ERIE-WESTEN PENNSYVANIA PORT AUTHORITY
BLUFF AND RAVINE MAINTENANCE
POLICY AND STANDARDS

The policy and standards are the result of a comprehensive evaluation and study conducted by Dahlkemper Landscape Architects and Contractors. Bluff and ravine recession is a naturally occurring physical process that is intensified by human influences. The Port Authority recognizes the importance of properly managing these fragile areas. The focus is on using recommended best management practices to foster stability.

PROPERTY INDEX

Port Authority owned bluff and ravine properties
(see appendix A Locations)

1.) Bayfront Bluffs: West - Cascade Street to Walnut Street

2.) Bayfront Bluffs: Central - Walnut Street to Peach Street

3.) Bayfront Bluffs: East - Holland Street to Parade Street

4.) Cascade Creek Bluff& Wetlands

5.) Ravine Park: Bayview Avenue

6.) Ravine Park: West of Ravine Drive

7.) Ravine Park: East of Ravine Drive

ERIE-WESTEN PENNSYVANIA PORT AUTHORITY
BLUFF AND RAVINE MAINTENANCE
POLICY AND STANDARDS

OVERVIEW

The information within the Policy and Standards will be used as a guide to properly maintain and manage the Port Authority s ravine & bluff properties. The standards and best management practices will apply to all contractors and Port staff. Consultations with an arborist or landscape architect will be utilized as needed.

Inventory of Existing Site Resources and Site-Specific Management Plan

- Inventory shall include all the existing vegetation (herbaceous, woody shrubs, and trees), any water found in or around the property that could affect erosion, and a general description of the topography of the site.

Remove Hazardous Plant Material and Remove/Control Aggressive Plants

- Any invasive, dead, dying, and/or material posing a healthy/safety risk should be removed. If there is an entire area or large swaths of this type of material, there will be phases of removal to avoid exposing the slope to bare, loose soil that is susceptible to erosion.
- Any trees/shrubs/woody material removed from the slopes shall be cut flush with the surface and the stump/roots shall be left in place.
- Tree pruning will be done according to ANSI A300 standards.
- Maintain 40-60% canopy coverage to allow enough sunlight to reach the understory layers; Maintain 10-15% understory coverage (small trees & shrubs).
- Herbaceous plants help further stabilize the soil. Removal of these species should be done manually when possible. If herbicides are used make sure to follow the written instructions and application rates. Avoid pulling/spraying large areas at once.
- Any debris created from the removal process including logs, limbs, brush, etc. shall be removed from the property. Instances where a log is too large to move or inaccessible by heavy equipment will require a consultant to minimize its disturbance.

Restore Utilizing Native Plants

- According to DCNR, a native plant is one which occurred within the state before settlement by Europeans. Native plants include herbaceous plants (flowers, grasses, sedges, ferns, and groundcovers), large trees, intermediate trees, small trees, and shrubs (also known as woody plants). Native plants help create beautiful landscapes that provide wildlife habitat and reduce maintenance costs. (See appendix E)

Monitor and Maintain Annually

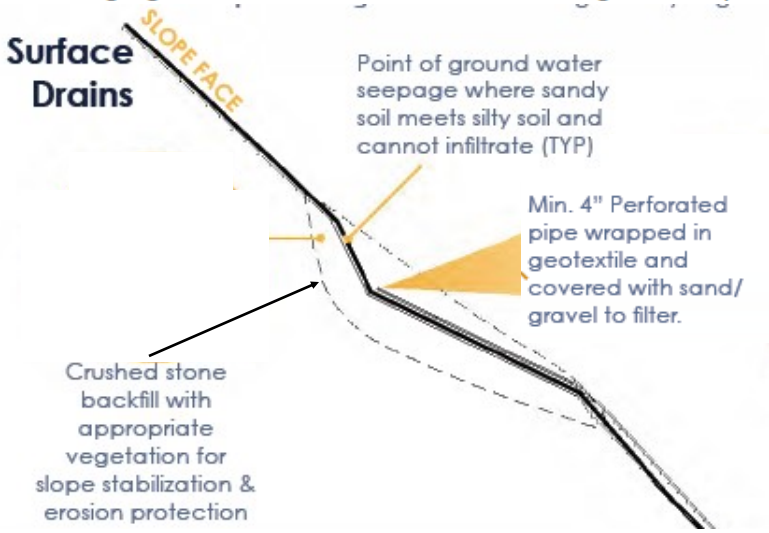
- General monitoring will be performed by Port staff.
- A professional evaluation will be performed every 5 – 10 years to identify any areas of concern.

