Critical Area Buffer Resources Guide

Critical Area Commission
1804 West Street
Suite 100
Annapolis, MD 21401
(410) 260-3460
https://dnr.maryland.gov/criticalarea/

March 31, 2011

ADKINS ARBORETUM

Critical Area Commission
Chesapeake and Atlantic Coastal Bays

NOAA

MARYLAND DEPARTMENT OF NATURAL RESOURCES

Critical Area Buffer Resources Guide

Acknowledgements
This Buffer Resources Guide was developed through a partnership between the Critical Area Commission for the Chesapeake and Atlantic Coastal Bays and Adkins Arboretum. Financial assistance was provided by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resource Management (OCRM), National Oceanic and Atmospheric Administration (NOAA), through the Maryland Department of Natural Resources Chesapeake and Coastal Program pursuant to NOAA award No. NA09NOS4190170.

March 31, 2011

ADKINS ARBORETUM

Critical Area Commission
Chesapeake and Atlantic
Coastal Bays

NOAA

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

BUFFER RESOURCES GUIDE

Table of Contents

Title 27 CRITICAL AREA COMMISSION FOR THE CHESAPEAKE AND ATLANTIC COASTAL BAYS

Subtitle 01 CRITERIA FOR LOCAL CRITICAL AREA PROGRAM DEVELOPMENT

Chapter 09 Habitat Protection Areas in the Critical Area

Authority: Natural Resources Article, §§8-1806, Annotated Code of Maryland

.01 Buffer.

A. In this chapter, the following terms have the meanings indicated.

B. Terms Defined.

(1) "Accessory" means a structure that is:

(a) Detached from a principal structure;

(b) Located on the same lot as the principal structure; and

(c) Customarily incidental and subordinate to the principal structure.

(2) "Addition" means a newly constructed area that increases the size of a structure.

(3) Buffer Management Plan.

(a) "Buffer management plan" means a narrative, graphic description, or plan of the buffer that is necessary when an applicant proposes a development activity that will:

(i) Affect a portion of the buffer;

(ii) Alter buffer vegetation; or

(iii) Require the establishment of a portion of the buffer in vegetation.

(b) "Buffer management plan" includes a major buffer management plan, a minor buffer management plan, and a simplified buffer management plan.

(4) "Caliper" has the meaning stated in COMAR 08.19.03.01.

(5) "Canopy tree" means a tree that, when mature, reaches a height of at least 35 feet.

(6) "Financial assurance" means a performance bond, letter of credit, cash deposit, insurance policy, or other instrument of security acceptable to a local jurisdiction.

(7) "In-kind replacement" means the removal of a structure and the construction of another structure that is smaller than or identical to the original structure in use, footprint area, width, and length.

(8) "Invasive species" means a type of plant that is non-native to the ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health.

(9) "Landward edge" means the limit of a site feature that is farthest away from a tidal water, tidal wetland, or tributary stream.

(10) "Large shrub" means a shrub that, when mature, reaches a height of at least 6 feet.

(11) "Major buffer management plan" means a plan and supporting documentation required under Regulation .01-3J of this chapter.

(12) "Minor buffer management plan" means a plan and supporting documentation required under Regulation .01-3I of this chapter.

(13) "Native" means indigenous to the physiographic area in Maryland where the planting is proposed.

(14) "Natural regeneration" has the meaning stated in COMAR 08.19.03.01.

(15) "Simplified buffer management plan" means a plan required for an application under Regulation .01-3H of this chapter.

(16) "Small shrub" means a shrub that, when mature, reaches a height of up to 6 feet.

(17) "Structure" means building materials that are purposely joined together on or over land or water, including those that do not result in lot coverage.

(18) "Substantial alteration" means a repair, reconstruction, replacement, or improvement of a principal structure, with a proposed total footprint that is at least 50 percent greater than that of the structure that is the subject of the application.

(19) "Understory tree" means a tree that, when mature, reaches a height of 12 to 35 feet.

(20) "Upland boundary" means the landward edge of a tidal wetland or a nontidal wetland.

C. Policies. In developing their Critical Area programs, local jurisdictions shall use the following policies with regard to the Buffer:

(1) Provide for the removal or reduction of sediments, nutrients, and potentially harmful or toxic substances in runoff entering the Bay and its tributaries;

(2) Minimize the adverse effects of human activities on wetlands, shorelines, stream banks, tidal waters, and aquatic resources;

(3) Maintain an area of transitional habitat between aquatic and upland communities;

(4) Maintain the natural environment of streams; and

(5) Protect riparian wildlife habitat.

D. Authority of Secretary; Scope; Alternative Procedures and Requirements.

(1) The provisions of this chapter may not be construed to limit the authority of the Secretary of Agriculture under Agriculture Article, Title 9, Subtitle 4, Annotated Code of Maryland.

(2) The provisions of Regulations .01-1 through .01-6 of this chapter do not apply to an area of the buffer that is designated as a buffer exemption area under Regulation .01-7 of this chapter.

(3) A local jurisdiction may adopt alternative procedures and requirements for the provisions of this chapter if:

(a) The alternative procedures and requirements are at least as effective as the Critical Area program under Natural Resources Article, Title 8, Subtitle 18, Annotated Code of Maryland, regulations adopted under the authority of that subtitle, and any additional requirements of the local program; and

(b) The Commission has approved those alternative procedures and requirements.

E. Buffer Standards.

(1) A local jurisdiction may authorize disturbance in the buffer for:

(a) A new development activity or a redevelopment activity:

(i) Associated with a water-dependent facility under COMAR 27.01.03;

(ii) Located in an approved buffer exemption area under Regulation .01-7 of this chapter; or

(iii) In accordance with §E(8) of this regulation; or

(b) In accordance with COMAR 26.24.02, a shore erosion control measure under COMAR 27.01.04.

(2) Except as authorized under §E(1) of this regulation, a local jurisdiction may not authorize disturbance in the buffer.

(3) Except for the minimum buffer widths under §E(5)—(8) of this regulation, a local jurisdiction shall establish a buffer of at least 100 feet landward from:

(a) The mean high water line of tidal waters;

(b) The edge of each bank of a tributary stream; and

(c) The upland boundary of a tidal wetland.

(4) For purposes related to the calculation of the minimum buffer widths under §E(5)—(8) of this regulation, a local jurisdiction shall measure landward from the points specified under §E(3) and (4) of this regulation.

(5) Except as provided under §E(6) of this regulation, and in accordance with §E(4) of this regulation, if a local jurisdiction grants final local approval for a subdivision or a site plan in the Resource Conservation Area on or after July 1, 2008, the local jurisdiction shall establish:

(a) An expanded buffer in accordance with §E(7) and (8) of this regulation; and

(b) A buffer of at least 200 feet from tidal waters or a tidal wetland.

(6) The provisions of §E(5)(b) of this regulation do not apply if:

(a) The application for subdivision or site plan approval was submitted before July 1, 2008, and legally recorded by July 1, 2010;

(b) The application involves the use of growth allocation; or

(c) A local program procedure approved by the Commission provides for the reduction of the strict application of the minimum 200-foot buffer under §E(5)(b) of this regulation if that minimum would preclude a subdivision of the property at a density of one dwelling unit per 20 acres or an intra-family transfer authorized under Natural Resources Article, §8-1808.2, Annotated Code of Maryland.

(7) If a buffer is contiguous to a steep slope, a nontidal wetland, a nontidal wetland of special State concern under COMAR 26.23.06.01, a hydric soil, or a highly erodible soil, a local jurisdiction shall expand the minimum buffer required under §E(3) or (5) of this regulation and shall calculate the extent of that expansion in accordance with the following requirements:

(a) A steep slope at a rate of 4 feet for every 1 percent of slope or to the top of the slope, whichever is greater;

(b) A nontidal wetland of special State concern to include the wetland and its regulated 100-foot buffer;

(c) A nontidal wetland that is not a nontidal wetland of special State concern, to the upland boundary of the nontidal wetland; and

(d) A highly erodible soil on a slope less that 15 percent or a hydric soil, to the lesser of:

(i) The landward edge; or

(ii) 300 feet, including the minimum buffer required under §E(3) or (5) of this regulation.

(8) If a buffer is contiguous to a highly erodible soil on a slope less than 15% or a hydric soil and is located on a lot or parcel that was created before January 1, 2010, a local jurisdiction may authorize a development activity in the expanded buffer, if:

(a) The location of the development activity is in the expanded portion of the buffer for a highly erodible soil on a slope less than 15 percent or a hydric soil, but not the 100-foot buffer;

(b) The buffer for a highly erodible soil on a slope less than 15 percent or a hydric soil occupies at least 75 percent of the lot or parcel; and

(c) Mitigation occurs at a 2:1 ratio based on the lot coverage of the proposed development activity that is in the expanded buffer.

.01-1 Buffer Establishment.

A. Applicability.

(1) The requirements of this regulation are applicable to:

(a) A development or redevelopment activity that occurs on a lot or parcel that includes a buffer to tidal waters, a tidal wetland, or a tributary stream if that development or redevelopment activity is located outside the buffer; or

(b) The approval of a new subdivision that includes a buffer to tidal waters, a tidal wetland, or a tributary stream.

(2) The requirements of this regulation are not applicable to:

(a) An in-kind replacement of a principal structure; or

(b) Land that remains in agricultural use after subdivision in accordance with a buffer management plan under Regulation .01-3 of this chapter.

B. A local jurisdiction shall require an applicant to establish the buffer in vegetation in accordance with §C of this regulation and Regulation .01-2 of this chapter and to provide a buffer management plan under Regulation .01-3 of this chapter when an applicant applies for:

(1) Approval of a new subdivision or a new lot;

(2) Conversion from one land use to another land use on a lot or a parcel; or

(3) Development on a lot or a parcel created before January 1, 2010.

C. At the time of application, if the buffer is not fully forested or is not fully established in woody or wetland vegetation, an applicant shall establish the buffer to the extent required in the following table:

Development Category	Lot Created Before Local Program Adoption	Lot Created After Local Program Adoption
New development on a vacant lot	Establish the buffer based on total lot coverage	Fully establish the buffer
New subdivision or new lot	Fully establish the buffer	
New lot with an existing dwelling unit	Establish the buffer based on total lot coverage	
Conversion of a land use on a parcel or lot to another land use	Fully establish the buffer	
Addition or accessory structure	Establish the buffer based on net increase in lot coverage	
Substantial alteration	Establish the buffer based on total lot coverage	

D. For a buffer management plan required under Regulation .01-3J of this chapter that is related to the establishment of more than 1 acre, a local jurisdiction may approve natural regeneration up to 50 percent of the area required for establishment if:

(1) The plan does not include any new managed lawn or turf;

(2) All of the natural regeneration area is within 50 feet of a mature forest that contains a seed bank of native species adequate for natural regeneration;

(3) The plan includes a supplemental planting plan for subsequent implementation if the natural regeneration does not succeed; and

(4) The financial assurance provided for implementing the buffer management plan:

(a) Is sufficient to cover the cost of planting an equivalent area; and

(b) Specifies that release of the financial assurance may not occur until the later of 5 years after the date of plan approval or the areal coverage of the buffer is at

least 300 native woody stems, on a per-acre basis, that are at least 4 feet in height.

E. At the end of 5 years after the date of approval of a natural regeneration plan, an applicant shall implement a supplemental planting plan for at least 2 years if the areal coverage of the buffer is not, on a per-acre basis, at least 300 native woody stems of at least 4 feet in height.

.01-2 Mitigation and Planting Standards.

A. Applicability. The requirements of this regulation are applicable to a development or redevelopment activity that occurs on a lot or parcel that includes a buffer to tidal waters, a tidal wetland, or a tributary stream when that development or redevelopment activity is located inside the buffer.

B. As applicable to a site, a local jurisdiction shall require that a buffer management plan in accordance with Regulation .01-3 of this chapter satisfy the planting and mitigation standards of this regulation and satisfy the buffer establishment standards required under Regulation .01-1 of this chapter so as to:

(1) Prohibit the installation or cultivation of new lawn or turf on-site in the buffer;

(2) Ensure the planting of native species in compliance with the amounts specified under §§C, G, and H of this regulation;

(3) Ensure coverage of the buffer with mulch or ground cover or both until buffer plantings are established;

(4) Ensure planting is evenly distributed throughout the entire buffer; and

(5) Provide optimum habitat and water quality benefits.

C. As applicable to a site, a local jurisdiction shall calculate the cumulative amount of buffer mitigation required in accordance with the following standards:

(1) For a development activity within the buffer, mitigation shall be based on the limits of disturbance and calculated in accordance with the ratios under §G of this regulation;

(2) Except for the mitigation required under §C(3) of this regulation, for the removal of an individual tree with a diameter of at least 2 inches when measured at 4.5 feet above the ground surface, mitigation shall be at a rate of 100 square feet for every 1 inch of diameter; and

(3) For removal of a dead, diseased, or dying tree, mitigation shall be at least one 1-inch caliper tree for each tree removed.

D. Except as authorized under §E of this regulation, if mitigation planting cannot be located on-site within the buffer because of site constraints, a local jurisdiction shall require planting in the following order of priority:

(1) On-site and adjacent to the buffer; and

(2) On-site elsewhere in the Critical Area.

E. A local jurisdiction may authorize payment of a fee in lieu of buffer mitigation under Regulation .01-4 of this chapter, but only if there is no feasible alternative.

F. A local jurisdiction may authorize off-site planting in the buffer if this option is part of a local Critical Area program approved by the Commission or the subject of a written agreement between the local jurisdiction and the Commission.

G. In accordance with the applicable activity, a local jurisdiction shall require the following ratios of mitigation:

Activity	Mitigation Ratio
Shore erosion control	1:1
Riparian water access	2:1
Development or redevelopment of water-dependent facilities	2:1
Variance	3:1
Violation	4:1

H. A local jurisdiction may authorize the combination of the planting and mitigation standards found in §§I and K of this regulation in accordance with the following table:

Requirement	Amount	Options
Establishment	Less than 1/4 acre	Landscaping stock according to §I of this regulation for the entire area
	1/4 acre to less than or equal to 1 acre	At least 50 percent of area in landscaping stock according to §I of this regulation, the remainder according to §K of this regulation
	Greater than 1 acre to less than or equal to 5 acres	At least 25 percent of area in landscaping stock according to §I of this regulation, the remainder according to §K of this regulation
	Greater than 5 acres	At least 10 percent of area in landscaping stock according to §I of this regulation, the remainder according to §K of this regulation
Mitigation	Less than 1 acre	Landscaping stock according to §I of this regulation for the entire area
	1 acre or greater	At least 50 percent of area in landscaping stock according to §I of this regulation, the remainder according to §K of this regulation

I. A local jurisdiction shall apply the following planting credits for the type and size of the vegetation proposed:

Vegetation Type	Minimum Size Eligible for Credit	Maximum Credit Allowed (Square Feet)	Maximum Percent of Credit
Canopy tree	2-inch caliper and 8 feet high	200	Not applicable
Canopy tree	1-inch caliper and 6 feet high	100	Not applicable
Understory tree	1-inch caliper and 6 feet high	75	Not applicable
Large shrub	1 gallon and 4 feet high	50	30
Small shrub	1 gallon and 18 inches high	25	20
Herbaceous perennial*	1 quart	2	10
Planting Cluster 1*	1 canopy tree; and 3 large shrubs or 6 small shrubs of sizes listed above	300	Not applicable
Planting Cluster 2*	2 understory trees; and 3 large shrubs or 6 small shrubs of sizes listed above	350	Not applicable

* These options are available only for buffer establishment and buffer mitigation of less than 1 acre.

J. All landscaping stock planted in accordance with §I shall be 100 percent guaranteed for at least 2 years after planting is completed.

K. A local jurisdiction may use the following table to allow flexible stocking size when authorized under §H of this regulation:

Stock Size of Trees Only	Required Number of Stems Per Acre	Survivability Requirement	Minimum Financial Assurance Period After Planting
Bare-root seedling or whip	700	50 percent	5 years
1/2-inch to 1-inch container grown trees	450	75 percent	2 years
More than 1-inch container grown trees	350	90 percent	2 years

L. A local jurisdiction may not:

(1) Authorize a variance to the planting and mitigation standards under this regulation; or

(2) Issue a final use and occupancy permit for an application under Regulation .01-3B(2) of this chapter unless the applicant:

(a) Completes the planting required under an approved buffer management plan; or

(b) Pending completion of the planting required under an approved buffer management plan during the next planting season, provides financial assurance to cover the costs for:

(i) Materials and installation; and

(ii) In the case of a mitigation or establishment requirement that is at least 5,000 square feet, long-term survivability in accordance with the requirements of Regulation .01-3J(2)(d) of this chapter.

M. Before recordation of a final subdivision, an applicant shall:

(1) Post permanent signs delineating the upland boundary of the buffer at a ratio of at least one sign per lot or per 200 linear feet of shoreline, whichever is applicable; and

(2) Design each sign required under §M(1) of this regulation so that it:

(a) Is at least 11 inches in width and 15 inches in height;

(b) Is placed at a height of 4.5 feet, but not attached to a tree; and

(c) Clearly states "Critical Area Buffer—No clearing or disturbance permitted".

N. Concurrent with the recordation of a final plat, an applicant shall record a protective measure in a buffer management plan in accordance with Regulation .01-3 of this chapter.

O. A local jurisdiction may not approve a final subdivision application until the jurisdiction has reviewed and approved the buffer management plan.

.01-3 Buffer Management Plans.

