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
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.

Sub-Surface Drains

Min. 4" Perforated pipe wrapped in geotextile and covered with sand/gravel to filter.

Collection & discharge pipes placed at bottom of slope into appropriate drainage system.

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.

- **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 uppermost 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.
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 as 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)
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-site 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.
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](http://www.porterie.org) prior to completing this application.

<table>
<thead>
<tr>
<th>Applicants Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address:</td>
</tr>
<tr>
<td>Phone:</td>
</tr>
<tr>
<td>Email:</td>
</tr>
<tr>
<td>Location Description:</td>
</tr>
<tr>
<td>Description of Work: (attach additional pages if needed)</td>
</tr>
<tr>
<td>Contractor Name:</td>
</tr>
<tr>
<td>Contact Person:</td>
</tr>
<tr>
<td>Phone:</td>
</tr>
</tbody>
</table>

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.
APPENDIX A

Cascade Street to Walnut Street

Walnut Street to Peach Street
Holland Street to Parade Street
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
Rhamnus spp.

Paper mulberry
Broussonetia papyrifera
APPENDIX B

INVASIVE SHRUBS & VINES

Asian Bittersweet
Celastrus orbiculatus
Boston Ivy
Parthenocissus tricuspidata
Burning Bush
Euonymus alatus
English Ivy
Hedera helix
European Highbush Cranberry
Viburnum opulus
Honeysuckle species
Lonicera x bella
Wineberry
Rubus phoenicolasius

Japanese Barberry
Berberis thunbergii
Paper mulberry
Broussonetia papyrifera
Multiflora Rose
Rosa multiflora
Pachysandra
Pachysandra terminalis
Privet Species
Ligustrum spp.
Japanese spirea
Spiraea japonica
Doublefile Viburnum
Viburnum plicatum

Linden Viburnum
Viburnum dilatatum
Wintercreeper
Euonymus fortunei
Mile-a-minute weed
Persicaria perfoliata
Kudzu
Pueraria lobata
Common penwinkle
Vinca minor
Japanese wisteria
Wisteria floribunda
PROTECTED EVERGREENS

Black Pine
Pinus nigra

Blue Spruce
Picea pungens glauca

Serbian Spruce
Picea omorika

Colorado Spruce
Picea pungens

Douglas 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.
APPENDIX C

PROTECTED HERBACEOUS PLANTS

Canada Goldenrod
Solidago canadensis

Sunflowers
Helianthus spp.

Tall Goldenrod
Solidago altissima
## KEY HERBACEOUS PLANTS

<table>
<thead>
<tr>
<th>Aster Species</th>
<th>Bellwort</th>
<th>Black-Eyed Susan</th>
<th>Bloodroot</th>
<th>Blue Phlox</th>
<th>Broad-leaved Goldenrod</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aster spp.</td>
<td>Uvularia graminea</td>
<td>Rudbeckia spp.</td>
<td>Sanguinaria canadensis</td>
<td>Phlox divaricata</td>
<td>Solidago flexicaulis</td>
</tr>
<tr>
<td>Columbine</td>
<td>Smilacina racemosa</td>
<td>Golden Alexander</td>
<td>Lead Plant</td>
<td>Marsh Marigold</td>
<td>Allium palustre</td>
</tr>
<tr>
<td>Aquilegia canadensis</td>
<td>Smilacina racemosa</td>
<td>Zizia aurea</td>
<td>Amorpha canescens</td>
<td>Caltha palustris</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>May Apple</th>
<th>Sharp-toothed Hepatica</th>
<th>Shooting Star</th>
<th>Wild Geranium</th>
<th>Solomon's Seal</th>
<th>Trillium Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Podophyllum peltatum</td>
<td>Hepatica acutifoba</td>
<td>Dodecatheon meadia</td>
<td>Geranium maculatum</td>
<td>Polygonatum spp.</td>
<td>Trillium spp.</td>
</tr>
</tbody>
</table>
APPENDIX D

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
APPENDIX D

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
APPENDIX D

KEY GRASSES & SEDGES

Bluestem Species
Andropogon spp.