BEST MANAGEMENT PRACTICES & STANDARDS

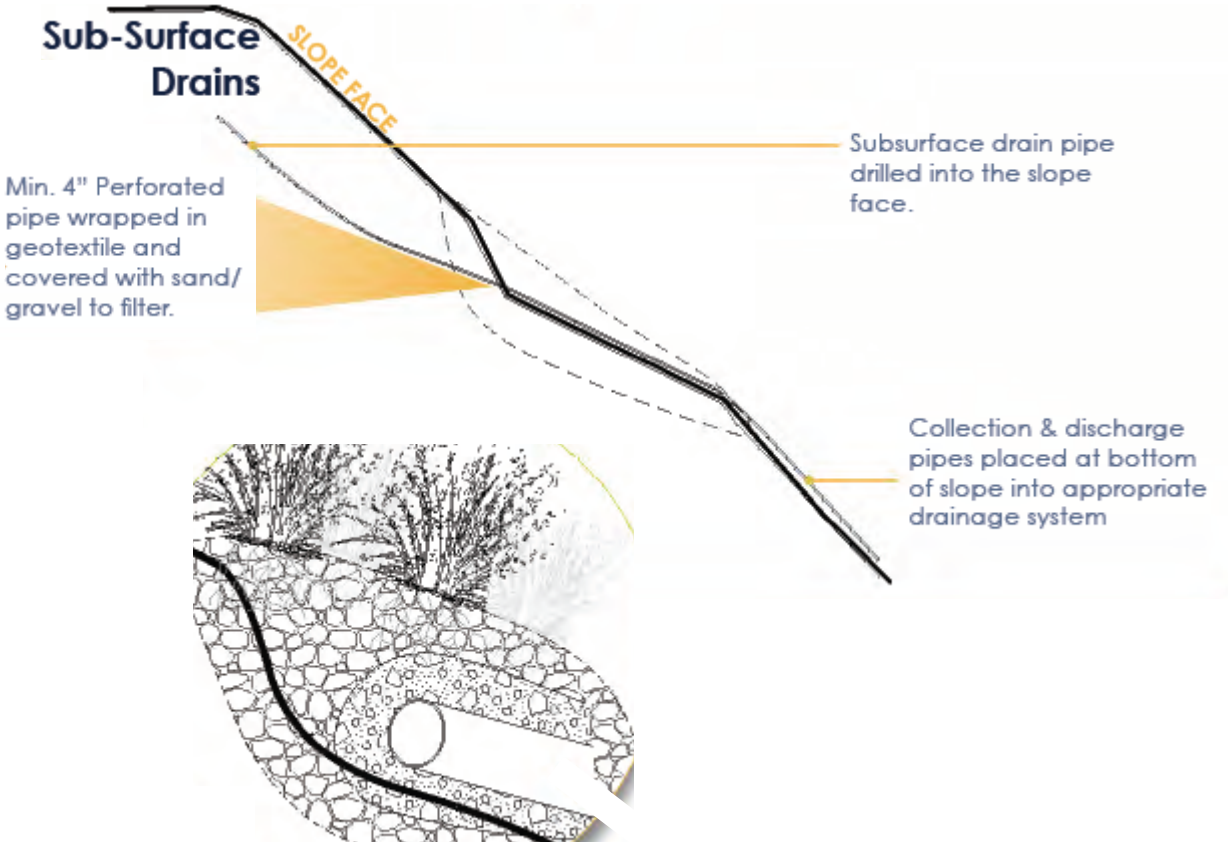
EROSION CONTROL

Ground and surface water play the biggest role in causing erosion. The slope faces are highly susceptible due to the loose sandy soil and low shear strength. A stability evaluation identified sloughing and rill erosion as areas of concern. Sloughing is when soil slides or moves down a slope due to loss in cohesion. A rill is a shallow channel cut into soil by the erosive action of concentrated water running along particular path. The development of rills is usually the first sign of an enduring erosion problem. There are various methods to reduce erosion by improving drainage.
The following are the simplest and cause the least amount disturbance:

- Surface Drains:
  - Perforated Pipe: Used to intercept water at the slope.
    The installation of perforated pipes wrapped in geotextile fabric, anchored to the slope, bedded in sand & gravel discharging at the bottom or into an existing storm system.
  - Corrugated Pipe: Used to extend an improperly installed discharge pipe.
    The installation of a corrugated flexible pipe extending an existing pipe down the slope and discharging at the bottom or into an existing storm system.



- Sub-surface Drains:
  - Catch basin: Used to capture water concentrating over the slope at a specific area.
    The installation of a plastic catch basin with solid pipe in a trench down the slope and discharging at the bottom or into an existing storm system.
  - French Drain: Used to capture water that is sheet flowing over the Slope that cannot be done at a single location.



The installation of a 12" to 18" wide x 12" deep gravel strip with a solid pipe underdrain in a trench discharging at the bottom or into an existing storm system.

- French Drain: Used to capture water that is sheet flowing over the Slope that cannot be done at a single location.

The installation of a 12" to 18" wide x 12" deep gravel strip with a solid pipe underdrain in a trench discharging at the bottom or into an existing storm system.

GRAVEL STRIP WITH DRAIN PIPE DOWN SLOPE

- Vegetated Buffer:

One of the most basic ways to manage stormwater runoff is to create a vegetated buffer. Vegetated buffer zones help stabilize the soil as well as decrease groundwater runoff. Space is the most limiting factor to implementing a buffer zone. The standard to establish a buffer zone is as follows:

Bayfront Bluffs: Buffer shall be a minimum of 5 feet (where space allows).
Ravine Park: Buffer shall be a minimum of 10 feet (larger is encouraged).

Buffers can be done at different scales and to various extents.

- No-mow zone: *Minimum required buffer for all areas.*
  Designated areas will not be regularly mowed. Specific selective herbicides are applied to control broad-leaf and woody plant material. Areas will be brush-hogged one to two times per year to control growth.
- Simple vegetated buffer: *Single layer of vegetation.*
  Designated areas are planted with native herbaceous plant material and ground covers. Their roots will help stabilize the surface soil as well as protect the surface soil from rain. Specific selective herbicides are applied to control broad-leaf and woody plant material.

- Mid-range vegetated buffer: *Two layers of vegetation.*
  Designated areas are planted with native herbaceous plant material and ground covers. An additional layer of native shrubs and woody plant material is planted. Their deeper roots increase soil cohesion and reduce soil erosion.
- Complex vegetated buffer: *Three layers of vegetation.*
  Designated areas are planted with native herbaceous plants, ground covers, shrubs, and woody plant material. An additional layer of native trees is planted. Tree roots penetrate deeper and absorb a lot of ground water offering the most soil stabilization.

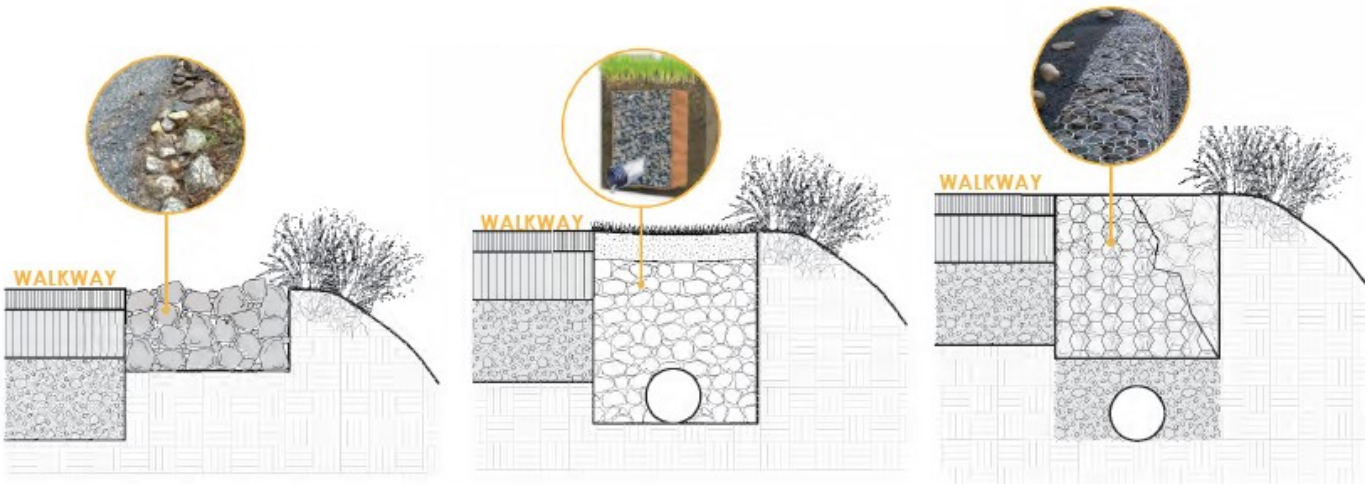
- Slope Edge Stabilization:
  The edges of the multi-use trails running directly on top of slopes are beginning to undercut. Water runoff at these areas is causing erosion requiring stabilization protection.
  - Stone reinforcement:

Installing an 18" wide Geotech fabric lined trench filled with oversized stone along the edge of the hardscape surface. The stone shall be 3" to 6" angular stone with fines in between allowing the stone to lock together strengthening the edge. The stone will also slow and disperse water as well as capture sediment.