A. The provisions of this regulation do not apply to maintenance of an existing grass lawn or an existing garden in the buffer.

B. A local jurisdiction shall require an applicant proposing a development activity to submit a buffer management plan if:

(1) The establishment of the buffer is required in accordance with Regulation .01-1 of this chapter; or

(2) Disturbance to the buffer will result from the issuance of a:

(a) Variance;

(b) Subdivision approval;

(c) Site plan approval;

(d) Shore erosion control permit as required under COMAR 26.24.01;

(e) Building permit;

(f) Grading permit; or

(g) Special exception.

C. In accordance with the requirements under Regulations .01-1 and .01-2 of this chapter, a local jurisdiction shall require an applicant to submit a:

(1) Simplified buffer management plan;

(2) Minor buffer management plan; or

(3) Major buffer management plan.

D. A local jurisdiction may not approve a buffer management plan unless:

(1) The plan clearly indicates that all planting standards under Regulation .01-2 of this chapter will be met; and

(2) Appropriate measures are in place for the long-term protection and maintenance of all buffer areas established under this regulation.

E. A local jurisdiction may not issue a permit for a development activity under Regulation .01-1 or .01-2 of this chapter unless the local jurisdiction has approved the buffer management plan submitted under §C of this regulation.

F. If an applicant fails to implement a buffer management plan, that failure shall constitute a violation of the local Critical Area program.

G. A local jurisdiction may not issue a permit on a property that is the subject of a violation under §F of this regulation.

H. Simplified Buffer Management Plan.

(1) Before the performance of an activity under this section in the buffer, a local jurisdiction shall require the applicant to submit a simplified buffer management plan as part of the application associated with any of the following activities:

(a) Providing access to a private pier or shoreline that is up to 3 feet wide;

(b) Manually removing invasive or noxious vegetation;

(c) Filling to maintain an existing grass lawn; or

(d) Except for an emergency situation under §H(2) of this regulation, cutting a tree that is in imminent danger of falling and causing damage to a dwelling or other structure, causing blockage to a stream, or accelerating shore erosion.

(2) If cutting a tree in the buffer is immediately necessary because of an emergency situation, the applicant shall submit a simplified buffer management plan to the local jurisdiction at the earliest possible time after the tree has been cut.

(3) A simplified buffer management plan shall include:

(a) A brief narrative describing the proposed activity, including the anticipated start date and method to be used;

(b) The proposed mitigation;

(c) In the case of the removal of invasive or noxious species, the revegetation of the area in accordance with Regulation .01-2 B(1) and (3) of this chapter;

(d) The proposed planting date; and

(e) The signature of the party responsible for the proposed activity and for ensuring the survival of the planting.

I. Minor Buffer Management Plan.

(1) A local jurisdiction shall require an applicant to submit a minor buffer management plan for:

(a) Establishment of less than 5,000 square feet of the buffer for an application listed under Regulation .01-1 of this chapter; or

(b) A requested disturbance that requires less than 5,000 square feet of mitigation for an application listed under Regulation .01-2 of this chapter.

(2) A minor buffer management plan shall include:

(a) A plan that shows the proposed limit of disturbance, the total number and size of trees to be removed, if applicable, and the arrangement of the planting to be done;

(b) A landscape schedule that shows the proposed species type, the quantity of plants, the size of plants to be installed, and the planting date;

(c) A maintenance plan for the control of invasive species, pests, and predation that shows invasive species and pest control practices, the provision of at least 2 years of monitoring, and a reinforcement planting provision if survival rates fall below the standards in Regulation .01-2J and K of this chapter;

(d) An inspection agreement that grants permission to the local jurisdiction to inspect the plantings at appropriate times;

(e) If buffer establishment is required under Regulation .01-1 of this chapter, the information on which calculation of the amount of buffer to be planted was based;

(f) If buffer mitigation is required under Regulation .01-2 of this chapter, the

information on which calculation of the amount of the buffer to be planted was based; and

(g) The signature of the party responsible for the proposed activity and for ensuring the survival of the planting.

J. Major Buffer Management Plan.

(1) A local jurisdiction shall require an applicant to submit a major buffer management plan for:

(a) Establishment of at least 5,000 square feet of the buffer for an application listed under Regulation .01-1 of this chapter; or

(b) A requested disturbance that requires at least 5,000 square feet of mitigation for an application listed under Regulation .01-2 of this chapter.

(2) A major buffer management plan shall include:

(a) A plan that shows the proposed limit of disturbance, the total number and size of trees to be removed, if applicable, and the arrangement of the planting to be done;

(b) A landscape schedule that shows the proposed species type, the quantity of plants, the size of plants to be installed, and the planting date;

(c) A maintenance plan for the control of invasive species, pests, and predation that shows invasive species and pest control practices, the provisions of at least 2 years of monitoring, and a reinforcement planting provision if survival rates fall below the standards in Regulation .01-2J and K of this chapter;

(d) A long-term protection plan that includes evidence of financial assurance that adequately covers the planting and survivability requirement, a provision for at least 2 years of monitoring as required in Regulation .01-2J and K of this chapter, and if planting, an anticipated planting date before construction or the sale of the lot;

(e) An inspection agreement that grants permission to the local jurisdiction to inspect the plantings at appropriate times;

(f) If buffer establishment is required under Regulation .01-1 of this chapter, the information on which calculation of the amount of buffer to be planted was based;

(g) If buffer mitigation is required under Regulation .01-2 of this chapter, the information on which calculation of the amount of the buffer to be planted was

based; and

(h) The signature of the party responsible for the proposed activity and for the survival of the planting.

(3) For a major buffer management plan:

(a) A single species may not exceed 20 percent of the total planting requirement; and

(b) Shrubs may not exceed 50 percent of the total planting requirement.

.01-4 Fee In Lieu of Buffer Mitigation.

A. A local jurisdiction shall collect a fee in lieu of buffer mitigation if the planting requirements under Regulation .01-2 of this chapter cannot be met.

B. A local jurisdiction shall:

(1) Calculate the square footage of mitigation due in accordance with Regulation .01-2 of this chapter;

(2) Except as provided under §C of this regulation, collect at least $1.50 per square foot of mitigation required;

(3) Establish a special fund, which may not revert to the jurisdiction's general fund, for the collection of the fee in lieu of buffer mitigation; and

(4) Use money from that fund only:

(a) To establish the buffer on sites where planting is not a condition of development or redevelopment; or

(b) For water quality and habitat enhancement projects, as described in a local Critical Area program approved by the Commission or in an agreement between the local jurisdiction and the Commission.

C. A local jurisdiction may utilize a lesser fee in lieu of buffer mitigation that is based on an alternative to the amount required under §B of this regulation if:

(1) The jurisdiction demonstrates that its proposed alternative will ensure the receipt of funds sufficient to administer a financially sound fee in lieu of buffer mitigation program, based on the following costs in that jurisdiction:

(a) Planting materials;

(b) Labor;

(c) Land acquisition, either by fee simple or by easement;

(d) Planting maintenance; and

(e) Monitoring and administration of the special account; and

(2) The Commission approves the lesser alternative proposed.

D. Each year by April 1, on a form provided by the Commission, a local jurisdiction shall report to the Commission regarding the administration of its fee program and its special fund over the course of the previous calendar year, including:

(1) The number of projects for which a fee was collected and the amount of the fee per project;

(2) The total square footage of buffer impact that generated the fee;

(3) A short description of each planting project, including the amount spent on each project;

(4) The square footage area of buffer replanted;

(5) The account balance as of December 31; and

(6) If funds are purposely being held in the separate account in order to achieve a long-term purpose that is consistent with the local program polices and goals, the nature of that purpose and the projected time and funding that will be necessary to accomplish that purpose.

.01-5 Agricultural Activities.

A. The buffer is not required for agricultural drainage ditches if the adjacent agricultural land has in place best management practices as required in COMAR 27.01.06.

B. Agricultural activities are permitted in the buffer, if, as a minimum best management practice, a 25-foot vegetated filter strip measured landward from the mean high water line of tidal waters or tributary streams (excluding drainage ditches), or from the edge of tidal wetlands, whichever is further inland, is established, and further provided that:

(1) The filter strip shall be composed of either trees with a dense ground cover, or a thick sod of grass, and shall be so managed as to provide water quality benefits and

habitat protection consistent with the policies stated in Regulation .01 of this chapter; noxious weeds, including Johnson grass, Canada thistle, and multiflora rose, which occur in the filter strip, may be controlled by authorized means;

(2) The filter strip shall be expanded by a distance of 4 feet for every 1 percent of slope, for slopes greater than 6 percent;

(3) The 25-foot vegetated filter strip shall be maintained until such time as the landowner is implementing, under an approved soil conservation and water quality plan, a program of best management practices for the specific purposes of improving water quality and protecting plant and wildlife habitat; and provided that the portion of the soil conservation and water quality plan being implemented achieves the water quality and habitat protection objectives of the 25-foot vegetated filter strip;

(4) The best management practices shall include a requirement for the implementation of a grassland and manure management program, where appropriate, and that the feeding or watering of livestock may not be permitted within 50 feet of the mean high water line of tidal water and tributary streams, or from the edge of tidal wetlands, whichever is further inland;

(5) Clearing of existing natural vegetation in the buffer is not allowed; and

(6) Farming activities, including the grazing of livestock, do not disturb stream banks, tidal shorelines, or other habitat protection areas as described in this chapter.

.01-6 Tree Clearing and Timber Harvesting.

A. The buffer shall be managed to achieve or enhance the functions stated in Regulation .01 of this chapter. Cutting or clearing of trees within the buffer shall be prohibited except that commercial harvesting of trees by selection or by the clearcutting of loblolly pine and tulip poplar may be permitted to within 50 feet of the landward edge of the mean high water line of tidal waters and perennial tributary streams, or the edge of tidal wetlands if:

(1) This cutting does not occur in the habitat protection areas described in COMAR 27.01.09.02, .03, .04, and .05; and

(2) The cutting is conducted pursuant to the requirements of COMAR 27.01.05 and in conformance with a buffer management plan prepared by a registered, professional forester and approved by the Forestry Programs and the Fish, Heritage and Wildlife Administration of the Department of Natural Resources.

B. The plan shall be required for all commercial harvests within the buffer, regardless of the size of the area to be cut, and shall contain the following minimum

requirements:

(1) Disturbance to stream banks and shorelines shall be avoided;

(2) The area disturbed or cut shall be replanted or allowed to regenerate in a manner that assures the availability of cover and breeding sites for wildlife, and reestablishes the wildlife corridor function of the buffer; and

(3) The cutting does not involve the creation of logging roads and skid trails within the buffer.

C. Commercial harvesting of trees, by any method, may be permitted to the edge of intermittent streams provided that the cutting is conducted pursuant to the requirements of §A(1) of this regulation.

.01-7 Buffer Exemption Areas.

As part of the local Critical Area program to be submitted to the Commission, local jurisdictions may request an exemption of certain portions of the Critical Area from the buffer requirements where it can be sufficiently demonstrated that the existing pattern of residential, industrial, commercial, or recreational development in the Critical Area prevents the buffer from fulfilling the functions stated in Regulation .01 of this chapter. If an exemption is requested, local jurisdictions shall propose other measures for achieving the water quality and habitat protection objectives of the policies. These measures may include, but are not limited to, public education and urban forestry programs.

Chapter 1-124. The 100-foot Buffer.

A. **Applicability.** The Buffer shall be identified, and the applicable standards applied, on all lands on which a development activity, subdivision, or a change in land use is proposed. The applicant shall be responsible for ensuring that the Buffer is accurately identified and delineated.

(1) The provisions of this chapter may not be construed to limit the authority of the Secretary of Agriculture under Title 9, Subtitle 4 of the Agriculture Article, Annotated Code of Maryland.

(2) The provisions of this chapter do not apply to an area of the Buffer that is designated as a Buffer Modification Area under Chapter _____ of this Code.

B. **General policies.** The purpose of protecting and managing the Buffer is to provide the following functions:

(1) Provide for the removal or reduction of sediments, nutrients, and potentially harmful or toxic substances in runoff entering the Bay and its tributaries.

(2) Minimize the adverse effects of human activities on wetlands, shoreline, stream banks, tidal waters, and aquatic resources.

(3) Maintain an area of transitional habitat between aquatic and upland communities.

(4) Maintain the natural environment of streams.

(5) Protect riparian wildlife habitat.

C. **Buffer delineation.** An applicant for a development activity, subdivision, or a change in land use shall identify in the field and delineate based on actual site conditions, a minimum 100-foot Buffer landward from:

(1) The mean high water line of tidal waters;

(2) The edge of each bank of a tributary stream; and

(3) The upland boundary of a tidal wetland.

D. **Buffer expansion.** The Buffer shall be expanded beyond the minimum 100-foot Buffer as described above and the minimum 200-foot Buffer as described below, to include the following contiguous land features:

(1) A steep slope at a rate of four feet for every one percent of slope or the entire steep slope to the top of the slope, whichever is greater;

(2) A nontidal wetland to the upland boundary of the nontidal wetland;

(3) A nontidal Wetland of Special State Concern (WSSC) including its regulated 100-foot buffer as stated in COMAR § 26.23.06.01;

(4) A highly erodible soil, on a slope less than 15 percent, or a hydric soil, to the lesser of:

(a) The landward edge of the soil; or

(b) Three hundred feet where the 300 foot expansion area includes the minimum 100-foot Buffer.

E. **Standards.** The following general standards apply to the Buffer and expanded Buffer:

(1) Existing, planted, and regenerating natural vegetation within the Buffer shall be maintained for the water quality and habitat functions it provides as specified in this section;

(2) Supplemental planting is encouraged within the Buffer, particularly where it functions to protect, stabilize, or enhance the shoreline; and

(3) Except as authorized in Section I below, new development activities and redevelopment activities including the construction of structures, roads, parking areas and other lot coverage, installation of septic systems and utilities, grading, mining and related facilities may not be allowed in the Buffer.

F. **200 – foot Buffer for projects in the RCA.** On lands located within the RCA, applications for a subdivision and applications for a development activity requiring site plan approval and involving a change in land use on or after July 1, 2008 shall include:

(1) A Buffer of at least 200 feet from a tidal waterway or tidal wetlands;

(2) A Buffer of at least 100 feet from a tributary stream;

(3) An expanded Buffer from tidal waters, tidal wetlands or a tributary stream in accordance with Section D. above

(4) The 200-foot Buffer provisions do not apply if:

(a) The application for subdivision or site plan approval was submitted before July 1, 2008, and was legally recorded (subdivisions) or received final site plan approval (site plans), by July 1, 2010;

(b) The application involves the use of growth allocation.

G. **Buffer establishment in vegetation.** A lot or parcel that includes a Buffer to tidal waters, tidal wetlands or tributary streams shall establish the Buffer in vegetation in accordance with the standards described below.

(1) The provisions of this section apply to:

(a) A development or redevelopment activity that occurs on a lot or parcel that includes a Buffer to tidal waters, tidal wetlands or a tributary stream when that development is located outside the Buffer; or

(b) The approval of a subdivision that includes a Buffer to tidal waters, tidal wetlands, or a tributary stream.

(2) The provisions of this section do not apply to:

(a) An in-kind replacement of a principal structure; or

(b) The subdivision of land that remains in agricultural use after subdivision, provided that it is specified that implementation of a Buffer Management Plan is being deferred until a lot is sold or the land use changes on a lot. The future establishment of the Buffer must be addressed in a Buffer Management Plan as described in this Chapter.

(3) An applicant shall establish the Buffer in vegetation in accordance with Section H and provide a Buffer Management Plan in accordance with Sections N – P for the following types of applications or activities:

(a) The approval of a new lot or subdivision;

(b) Conversion of a lot or parcel from one land use to another; or

(c) Development on a lot or parcel created before January 1, 2010.

H. <u>Required area of Buffer establishment.</u> The area of the Buffer not fully forested or fully established in natural vegetation shall be planted in accordance with the table below at the time of application:

Table H.1 Required Area of Buffer Establishment

Development Category	Lot Created Before Local Program Adoption	Lot Created After Local Program Adoption
New development on a vacant lot	Establish the Buffer based on total lot coverage	Fully establish the Buffer
New subdivision or new lot	Fully establish the Buffer	
New lot with an existing dwelling unit	Establish the Buffer based on total lot coverage	
Conversion of a land use on a parcel or lot to another land use	Fully establish the Buffer	
Addition or accessory structure	Establish the Buffer based on net increase in lot coverage	
Substantial alteration	Establish the Buffer based on total lot coverage	

I. **Authorized disturbance to the Buffer.** Disturbance to the Buffer may be authorized for the following activities subject to the mitigation requirements in Section J:

(1) A new development or redevelopment activity associated with a water-dependent facility in accordance with Chapter _____ of this Ordinance;

(2) A shore erosion control activity constructed in accordance with COMAR 26.24.02, COMAR 27.01.04, and Chapter _____ of this Ordinance;

(3) A new development or redevelopment activity subject to approval of a variance.

(4) A new development or redevelopment activity on a lot or parcel that was created before January 1, 2010 where:

(a) The Buffer is expanded only for a highly erodible soil on a slope less than 15 percent or is expanded for a hydric soil;

(b) The 100-foot Buffer and expanded Buffer occupies at least 75% of the lot or parcel;

(c) The development or redevelopment is located in the expanded portion of the Buffer and not within the 100-foot Buffer; and

(d) Mitigation occurs at a 2:1 ratio based on the lot coverage of the proposed development activity that is in the expanded Buffer.

