Streambank Restoration

A streambank restoration is a stormwater BMP used for streams that are prone to significant streambank erosion and/or have a substantial build-up of sediment along the water's edge. Streams that have these issues often have not maintained their natural channel design and therefore can have major erosion problems during storm events (or otherwise).

Streambank restoration projects are extremely effective at minimizing erosion and reducing sediment and other pollutants from discharging into the waterways.

Streambank restoration projects are designed specific to the project site since each stream is different and there are different causes of streambank erosion and sediment issues. Most streambank erosion projects involve the regrading of portions of the streambank and then stabilization of the streambank. Stabilization typically includes planting native vegetation and the establishment of a riparian buffer area (see the Riparian Buffer BMP for details). Stabilization may also include the installation of rocks and/or boulders to protect certain sections of stream. Stabilization may also require the modification of existing stormwater culverts or other inlet/outlet structures along the streambank.

Not all streams are in need of a "streambank restoration." A stormwater professional can assist you with evaluating if a streambank restoration would be an effective stormwater BMP on your property.

Streambank Restoration Maintenance

Typical Maintenance Indicators	Typical Maintenance Actions
Poor vegetation establishment/bare spots	Re-seed, re-establish vegetation.
Overgrown vegetation and invasive weeds/plants	Mow or trim as appropriate and remove invasive plants. Selective herbicides can be used if in accordance with local, state, and federal laws. Refer to invasive weeds/plants section of the guide for pictures.
Signs of dumping	Contact your local municipality to report a potential illicit discharge/illegal dumping.
Erosion	Repair/re-seed eroded areas (may need added measures such as erosion control blankets or stone at flow entry points), may include re-grading areas.
Accumulation of sediment	Remove and properly dispose of accumulated materials such as trash and landscape debris. As part of the permit requirements for a streambank restoration, a detailed post construction monitoring plan is required. Areas of sediment accumulation should be closely monitored and managed in accordance with the O&M Plan for the project.
Damage to structural components	Remove any debris or sediment that could plug the outlets. A professional contractor or consultant may be required to assist with re-establishing/re-building a structural component.
General obstructions	Flow channel should be free of any general obstructions. This is critical for large and/or long rain events. Take the time to inspect and remove any general obstructions that may be present prior to forecasted rain.

What to Look For

Accumulation of Sediment, Litter, Debris

Standing Water

Erosion

Overgrown Vegetation/Invasive Weeds

Poor Vegetation Establishment/Bare Spots

Structural Damage

Signs of Dumping

General Obstructions (log jams, etc.)

Other BMPS

Dry Well/Seepage Pit

- A dry well (also known as a seepage pit) collects and stores runoff generally from rooftops and ultimately infiltrates the storm-water.
- A common issue with dry wells is pipe clogging, especially if gutters go un-checked and un-cleaned and the debris clogs into the pipe. This can be a headache especially if the clog is underground.
- Check the actual dry well at least four times per year. Accumulated sediment, debris, etc. in the well should be removed and disposed of on a regular basis.

Flooodplain/Stream Restoration

- Floodplain Restoration (FPR) is considered the "King of BMPs." It is generally a regional BMP treating runoff from multiple or large properties.
- Over the long run, floodplain restoration generally requires the least maintenance of all BMPs. It is important to keep invasive weeds out for the first 3-5 years to allow the native vegetation to establish and build resistance to invasive vegetation.
- Floodplain restoration projects typically require a significant amount of site analysis and permitting prior to construction; therefore, it is important to select a professional with expertise in floodplain restoration if you are interested in pursuing floodplain restoration opportunities on your property.

Landscape Restoration

- Landscape restoration includes restoration of a forest and/or a meadow from turf.
- Revegetation should include only native plants, and it should not require significant chemical maintenance (i.e. fertilizers, pesticides, or herbicides)
- This creates a system with healthy soils that absorb and filter a higher volume of stormwater runoff.
- Mowing should only occur two times per year.

Site Drainage System

- While not necessarily considered a true BMP, a site drainage system (inlets, pipes, etc.) is just as important as the actual BMPs the system may be conveying stormwater to.
- A series of pipes, inlets, etc. are generally more common on commercial/business properties than on residential properties. However, some sub-divisions may have yard inlets connected to the MS4 on individual properties.
- It is important to keep inlet structures to the drainage system clear of debris such as leaves, trash, and other landscape debris.
- Inspect the bottom of inlet structures twice a year and remove accumulated debris, trash, etc. Check for settling of soils and the structural integrity of the inlet structure. Contact your local municipality for guidance if a structure is crumbling or caving in.

Soil Amendments

- Your stormwater management plan may have included Soil Amendments (also known as Soil Restoration) as one of the implemented BMPs.
- Soil amendments are implemented to improve overall drainage conditions and generally involves ripping up existing compacted soils and tilling in a mixture with additives such as compost.
- The restoration process will most likely need to be repeated over time due compaction (especially in high traffic areas).
- Soil tests should be conducted every few years to gauge the nature of the soils and if a repeat of the soil restoration process is necessary.