Bottabrush 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
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.
# Appendix E

## Native Plants for Vegetation Restoration

### Medium to Large Trees

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Zone</th>
<th>Bloom Period</th>
<th>Wildlife Value</th>
<th>Light Preference</th>
<th>Moisture</th>
<th>Height (ft)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Maple</td>
<td>Acer rubrum</td>
<td>5-6</td>
<td>Mar-Apr</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>45-60</td>
<td>Beautiful red fall color</td>
<td></td>
</tr>
<tr>
<td>Sugar Maple</td>
<td>Acer saccharum</td>
<td>5-6</td>
<td>Apr-May</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>60-75</td>
<td>Yellow flowers; Fall Color; Maple Syrup</td>
<td></td>
</tr>
<tr>
<td>Yellow Birch</td>
<td>Betula alleghaniensis</td>
<td>6-9</td>
<td>Apr-May</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>60-75</td>
<td>Cattails in winter</td>
<td></td>
</tr>
<tr>
<td>Black Birch</td>
<td>Betula lenta</td>
<td>4-9</td>
<td>Apr-May</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>45-55</td>
<td>Cattails in winter</td>
<td></td>
</tr>
<tr>
<td>River Birch</td>
<td>Betula nigra</td>
<td>4-9</td>
<td>Apr-May</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>60-90</td>
<td>Cattails; beautiful bark</td>
<td></td>
</tr>
<tr>
<td>American Beech</td>
<td>Fagus grandifolia</td>
<td>5-6</td>
<td>Apr-May</td>
<td>High</td>
<td>X X X X X X</td>
<td>50-70</td>
<td>Beautiful trees; edible nuts</td>
<td></td>
</tr>
<tr>
<td>Tulip Poplar</td>
<td>Liriodendron tulipifera</td>
<td>6</td>
<td>May-June</td>
<td>Intermediate</td>
<td>X X X X X X</td>
<td>75-100</td>
<td>Green flowers in early summer;</td>
<td></td>
</tr>
<tr>
<td>Black Gum</td>
<td>Nyssa sylvatica</td>
<td>6</td>
<td>Apr-May</td>
<td>High</td>
<td>X X X X X X</td>
<td>50-80</td>
<td>Outstanding fall color</td>
<td></td>
</tr>
<tr>
<td>Eastern White Pine</td>
<td>Pinus strobus</td>
<td>5-6</td>
<td>N/A</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>50-80</td>
<td>Evergreen conifer</td>
<td></td>
</tr>
<tr>
<td>Sycamore</td>
<td>Platanus occidentalis</td>
<td>5</td>
<td>Apr-May</td>
<td>Low</td>
<td>X X X X X X</td>
<td>75-100</td>
<td>Showy bark; drops fruits</td>
<td></td>
</tr>
<tr>
<td>White Oak</td>
<td>Quercus alba</td>
<td>6</td>
<td>Mar-May</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>50-100</td>
<td>Edible nuts; majestic</td>
<td></td>
</tr>
<tr>
<td>Chestnut Oak</td>
<td>Quercus montana</td>
<td>6</td>
<td>Apr-May</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>40-75</td>
<td>Fall color; attracts wildlife</td>
<td></td>
</tr>
<tr>
<td>Pin Oak</td>
<td>Quercus palustris</td>
<td>6</td>
<td>Apr-May</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>60-70</td>
<td>Fall color</td>
<td></td>
</tr>
<tr>
<td>Red Oak</td>
<td>Quercus rubra</td>
<td>5-6</td>
<td>Apr-May</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>60-70</td>
<td>Hardy long lived; fall color</td>
<td></td>
</tr>
<tr>
<td>Sassafras</td>
<td>Sassafras albidum</td>
<td>6</td>
<td>Apr-May</td>
<td>High</td>
<td>X X X X X X</td>
<td>30-50</td>
<td>Edible &amp; herbal uses; fall color</td>
<td></td>
</tr>
<tr>
<td>Basswood</td>
<td>Tilia americana</td>
<td>5-6</td>
<td>May-Jun</td>
<td>Very Low</td>
<td>X X X X X X</td>
<td>60-80</td>
<td>Aromatic flower; multiple trunks</td>
<td></td>
</tr>
<tr>
<td>Canada Hemlock</td>
<td>Tsuga canadensis</td>
<td>5-6</td>
<td>N/A</td>
<td>High</td>
<td>X X X X X X</td>
<td>40-70</td>
<td>Evergreen; PA State Tree</td>
<td></td>
</tr>
<tr>
<td>Hop Hornbeam, Ironwood, Ironwood Oshya virginiana</td>
<td>3-9</td>
<td>April Low</td>
<td>X X X X X X</td>
<td>25-40</td>
<td>Unique wood texture; Deer resistant</td>
<td></td>
<td></td>
<td></td>
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### Small Trees and Shrubs