J. **Buffer mitigation.** Mitigation is required for development in or disturbance to the Buffer or expanded Buffer in accordance with the standards described below.

(1) The requirements of this section apply to a development or redevelopment activity located inside the Buffer that result from the approval or issuance of:

(a) A variance;

(b) A subdivision;

(c) A site plan;

(c) A shore erosion control permit;

(d) A grading permit; or

(e) A special exception

(2) An application for a development activity or redevelopment activity in the Buffer shall calculate the cumulative amount of Buffer mitigation as specified below:

(a) The area of disturbance multiplied by the mitigation ratio in accordance with the table below:

Table (J)(1) Mitigation Ratios for Development Activities

Activity	Mitigation Ratio
Shore erosion control	1:1
Riparian water access	2:1
Development or redevelopment of water-dependent facilities	2:1
Development in the expanded Buffer that meets the standards of E(2)	2:1
Penalty for a violation	4:1
Variance	3:1

(b) The area of individual trees removed calculated as 100 square feet for every 1 inch of diameter of an individual tree removed that is at least 2 inches in diameter when measured at 4.5 feet above the ground surface; and

(c) One 1-inch caliper tree shall be provided for every dead, diseased, or dying tree removed.

(3) Mitigation shall be located on-site within the Buffer until it is fully established. If some or all of the mitigation planting cannot be located on-site within the Buffer because of site constraints, the applicant may provide mitigation in accordance with the following order of priority:

a) Plant on-site and adjacent to the Buffer;

b) Plant on-site elsewhere in the Critical Area;

c) Pay a fee-in-lieu according to Section N of this Chapter; or

d) Plant off-site at some location that is approved as part of the County Program or is the subject of a written agreement between the County and the Commission.

(6) A variance may not be granted to the mitigation ratios in Section J(2) or to the planting standards in Section K.

K. **<u>Buffer planting standards</u>.** Any Buffer Management Plan submitted to meet the requirements for Buffer establishment, Buffer mitigation, or both shall:

(1) Prohibit the installation or cultivation of new lawn or turf on-site in the Buffer;

(2) Use native species in compliance with the provisions specified in this section;
(3) Ensure coverage of the planted areas in the Buffer with mulch or ground cover or both until Buffer plantings are established;

(4) Ensure that plantings are appropriately located to perform the identified Buffer functions and that when full establishment of the Buffer is required, full coverage of the Buffer is provided;

(5) Provide optimum habitat and water quality benefits;

(6) Planting credits for the installation of nursery stock shall be based on the type and size of the vegetation. All landscaping stock shall be 100 percent guaranteed for at least 2 years after planting is completed. Credit for planting herbaceous perennials, planting cluster 1 or planting cluster 2 shall only be allowed when the Buffer mitigation or establishment requirement is less than 1 acre. The credit for each vegetation type and the maximum composition allowed shall be as set forth in the table below.

Table K(1) Nursery Stock Credits

Vegetation Type (Species)	Minimum Size	Credit (Square Feet)	Maximum Composition
Canopy Tree	2" caliper and 8' high	200	N/A
Canopy Tree	1" caliper and 6' high	100	N/A
Understory Tree	1" caliper and 6" high	75	N/A
Large Shrub	1 gallon and 4 feet high	50	30%
Small Shrub	1 gallon and 18" high	25	20%
Herbaceous perennials	1 quart	2	10%
Planting Cluster 1	1 Canopy Tree plus 3 Large Shrubs or 6 Small Shrubs of sizes listed above	300	N/A
Planting Cluster 2	2 Understory Trees plus 3 Large Shrubs or 6 Small Shrubs of sizes listed above	350	N/A

(7) Flexibility to use a combination of nursery stock and smaller stock is permitted when the Buffer establishment planting requirement is ¼ acre (10,980 square feet) in size or greater. For planting involving smaller stock, all species must be canopy or understory tree species. Planting credits for the installation using a combination of stock shall be in accordance with the requirements set forth in the tables below:

Table K(2) Combination Planting Standards

Requirement	Amount	Options
Establishment	Less than ¼ acre	Nursery stock according to Table (1) for the entire area
	Greater than ¼ acre ≤ 1 acre	At least 50% of the area in nursery stock according to Table (1), the remainder according to Table (3)
	Greater than 1 acre to ≤ 5 acres	At least 25% of the area in nursery stock according to Table (1), the remainder according to Table (3)
	Greater than 5 acres	At least 10% of the area in nursery stock according to Table (1), the remainder according to Table (3)
Mitigation	Less than 1 acre	Nursery stock according to Table (1) for the entire area
	1 Acre or greater	At least 50% of area in nursery stock according to Table (1), the remainder according to Table (3)

Table K(3) Flexible Stocking Standards

Stock Size (Trees Only)	Number per Acre	Required Survival Rate	Required Survival Prior to Release of Financial Assurance
Bare-root seedling or whip	700	50% 385 per acre	5 years
½" to 1" Container grown trees	450	75% 290 per acre	2 years
More than 1-inch container grown tree	350	90% 315 per acre	2 years

L. **Natural regeneration.** For Buffer establishment that is one acre or greater in size, the County may approve a Buffer Management Plan that includes natural regeneration of up to 50% of the area required for establishment if:

(a) The Plan does not include any new managed lawn or turf;

(b) All of the natural regeneration area is within 50 feet of a mature forest that contains a seed bank of native species adequate for natural regeneration;

(c) The Plan includes a supplemental planting plan to be implemented if, at the end of 5 years, the areal coverage of the Buffer does not contain, on a per-acre basis, at least 300 native woody stems at least 4 feet in height; and

(d) The financial assurance provided for implementing the Buffer Management Plan is:

(1) Sufficient to cover the cost of planting an equivalent area; and

(2) Specifies that the release of the financial assurance may not occur until the later of 5 years after the date of plan approval or the County determines that the regeneration is successful and that areal coverage of the Buffer is at least 300 native wood stems, on a per-acre basis, that are at least 4 feet in height.

M. **Buffer signs.** Before an applicant records a final subdivision that includes a Buffer or expanded Buffer, the applicant shall:

(1) Post permanent signs delineating the upland boundary of the Buffer with at least one sign per lot or one for each 200 linear feet of shoreline, whichever is applicable; and

(2) Design each sign so that it:

(a) Is at least 11 inches in width and 15 inches in height;

(b) Is placed at a height of 4.5 feet, but not attached to a tree; and

(c) Clearly states "Critical Area Buffer – No clearing or disturbance permitted."

N. **Required Submittal and Approval of Buffer Management Plans.** When the Buffer is required to be established or mitigation is required for disturbance to the Buffer, an applicant

shall submit a Buffer Management Plan with the application for the specific activity. The requirement to submit a Buffer Management Plan does not apply to maintaining an existing grass lawn or an existing garden in the Buffer.

(1) An application for a development activity or redevelopment activity in the Buffer shall provide a Buffer Management Plan in accordance with this Chapter that meets the standards for establishment and mitigation and:

(a) Prohibits the installation or cultivation of new lawn or turf on-site in the Buffer;

(b) Uses native species;

(c) Ensures coverage of the planted areas in the Buffer with mulch or ground cover or both until Buffer plantings are established;

(d) Ensures that when full establishment of the Buffer is required, that full coverage of the Buffer is provided; and

(e) Provides optimum habitat and water quality benefits.

(2) If the Buffer is required to be established in accordance with Sections G and H of this Chapter, a Buffer Management Plan shall be submitted with all other application materials and shall clearly specify the area to be planted and state if the applicant is:

(a) Fully establishing the Buffer;

(b) Partially establishing an area of the Buffer equal to the net increase in lot coverage;

(c) Partially establishing an area of the Buffer equal to the total lot coverage, and

(d) If mitigation is required for disturbance to the Buffer, the information on which the amount of mitigation is based.

(3) If mitigation is required for any disturbance to the Buffer in accordance with Section J of this Chapter, a Buffer Management Plan shall be submitted with all other application materials and shall clearly specify the area to be planted and include the following:

(a) The area of disturbance in the Buffer;

(b) The area of any existing lot coverage, new lot coverage, and total lot coverage in the Buffer;

(c) The number and size of any developed woodland vegetation to be removed and the area of any existing forest to be removed;

(d) The required mitigation for any vegetation removal in the Buffer

(e) The required mitigation, using the ratios set forth in Table J(1); for the disturbance to the Buffer;

(4) An applicant may not obtain a permit for a development activity that requires Buffer establishment or Buffer mitigation until the County has approved a Buffer Management Plan in accordance with these regulations.

(5) An applicant may not obtain final approval of a subdivision application until the Buffer Management Plan has been reviewed and approved by the County.

(6) The County may not approve a Buffer Management Plan unless the plan clearly indicates that all planting standards in this Chapter can be met and that appropriate measures are in place for the long-term protection and maintenance of all Buffer areas.

(7) For a Buffer Management Plan submitted to mitigate for authorized disturbance to the Buffer, a final use and occupancy permit may not be issued until the applicant completes the implementation of a Buffer Management Plan. A temporary use and occupancy permit may be issued if the time of year is not conducive to planting; and the applicant provides financial assurance to cover the costs of materials and installation and if required, the long-term survivability requirements in this Chapter.

(8) Concurrent with recordation of a subdivision plat, an applicant shall record a protective easement for the Buffer.

O. **Noncompliance with Buffer Management Plans.** If an applicant fails to implement a Buffer Management Plan, that failure shall constitute a violation of the Critical Area Program, and the applicant shall be issued a notice of violation. The County may not issue any permit or authorization for the property that has the violation.

P. **Simplified Buffer Management Plan.** A Simplified Buffer Management Plan shall be prepared for specified activities in the Buffer that do not require a detailed landscape plan, but do require mitigation measures in accordance with the following provisions.

(1) A Simplified Buffer Management Plan shall be submitted and approved by the local government before authorizing the following activities in the Buffer as specified below:

(a) Access to a private pier or to the shoreline that is no wider than three feet;

(b) Manual removal of invasive or noxious vegetation;

(c) Fill necessary to maintain an existing grass lawn; or

(d) Except in the case of an emergency, removal of a tree that is in imminent danger of falling and causing damage to a dwelling or other structure, causing blockage to a stream, or accelerating shore erosion. In case of an emergency, an applicant who cuts a tree in the Buffer because it was immediately necessary shall submit a simplified Buffer Management Plan to the County at the earliest possible time after the tree has been cut.

(2) A Simplified Buffer Management Plan shall include the following minimum information:

(a) A brief statement describing the activity, how it will be accomplished (i.e. chainsaw, hand removal, etc.), and the anticipated date of the work;

(b) The proposed mitigation;

(c) In the case of the removal of invasive or noxious species and as necessary, the method of revegetating of the area;

(d) The proposed mitigation planting date; and

(e) The signature of the party responsible for the activity and for ensuring survival of the planting.

Q. **Minor Buffer Management Plan**. A Minor Buffer Management Plan is a landscape plan required for applications for development activities that exceed the limitations for Simplified Buffer Management Plans and involve total planting required for Buffer mitigation and establishment calculations that is less than 5,000 square feet.

(1) A Minor Buffer Management Plan shall include all of the following information:

(a) A plan that shows the limit of disturbance, the proposed development activity within and outside the Buffer, the total number and size of trees removed, if applicable, and the arrangement of the proposed planting;

(b) A landscape schedule showing the proposed species type, the quantity of plants, the size of plants, and the stock type that is proposed for installation;

(c) The anticipated planting date, based on the next available planting season and construction timeline;

(d) A maintenance plan that includes:

(i) Practices to control invasive species and pests and minimize destruction of plants by wildlife;

(ii) The signature of a responsible party;

(iii) Provisions for monitoring and reinforcement planting if survival rates fall below those required in this Chapter;

(iv) A signature that confirms the review and approval of the maintenance plan by the County.

(e) An inspection agreement that grants permission to the County to inspect the plantings at appropriate times, and requires a reinforcement planting provision if survival rates fall below those required in Section K; and

(f) Signature(s) of the party responsible for the proposed activity and for ensuring the survivability of the planting.

R. **Major Buffer Management Plan.** A Major Buffer Management Plan is a landscape plan required for applications for development activities that exceed the limitations for Simplified Buffer Management Plans and Minor Buffer Management Plans and involve total planting required for Buffer mitigation and establishment that is 5,000 square feet or more.

(1) A Major Buffer Management Plan shall include all of the following information:

(a) A plan that shows the limit of disturbance, the proposed development activity within and outside the Buffer, the total number and size of trees removed, if applicable, and the arrangement of the proposed planting;

(b) A landscape schedule showing the proposed species type, the quantity of plants, the size of plants, and the stock type that is proposed for installation;

(c) The anticipated planting date, based on the next available planting season and construction timeline;

(d) A maintenance plan that includes:

(i) Practices to control invasive species and pests and minimize the destruction of plants by wildlife;

(ii) The signature of a responsible party;

(iii) Provisions for monitoring and reinforcement planting if survival rates fall below those required in this Chapter;

(e) An inspection agreement that grants permission to the local government to inspect the plantings at appropriate times, and requires a reinforcement planting provision if survival rates fall below those required in Section K;

(f) Signature(s) of the party responsible for the proposed activity and for ensuring the survivability of the planting; and

(g) A long-term protection plan that includes:

(i) Deed restrictions, plat notes, easements, or other agreements required by the County to ensure the protection of planted and existing vegetation in the Buffer in accordance with the provisions of this Chapter;

(ii) Evidence of financial assurance accepted by the County before final approval of a subdivision or site plan that covers the planting and survivability requirement;

(iii) Provisions for at least two to five years of monitoring based on the type of planting or the use of natural regeneration;

(iv) An anticipated planting date before construction on an individual lot or parcel or prior to sale of the lots in a subdivision.

S. **Fee-In-Lieu of Buffer Mitigation.** If the planting requirements set forth in this Chapter cannot be met, the County shall collect a fee-in-lieu of mitigation. Fee-in-lieu cannot be collected for Buffer establishment which must be accomplished on the project site. Fee-in-lieu monies shall be collected and managed in accordance with the following standards:

(1) Fee-in-lieu monies shall be collected and held in a separate account that cannot revert to the County's general fund;

(2) Fee-in-lieu shall be assessed at $1.50 per square foot of required Buffer mitigation;

(3) A portion of fee-in-lieu money can be used for management and administrative costs; however, this cannot exceed 20% of the fees collected; and

(4) Fee-in-lieu monies shall be used for the following projects:

(a) To establish the Buffer on sites where planting is not a condition of development or redevelopment;

(b) To fund all or portions of other natural resource enhancement efforts that provide habitat or water quality benefits to the Critical Area.

T. **Shore Erosion Control Projects.** Shore erosion control measures are permitted activities within the Buffer in accordance with the following requirements:

(1) An applicant for a shore erosion control project that affects the Buffer in any way shall submit a Buffer Management Plan in accordance with the requirements of this chapter.

(2) This includes, but is not limited to:

(a) Disturbance necessary for access to the shoreline;
(b) Disturbance associated with material stockpiling;
(c) Vegetation removal and pruning;
(d) Finish grading or backfilling between a revetment, groin, sill, bulkhead, or marsh creation and the shoreline.

(3) The applicant shall comply fully with all of the policies and criteria for a shore erosion control project stated in COMAR 27.01.04 and COMAR 26.24.06.01.

U. **Agriculture in the Buffer.** Agricultural activities within the Buffer are subject to the following limitations and standards:

(1) The Buffer is not required for agricultural drainage ditches if the adjacent agricultural land has appropriate best management practices in place as required in COMAR 27.01.06.

(2) Agricultural activities are permitted in the Buffer if:

(a) A 25-foot vegetated filter strip is established. The filter strip shall be measured landward from the mean high water line of tidal waters or tributary streams (excluding drainage ditches), or from the edge of tidal wetlands, whichever is further inland;

(b) The filter strip shall be composed of either trees with a dense ground cover, or a thick sod of grass, and shall be managed to provide water quality benefits and habitat protection consistent with the policies of this Chapter;

(c) Noxious weeds, including Johnson grass, Canada thistle, and multiflora rose, which occur in the filter strip may be controlled by authorized means;

(d) The filter strip shall be expanded four feet for every one percent of slope, for slopes greater than six percent;

(e) The filter strip shall be maintained until such time as the landowner is implementing, under an approved soil conservation and water quality plan, a program of best management practices for the specific purposes of improving water quality and protecting plant and wildlife habitat; and provided that the plan includes measures that achieve the same water quality and habitat protection objectives as the filter strip;

(f) The best management practices shall include a requirement for the implementation of a grassland and manure management program, where appropriate;

(g) The best management practices shall ensure that the feeding or watering of livestock is not permitted within 50 feet of the mean high water line of tidal waters, the edge of each bank of tributary streams, or the landward edge of tidal wetlands, whichever is further inland;

(h) Clearing of existing natural vegetation in the Buffer is not allowed;

(i) Farming activities, including the grazing of livestock, do not disturb stream banks, tidal shorelines, or other habitat protection areas specified in the applicable Chapters.

V. **Timber harvests in the Buffer.** The Buffer shall be managed to achieve or enhance the functions stated in section B of the Chapter. Cutting or clearing of trees within the Buffer shall

be prohibited except as specified herein.

(1) Commercial harvesting of trees by selection or clearcutting of loblolly pine and tulip poplar permitted to within 50 feet of the landward edge of the mean high water line of tidal waters, the edge of each bank of perennial tributary streams, or the edge of tidal wetlands if:

(a) The cutting does not occur in the Habitat Protection Areas described in COMAR 27.01.09.02, .03, .04, and .05; and

(b) The cutting is conducted in accordance with the requirements of COMAR 27.01.05 and in conformance with a timber harvest buffer management plan prepared by a registered professional forester and approved by the forestry Programs of Department of Natural Resources.

