schueler's (1997) equation for calculating the cost is as follows:

$$C = 30.6V^{0.705}$$

Where:

C = Construction, Design and Permitting Cost

V = Wetland Volume needed to control the 10-year storm (cubic feet)

Using this equation, typical construction costs are:

\$ 57,100 for a 1 acre-foot facility

\$ 289,000 for a 10 acre-foot facility

\$ 1,470,000 for a 100 acre-foot facility

Design Specifications

- A sediment forebay, containing at least 10 percent of the wetland's treatment volume and being 4 to 6 feet deep should be constructed to decrease the volume and sediment loading to the wetland.
- A buffer at least 25 feet in length should be installed to separate the wetland from surrounding land. When wildlife habitat is of concern, add an additional 25 feet of buffer.
- Before the outlet, a 4-6 foot deep micropool should be installed to prevent the outlet from clogging. The outlet of the micropool should be located at least one foot below the normal pool surface.
- Above ground berms or high marshes should be placed at 50-foot intervals, at right angles to the direction of the flow.
- Install a bottom drain pipe with an inverted elbow in order to drain the wetland for emergency or maintenance purposes.
- Fit both the outlet pipe and the bottom drain pipe with adjustable valves at the outlet ends to regulate flows.