Stormwater Quality Filter

- The snout is a BMP that helps control debris and trash entering into waterways from impervious surfaces.
- The snout is designed to keep trash, debris and oil out of the waterways. When it enters the well of a stormwater inlet, trash and oil float to the top while debris and other heavy materials settle to the bottom. This allows clean water to exit through the middle and into the waterways.
- The snout should be checked after significant rainfall events to prevent damage and to monitor general wear and tear.

Illicit Discharge/Dumping

Stormwater runoff starts on your roof, lawn, and driveway, as well as on local roads and business parking lots. From there it enters storm drains that ultimately discharge into our streams and creeks. Along the way to the streams, stormwater runoff can pick up pollutants and debris, or debris can clog the system and cause stormwater runoff to pond up and cause flooding problems. The pollutants and debris can affect the quality of the water, including:

- Increased cost in treating drinking water
- Algal blooms that can harm aquatic wildlife
- Chemical pollutants that kill plants and animals
- Unsightly streams with unpleasant odors
- Expensive fines from the DEP and the EPA to fix the problems

Photo: nctcog.org

Illicit Discharge/Dumping

Your municipality was issued a Municipal Separate Storm Sewer System (MS4) Permit that requires your municipality to implement control measures to protect water quality and reduce the potential for the previously listed problems. An MS4 is made up of a series of inlets/storm drains, storm sewer pipes, swales, and outfalls that collect and convey storm-water. Most likely, your stormwater management facility or BMP is connected to the MS4. In turn, stormwater that exits your BMP will most likely end up in local streams.

It is important to keep your BMP free of debris and with stable vegetation to help allow the entire system to function appropriately. Dumping or storing landscape debris (grass clippings, leaves, soil/dirt, etc.) or hazardous materials (oils, grease, etc.) in and around BMPs is not allowed. Pet waste should be cleaned up promptly in a BMP as well. Intermingling of these materials with stormwater can generate polluted discharges or result in an illicit discharge.

If you see something suspicious (soapy suds or unusually colored water flowing into or within a local waterway (or in your BMP), someone dumping material like leaves, grass clippings, trash, or liquids near your BMP or into a local waterway, etc.), please call your municipality.

Photo: fairfaxcounty.gov

Native Plants

Native plants include any plant species that occurred in the area before the region was colonized by Europeans. Native plants are critical to a balanced, healthy ecosystem. Native plants can also be more resistant to drought and disease and tolerate the local climate better than non-native plants. From a stormwater management prospective, many native plants are more effective than their non-native counterparts at stabilizing soil and therefore, minimize runoff. The list of native plants herein is not an exhaustive list of native plants in this region; however, these plants represent some of the common native plants observed in various stormwater BMPs in the area.

For more information on native plants, go to Pennsylvania Department of Conservation and Natural Resources Wild Plants or Pennsylvania Native Plant Society.

www.dcnr.pa.gov/Conservation/WildPlants/LandscapingwithNativePlants/Pages/default.aspx

www.panativeplantsociety.org

Native Grasses

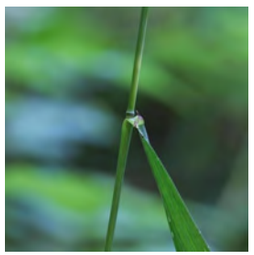
Big Bluestem


Indian Grass


Wild Rye


Bee-balm


Bottlebrush Grass




Broomsedge Bluestem


Native Herbs

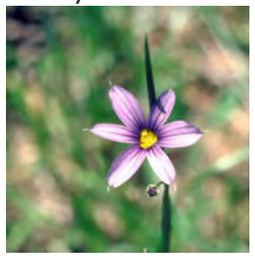
Adam's-needle Yucca


Blazing Star


Photo sources on pages 64-65

Blue Vervain


Blue-eyed Grass




Boneset


Bottle Gentian


Brown Eyed Susan


Cardinal Flower


Common Sneezeweed


Creamy Violet


Culver's Root


Flat-topped Aster


Golden Ragwort


Goldenrod


Photo sources on pages 64-65

Great Blue Lobelia


Joe-Pye Weed


Marsh Marigold


Monkey Flower


Green-headed Coneflower


Maple-Leaved Waterleaf


Meadow Phlox


New England Aster


Hairy Woodrush


Marginal Woodfern


Meadowsweet


New York Ironweed


Photo sources on pages 64-65

Northern Blue Flag


Oxeye


Purple Bergamot


Sea Lavender


Sea Thrift


Sensitive Fern


Spiderwort


Spreading Jacob's Ladder


Swamp Milkweed


Swamp Rose Mallow


Tall Meadow Rue


Tall Sunflower


Photo sources on pages 64-65