(2) A timber harvest buffer management plan shall be required for all commercial harvests within the Buffer regardless of the size of the area to be cut, and shall meet the following requirements:

(b) Disturbance to any stream banks and shorelines shall be avoided; and

(c) The area disturbed or cut shall be replanted or allowed to naturally regenerate in a manner that assures the availability of cover and breeding sites for wildlife, and reestablishes the wildlife corridor function of the buffer; and

(c) The cutting does not involve the creation of logging roads and skid trails within the Buffer.

(3) Commercial harvesting of trees, by any method, may be permitted to the edge of intermittent streams provided that the cutting is conducted pursuant to the requirements of Section (1)(a) above.

Buffer Regulations:

Improving Water Quality

Increasing Riparian Habitat

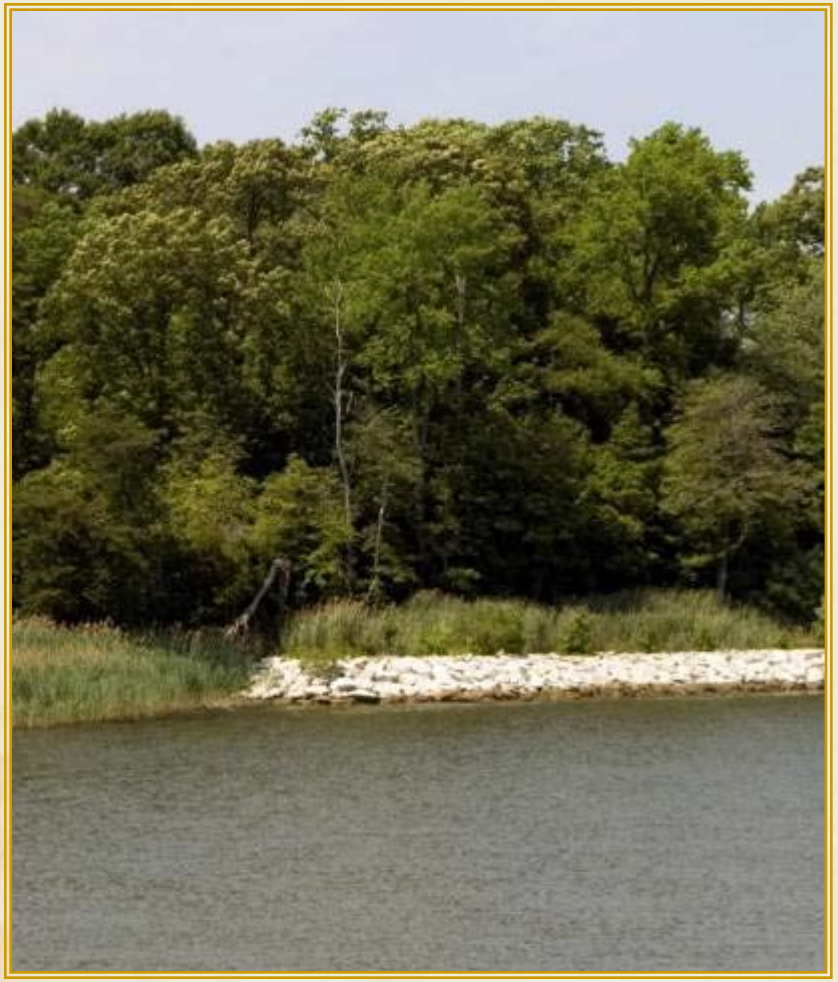
Buffer Regulations

Background – Why Now?

- Improved effectiveness needed
- Shoreline development has intensified
- Shoreline buffers an essential element to Bay restoration efforts
- Buffer planting is part of a resource enhancement program not just mitigation for impacts
- Regulatory authority in HB 1253 provided the mechanism

Buffer Regulations
Statement of Purpose

- Provides more specificity
- Provides greater consistency and more uniform implementation
- Clarifies definitions
- Creates standards for:
  - Measurement
  - Maintenance
  - Establishment
  - Mitigation
  - Enforcement



Buffer Regulations
State Regulations and Local Codes

- New regulations effective March 8, 2010
- Authority to adopt regulations included in Annotated Code, § 8- 1806 (b)
- COMAR 27.01.01.03 requires compliance with regulations
  - Even if provisions aren't in a local program
  - Even if different provisions are in local program
  - Considered minimum standards
  - If there are conflicts between State and local, stricter provisions apply

General Definition Changes

Changes to General Provisions

- **Buffer** – area immediately landward of tidal waters, tidal wetlands, tributary streams – even if area is disturbed or developed
- **Disturbance** – any alteration or change to the land, includes clearing, grading, construction activity
- **Establishment** – planting of native vegetated cover throughout the Buffer
- **Mitigation** – an action to compensate for an adverse impact resulting from a development activity or a change in land use or intensity

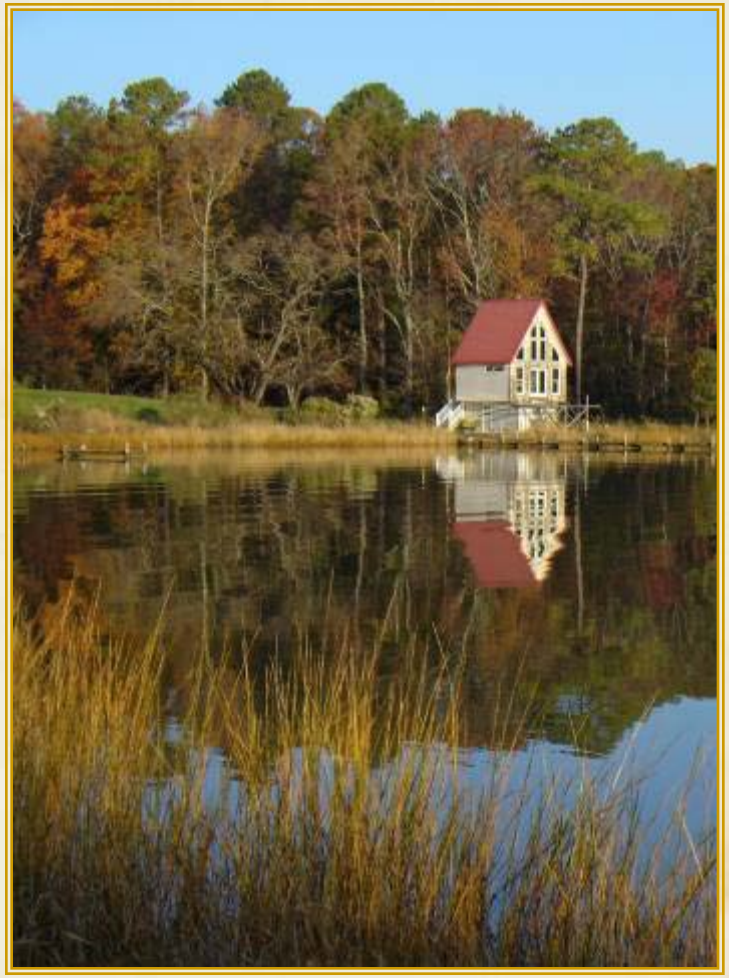
Buffer Definitions
Construction Terms

- **Accessory** – detached, on same lot, clearly incidental and subordinate to principal structure
- **Addition** – newly constructed area that increases the size of the structure
- **In-kind replacement** – removal of a structure and construction of a structure that is smaller or identical to original structure in
  - Use
  - Footprint
  - Area
  - Width
  - Length

Buffer Definitions
Construction Terms

- **Structure** – building materials joined together on or over land or water, <u>including those that do not result in lot coverage</u> (i.e. decks)
- **Substantial alteration** – repair, reconstruction, or improvement of a principal structure with a proposed total footprint that is 50 percent or greater than existing principal structure

Buffer Delineation
Standard Site Conditions

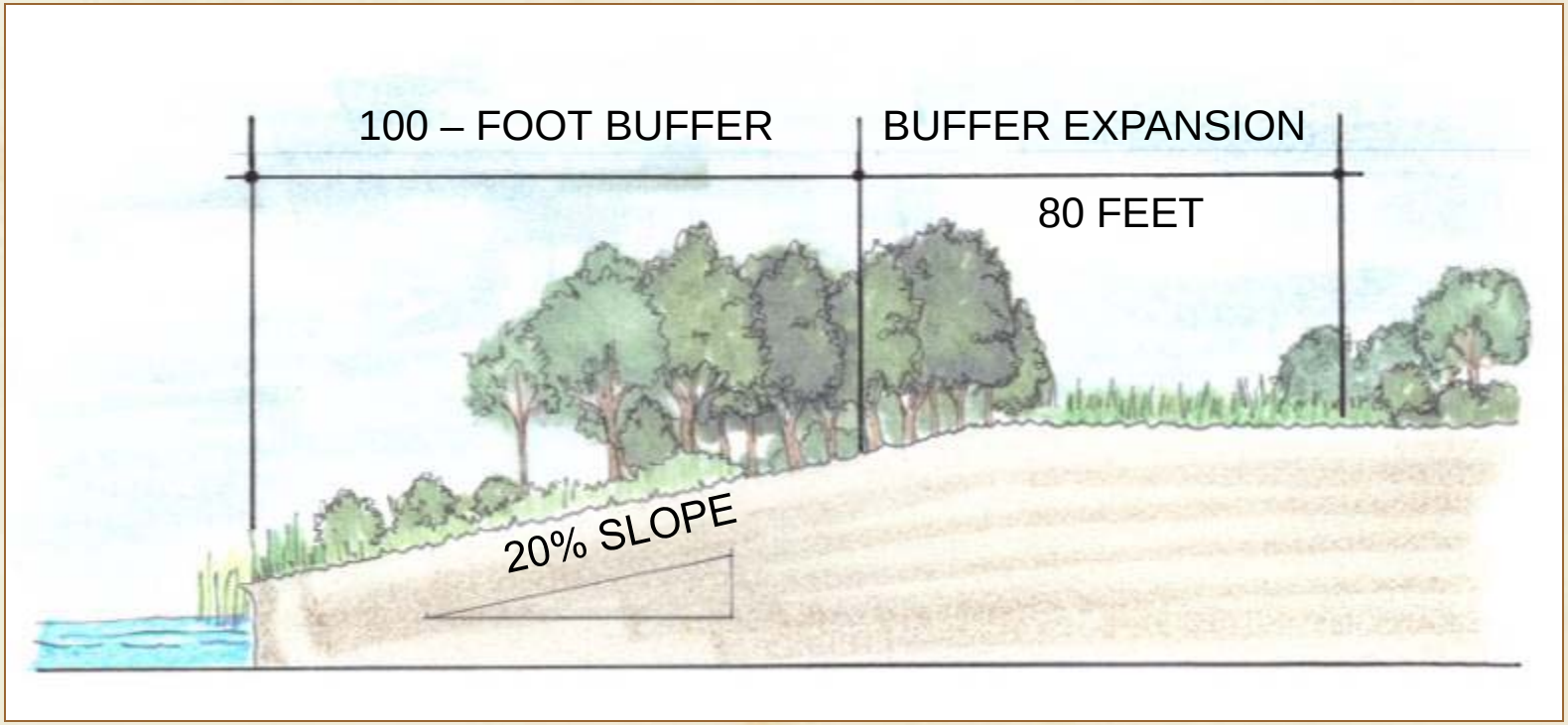


- Delineated in the field based on site conditions at time of application
- Minimum width – 100 feet
  - From mean high water of tidal waters
  - From upland boundary of tidal wetlands
  - From edge of bank of tributary streams

Buffer Delineation

Expansion for Steep Slopes

Buffer expanded four feet for every 1% of slope or to top of slope – <u>whichever is greater</u>



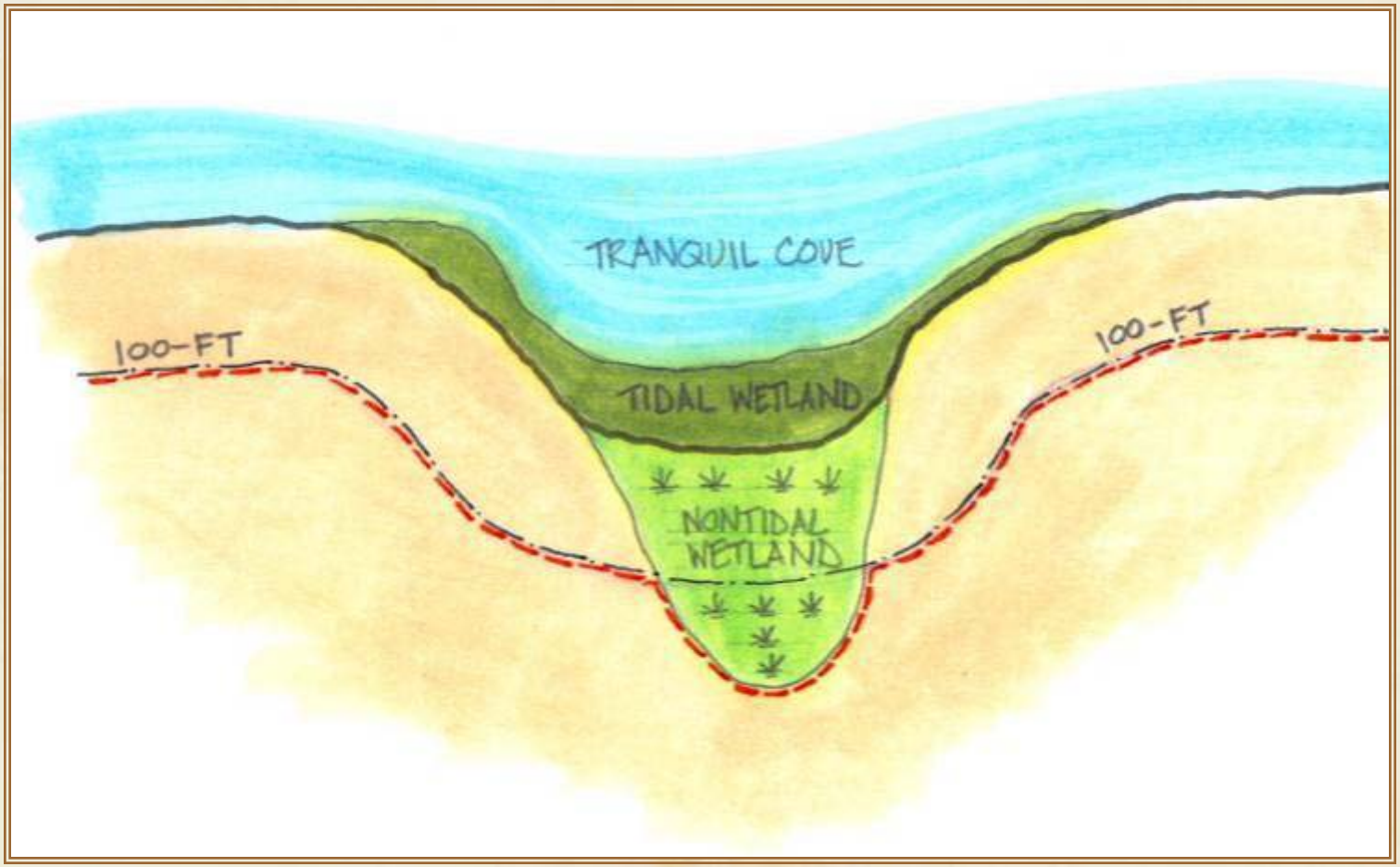
Buffer Delineation

Expansion for Nontidal Wetlands

- For nontidal Wetlands of Special State Concern (WSSC) – expand CA Buffer to include wetland and MDE required100-foot buffer around it
- For other nontidal wetlands – expand to include entire wetland