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Zone</th>
<th>Bloom Period</th>
<th>Wildlife Value</th>
<th>Light Preference</th>
<th>Moisture</th>
<th>Height (ft)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smooth Alder</td>
<td>Alnus serrulata</td>
<td>6</td>
<td>Mar-April</td>
<td>High</td>
<td>X X X X X X</td>
<td>6-10</td>
<td>Yellow catkins; multi-stemmed</td>
<td></td>
</tr>
<tr>
<td>Serviceberry</td>
<td>Amelanchier arborea</td>
<td>6</td>
<td>Mar-May</td>
<td>High</td>
<td>X X X X X X</td>
<td>15-25</td>
<td>White flowers; edible berries; fall color</td>
<td></td>
</tr>
<tr>
<td>Black chokeberry</td>
<td>Aronia melanocarpa</td>
<td>3-8</td>
<td>Mar-Jul</td>
<td>Intermediate</td>
<td>X X X X X X</td>
<td>3-6</td>
<td>White flowers; multi-stemmed; fall color</td>
<td></td>
</tr>
<tr>
<td>New Jersey Tea</td>
<td>Ceanothus americanus</td>
<td>6</td>
<td>May-Sep</td>
<td>Intermediate</td>
<td>X X X X X X</td>
<td>&lt;3</td>
<td>White flowers; fixes nitrogen; tough</td>
<td></td>
</tr>
<tr>
<td>Buttonbush</td>
<td>Cephalanthus occidentalis</td>
<td>6</td>
<td>Jun-Sep</td>
<td>Intermediate</td>
<td>X X X X X X</td>
<td>6-15</td>
<td>White flowers; multi-stemmed</td>
<td></td>
</tr>
<tr>
<td>Redbud</td>
<td>Ceris canadensis</td>
<td>4-6</td>
<td>April</td>
<td>Very Low</td>
<td>X X X X X X</td>
<td>20-50</td>
<td>Purple flowers in spring; fixes nitrogen</td>
<td></td>
</tr>
<tr>
<td>All-Leaved Dogwood</td>
<td>Cornus alternifolia</td>
<td>5-6</td>
<td>May-Jun</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>15-25</td>
<td>White flowers; blue berries; Multi-stem</td>
<td></td>
</tr>
<tr>
<td>Silky Dogwood</td>
<td>Cornus amomum</td>
<td>6</td>
<td>May-Jul</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>6-12</td>
<td>White flowers; blue berries; Multi-stem</td>
<td></td>
</tr>
<tr>
<td>Flowering Dogwood</td>
<td>Cornus florida</td>
<td>6</td>
<td>Apr-Jun</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>10-30</td>
<td>White bracts in spring; red berries; yellow flowers; deer resistant</td>
<td></td>
</tr>
<tr>
<td>Wilcox-hazel</td>
<td>Hamamelis virginiana</td>
<td>5-6</td>
<td>Sep-Nov</td>
<td>Low</td>
<td>X X X X X X</td>
<td>20-30</td>
<td>Yellow blooms in summer; multi-stem</td>
<td></td>
</tr>
<tr>
<td>Wild Hydrangea</td>
<td>Hydrangea arborescens</td>
<td>6</td>
<td>Jun-Jul</td>
<td>Low</td>
<td>X X X X X X</td>
<td>3-5</td>
<td>White blooms in winter;</td>
<td></td>
</tr>
<tr>
<td>Winterberry</td>
<td>Illex verticillata</td>
<td>6</td>
<td>May-Jun</td>
<td>High</td>
<td>X X X X X X</td>
<td>6-10</td>