- French drain: *This application is suitable for heavy sheet flow over the hard surface.*
  The installation of a 12" to 18" wide x 12" deep gravel strip with a solid drainpipe discharging at the bottom or into an existing storm system.

- Gabion basket: *This application requires further investigations to design a solution to fit the problem.*
  The installation of a gabion basket into a trench along the edge of the hardscape surface. Installation can be at grade level or constructed as a retaining wall. The use of a french drain system at the bottom of the trench is possible.

- Timber retaining wall: *This application is suitable for areas with limited space.*
  The installation of an 18" timber curb along the edge of the hardscape surface . Three horizontal rows of 6" timbers are set into the slope with vertical timbers, spaced appropriately, holding them in place.



TREE/VEGETATION MANAGEMENT

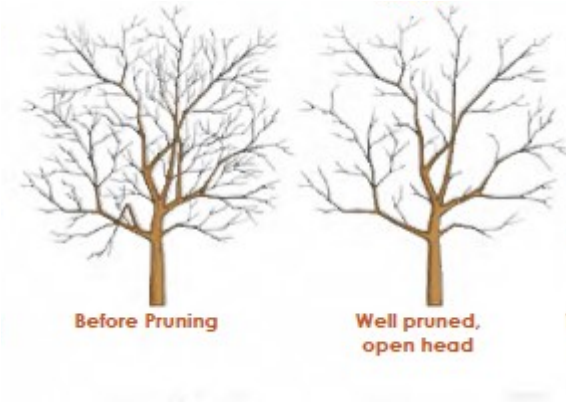
A healthy ravine & bluff ecosystem has three vegetation zones. The upper most zone should consist of deciduous & coniferous trees of varying sizes, ages, and types. This zone protects the floor from too much sun & precipitation as well as provides deep roots for soil stabilization.

The middle zone includes smaller native trees and shrubs. This zone provides even more coverage for the floor as well as acts as a cohesive layer to help further maintain slope & soil stability. The lower zone has native herbaceous plants, grasses, and sedges. This vegetation zone helps stabilize surface soils as well as acts as a filter to slow down water for increased infiltration and trap sediment.

- General trimming/pruning standards
- All work must follow ANSI A300 industry standards for tree care practices.
- All recommended safety practices must be followed and proper safety equipment used.
- All contracted work must be done by a certified company with minimum 5-years' experience trimming/thinning/pruning trees in our area.
- Always use sharp and clean pruning instruments (pruners, saws, loppers, etc.).
- Trees and shrubs shall be cut flush with the soil leaving the stumps and roots in place for soil stabilization.
- All debris generated by the work must be completely removed from the site and disposed of properly
- Tree topping, bulk clearing, or complete removal (without approval) is not allowed under any circumstance

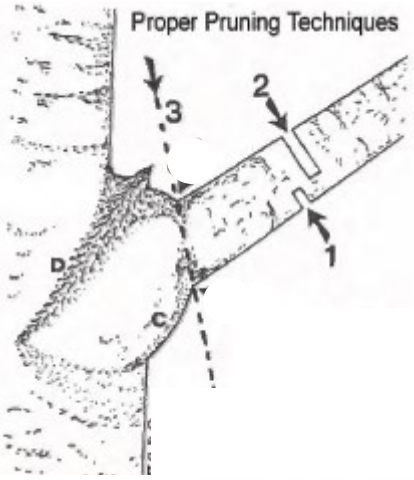
- Tree Canopy Coverage: The ideal canopy coverage is between 40% and 60%. This can be obtained through selective trimming & removal.
    - Selective removal:
        - Primary targets are dead, dying, diseased, hazardous, and invasive species.
        - Avoid removing native, key and protected species.

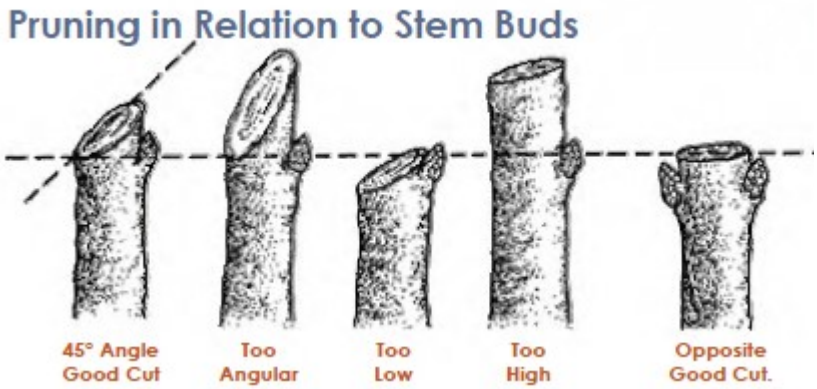
- Tree thinning:
  - Open up tree (think of being able to throw a ball through it)
  - Remove all dead branches and vines first.
  - Remove crossover branches.
  - Selectively remove branches keeping the natural shape of the tree.
  - Small branches shall be removed back to their point of origin.
  - Larger limbs shall be pruned back to a lateral branch that is large enough (at least 1/3 the diameter of the limb being removed) to assume the terminal role.
  - DO NOT top a tree.
  - Do not sub or crosscut.
  - Avoid witches' brooms and lion tailing.
  - Remove no more than 30% of the tree during a single event.

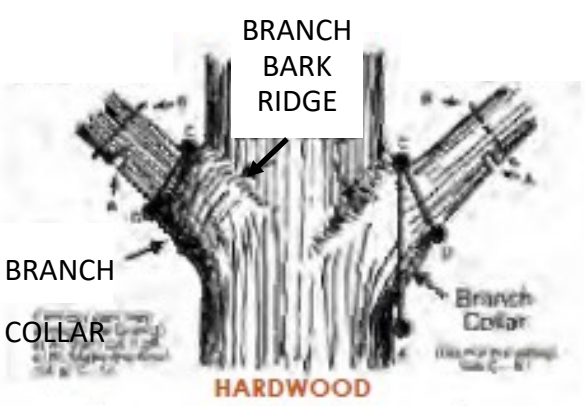


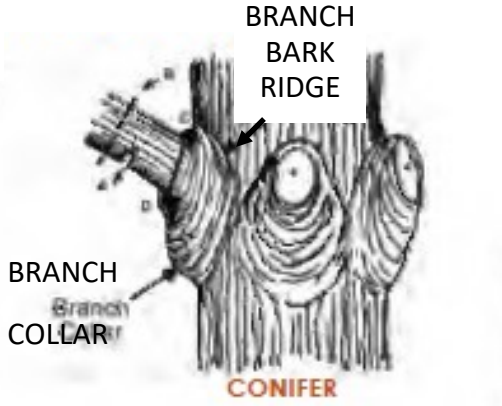
- Selective trimming/pruning:
  - General Rule - if the plant flowers before June 1st, prune it during or shortly after flowering. If it blooms after June 1st prune it in the late winter or early spring before flower buds are visible.
  - Prune trees and shrubs annually to maintain a well-shaped healthy plant. Avoid over-pruning a neglected plant.
  - Selectively remove branches to maintain the natural shape of the tree/shrub.
  - Remove all dead branches.
  - Remove crossover branches.
  - Cut on an angle near a node or bud 1/4 to 1/2" away

- When removing a branch at the trunk, cut in line with the branch collar without cutting into the collar
- When removing large limbs, make three cuts to keep the limb from stripping the bark below the cut.
    1. Make an undercut above the branch collar.
    2. Make a top cut just above the undercut.
    3. Make final cut at the edge of the branch collar.