Buffer Delineation

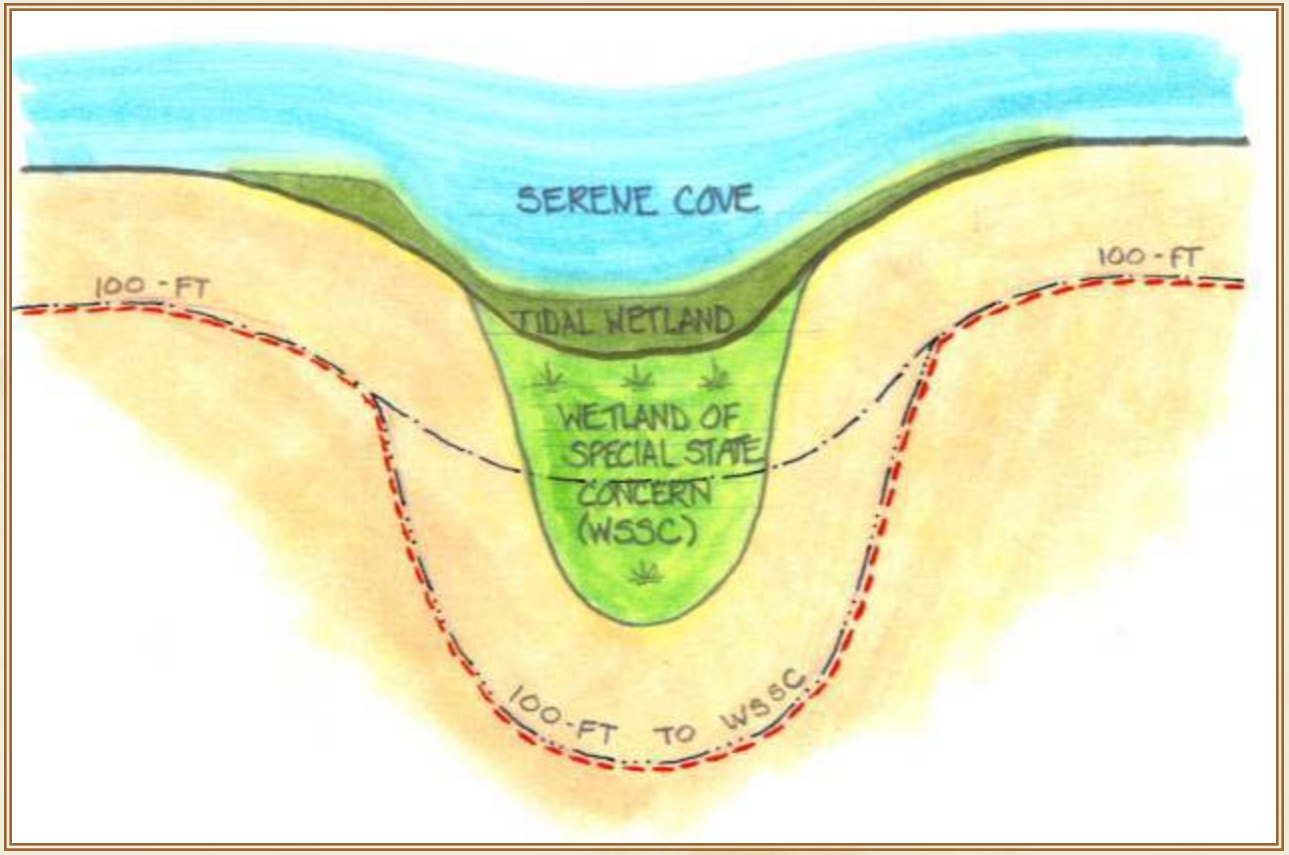
Expansion for Nontidal Wetlands



Expand to upland limit of nontidal wetland

Buffer Delineation

Expansion for Wetland of Special State Concern

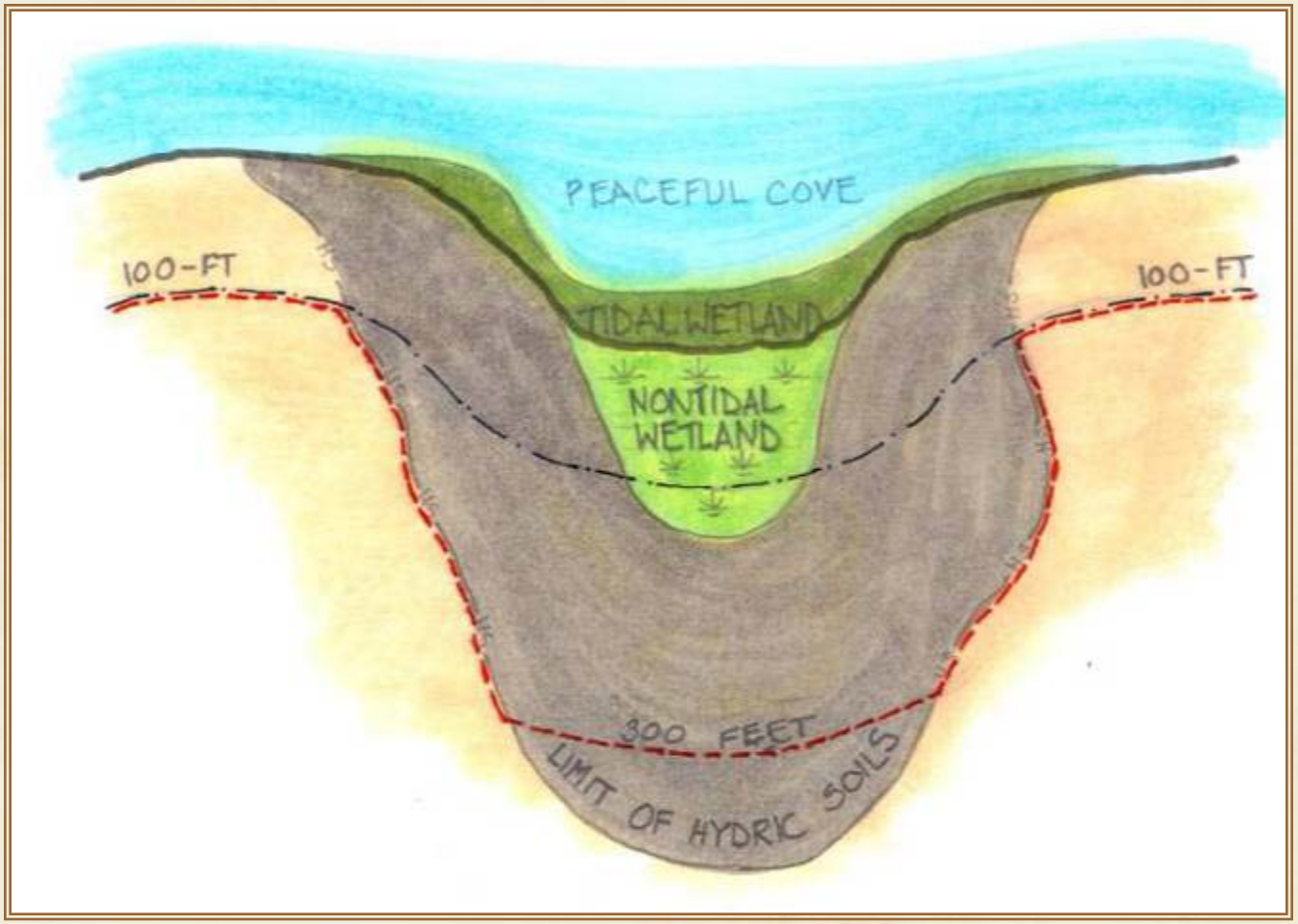


Expand to include entire Wetland of Special State Concern and MDE's required 100-foot buffer

Buffer Delineation
Expansion for Hydric Soils

- Can use soil borings or soil survey data
- Expand to landward edge of soil or 300 feet (including required 100 feet)
- Flexibility provides local governments with option to allow construction in expanded Buffer if lot created before Jan. 1, 2010 and expanded Buffer encompasses 75% or more of lot area

Buffer Delineation
Expansion for Hydric Soils

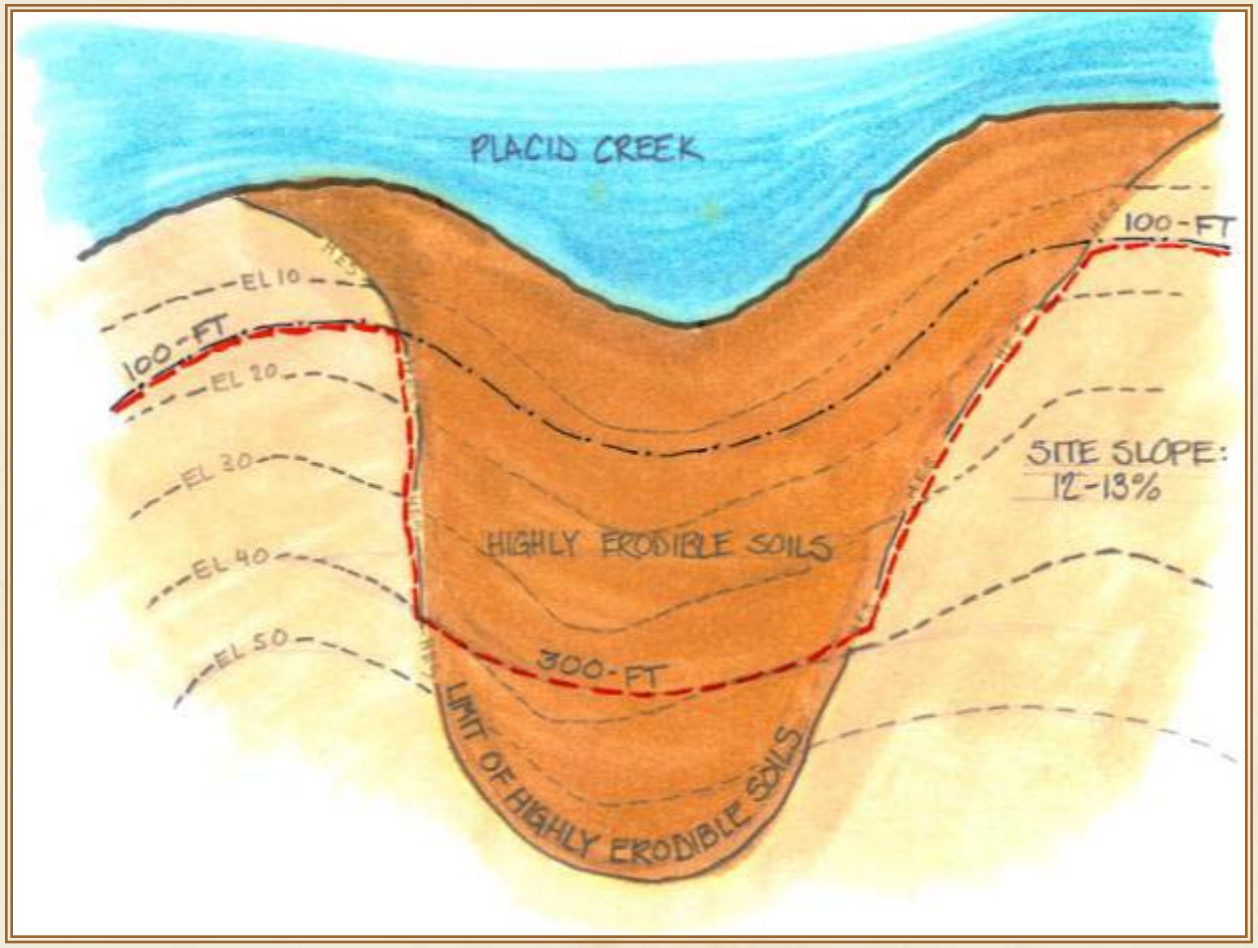


Expand to limit of hydric soils or 300 feet, whichever is less

Buffer Delineation
Expansion for Highly Erodible Soils

- Can use soil borings or soil survey data
- Expand to landward edge of soil or 300 feet (including required 100 feet)
- Flexibility provides local governments the option to allow construction in expanded Buffer if lot created before Jan. 1, 2010 and expanded Buffer encompasses 75% or more of lot area

Buffer Delineation
Expansion for Highly Erodible Soils



Expand to limit of highly erodible soils or 300 feet, whichever is less

200-foot Buffer
When Is It Required?

- Required for new subdivisions and certain site plan approvals in the RCA
- Requirement does not apply if:
  - Application submitted before July 1, 2008 and receives final approval before July 1, 2010
  - Application involves the use of growth allocation where different Buffer and setback requirements apply
  - Local government adopts provisions to allow a reduction when the 200-foot Buffer would prevent development at allowed density or an intrafamily transfer

Buffer Planting

Establishment Versus Mitigation

- Establishment is required when development activities take place outside the Buffer on a lot that includes Buffer lands adjacent to tidal waters, tidal wetlands, and tributary streams
- Mitigation is required when clearing, grading, or construction takes place in the Buffer

Buffer Establishment

Development on Land that Includes the Buffer

- Regulations require planting in the Buffer even when all development is outside the Buffer
- Why?
  - Development activity outside the Buffer affects water quality and habitat
  - Effects are intensified when there is little or no natural vegetation at the shoreline
  - Shoreline development activity is outpacing natural resilience of aquatic resources
  - Human activity on existing lots still contributes nutrients, pollutants
  - Human activity, especially as it intensifies, is detrimental to wildlife habitat

Buffer Establishment
Depends on Activity and Type of Lot

- Full Buffer establishment required:
  - For new subdivisions
  - For new commercial, industrial, institutional, recreational use on vacant lot
  - For conversion of property from one land use to another (i.e. parking lot converted to a hotel)
  - For new dwelling on an undeveloped lot platted after local program adoption

Buffer Establishment
Depends on Activity and Type of Lot

- Buffer establishment equal to total lot coverage
  - For new dwelling on a lot created before local program adoption
  - For substantial alterations on any lot, whether created before or after program adoption
- Buffer establishment equal to increase in lot coverage
  - For additions
  - For accessory structures

Buffer Establishment

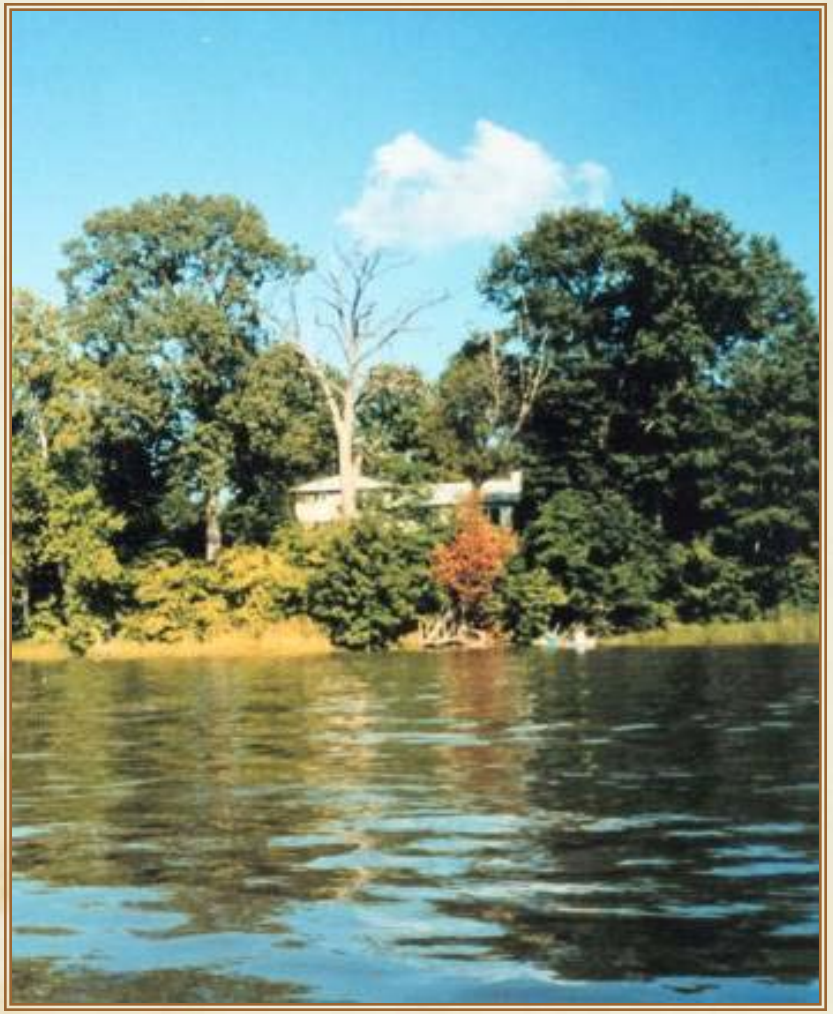
Must Take Place on Project Site

- Establishment is planting on-site in the Buffer
- If Buffer is fully forested, no requirement for additional planting

Buffer Establishment

Fully Forested Is …

- Good canopy coverage or the potential for canopy coverage at maturity
- Structural diversity with understory and shrub species
- Ground cover that is not mowed turf grass
- Dominant species are native woody or shrub-scrub
- Mulch or natural leaf litter to stabilize the soil



Buffer Establishment

Not Required for Certain Projects

- In-kind replacement (same footprint and use) of a principal structure
- Land that remains in agricultural use after subdivision – must be addressed in Buffer Management Plan

Buffer Mitigation

Always Required for Impacts to the Buffer

- Depends on limits of disturbance
- Type of activity proposed
- Number and size of trees taken out

Buffer Mitigation
Location Depends on Site

- On-site in the Buffer
- On-site and adjacent to the Buffer
- On-site elsewhere in the Critical Area
- Payment of fees-in-lieu if no feasible alternative
- Off-site planting in the Buffer if:
  - Allowed in local program
  - Subject of written agreement with CAC

New Requirement

Fee-In-Lieu of Buffer Mitigation

- Jurisdictions now required to collect fees-in-lieu
- Fee-in-lieu cannot be used for Buffer establishment
- Fee calculations based on required square footage of mitigation
- Must be at least $1.50 per square foot unless a jurisdiction and CAC formally approves a lesser amount
- Fees collected must be maintained by local government in a separate fund

New Requirement

Fee-In-Lieu Program Standards

- Jurisdictions must report annually to the Commission and report must include:
  - Number of projects for which a fee was collected and the amount of the fee
  - Total square footage of Buffer impacts that generated the fee
  - A short description of each planting project, including the money spent on each project
  - The square footage of Buffer replanted
  - The account balance as of December 31
  - If funds are being held for “major project”, supplemental information about the project purpose, timing, and funding

Mitigation and Planting Standards
Planting Techniques

- Less than one acre – use landscape stock in accordance with stocking credits
- One acre or more – at least 50% of area must be landscape stock, remainder can be natural regeneration or small stock