<td>Evergreen; multi-stem; PA State Flower</td>
<td></td>
</tr>
<tr>
<td>Mountain Laurel</td>
<td>Kalmia latifolia</td>
<td>6</td>
<td>May-Jul</td>
<td>Very Low</td>
<td>X X X X X X</td>
<td>7-15</td>
<td>Berries and foliage in fall; multi-stem</td>
<td></td>
</tr>
<tr>
<td>Spicebush</td>
<td>Lindera benzoin</td>
<td>6</td>
<td>Mar-May</td>
<td>High</td>
<td>X X X X X X</td>
<td>6-12</td>
<td>Pink flowers; papery bark; multi-stem</td>
<td></td>
</tr>
<tr>
<td>Ninebark</td>
<td>Physocarpus opulifolius</td>
<td>6</td>
<td>May-Jul</td>
<td>Intermediate</td>
<td>X X X X X X</td>
<td>5-10</td>
<td>White flowers; edible fruit; Rose flowers; evergreen</td>
<td></td>
</tr>
<tr>
<td>Wild Plum</td>
<td>Prunus americana</td>
<td>6</td>
<td>Apr-May</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>15-25</td>
<td>White flowers; edible fruit; Rose flowers; evergreen</td>
<td></td>
</tr>
<tr>
<td>Rosebay</td>
<td>Rhamodendron maximum</td>
<td>5</td>
<td>Jun-Jul</td>
<td>Very Low</td>
<td>X X X X X X</td>
<td>10-30</td>
<td>Stabilizes slopes; fall color; edible fruit</td>
<td></td>
</tr>
<tr>
<td>Staghorn Sumac</td>
<td>Rhus Typhina</td>
<td>3-8</td>
<td>Jun-Jul</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>15-25</td>
<td>Catkins in spring; wet to moist soil</td>
<td></td>
</tr>
<tr>
<td>Black Willow</td>
<td>Salix nigra</td>
<td>6</td>
<td>Apr-May</td>
<td>Intermediate</td>
<td>X X X X X X</td>
<td>&lt;12</td>
<td>Catkins; wet conditions</td>
<td></td>
</tr>
<tr>
<td>Silky Willow</td>
<td>Salix sericea</td>
<td>5-6</td>
<td>May</td>
<td>Intermediate</td>
<td>X X X X X X</td>
<td>1-3</td>
<td>White flowers; edible berries &amp; flowers</td>
<td></td>
</tr>
<tr>
<td>Elderberry</td>
<td>Sambucus canadensis</td>
<td>6</td>
<td>Jun-Jul</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>1-2</td>
<td>White flowers; edible berries</td>
<td></td>
</tr>
<tr>
<td>Lowbush Blueberry</td>
<td>Vaccinium angustifolium</td>
<td>5</td>
<td>May-Jun</td>
<td>Very High</td>
<td>- X X X X</td>
<td>6-12</td>
<td>White flowers; edible berries</td>
<td></td>
</tr>
<tr>
<td>Highbush Blueberry</td>
<td>Vaccinium corymbosum</td>
<td>5</td>
<td>Apr-May</td>
<td>Very High</td>
<td>X X X X X X</td>
<td>4-6</td>
<td>White flowers; edible berries</td>
<td></td>
</tr>
<tr>
<td>Maple-Leaved Viburnum</td>
<td>Viburnum acerifolium</td>
<td>5-6</td>
<td>May-Jun</td>
<td>Intermediate</td>
<td>X X X X X X</td>
<td>3-15</td>
<td>White flowers in late spring;</td>
<td></td>
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</table>
## Native Plants for Vegetation Restoration