- Invasive Plant Control:

Invasive Plant Species are defined as non-native to a particular area and whose introduction causes harm to the environment, local species, or human interests. Due to the aggressive spreading nature of these species, control must occur annually to prevent beneficial native species from being choked out of the environment.

Each method requires two treatments

- Cut Stem Treatment: *This method is used to treat larger or isolated stands.*
  Plants are cut approximately waist height. The hollow stems are immediately treated with the proper herbicide (such as Glyphosate) by a licensed applicator.

- Herbicide Treatment: *This method is used to treat individual plants or small patches*
  The proper herbicide is sprayed by a licensed applicator. The plants are cut and properly disposed of when dead.

- Native Plant Restoration:

To maintain bluff and ravine resilience, the removal of invasive, dead, dying, and/or material posing a healthy/safety risks is necessary. Removal of large areas need to be done in phases to avoid exposing the slope to bare, loose soil that is susceptible to erosion. After vegetation has been removed a restoration plan should be put in place.

- Refer to the "Native Plants for Vegetation Restoration" list for plant recommendations.
- Deep rooted, native plants of smaller sizes will do better in the long term and cause less disturbance when planted.
- Remove excess soil from the slope and mulch over fresh topsoil when completed.
- When using native seeds on a slope, consider using erosion control blankets until the site has an established 70% coverage.
- Water by hand or slow drip bag. Over watering increases the risk of soil erosion.

- Organic Waste Dumping:

The dumping of yard waste over the bluffs and ravines is a concern across all areas. Yard waste and trash:

- Adds extra weight to the upper portion of the slope, eventually causing failure.
- Smothers underlying vegetation.
- Prevents ground cover and understory vegetation to become established, leaving bare loose soil open to erosion.
- The organic waste eventually breaks down leaving behind unstable loose material susceptible to sliding and sloughing.
- Prevents rainwater from soaking into the ground.
- Spreads invasive species.

Efforts to minimize poor practices and maintaining resiliency across all areas:

- Educating the public about these threats and how to prevent them through the installation of educational signage.
- Offer educational initiatives to neighbors and community groups on why dumping organic waste is a threat to the ravines & bluffs.

ERIE-WESTEN PENNSYVANIA PORT AUTHORITY
BLUFF AND RAVINE MAINTENANCE
POLICY AND STANDARDS

VEGETATION REMOVAL GUIDELINES

The trimming and or removal of trees, shrubs, and herbaceous plants is the first step toward managing vegetation on ravine and bluff slopes. Any trimming and/or removal on Port Authority property will require a permit and all standards and policies must be followed.

Mature trees on the ravine and bluff slopes are desirable, however, the desired canopy coverage is approximately 40%—60%. Therefore, trimming, pruning, and removal of trees may be necessary to achieve this coverage to allow adequate sunlight to support herbaceous vegetation at the ground level. The increased sunlight will support robust growth of understory plants as well as grasses and wildflowers that prevent soil erosion, stabilize slopes, and provide habitats for wildlife.

The following categories of vegetation must be considered before the removal of any vegetation:

INVASIVE: These species can and should be completely removed when found in the landscape. The removal is required to decrease competition and promote native plants. (See appendix B)

PROTECTED: These species can be considered for removal under certain conditions and circumstances. These species may include certain species such as Maples and Sumac which can become too aggressive and/ or prone to diseases such ad Emerald Ash Borer or Dutch Elm Disease. It may be recommended that selective thinning is done first prior to complete removal. (See appendix C)

KEY: These species should be completely preserved on all sites. There may be circumstances where one of these species will need to be removed, but it will be handled on a case by case basis. (See appendix D)

ERIE-WESTERN PENNSYLVANIA PORT AUTHORITY

PRIVATE LANDSCAPE MODIFICATIONS

POLICY and PROCEDURE

I. Purpose

This policy establishes an effective framework of managing private landowner requests to perform maintenance work on Port owned bluff, ravine, and wetland properties.

The Port Authority recognizes the importance of properly managing these ecologically fragile areas. The focus of the policies and standards is to observe and enforce Best Management Practices to foster their stability. Only work that promotes healthy vegetation and reduces erosion and stabilizes the slope will be considered and approved.

II Scope

This policy applies to adjacent property owners, neighborhood, and community groups wishing to contract work to be done on Port owned property at their sole expense. Their objective may be beautification or improving views. The Ports maintenance budget, which prioritizes health and stability, may not provide for this type of work.
All work must be performed by a properly licensed and insured contractor with a minimum of 5-years experience. All work must follow the authorities Bluff and Ravine Maintenance Policies and Standards

III Procedure

1. Requests

All inquiries will be directed to the Ports website to review the Bluff & Ravine Maintenance Policy & Standards.

2. Submittal

All requests must be submitted in writing using the Private Landscape Modification request application. Applications must be fully completed, including a detailed description, and drawing or photos of the proposed work and location.

3. Staff Review

Preliminary review of applications will be done by the Director of Operations to ensure fundamental compliance with the Maintenance Policy & Standards.

3.1 Application non-compliant

The applicant is notified of non-compliance and informed of the corrections needed for resubmittal.

3.2 Application compliant

The applicant is notified and informed of the professional consultant fee. Upon agreement of the non-refundable fee, the application is forwarded to the consultant for review.

4. Professional Consultant Review

The application is reviewed by a Certified Arborist or Licensed Landscape Architect, depending on the requested work. They determine if the work can be completed without having a negative impact on the area.

4.1 Application denied

Applicant is notified of denial and informed of the reasons. It is possible that portions of the request are approved, in which case the applicant decides to proceed or not.

4.2 Application approved

Applicant is notified of approval and informed of the Best Management Practices needing followed to have the work completed properly. A permit/agreement is generated and executed.

5. Project Consultation

A consultation is scheduled between the applicant, professional consultant, Director of Operations, and the approved contractor performing the work. All are informed of the exact work being approved and the specifications under which it is to be done.

6. Project Inspection

Upon completion of the work, the professional consultant performs an on-sit inspection to ensure the work was done to the approved standards.

IV **Violation**

The following conditions will apply to individuals performing unpermitted work or permitted work not to specifications.

The Erie Port Authority will proceed, in accordance with the laws of the Commonwealth of Pennsylvania, to collect all costs to mitigate any damages caused.

ERIE-WESTERN PENNSYLVANIA PORT AUTHORITY

Private landscape modification

Request application

The objective of the Port Authority's Bluff and Ravine Maintenance Policy is to utilize Best Management Practices to foster their stability. Funding prioritizes the health and stability of the slope and may not provide for beautification or view enhancements.