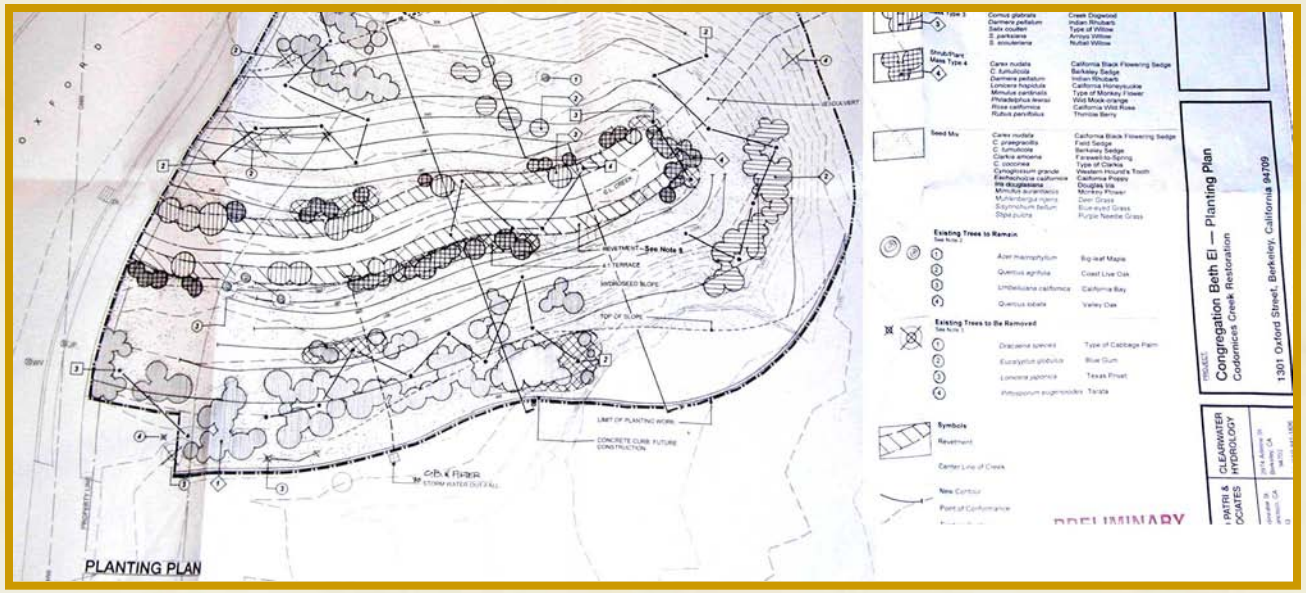
Planting Techniques
Natural Regeneration

- No new lawn or managed turf
- Can't be used for Buffer mitigation
- Can be used for up to 50% of Buffer establishment if requirement exceeds 1 acre
- Must be within 50 feet of mature forest with a seed bank of native species

Planting Techniques

Natural Regeneration

- Must include a supplemental planting plan in case natural regeneration fails
- Requires financial assurance (bond) to implement plan – sufficient to cover equivalent area
- Bond cannot be released until 5 years after plan approval
- Coverage must be 300 woody stems per acre that are 4 feet high



Planting Techniques
Flexible Stocking for Large Areas

- Provide flexibility for larger planting requirements
- Survival enhanced by different stock sizes
- Promotes structural diversity
- Can reduce costs and maintenance

Planting Techniques
Landscape Stock

- Preferred for smaller planting requirements due to ease of maintenance and monitoring
- Mature trees and shrubs provide greater water quality and habitat benefits sooner
- Nursery stock usually guaranteed for one year by the nursery
- Often preferred by landowners because of aesthetics

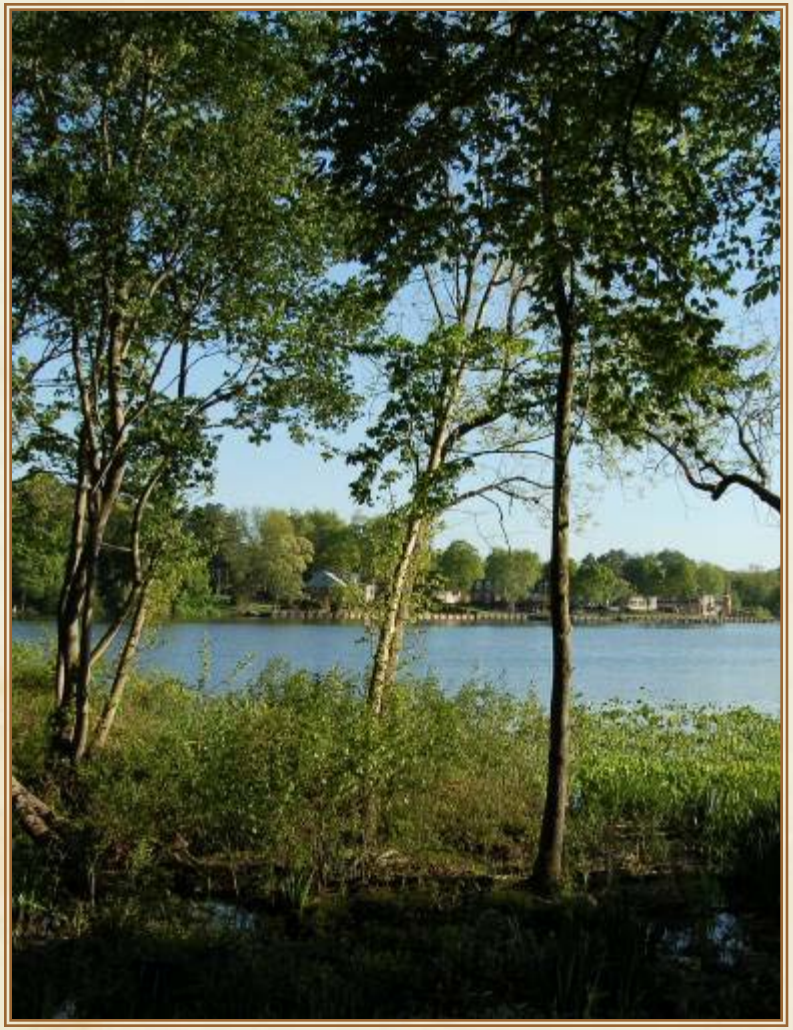
Buffer Definitions

Plant Stock

- Canopy Tree – a tree that, when mature, reaches a height of at least 35 feet
- Understory Tree – a tree that, when mature, reaches a height of 12 to 35 feet
- Large shrub – a shrub that, when mature, reaches a height of at least 6 feet
- Small shrub – a shrub that, when mature, reaches a height of up to 6 feet
- Native - species that are indigenous to the physiographic area in Maryland where the planting is proposed

New Approach
Enhance and Mitigate

- New approach emphasizes restoring functioning Buffers on all developed lands as opposed to just mitigating for disturbance
- Promoting Buffer improvement rather than just reacting to disturbance
- Some Buffer enhancement involves the “area between our ears” and thinking about the Buffer and the shoreline in a new way



Buffer Management Plans

New Requirement

Buffer Management Plans

- Requirement does not apply
  - Maintaining an existing grass lawn
  - Planting or gardening
- Requirement does apply
  - Removing vegetation in the Buffer
    - Includes dead trees
    - Includes invasive plants
  - Buffer establishment for development activities
  - Buffer mitigation for disturbance to the Buffer

Buffer Management Plans

General Requirements

- Plan must show planting standards can be met
- Must include measures for maintenance
- All new and existing Buffer vegetation is protected under regulations
- Permits for development activity cannot be issued without approved plan
- If plan is not implemented as specified – VIOLATION
- If violation exists, no permit may be issued

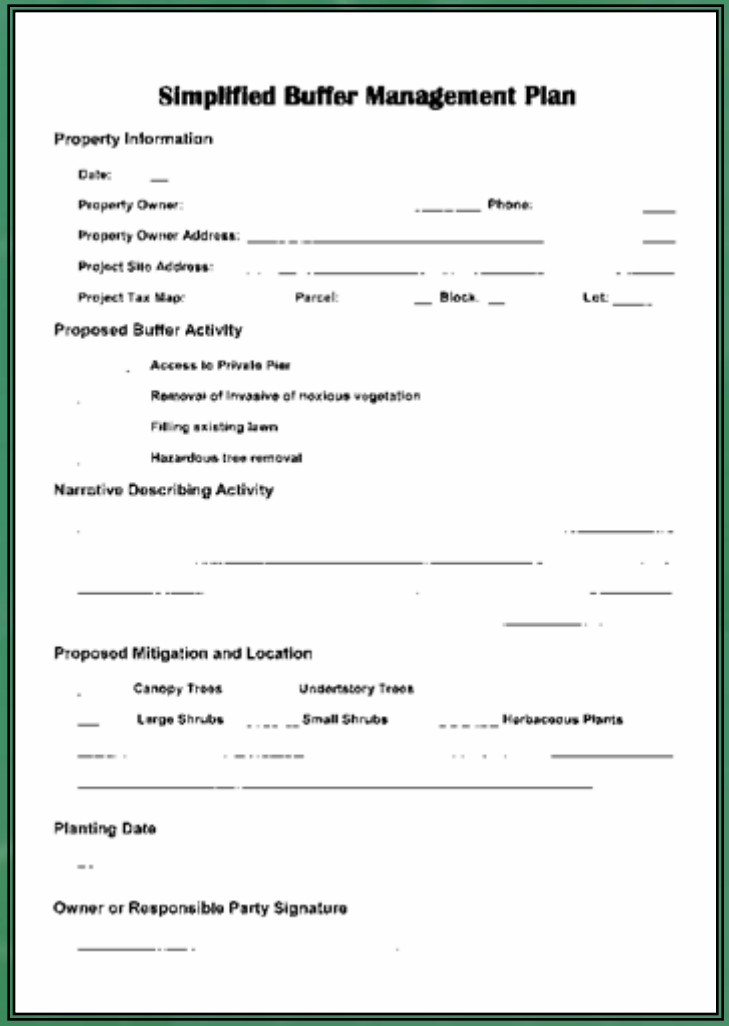
New Requirement
Simplified Buffer Management Plan

- Required for:
  - Providing access to a private pier up to 3 feet wide
  - Manually (no heavy equipment) removing invasive or noxious vegetation
  - Filling to maintain an existing grass lawn
  - Cutting to remove a hazard tree that may damage a structure or accelerate erosion

New Requirement

Simplified Buffer Management Plan

- Simple, one-page
- Narrative describing activity including the start date and method to be used
- Proposed mitigation
- Planting date
- Responsible party
- Local approval and date



Simplified Buffer Management Plan

Property Information

Date:

Property Owner: Phone:

Property Owner Address:

Project Site Address:

Project Tax Map: Parcel: Block: Lot:

Proposed Buffer Activity

Access to Private Pier

Removal of invasive of noxious vegetation

Filling existing lawn

Hazardous tree removal

Narrative Describing Activity

Proposed Mitigation and Location

Canopy Trees Understory Trees

Large Shrubs Small Shrubs Herbaceous Plants

Planting Date

Owner or Responsible Party Signature

New Requirement

Minor Buffer Management Plan

Required for planting less than 5,000 square feet of plantings for either mitigation or establishment

New Requirement

Major Buffer Management Plan

Required for planting more than 5,000 square feet of plantings for either mitigation or establishment

New Requirement

Buffer Management Plan

Must include:

- For establishment – area calculations
- For mitigation – calculations (disturbance X ratio + individual trees)
- Landscape plan
- Landscape schedule
- Maintenance, monitoring, and replacement plan
- Inspection agreement
- Signature of responsible party
- Long-term protection plan and financial assurance (bond) – required for Major Buffer Management Plans only

Buffer Management Plan Elements
Landscape Plan

Landscape Plan

- Area of Buffer
- Limits of disturbance
- Existing structures, paths, walkways, etc.
- Existing vegetation (if any)
- Number and size of trees and areas of vegetation to be removed (if any)
- Areas of natural regeneration
- The arrangement and location of proposed planting using flexible stocking, clusters, or landscape stock

Buffer Management Plan Elements
Landscape Schedule

Landscape Schedule

- Plant type (Canopy Tree, Understory Tree, Large Shrub, Small shrub, Herbaceous Perennial)
- Species (Common name and scientific name recommended)
- Quantity
- Stock size (Example: 6’ tall B&B)
- Planting date before construction on or sale of the lot

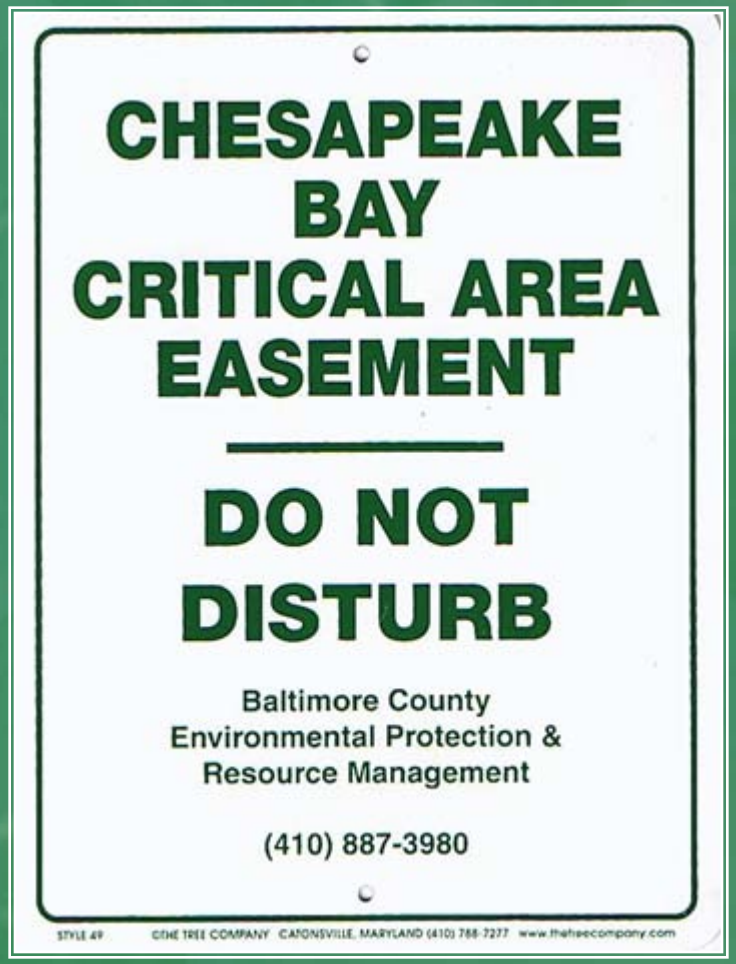
Buffer Management Plan Elements
Maintenance Plan

Maintenance Plan

- Must address control of invasive species, pests, and predation (deer)
- Must include control practices (i.e. spraying, tree tubes, etc.)
- Must include 2 years or 5 years of monitoring, depending on stock size
- Must include reinforcement planting provisions

Buffer Management Plan Elements
Long Term Protection

- Used to permanently protect vegetation in the Buffer
- May be plat notes, deed restrictions, “easements”, etc.
- Enforcement through COMAR provisions and local zoning
- Fines up to $10,000 are applicable



Buffer Management Plan Elements
Inspection Agreement

Inspection Agreement

- Grants permission to local government to inspect plantings at appropriate times
- Should include contact information for scheduling
- Should be disclosed upon property transfer

Buffer Management Plan Elements
Financial Assurance

- Required for Major Buffer Management Plans
- Financial assurance must cover planting and survivability
- Financial assurance means a performance bond, letter of credit, cash deposit, insurance policy, or other instrument of security
- Local jurisdiction has some discretion
- Rates for bonds vary, usually ½ to 1% of the contract price

F.I.R.E. UNCONDITIONAL GUARANTEES

PERMANENT GUARANTEE

First In Residential Education extends the guarantee of any F.I.R.E. promoted products unconditionally as follows:

Should any of the Three (3) or more Permanently Guaranteed Fire Suppression Units that you purchased from F.I.R.E. ever fail to hold a charge for as long as you own the unit(s), simply return it to the F.I.R.E. Headquarters (address below) for a...

FREE REPLACEMENT(S)

Should you ever discharge your F.I.R.E. Fire Suppression Unit on an accidental fire in your **HOME:**

1. Send us a written testimonial letter explaining the details of your accidental fire and the used extinguisher to the First In Residential Education Headquarters (address below), and receive...

FREE REPLACEMENT(S) WITHIN 48 HOURS

20 YEAR UNCONDITIONAL WARRANTY

Should you ever discharge any of the One (1) or Two (2) 1Lb. Fire Suppression Clean Agent Units or any of the One (1) or Two(2) 16oz. FireAde^{2000} AB Rated Fire Extinguishers on an accidental fire in you HOME:

1. Send us a written testimonial letter explaining the details of your accidental fire and the used extinguisher to the First In Residential Education Headquarters (address below), and receive a...

REPLACEMENT(S) AT 1/2 PRICE THE PRESENT RETAIL VALUE WITHIN 48 HOURS WITH ANOTHER 20 YEAR WARRANTY

5 & 10 YEAR UNCONDITIONAL WARRANTIES

Should your SMOKE ALARM(S) (10 Yr. Warranty) **OR** CARBON MONOXIDE ALARM(S) (5 Yr. Warranty) that you purchased from First In Residential Education ever fail to operate during monthly tests with a charged battery, simply return it to F.I.R.E. for a...

FREE REPLACEMENT(S) FOR ANOTHER 5 YEARS ON (CO ALARMS) AND 10 YEARS (SMOKE ALARMS)

COST GUARANTEE

Should you ever discover the same product offering the same guarantees, for free replacement(s) at a lower cost, simply send proof of competitive offer to First In Residential Education and you may keep your First In Residential Education Package and receive a...