### Wildflowers

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Zone</th>
<th>Bloom Period</th>
<th>Bloom Color</th>
<th>Light Preference</th>
<th>Moisture Requirement</th>
<th>Height (FT)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doll’s Eyes</td>
<td>Actaea pachyonoda</td>
<td>5</td>
<td>Apr-Jun</td>
<td>White</td>
<td>-</td>
<td>X</td>
<td>1-3</td>
<td>Deer-resistant, slope spread by seed</td>
</tr>
<tr>
<td>Wild Columbine</td>
<td>Aquilegia canadensis</td>
<td>5-6</td>
<td>Apr-Jun Red &amp; Yellow</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Jack-in-the-pulpit</td>
<td>Anemone triphyllum</td>
<td>5-6</td>
<td>Apr-Jun Green-purple</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Wild Ginger</td>
<td>Asarum canadense</td>
<td>5-6</td>
<td>Apr-May Maroon</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>Swamp milkweed</td>
<td>Asclepias incarnata</td>
<td>6</td>
<td>Jul-Aug Rose</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Common Milkweed</td>
<td>Asclepias syriaca</td>
<td>5-6</td>
<td>Jun-Aug Pink</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Butterfly Weed</td>
<td>Asclepias tuberosa</td>
<td>6</td>
<td>May-Aug Orange</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Turtlehead</td>
<td>Chelone glabra</td>
<td>5-6</td>
<td>Jul-Sep White</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Jewelweed</td>
<td>Eupatorium rugosum</td>
<td>6</td>
<td>Jul-Oct White</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>White Snakeroot</td>
<td>Eupatorium rugosum</td>
<td>6</td>
<td>Jul-Oct White</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>Gaura</td>
<td>Gaura biennis</td>
<td>6</td>
<td>Jul-Sep White</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Wood Geranium</td>
<td>Geranium maculatum</td>
<td>5-6</td>
<td>Apr-Jul Rose</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Common Sneezeweed</td>
<td>Helianthus annuus</td>
<td>6</td>
<td>Aug-Oct Yellow</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Sunflowers</td>
<td>Helianthus annuus</td>
<td>6</td>
<td>Jul-Sep Yellow</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Creeping Sunflower</td>
<td>Helianthus annuus</td>
<td>6</td>
<td>Jul-Sep Yellow</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Allium</td>
<td>Helenium autumnale</td>
<td>6</td>
<td>Aug-Oct Purple</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Cardinal Flower</td>
<td>Lobelia cardinalis</td>
<td>6</td>
<td>Jul-Sep Scarlet</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
<td>Great Blue Lobelia</td>
<td>Lobelia siphilitica</td>
<td>6</td>
<td>Jul-Oct Yellow</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Monkeyflower</td>
<td>Mimulus ringens</td>
<td>5-6</td>
<td>Jul-Sep Violet</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Parthenigrain</td>
<td>Mitchella repens</td>
<td>5-6</td>
<td>Jun-Jul White</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Bear's-balm</td>
<td>Monarda didyma</td>
<td>5</td>
<td>Jul-Aug Red</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Sundrops</td>
<td>Monarda fistulosa</td>
<td>5</td>
<td>Jul-Aug Violet</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Sundrops</td>
<td>Oenothera perennis</td>
<td>5-6</td>
<td>Jun-Aug Yellow</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Beard-tongue</td>
<td>Penstemon digitatus</td>
<td>6</td>
<td>May-Jul White</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Phlox</td>
<td>Phlox drummondii</td>
<td>6</td>
<td>May-Jun Lilac</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Phlox</td>
<td>Phlox geumifolium</td>
<td>6</td>
<td>Jun-Sep Purple</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Phlox</td>
<td>Phlox paniculata</td>
<td>6</td>
<td>Jul-Oct Purple</td>
<td>X</td>
<td>X</td>
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<tr>
<td>May-Apple</td>
<td>Podophyllum peltatum</td>
<td>6</td>
<td>May White</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Spreading Jacob’s Ladder</td>
<td>Polemonium reptans</td>
<td>3-8</td>
<td>Apr-Jun Blue</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Solomon’s Seal</td>
<td>Polygonatum peruvianum</td>
<td>6</td>
<td>Apr-Jun Yellow</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Black-eyed Susan</td>
<td>Rudbeckia hirta</td>
<td>5-6</td>
<td>May-Sep Orange</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Cutleaf Coneflower</td>
<td>Rudbeckia laciniata</td>
<td>5-6</td>
<td>Jul-Sep Yellow</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Bloodroot</td>
<td>Sanguinaria canadensis</td>
<td>6</td>
<td>Mar-May White</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Golden Ragwort</td>
<td>Senecio aureus</td>
<td>6</td>
<td>May-Jul Yellow</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>False Solomon’s Seal</td>
<td>Smilacina racemosa</td>
<td>5-6</td>
<td>May-Jul White</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Wicker-leaf goldenrod</td>
<td>Solidago rosenia</td>
<td>5-6</td>
<td>Jul-Nov Yellow</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Nodding Liatris</td>
<td>Spiranthes cernua</td>
<td>5-6</td>
<td>Aug-Oct White</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Tall Meadow-sage</td>
<td>Thalictrum pubescens</td>
<td>5-6</td>
<td>May-Jun White</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Foamflower</td>
<td>Tiarella cordifolia</td>
<td>5</td>
<td>Apr-Jul White</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Trillium</td>
<td>Trillium grandiflorum</td>
<td>4-8</td>
<td>Apr-Jun White</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Blue vervain</td>
<td>Verbesina hastata</td>
<td>5-6</td>
<td>Jun-Sep Blue</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>New York Ironweed</td>
<td>Vernonia noveboracensis</td>
<td>6</td>
<td>Jul-Sep Purple</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
NATIVE PLANTS FOR VEGETATION RESTORATION