Permission may be granted to property owners or neighborhood/community groups to make landscape modifications on the Authority's property at their sole expense. Only work that promotes healthy vegetation and reduces erosion and stabilizes the slope will be considered and approved.

Please review the standards and guidelines at www.porterie.org prior to completing this application.

Applicants Name:	
Address:	
Phone:	
Email:	

Location Description:

Description of Work: (attach additional pages if needed)

All work must be completed by a properly licensed and insured contractor with a minimum of 5- years experience.
All trimming, thinning, and pruning must follow the ANSI A300 industry standards

Contractor Name:	
Contact Person:	
Phone:	

APPENDIX A

Cascade Street to Walnut Street

Walnut Street to Peach Street

APPENDIX A

Holland Street to Parade Street

APPENDIX A


RAVINE PARK - BAYVIEW AVE.


RAVINE PARK - WEST
KAHKWA AVE
KAHKWA AVE
KAHKWA AVE
CRESCENT DR
SUPERIOR AVE
SUPERIOR AVE
KAHKWA BLVD
KAHKWA BLVD
PLYMOUTH AVE
PLYMOUTH AVE
VIRGINIA
05/13/2020

APPENDIX A


RAVINE PARK - EAST
S SHORE DR
SUPERIOR AVE
ILLINOIS AVE
KAMAIYA AVE
RAVINE DR
RAVIEW AVE
ROSEMONT AVE
MADISON AVE
CRESCENT DR
MOHAWK DR
LINCOLN AVE
2020 - 05/13/2020

APPENDIX B

INVASIVE TREES

Amur Maple
Acer ginnala

Siberian Elm
Ulmus pumila

Tree-of-Heaven
Ailanthus altissima

White Mulberry
Morus alba

Norway Maple
Acer platanoides

Sycamore Maple
Acer pseudoplatanus

European Black Alder
Alnus glutinosa

Mimosa
Albizia julibrissin

Callery or Bradford Pear
Pyrus calleryana

Buckthorn Species
Rhammus spp.

Paper mulberry
Broussonetia papyrifera

INVASIVE SHRUBS & VINES

APPENDIX B

INVASIVE HERBACEOUS PLANTS

Bishop's Goutweed
Aegopodium podagraria

Canada Thistle
Cirsium arvense

Common Burdock
Arctium minus

Common Mugwort
Artemisia vulgaris

Crown vetch
Securigera varia

Orange Daylily
Hemerocallis fulva

Birds Foot Trefoil
Lotus corniculatus

Garlic mustard
Alliaria petiolata

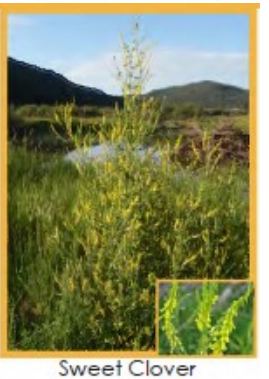
Japanese Knotweed
Polygonum Cuspidatum

Japanese Hop
Humulus japonicus

Moneywort
Lysimachia nummularia

Purple Loosestrife
Lythrum salicaria

Seaside Goldenrod
Solidago sempervirens



Sweet Clover
Melilotus spp.

Teasel Species
Dipsacus spp.

Beefsteak Plant
Perilla frutescens

Wild Parsnip
Pastinaca sativa

Giant Hogweed
Heracleum mantegazzianum

APPENDIX B

INVASIVE GRASSES & SEDGES

Common Reed
Phragmites australis

Lyme Grass
Leymus arenarious

Reed Canary Grass
Phalaris arundinacea

Small Carpetgrass
Anthraxon hispidus

Cheatgrass
Bromus tectorum

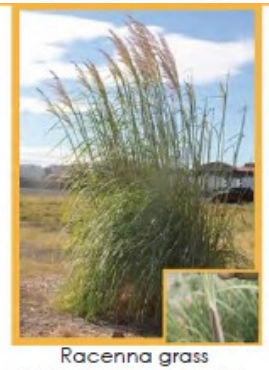
Common Velvet Grass
Holcus lanatus

Japanese stiltgrass
Microstegium vimineum

Chinese silvergrass
Miscanthus sinensis

Golden bamboo
Phyllostachys aurea

Rough bluegrass
Poa trivialis



Racenna grass
Saccharum ravennae

Tall Fescue
Schedonorus arundinaceus

Johnsongrass
Sorghum halepense

Horsetail
Equisetum hyemale

APPENDIX C

PROTECTED TREES

American Elm
Ulmus americana

Basswood
Tilia americana

Black Cherry
Prunus serotina

Black Locust
Robinia pseudoacacia

Black Willow
Salix nigra

Box Elder
Acer negundo

Eastern Cottonwood
Populus deltoides

Eastern Redcedar
Juniperus virginiana

Green Ash
Fraxinus pennsylvanica

Quaking Aspen
Populus tremuloides

Sugar Maple
Acer saccharum

White Ash
Fraxinus americana

Hawthorn species
Crataegus spp.

Smooth Sumac
Rhus glabra Smooth Sumac

Staghorn Sumac
Rhus typhina Staghorn

PROTECTED EVERGREENS

Black Pine
Pinus nigra

Blue Spruce
Picea pungens glauca

Serbian Spruce
Picea omorika

Colorado Spruce
Picea pungens

Douglis Fir
Pseudotsuga menziesii

Eastern Red Cedar
Juniperus virginiana

False Cypress
Chamaecyparis sp.

Northern White Cedar
Thuja occidentalis

Norway Spruce
Picea abies

PROTECTED SHRUBS & VINES

Chokecherry
Prunus virginiana

Gray Dogwood
Cornus racemosa

Peach-leaved Willow
Salix amygdaloides

Raspberry Species
Rubus spp.

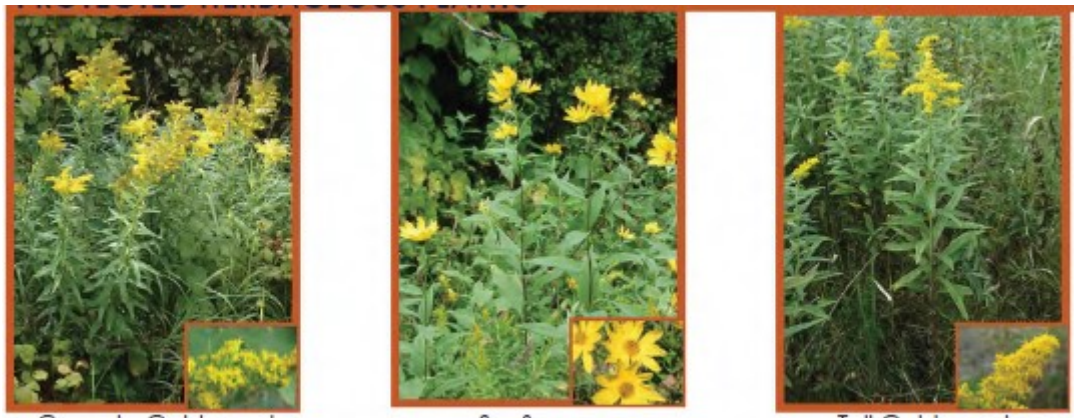
PROTECTED GRASSES & SEDGES

Brome species
Bromus spp.