FULL REFUND

First In Residential Education
42 Read's Way, Suite 139
New Castle, DE 19720
Phone: (302) 324-9282 Fax: (302) 324-9283

Step 1

Establishment or Mitigation?

- Determine establishment or mitigation or combination
  - Is the project completely outside the Buffer with no Buffer impacts? (Establishment → Step 5)
  - Does the project involve disturbance or vegetation removal in the Buffer or expanded Buffer ?(Mitigation)
  - Does the project involve some disturbance within the Buffer and some outside the Buffer? (Combination)

Step 2

Mitigation for work in the Buffer

- Calculate area disturbed in the Buffer. Multiply by the mitigation ratio in the table for square footage

ACTIVITY	MITIGATION RATIO
Shore erosion control	1:1
Riparian water access	2:1
Water-dependent facilities	2:1
Variance	3:1
Violation	4:1

Step 3

Mitigation for Clearing Trees

- Calculate total diameter of all trees removed that are 2” or more at 4.5’ above ground
- Multiply number of inches by 100 SF

Special Condition

Mitigation for Clearing Trees

- For removal of dead, diseased, or dying tree – replant one tree for each one removed
- For removal of invasive species, mitigate based on area treated

Step 4

Determine Total Mitigation

Mitigation for disturbance
(LOD x Ratio)

+

Mitigation for trees removed
(DBH x 100 sf)

=

Total Mitigation

Step 5

Establishment for Development

- Identify development category. Determine when the lot was created. Use the table to determine how much of the Buffer must be established.

DEVELOPMENT CATEGORY	BEFORE PROGRAM DATE*	AFTER PROGRAM DATE
New development on vacant lot	Total lot coverage	Full establishment
New subdivision or new lot	Full establishment	
New lot with existing dwelling unit	Establishment = total lot coverage	
Conversion of land use to another land use	Full establishment	
Addition or accessory structure	Establishment = increase in lot coverage	
Substantial alteration	Establishment = total lot coverage	

*Program date is the adoption date of the local CA program – typically between 1987-1990

Step 6

Adjust For Existing Forest Cover

- If the project requires full establishment of the Buffer and there is existing forest cover on the site, required planting may be adjusted
- If project requires Buffer establishment equal to lot coverage, planting is always required unless Buffer is already fully forested
- Once Buffer is fully forested, no further establishment required

Step 7

Eligibility for Natural Regeneration

- Project requires Buffer establishment greater than one acre
- Up to 50 percent can be natural regeneration
- All natural regeneration areas must be within 50 feet of mature forest
- Supplemental planting plan, monitoring, financial assurance are required
- Monitoring and financial assurance required for 5 years
- Result must be 300 stems / acre

Step 8

Determine Stocking

- Identify areas of natural regeneration
- Evaluate remaining area using the table to determine the area that must be planted using landscape stock and the area that may be planted using flexible stocking

Step 8
Determine Stocking

REQUIREMENT	AMOUNT	OPTIONS
Establishment	Less than ¼ acre	Landscaping stock
	¼ acre up to or equal to 1 acre	Minimum 50% landscaping stock Remainder flexible
	More than 1 acre up to or equal to 5 acres	Minimum 25% landscaping stock Remainder flexible
	More than 5 acres	Minimum 10% landscaping stock Remainder flexible
Mitigation	Less than 1 acre	Landscaping stock
	1 acre or more	Minimum 50% landscaping stock Remainder flexible

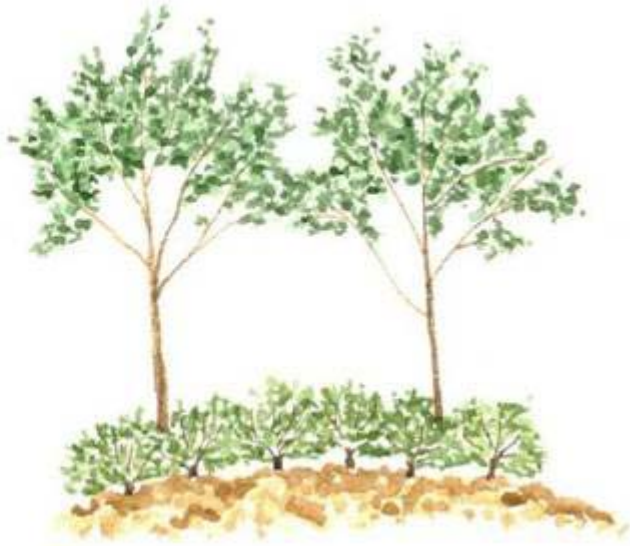
Step 9

Cluster Planting Evaluation

- Is requirement for either Buffer establishment or mitigation less than 1 acre?
- Can plants be grouped together in mulched beds?
- “Cluster design” provides bonus credit because clustering maximizes water quality and habitat benefits on smaller sites

Step 9

Cluster Planting Evaluation

PLANTING CLUSTER 1	PLANTING CLUSTER 2
	
1 CANOPY TREE AND 3 LARGE SHRUBS OR 6 SMALL SHRUBS	2 UNDERSTORY TREES AND 3 LARGE SHRUBS OR 6 SMALL SHRUBS
300 SF	350 SF

Step 10
Landscape Stock, Size, and Quantity

Based on the results from Step 8 and Step 9, subtract to determine the remaining required square footage of planting and use the table to determine stock type, size , and quantity

VEGETATION TYPE	MINIMUM SIZE ELIGIBLE FOR CREDIT	CREDIT (SF)	MAXIMUM % OF PLANTING
Canopy Tree	2-inch caliper and 8-feet tall	200	N/A
Canopy Tree	1-inch caliper and 6-feet tall	100	N/A
Understory Tree	1-inch caliper and 6-feet tall	75	N/A
Large Shrub	1-gallon and 4-feet high	50	30
Small Shrub	1-gallon and 18 inches high	25	20
Herbaceous Perennial *	1-quart	2	10

* Herbaceous perennials can only be used for Buffer establishment and mitigation of less than one acre

Step 10

Landscape Stock, Size, and Quantity

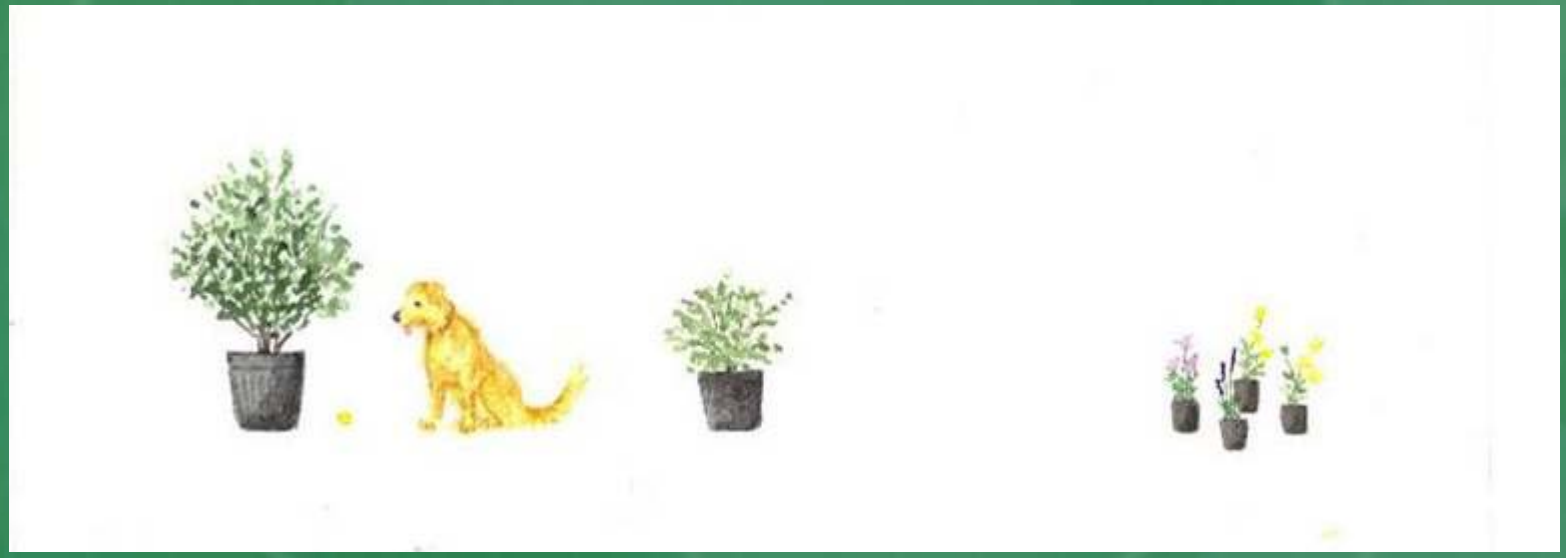
LARGE CANOPY TREE	REGULAR CANOPY TREE	UNDERSTORY TREE

2 - INCH CALIPER 8 - FEET HIGH	1 - INCH CALIPER 6 – FEET HIGH	UNDERSTORY TREE 6 – FEET HIGH
200 SF	100 SF	75 SF

Step 10

Landscape Stock, Size, and Quantity

LARGE SHRUB	SMALL SHRUB	HERBACEOUS PERENNIAL



1 - GALLON 4 - FEET HIGH	1 - GALLON 18 INCHES HIGH	1 QUART
50 SF	25 SF	2 SF

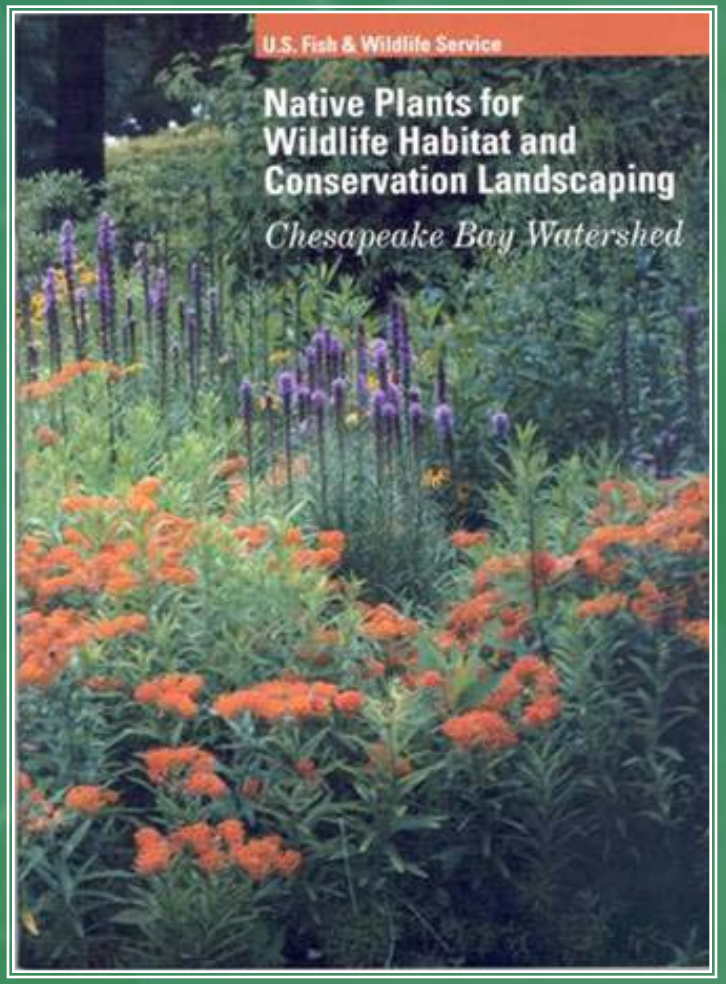
Step 11
"Flexible Stocking" Analysis

- If the results of Step 8 allow flexible stocking, use the table to determine the number of trees that must be planted
- Use only tree species
- Monitoring and financial assurance are mandatory

STOCK SIZE	NUMBER / ACRE	SURVIVABILITY REQUIREMENT	MINIMUM BOND PERIOD
Bare root seedling or whip	700	50 percent	5 years
½-inch to 1-inch container grown trees	450	75 percent	2 years
More than 1-inch container grown trees	350	90 percent	2 years

Step 12
Evaluate Species

- Use USFWS publication to select plants
- Classification as canopy tree, understory tree, large shrub, small shrub, and herbaceous perennial based on publication
- Includes information about soil, sunlight, moisture, predation
- Pictures and descriptions are helpful
- Indexes at the end for common and scientific species names



Step 13

Ensure Species Diversity

- Use a variety of plant types and species
- Analyze surrounding native trees and forests to identify species that will likely adapt well to the site
- Major Buffer Management Plans cannot fulfill more than 50 percent of the planting requirement using shrubs and a single species cannot comprise more than 20 percent of the planting requirement

Beyond Planting ...
Supplemental Information

- Buffer planting is forever
- Buffer Management Plans must include a planting date
- Management Plans must include additional information for long term
  - Maintenance plan
  - For Major Buffer Management Plans - Long-term protection plan: financial assurance, 2 to 5 years of monitoring, replacement planting
  - Inspection agreement
  - Signature of responsible party

When to Plant
Planting Seasons

- Spring Planting Season
  - March 15 – May 31
  - Watering will usually be necessary
  - Maintenance is easier
- Fall Planting Season
  - September 15 – November 30
  - Deer predation may be an issue
  - Storm damage is a consideration

Buffer Management Plan Implementation
Inspection Periods and Survival

- Planting must be monitored with annual inspections
  - To ensure survival
  - So maintenance can be adjusted as needed
  - To provide replacement planting as necessary
  - To extend monitoring if replacement planting is required

STOCKING TYPE	SURVIVABILITY	MONITORING/ BOND PERIOD
Landscape stock	100 %	2 years
Bare-root seedling or whip	50% (350 stems/acre)	5 years
½" – 1" Container grown trees	75% (338 stems/acre)	2 years
More than 1" container grown trees	90% (315 stems/acre)	2 years
Natural regeneration	300 stems/acre	5 years

Following Up
Inspection Agreement

- Financial guarantees and inspection agreements should be disclosed to new property owners if property is transferred.
- Planting agreement or other instrument may be modified to change responsible party

The “Buffer Guarantee”
Financial Assurance

- Essential for effective implementation
- Plantings that do not survive must be replaced the next possible planting season
- Local government holds bond, letter of credit, etc. until minimum survival period has passed and number of stems is sufficient

Buffer Accountability
Responsible Party Signature

- Signature of responsible party is required for all Buffer Management Plans
- If a proposed change in ownership affects the responsible party, a formal change must be made
- Original responsible party, new responsible party, and jurisdiction must agree to the change
- If no formal change made, original party is responsible until all survival requirements have been met

Summary

Buffer Regulations Have Changed

- Planting in the Buffer required whenever development takes place on lots that include Buffer lands unless Buffer is fully forested
- Buffer Management Plans are a tool to ensure that projects are in full compliance with the new Buffer regulations
- Standardized planting credits for canopy trees, understory trees, large and small shrubs, and herbaceous plantings
- Larger projects with greater Buffer establishment and mitigation requirements are more complex in order to provide flexibility for landowners and developers
- Long term commitment to Maryland's Bays and tidal ecosystems

LOCAL GOVERNMENT ASSISTANCE GUIDE

Critical Area Buffer

COMAR 27.01.09.01

Effective Date: March 8, 2010

Critical Area Commission
Chesapeake and Atlantic Coastal Bays
1804 West Street, Suite 100, Annapolis, Maryland 21401
(410) 260-2380
www.dnr.state.md.us/criticalarea

Purpose:

The purpose of this Local Government Assistance Guide is to convey information about the Critical Area Commission's Buffer Regulations. The regulations became effective on March 8, 2010. This guide is a general summary of the provisions. It is not intended as a substitute for the specific requirements that are found only in the official regulations. The Commission's Buffer regulations can be accessed on the internet at http://www.dsd.state.md.us/comar/subtitle_chapters/27_Chapters.aspx and searching codification number 27.01.01.01 for changes to the definitions and 27.01.09.01 for the new Buffer provisions. Most of the new Buffer provisions are found in subsections 27.01.09.01-1 through 27.01.09.01-7.

The Buffer Regulations establish comprehensive standards and procedures for the treatment of the Critical Area Buffer. The original Critical Area Criteria included provisions for measuring, establishing, maintaining, and protecting the Buffer. However, these provisions were often subject to different interpretations, and emphasized mitigating for adverse impacts to the Buffer as opposed to improving and enhancing the Buffer. The original provisions were considered insufficient to adequately protect the Buffer, especially in light of continued development pressure along the shoreline of Maryland's tidal waters, wetlands, and tributaries.

The new regulations create standards for delineating the Buffer, measuring the Buffer, and mandatory expansion for contiguous sensitive areas. All aspects of Buffer implementation, including Buffer establishment, protection, maintenance, mitigation, and enforcement are covered. The specificity now included in the regulations will allow for consistent, equitable, and efficient application of the regulations throughout the 64 Critical Area jurisdictions.

The new regulations include mitigation ratios, establishment methodologies, planting standards, a planting credit system, planting timetables, and maintenance and survival requirements. Different types of development activity on property that includes the Critical Area Buffer will require different types of Buffer planting which will be addressed through local approval of a Buffer Management Plan. The regulations describe the three types of Buffer Management Plans, when each type of Plan is required, and what needs to be included in these plans. The regulations also include provisions that authorize a local government to collect a fee in lieu of mitigation and specify how the money collected can be spent.

The adoption of State regulations allows for clear, specific, and uniform standards to be applied in response to development activities. Under the new regulations, the goals of minimizing adverse impacts to water quality and conserving and enhancing habitat are comprehensively addressed. Improving the functions of the Buffer is now required as part of all development activities on waterfront properties and other lands affected by the Buffer. It is anticipated that these regulations will enhance the effectiveness of the Critical Area Program and accelerate the restoration of Maryland's fragile shoreline resources.