### WILDFLOWERS

<table>
<thead>
<tr>
<th>COMMON NAME</th>
<th>SCIENTIFIC NAME</th>
<th>ZONE</th>
<th>BLOOM PERIOD</th>
<th>BLOOM COLOR</th>
<th>LIGHT PREFERENCE</th>
<th>MOISTURE</th>
<th>HEIGHT (FT)</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Dog Violet</td>
<td>Viola conspersa</td>
<td>6</td>
<td>Apr-May</td>
<td>Violet</td>
<td>X X X X X X</td>
<td>-</td>
<td>&lt;1</td>
<td>Delicate plant &amp; flower; Edible</td>
</tr>
<tr>
<td>Common blue violet</td>
<td>Viola conspersa</td>
<td>6</td>
<td>Apr-May</td>
<td>Violet</td>
<td>X X X X X</td>
<td>-</td>
<td>&lt;1</td>
<td>Delicate plant &amp; flower; Edible</td>
</tr>
<tr>
<td>Golden Alexander</td>
<td>Zizia aurea</td>
<td>3-8</td>
<td>Apr-Jun</td>
<td>Gold</td>
<td>X X X X</td>
<td>-</td>
<td>1-2</td>
<td>Attracts good insects; slopes</td>
</tr>
<tr>
<td>Lead Plant</td>
<td>Amorpha canescens</td>
<td>2-9</td>
<td>Jul-Sept</td>
<td>Purple &amp; Blue</td>
<td>X - - -</td>
<td>X</td>
<td>2-3</td>
<td>Deep roots for slope stability</td>
</tr>
</tbody>
</table>