Cattail species
Typha spp.

Fescue Species
Festuca spp.

PROTECTED HERBACEOUS PLANTS



Canada Goldenrod
Solidago canadensis

Sunflowers
Helianthus spp.

Tall Goldenrod
Solidago altissima

APPENDIX D

KEY HERBACEOUS PLANTS

Aster Species
Aster spp.

Bellwort
Uvularia grandiflora

Black-Eyed Susan
Rudbeckia spp.

Bloodroot
Sanguinaria canadensis

Blue Phlox
Phlox divaricata

Broad-leaved Goldenrod
Solidago flexicaulis

Columbine
Aquilegia canadensis

Elm-leaved Goldenrod
Solidago ulmifolia

False Solomon's Seal
Smilacina racemosa

Golden Alexander
Zizia aurea

Lead Plant
Amorpha canescens

Marsh Marigold
Caltha palustris

May Apple
Podophyllum peltatum

Sharp-lobed Hepatica
Hepatica acutiloba

Shooting Star
Dodecatheon meadia

Wild Geranium
Geranium maculatum

Solomon's Seal
Polygonatum spp.

Trillium Species
Trillium spp.

KEY TREES

American Beech
Fagus grandifolia

Black Walnut
Juglans nigra

Hackberry
Celtis occidentalis

Hickory Species
Carya spp.

Oak Species
Quercus spp.

American Hornbeam
Carpinus caroliniana

Hop Hornbeam
Ostrya virginiana

Pagoda Dogwood
Cornus alternifolia

Paper Birch
Betula papyrifera

Redbud
Cercis canadensis

Serviceberry
Amelanchier arborea

Witch Hazel
Hamamelis virginiana

KEY SHRUBS & VINES

American Hazelnut
Corylus americana

Blackhaw Viburnum
Viburnum prunifolium

Buffalo Berry
Shepherdia canadensis

Common Juniper
Juniperus communis

Downy Arrowwood
Viburnum rafinesquianum

Summer Grape
Vitis aestivalis

Elderberry
Sambucus canadensis

Maple-leaved Viburnum
Viburnum acerifolium

Red-Twig Dogwood
Cornus stolonifera

Round leaved dogwood
Cornus rugosa

KEY GRASSES & SEDGES

Bluestem Species
Andropogon spp.

Bottlebrush Grass
Hystrix patula

Fowl Manna Grass
Glyceria striata

Poverty Oatgrass
Danthonia spicata

Sedge Species
Carex spp.

Switchgrass
Panicum virgatum

Wildrye Species
Elymus spp.

KEY EVERGREENS

Canadian Hemlock
Tsuga Canadensis

White Pine
Pinus strobus

KEY HERBACEOUS PLANTS

Wild Bergamot
Monarda fistulosa

NATIVE PLANTS FOR VEGETATION RESTORATION

According to DCNR, a native plant is one which occurred within the state before settlement by Europeans. Native plants include herbaceous plants (flowers, grasses, sedges, ferns, and groundcovers), large trees, intermediate trees, small trees, and shrubs (also known as wood plants). Native plants help create beautiful landscapes that provide wildlife habitat and reduce maintenance costs.

This section will provide recommended (mostly) native plants that should be planted to restore ravine and bluff properties. This is not intended to be an exclusive or comprehensive list and it is encouraged to consult a professional to determine the best plants for a particular area.

The following pages present a variety of trees, shrubs, and herbaceous species with information to aid in choosing the right combination of native plantings

NATIVE PLANTS FOR VEGETATION RESTORATION

COMMON NAME	SCIENTIFIC NAME	ZONE	BLOOM PERIOD	WILDLIFE VALUE	LIGHT PREFERENCE SUN	LIGHT PREFERENCE MED	LIGHT PREFERENCE SHADE	MOISTURE WET	MOISTURE MOIST	MOISTURE DRY	HEIGHT (FT)	NOTES
MEDIUM TO LARGE TREES												
Red Maple	Acer rubrum	5-6	Mar-Apr	Very High	X	X	X	X	X	X	40-60	Beautiful red fall color
Sugar Maple	Acer saccharum	5-6	Apr-May	Very High	-	X	X	-	X	-	60-75	Yellow flower; Fall Color; Maple Syrup
Yellow Birch	Betula alleghaniensis	4-9	Apr-May	Very high	-	X	X	-	X	-	60-80	Catkins in winter
Black Birch	Betula lenta	4-9	Apr-May	Very high	-	X	X	-	X	X	45-55	Catkins in winter
River Birch	Betula nigra	4-9	Apr-May	Very High	X	X	X	X	X	-	60-80	Catkins; beautiful bark
American Beech	Fagus grandifolia	5-6	Apr-May	High	X	X	X	-	X	-	50-70	Beautiful tree; edible nuts
Tulip Poplar	Liriodendron tulipfera	6	May-June	Intermediate	X	X	X	-	X	X	75-100	Green flowers in early summer;
Black Gum	Nyssa sylvatica	6	Apr-May	High	X	X	X	X	X	-	30-60	Outstanding fall color`
Eastern White Pine	Pinus strobus	5-6	N/A	Very High	X	X	X	-	X	X	50-80	Evergreen conifer
Sycamore	Platanus occidentalis	5	Apr-May	Low	X	X	X	-	X	-	75-100	Showy bark; drops fruits
White Oak	Quercus alba	6	Mar-May	Very High	X	X	X	-	X	X	50-100	Edible nuts; majestic
Chestnut Oak	Quercus montana	6	May-Jun	Very High	-	X	X	-	-	X	40-75	Fall color; attracts wildlife
Pin Oak	Quercus palustris	6	Apr-May	Very High	X	X	-	X	X	-	60-70	Fall color
Red Oak	Quercus rubra	5-6	Apr-May	Very High	X	X	-	-	X	X	60-80	Hardy long lived; fall color
Sassafras	Sassafras albidum	6	Apr	High	X	X	X	-	X	-	30-50	Edible & herbal uses; fall color
Basswood	Tilia americana	5-6	May-Jun	Ver Low	X	X	-	-	X	-	60-80	Aromatic flower; multiple trunks
Canada Hemlock	Tsuga canadensis	5-6	N/A	High	-	X	X	-	X	-	40-70	Evergreen; PA State Tree
Hop Hornbeam, Ironwood	Ostrya virginiana	3-9	April	Low	X	X	-	-	-	X	25-40	Unique wood texture;Deer resistant
SMALL TREES AND SHRUBS												
Smooth Alder	Alnus serrulata	6	Mar-April	High	X	X	X	X	-	-	6-10	Yellow catkins; multi-stemmed
Serviceberry	Amelanchier arborea	6	Mar-May	High	X	X	X	-	X	X	15-25	White flowers;edible berries;fall color
Black chokeberry	Aronia melanocarpa	3-8	Mar-Jul	Intermediate	X	X	X	X	X	X	3-6	White flowers;multi-stemmed;fall color
New Jersey Tea	Ceanothus americanus	6	May-Sep	Intermediate	X	X	X	-	X	X	< 3	White flowers; Fixes nitrogen; Tough
Buttonbush	Cephalanthus occidentalis	6	Jun-Sep	Intermediate	X	X	X	X	X	-	6-15	White flowers;multi-stemmed;
Redbud	Cercis canadensis	4-8	April	Very Low	-	X	X	-	X	X	20-35	Purple flowers in spring; Fixes nitrogen
Alt-Leaved Dogwood	Cornus alternifolia	5-6	May-Jun	Very High	-	X	X	-	X	-	15-25	White flowers; blue berries
Silky Dogwood	Cornus amomum	6	May-Jul	Very High	X	X	-	X	X	-	6-12	White flowers; blue berries; Multi-stem
Flowering Dogwood	Cornus florida	6	Apr-Jun	Very High	-	X	X	-	X	-	10-30	White bracts in spring; red berries;
Witch-hazel	Hamamelis virginiana	5-6	Sep-Nov	Low	-	X	X	-	X	-	20-30	yellow flowers; deer resistant
Wild Hydrangea	Hydrangea arborescens	6	Jun-Jul	Low	-	X	X	-	X	-	3-5	white bloods in summer;multi-stem
Winterberry	Ilex verticillata	6	May-Jun	High	X	X	X	X	X	-	6-10	Showy berries in winter;
Mountain Laurel	Kalmia latifolia	6	May-July	Very Low	X	X	X	X	X	X	7-15	Evergreen; multistem; PA State Flower
Spicebush	Lindera benzoin	6	Mar-May	High	-	X	X	X	X	-	6-12	Berries and foilage in fall;multistem
Ninebark	Physocarpus opulifolius	6	May-Jul	Intermediate	X	X	X	X	X	-	5-10	Pink flowers; papery bark; multistem
Wild Plum	Prunus americana	6	Apr-May	High	X	X	X	-	X	X	15-25	White flowers; edible fruit;
Rosebay	Rhododendron maximum	5	Jun-Jul	Very low	-	-	X	X	X	-	10-30	Rose flowers; evergreen
Staghorn Sumac	Rhus Typhina	3-8	Jun-Jul	Very High	X	X	X	-	X	X	15-25	Stabilizes slopes;fall color; edible fruit
Black Willow	Salix nigra	6	Apr-May	Intermediate	X	X	X	X	X	-	30-50	Catkins in spring; wet to moist soil
Silky Willow	Salix sericea	5-6	May	Intermediate	X	X	X	X	-	-	<12	Catkins;wet conditions
Elderberry	Sambucus canadensis	5-6	Jun-Jul	Very High	X	X	X	X	X	-	1-3	White flowers; edible berries & flowers
Lowbush Blueberry	Vaccinium angustifolium	5	May-June	Very High	X	X	-	-	X	X	1-2	White flowers; edible berries
Highbush Blueberry	Vaccinium corymbosum	5	Apr-Jun	Very High	X	X	X	X	X	-	6-12	White flowers; edible berries; Fall color
Maple-Leaved Viburnum	Viburnum acerifolium	5-6	May-Jun	Intermediate	-	X	X	X	X	X	4-6	White flowers; edible berries; Fall color
Arrow-wood	Virburnum recognitum	5	May-June	Very High	X	X	X	X	X	-	3-15	White flowers in late spring;