### GRASSES & SEDGES

<table>
<thead>
<tr>
<th>COMMON NAME</th>
<th>SCIENTIFIC NAME</th>
<th>ZONE</th>
<th>BLOOM PERIOD</th>
<th>BLOOM COLOR</th>
<th>LIGHT PREFERENCE</th>
<th>MOISTURE</th>
<th>HEIGHT (FT)</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Bluestem</td>
<td>Andropogon gerardii</td>
<td>4-9</td>
<td>Jun-Sept</td>
<td>N/A</td>
<td>X X - - X X</td>
<td>-</td>
<td>3-5</td>
<td>Deep roots for slope stability</td>
</tr>
<tr>
<td>Lund Sedge</td>
<td>Carex lirica</td>
<td>5-6</td>
<td>Jun-Oct</td>
<td>N/A</td>
<td>X X X X</td>
<td>-</td>
<td>1-2</td>
<td>Wet soils; Interesting seeds</td>
</tr>
<tr>
<td>Bottlebrush Grass</td>
<td>Elymus hystrix</td>
<td>6</td>
<td>Jun-Aug</td>
<td>N/A</td>
<td>- X - X</td>
<td>-</td>
<td>2-4</td>
<td>Grows well in shade</td>
</tr>
<tr>
<td>Riverbank Wild-rye</td>
<td>Elymus riparius</td>
<td>5-6</td>
<td>Jul-Sep</td>
<td>N/A</td>
<td>X X - X X</td>
<td>-</td>
<td>3-5</td>
<td>Good along stream banks</td>
</tr>
<tr>
<td>Virginia Wild-rye</td>
<td>Elymus virginicus</td>
<td>5-6</td>
<td>Jul-Sep</td>
<td>N/A</td>
<td>X X X X</td>
<td>-</td>
<td>2-4</td>
<td>Tolerates a lot of conditions</td>
</tr>
<tr>
<td>Switch Grass</td>
<td>Panicum virgatum</td>
<td>5-9</td>
<td>Aug-Sep</td>
<td>N/A</td>
<td>X - - X X</td>
<td>-</td>
<td>3-6</td>
<td>Deep roots for slope stability</td>
</tr>
<tr>
<td>Little Bluestem</td>
<td>Schizachyrium scoparium</td>
<td>6</td>
<td>Jul-Sep</td>
<td>N/A</td>
<td>X - - - X</td>
<td>-</td>
<td>2-4</td>
<td>Deep roots for slope stability</td>
</tr>
<tr>
<td>Indian Grass</td>
<td>Sorghastrum nutans</td>
<td>5</td>
<td>Aug-Sep</td>
<td>N/A</td>
<td>X - - - X</td>
<td>X</td>
<td>3-6</td>
<td>Clump grass; slope stability</td>
</tr>
</tbody>
</table>

### FERNS & GROUNDCOVERS

<table>
<thead>
<tr>
<th>COMMON NAME</th>
<th>SCIENTIFIC NAME</th>
<th>ZONE</th>
<th>BLOOM PERIOD</th>
<th>BLOOM COLOR</th>
<th>LIGHT PREFERENCE</th>
<th>MOISTURE</th>
<th>HEIGHT (FT)</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maidenhair Fern</td>
<td>Adiantum pedatum</td>
<td>5-6</td>
<td>N/A</td>
<td>N/A</td>
<td>X - X - X</td>
<td>-</td>
<td>1-2</td>
<td>Grows in clumps; herbal</td>
</tr>
<tr>
<td>Evergreen Shield Fern</td>
<td>Dryopteris marginalis</td>
<td>5-6</td>
<td>N/A</td>
<td>N/A</td>
<td>X X X X X</td>
<td>-</td>
<td>1-3</td>
<td>Evergreen; Clumps; Attractive</td>
</tr>
<tr>
<td>Interrupted Fern</td>
<td>Osmunda claytoniana</td>
<td>5-6</td>
<td>N/A</td>
<td>N/A</td>
<td>X X X - X</td>
<td>-</td>
<td>2-4</td>
<td>Clump former; distinctive fronds</td>
</tr>
<tr>
<td>Christmas Fern</td>
<td>Polysthichum australis</td>
<td>5-6</td>
<td>N/A</td>
<td>N/A</td>
<td>X X X - X</td>
<td>-</td>
<td>1-2</td>
<td>Evergreen; Clumps</td>
</tr>
<tr>
<td>Early Meadow Rue</td>
<td>Thalictrum dioicum</td>
<td>4-7</td>
<td>Apr-May</td>
<td>Green &amp; Purple</td>
<td>X X X - X</td>
<td>X</td>
<td>1-2</td>
<td>Ground cover; deer resistant</td>
</tr>
<tr>
<td>Trout Lily</td>
<td>Eryngium albidum</td>
<td>3-6</td>
<td>April</td>
<td>White &amp; Yellow</td>
<td>X X X - X</td>
<td>X</td>
<td>&lt;1</td>
<td>Does well on slopes; moist conditions</td>
</tr>
<tr>
<td>Virginia Creeper</td>
<td>Parthenocissus quinquefolia</td>
<td>3-9</td>
<td>May-Aug</td>
<td>N/A</td>
<td>X X X - X</td>
<td>X</td>
<td>30-50</td>
<td>Deer resistant</td>
</tr>
</tbody>
</table>