NATIVE PLANTS FOR VEGETATION RESTORATION

WILDFLOWERS

COMMON NAME	SCIENTIFIC NAME	ZONE	BLOOM PERIOD	BLOOM COLOR	LIGHT PREFERENCE SUN	/ MED	/ SHADE	MOISTURE WET	/ MOIST	/ DRY	HEIGHT (FT)	NOTES
Doll's Eyes	Actaea pachypoda	5	Apr-Jun	White	-	-	X	-	X	-	1-3	Interesting berries
Wild Columbine	Aquilegia canadensis	5-6	Apr-Jun	Red & Yellow	-	X	X	-	X	X	1-3	Deer -resistant; slopes; spread by seed
Jack-in-the-pulpit	Arisaema triphyllum	5-6	Apr-Jun	Green-purple	-	X	X	X	X	-	1-3	Unusual flower; bright red berries
Wild Ginger	Asarum canadense	5-6	Apr-May	Maroon	-	-	X	-	X	-	<1	Edible/Herbal use; slopes
Swamp milkweed	Asclepias incarnata	6	Jul-Aug	Rose	X	X	-	X	X	-	2-4	Butterfly plant; raingardens
Common Milkweed	Asclepias syriaca	5-6	Jun-Aug	Pink	X	X	-	-	X	X	2-6	Butterfly plant; raingardens
Butterfly Weed	Asclepias tuberosa	6	May-Sept	Orange	X	X	X	-	X	X	1-3	Butterfly plant; taproot; raingardens
New England Aster	Aster novae-angliae	6	Aug-Oct	Purple	X	X	-	-	X	-	2-6	showy; cultivated often
Turtlehead	Chelone glabra	5-6	Jul-Sept	White-ish	X	X	X	X	X	-	1-3	Strong grower; hummingbirds; Herbal
Joe-Pye Weed	Eupatorium fistulosum	6	Aug-Sept	Purple	X	X	-	X	X	-	3-6	Good for insects; raingardens; Herbal
White Snakeroot	Eupatorium rugosum	6	Jul-Oct	White	X	X	X	-	X	X	2-3	Tough plant;
Gaura	Gaura biennis	6	Jul-Sept	White	X	X	-	-	X	-	1-6	Attractive flowers
Wood Geranium	Geranium maculatum	5-6	Apr-Jul	Rose	X	X	X	-	X	-	1-2	Adaptable plant; spreader; Herbal
Common Sneezeweed	Helenium autumnale	6	Aug-Oct	Yellow	X	X	X	X	X	-	2-6	Tolerates wet areas
Sunflowers	Helianthus sp.	6	Jul-Sept	Yellow	X	X	X	X	X	X	4-6	Aggressive; good for birds
Oxeye sunflower	Heliopsis helianthoides	6	Jul-Sept	Yellow	X	X	X	-	X	-	1-5	Butterfly plant
Alum-root	Heuchera americana	6	May-Aug	Green-ish	X	X	X	-	X	-	1-2	Long bloom time; many cultivars
Cardinal Flower	Lobelia cardinalis	6	July-Sept	Scarlet	X	X	X	X	X	-	2-5	Long bloom time; butterfly
Great blue lobelia	Lobelia siphilitica	6	Jul-Oct	Blue	X	X	X	X	X	-	1-3	Long bloom time; butterfly
Monkey Flower	Mimulus ringens	5-6	Jul-Sept	Violet	X	X	-	X	X	-	2-3	Grows in moist places;
Partridge-berry	Mitchella repens	5-6	Jun-Jul	White	-	X	X	-	X	X	1-3	Evergreen; edible berry
Bee-Balm	Monarda didyma	5	Jul-Aug	Red	X	X	X	-	X	-	2-5	Showy; butterfly plant
Sundrops	Monarda fistulosa	5	Jul-Aug	Violet	X	X	-	-	X	X	2-5	Showy; butterfly plant; tolerates dry
Sundrops	Oenothera perennis	5-6	Jun-Sept	Yellow	X	-	-	-	X	X	1-2	Bright Flowers;
Sundrops	Oenothera fruticosa	6	Jun-Sept	Yellow	X	X	-	-	X	-	1-3	Bright Flowers;
Beard-tongue	Penstemon digitalis	6	May-Jul	White	X	-	-	-	X	X	2-5	Colored cultivars; hummingbirds
Phlox	Phlox divaricata	6	May-Jun	Lilac	X	X	X	X	X	-	1-2	Aromatic; Butterflies; Deer resistant
Phlox	Phlox maculata	6	Jun-Sept	Purple	X	X	X	X	X	-	1-3	Aromatic; Butterflies
Phlox	Phlox paniculata	6	Jul-Oct	Pink	X	X	X	X	X	-	2-5	Aromatic; Butterflies
May-Apple	Podophyllum peltatum	6	May	White	-	X	X	-	X	-	1-2	Edible fruit; mottled foilage
Spreading Jacobs Ladder	Polemonium reptans	3-8	Apr-Jun	Blue	X	X	X	-	X	-	1-2	Attractive; herbal
Solomon's Seal	Polygonatum pubescens	6	Apr-Jun	Yellow	X	X	X	-	X	-	1-3	Not fussy; deer resistant;edible uses
Black-eyed Susan	Rudbeckia hirta	5-6	May-Sept	Orange	X	X	X	-	X	X	2-3	Daisy like flower; long bloom
Cutleaf coneflower	Rudbeckia lacianata	5-6	Jul-Sept	Yellow	X	X	-	X	X	-	2-6	Tall daisy like flowers; herbal
Bloodroot	Sanguinaria canadensis	6	Mar-May	White	-	X	X	-	X	-	<1	Herbal uses;
Golden ragwort	Senecio aureus	6	May-Jul	Yellow	X	X	X	X	X	-	1-2	Wet conditions;
False Solomon's seal	Smilacina racemosa	5-6	May-Jul	White	-	X	X	-	X	X	1-2	Plume like flower; Deer resistant
Wrinkle-leaf goldenrod	Solidago rugosa	5-6	Jul-Nov	Yellow	X	X	X	-	X	-	2-6	tough plant; butterflies
Nodding ladies-tresses	Spiranthes cernua	5-9	Aug-Oct	White	X	X	-	X	X	-	1-2	Moist soil conditions; herbal
Tall meadow-rue	Thalictrum pubescens	5-6	May-June	White	X	X	X	X	X	-	2-8	Tall plant; delicate flowers
Foamflower	Tiarella cordifolia	5	Apr-Jul	White	-	X	X	-	X	-	<1	Attractive; many cultivars
Trillium	Trillium grandiflorum	4-8	Apr-Jun	White	-	-	X	-	X	-	1-2	Showy flowers; Common to PA
Blue vervain	Verbena hastata	5-6	Jun-Sept	Blue	X	X	-	X	X	-	2-5	Moist soils; herbal
New York Ironweed	Vernonia noveboracensis	6	Jul-Sept	Purple	X	X	-	X	X	-	3-6	Tall plant; bright flowers

NATIVE PLANTS FOR VEGETATION RESTORATION

COMMON NAME	SCIENTIFIC NAME	ZONE	BLOOM PERIOD	BLOOM COLOR	LIGHT PREFERENCE SUN	LIGHT PREFERENCE MED	LIGHT PREFERENCE SHADE	MOISTURE WET	MOISTURE MOIST	MOISTURE DRY	HEIGHT (FT)	NOTES
WILDFLOWERS												
American Dog Violet	Viola conspersa	6	Apr-May	Violet	X	X	X	X	X	-	<1	Delicate plant & flower; Edible
Common blue violet	Viola sororia	6	Apr-May	Violet	X	X	X	-	X	-	<1	Delicate plant & flower; Edible
Golden Alexander	Zizia aurea	3-8	Apr-Jun	Gold	X	X	X	-	X	-	1-2	Attracts good insects; slopes
Lead Plant	Amorpha canescens	2-9	Jul-Sept	Purple & Blue	X	-	-	-	-	X	2-3	Deep roots for slope stability
GRASSES & SEDGES												
Big Bluestem	Andropogon gerardii	4-9	Jun-Sept	N/A	X	X	-	-	X	X	3-5	Deep roots for slope stability
Lurid Sedge	Carex lurida	5-6	Jun-Oct	N/A	X	X	X	X	-	-	1-2	Wet soils; Interesting seeds
Bottlebrush Grass	Elymus hystrix	6	Jun-Aug	N/A	-	X	X	-	X	-	2-4	Grows well in shade
Riverbank Wild-rye	Elymus riparius	5-6	Jul-Sept	N/A	X	X	-	X	X	-	3-5	Good along stream banks
Virginia Wild-rye	Elymus virginicus	5-6	Jul-Sept	N/A	X	X	X	X	X	-	2-4	Tolerates a lot of conditions
Switch Grass	Panicum virgatum	5-9	Aug-Sept	N/A	X	-	-	-	X	X	3-6	Deep roots for slope stability
Little Bluestem	Schizachyrium scoparium	6	Jul-Sept	N/A	X	-	-	-	-	X	2-4	Deep roots for slope stability
Indian Grass	Sorghastrum nutans	5	Aug-Sept	N/A	X	-	-	-	X	X	3-6	Clump grass; slope stability
FERNS & GROUNDCOVERS												
Maidenhair Fern	Adiantum pedatum	5-6	N/A	N/A	-	-	X	-	X	-	1-2	Grows in clumps; herbal
Evergreen Shield Fern	Dryopteris marginalis	5-6	N/A	N/A	-	X	X	-	X	X	1-3	Evergreen; Clumps; Attractive
Interrupted Fern	Osmunda claytoniana	5-6	N/A	N/A	-	X	X	-	X	-	2-4	Clump former; distinctive fronds
Christmas Fern	Polystichum achrostichoides	5-6	N/A	N/A	-	X	X	-	X	-	1-2	Evergreen; Clumps
Early Meadow Rue	Thalictrum dioicum	4-7	Apr-May	Green & Purple	X	X	X	-	X	X	1-2	Groundcover; deer resistant
Trout Lily	Erythronium albidum	3-8	April	White & Yellow	-	X	X	-	X	X	<1	Does well on slopes; moist conditions
Virginia Creeper	Parthenocissus quinquefolia	3-9	May-Aug	N/A	-	X	X	-	X	-	30-50	Deer resistant