Applicability:

These regulations apply to all projects, approved on March 8, 2010 or thereafter, for development activity within the Critical Area where the property that is the subject of the application includes land identified as Critical Area Buffer or any required expansion. In accordance with the recently amended provisions of COMAR 27.01.01.03, regardless of any provision in a local law or ordinance, or the lack of a provision in a local law or ordinance, all of the requirements of the Buffer regulations shall apply to, and be applied by, a local jurisdiction. In the event that a provision of this title conflicts with a provision of a local program, the stricter provision applies.

The Buffer Regulations include provisions that allow local governments to develop alternatives to the regulations in order to provide flexibility and address local plans and policies. Alternative Buffer provisions must be reviewed and approved by the local government and the Critical Area Commission before they can become effective and be used at the local level.

Summary:

Important Definitions (COMAR 27.01.01 and COMAR 27.01.09)

Within the Buffer regulations, these terms are defined as follows:

Buffer means the area immediately adjacent to the mean high water line of tidal waters, the edge of each bank of tributary streams and the landward edge of tidal wetlands. It includes areas that are not naturally vegetated and may be developed or disturbed.

Development activity means human activity that results in disturbance to land, natural vegetation, or a structure.

Disturbance means any alteration or change to the land. Disturbance includes any amount of clearing, grading, or construction activity. Disturbance does not include gardening or maintenance of an existing grass lawn.

Accessory means a structure that is detached from a principal structure, located on the same lot, and clearly incidental and subordinate to the principal structure.

In-kind replacement means the removal of a structure and the construction of another structure that is smaller than or identical to the original structure in use, footprint area, width, and length.

Substantial alteration means a repair, reconstruction, replacement, or improvement of a principal structure, with a proposed total footprint that is at least 50 percent greater than that of the structure that is the subject of the application.

Native means species that are indigenous to the physiographic area in Maryland where the planting is proposed. Species types have been defined as follows:

- Canopy tree means a tree that, when mature, reaches a height of at least 35 feet.
- Understory tree means a tree that, when mature, reaches a height of 12 to 35 feet.
- Large shrub means a shrub that, when mature, reaches a height of at least six feet.
- Small shrub means a shrub that, when mature, reaches a height of up to six feet.

Buffer Measurement and Buffer Expansion (COMAR 27.01.09.01.D)

- The Buffer is measured landward from the mean high water line of tidal waters, the edge of each bank of tributary streams, and the landward edge of tidal wetlands.

- The Buffer is expanded when one or more of the following conditions exist:

- Steep slopes at a rate of four feet for every one percent of slope or to the top of the slope, whichever is greater,
- Nontidal Wetlands of Special State Concern to include the wetland and its regulated (by MDE) 100-foot buffer,
- Nontidal wetlands to the upland boundary of the nontidal wetland, and
- Highly erodible soils and hydric soils to the landward edge of the soil or 300-feet (which includes the minimum 100-foot Buffer), whichever is less.

- There is an alternative method for Buffer expansion for lots or parcels that existed prior to January 1, 2010 that have highly erodible or hydric soils. A development activity may be located in the expansion area, without a variance, provided that the Buffer and any expansion for hydric or highly erodible soils occupies at least 75 percent of the lot or parcel and mitigation occurs at a 2:1 ratio based on the lot coverage of the proposed development activity. This alternative does not apply to expansion of the Buffer associated with slopes that are 15% or greater.

- In accordance with the provisions enacted by the Maryland General Assembly in 2008, a 200-foot Buffer is required for new subdivisions and certain site plan approvals in the Resource Conservation Area. This requirement does not apply if:
  - The application was submitted before July 1, 2008 and receives final approval before July 1, 2010;
  - The application involves the use of growth allocation; or
  - A jurisdiction adopts provisions allowing a reduction in the Buffer when the strict application would prevent development of the property at the allowed density or preclude an intra-family transfer.

Buffer Establishment (COMAR 27.01.09.01-1)

- The regulations require planting to establish the Buffer when development activities take place on properties that include land within the Buffer, even if all development is outside the Buffer.

- The amount of Buffer establishment is dependent on the type of proposed development activity and whether the proposed development activity is on a new lot or an existing lot.

- The Buffer must be fully established when new subdivisions are platted, new development takes place on a lot created after local program adoption, or when a property is converted from one land use to another.

- For new development on a lot created before local program adoption or substantial alterations on any lot, an area of the Buffer equal to the total amount of lot coverage must be planted.

- For additions and accessory structures, an area of the Buffer equal to the increase in lot coverage must be planted.

- Buffer establishment is not required when the Buffer is already fully established in woody, forest, or wetland vegetation or when the project involves the in-kind replacement of principal structure.

- When the Buffer and adjacent lands will remain in agricultural use after subdivision, planting of the Buffer is not required until the lot(s) is developed. A Buffer Management Plan must be prepared to address the requirement at the time of subdivision.

- Buffer establishment of more than one acre may utilize natural regeneration to satisfy up to 50 percent of the area required to be established.

Mitigation and Planting Standards (COMAR 27.01.09.01-2)

- New areas of lawn or turf grass are not permitted in the Buffer, and the area of the Buffer required to be planted must be covered with mulch or ground cover or both until understory is established.

- All plantings must be native species and located within the Buffer to optimize the water quality and habitat functions of the Buffer.

- Buffer mitigation will be calculated according to the following standards:
  - The area of the limits of disturbance in the Buffer multiplied by a mitigation ratio in Table 1 below.
  - For removal on an individual tree that is at least two inches in diameter when measured 4.5 feet above the ground, mitigation will be at a rate of 100 square feet for every one inch of diameter. (For example, removal of a five-inch diameter tree would require 500 square feet of mitigation.)
  - For projects involving both disturbance in the Buffer and tree removal, mitigation is calculated as the sum of both.
  - For each dead, diseased or dying tree that is removed, mitigation is one one-inch caliper canopy tree.

Table 1: Mitigation Ratios for Development Activities

Activity	Mitigation Ratio
Shore erosion control	1:1
Riparian water access	2:1
Development or redevelopment of water-dependent facilities	2:1
Variance	3:1
Violation	4:1

- Variances may not be granted to planting and mitigation standards.

- Final use and occupancy permits can be issued only after the implementation of a Buffer Management Plan is complete, or the applicant has provided financial assurance (such as a bond) to cover the costs for materials, installation, and the survivability terms specified in the regulations.

- Before final recordation of a subdivision, the applicant must identify the limits of the Buffer in the field with a permanent sign that prohibits clearing or disturbance. There must be at least one sign per lot or for each 200 linear feet of shoreline. Concurrent with the recordation of the subdivision, the applicant must record a protective measure (deed restrictions or equivalent) within the Buffer Management Plan.

- Planting credit for landscape stock must be calculated in accordance with the credits included in Table 2 below. For planting requirements that are ¼ acre or greater, portions of the required planting can be comprised of bare-root seedlings or whips and ½-inch to one-inch container grown trees. The required number of plants and the required survival term depends on the stock size of the trees as specified in the regulations.

Table 2: Planting Credits

Vegetation Type	Minimum Size Eligible for Credit	Credit Allowed (Square Feet)	Maximum Percent of Credit
Canopy tree	2-inch caliper and 8 feet high	200	No maximum
Canopy tree	1-inch caliper and 6 feet high	100	No maximum
Understory tree	1-inch caliper and 6 feet high	75	No maximum
Large shrub	1-gallon and 4 feet high	50	30%
Small shrub	1-gallon and 18 inches high	25	20%
Herbaceous perennial *	1-quart	2	10%
Planting cluster 1 *	1 Canopy tree; and 3 large shrubs or 6 small shrubs	300	Not applicable
Planting Cluster 2 *	2 Understory trees; and 3 large shrubs or 6 small shrubs	350	Not applicable

* These options can only be used for Buffer establishment or mitigation of less than one acre.

Buffer Management Plans (COMAR 27.01.09.01-3)

- Local governments will require the submittal of a Buffer Management Plan for any project that involves establishment of the Buffer or mitigation for disturbance in the Buffer. Final subdivision approval cannot occur until a Buffer Management Plan has been submitted and approved.

- An applicant must submit a Buffer Management Plan to the local government for review and approval when establishment of all or a portion of the Buffer is required in accordance with these regulations or when disturbance to the Buffer will result from issuance of a variance, permit, or other project approval.

- A Buffer Management Plan is not required for maintenance of an existing grass lawn or for gardening.

- A Simplified Buffer Management Plan is required for the following activities:
  - Providing access to a private pier or shoreline that is up to three feet wide,
  - Manually removing invasive or noxious vegetation,
  - Filling to maintain an existing lawn, or
  - Cutting a tree that is in imminent danger of falling and causing damage or accelerating shore erosion. (For an emergency situation, the Plan may be filed after the tree has been cut.)

- A Minor Buffer Management Plan is required when the area of Buffer establishment or the area of Buffer mitigation required is less than 5,000 square feet. A Minor Buffer Management Plan must include:
  - A plan showing the limit of disturbance, total number and size of trees to be removed, and the proposed arrangement of planting,
  - A landscape schedule that includes species, quantity, size of all plantings and the planting date,
  - A maintenance plan with provisions for two years of monitoring and replacement planting,
  - An inspection agreement that allows a local government to inspect the plantings, and
  - Calculations as necessary to determine the required area of Buffer mitigation or Buffer establishment.

- A Major Buffer Management Plan is required when the area of Buffer establishment or the area of Buffer mitigation required is 5,000 square feet or greater. A Major Buffer Management Plan must include:
  - A plan showing the limit of disturbance, total number and size of trees to be removed, and the proposed arrangement of planting,
  - A landscape schedule that includes species, quantity, size of all plantings and the planting date,
  - A maintenance plan with provisions for two years of monitoring and replacement planting,
  - A long-term protection plan that includes financial assurance that covers the planting and required survival term, provisions for monitoring, and an anticipated planting date (with planting required to take place prior to construction on the property or sale of the property),
  - An inspection agreement that allows a local government to inspect the plantings,
  - Calculations as necessary to determine the required area of Buffer mitigation or Buffer establishment, and
  - Signature of the party responsible for the proposed activity and survival of the planting.

Fee In Lieu of Buffer Mitigation (COMAR 27.01.09.01-4)

- A local government must collect a fee in lieu of planting if the mitigation planting requirements cannot be met. A fee in lieu cannot be collected as an alternative to Buffer establishment.

- Fee-in-lieu monies must be collected in a special fund, which may not revert to the jurisdiction's general fund. The funds collected must be used to establish the Buffer on sites where planting is not a condition of development or redevelopment, for water quality and habitat enhancement projects as described in a local Critical Area program, or in an agreement between the local jurisdiction and the Commission.

- The fee in lieu collected must be at a rate of $1.50 per square foot of required mitigation. A local jurisdiction may propose to use a greater or lesser fee as necessary to implement these regulations. If a

jurisdiction opts to use a lesser fee, the jurisdiction must demonstrate that the fee is adequate to cover the costs associated with all aspects of implementing Buffer mitigation, and the Commission must approve the lesser alternative.

Agricultural Activities (COMAR 27.01.09.01-5)

These provisions were recodified, but no changes were made to the Buffer provisions as they apply to agricultural activities.

Tree Cutting and Timber Harvesting (COMAR 27.01.09.01-4)

These provisions were recodified and the development-related provisions concerning cutting trees for personal use were deleted.

Frequently Asked Questions:

Do I need to comply with these provisions just to install a 300 square foot prefabricated shed on my waterfront property outside the Buffer?

Yes, unless the Buffer on your property is fully established in forest vegetation, you will need to plant two trees and two large shrubs (or plantings that provide 300 square feet of credit) within the Buffer on your lot.

Why do I have to do this when my project does not affect the Buffer?

Human activity associated with residential development on waterfront property, or on lands affected by the Buffer, has impacts on the water quality and habitat of Maryland's Bays. Septic systems, lot coverage, stormwater runoff, and the creation of new lawn areas may be part of standard residential development, but these activities adversely affect Maryland's waters and wetlands. Planting trees and protecting existing forests near or immediately adjacent to tidal waters, tidal wetlands, and tributary streams offset these impacts.

If my local government hasn't adopted the new Buffer regulations, can I use the standards in the current zoning ordinance?

No. Your local government will require that you comply with the regulations as set forth in COMAR 27.01.09.01 as of March 8, 2010, which is the effective date of the regulations. The regulations have the full force and effect of law. Local governments can adopt their own Buffer provisions, subject to Commission review and approval. In the case of conflicting State and local provisions, the stricter provisions would apply.

Who can prepare a Buffer Management Plan?

Simplified and most Minor Buffer Management Plans can be prepared by a property owner. While the regulations do not require minimum credentials for a person preparing a Major Buffer Management Plan, those preparing the plans will need knowledge and experience relating to plan preparation, plant selection, plant installation and maintenance, and protective agreements.

How do I know if a certain plant species is considered "native" and therefore acceptable to use in the Buffer?

The Critical Area Commission and most local governments use the U.S. Fish and Wildlife Service publication, *Native Plants for Wildlife Habitat and Conservation Landscaping – Chesapeake Bay Watershed*, as a guide for selecting plants for Buffer mitigation and establishment. The publication includes over 400 species of canopy trees, understory trees, shrubs, and herbaceous plants and is accessible on-line at www.nps.gov/plants/pubs/chesapeake/. Other plant species may be acceptable. Contact your local government or the Critical Area Commission to make sure.

SIMPLIFIED BUFFER MANAGEMENT PLAN

Complete all sections below.

NOTE: PROPERTY OWNER MUST SIGN IN SECTION 8 OR THE PLAN WILL BE RETURNED WITHOUT APPROVAL

1. Applicant Information

Name: Martha Washington	
Address: 123 Creekside La.	
City: Rivertowne	State: MD Zip: 45678
Telephone: (410) 555-7890	E-mail address: mwash@tmail.com

2. Property address if different than above

Address: Same as above	
City:	State: Zip:
Tax Map: 12 Parcel: 23 Lot: 34	

3. Proposed activity must be one of the following: (check all that apply)

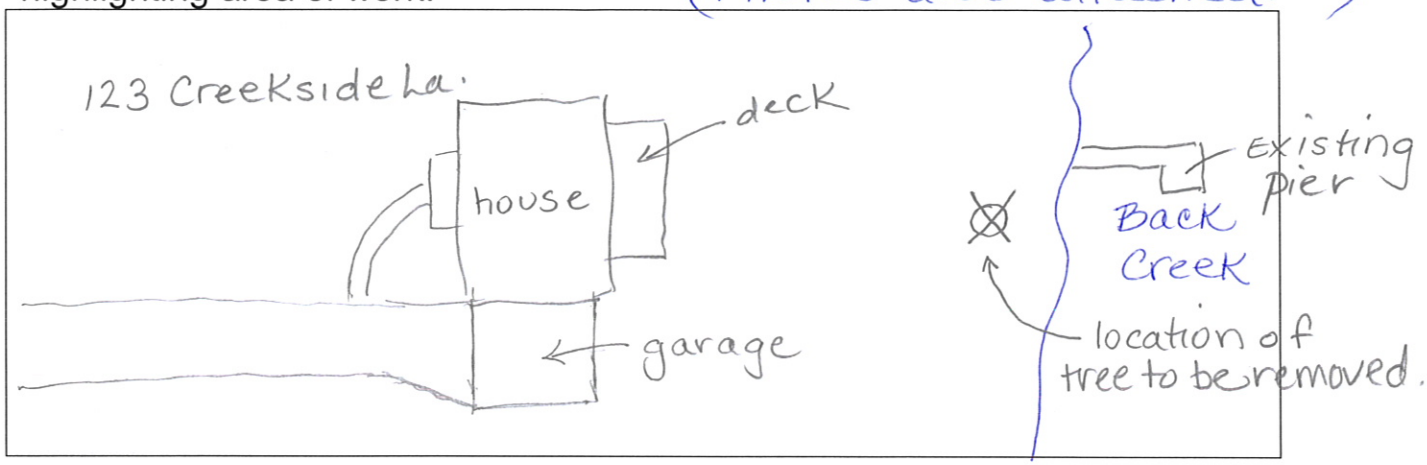
Access to pier or shoreline ☐	Removing invasive vegetation* ☐	Filling to maintain existing lawn ☐	Removal of tree in danger of falling ☑

4. Describe proposed work within the Buffer:

I would like to cut down one (1) existing tree within Buffer. It is a locust which was damaged during winter ice storm and is now leaning towards pier & water. I will have stump ground in place and would like to make a planting bed in that location.
(Please see photos attached.)

PLEASE COMPLETE REVERSE SIDE

5. To minimize review time, attach photos or provide sketch of property, highlighting area of work: (Photos also attached.*)



6. Site restoration or replanting (must include mulch or ground cover for any areas disturbed; new lawn areas prohibited):

Area around existing tree will be covered in mulch and planted as flower bed. Replacement tree - a 1½" caliper willow oak - will be planted in bed as well.

*Note: For invasive vegetation removal, natural regeneration may be utilized. Area must be stabilized. If regeneration of native species does not occur within 2 years of invasive removal, the area should be replanted.

7. Estimated dates for proposed work and mitigation:

Work will be completed by: May 1, 2011

Restoration will be completed by: Nov. 1, 2011 (Flower bed established immediately, tree planted in fall)

8. **Certification:**

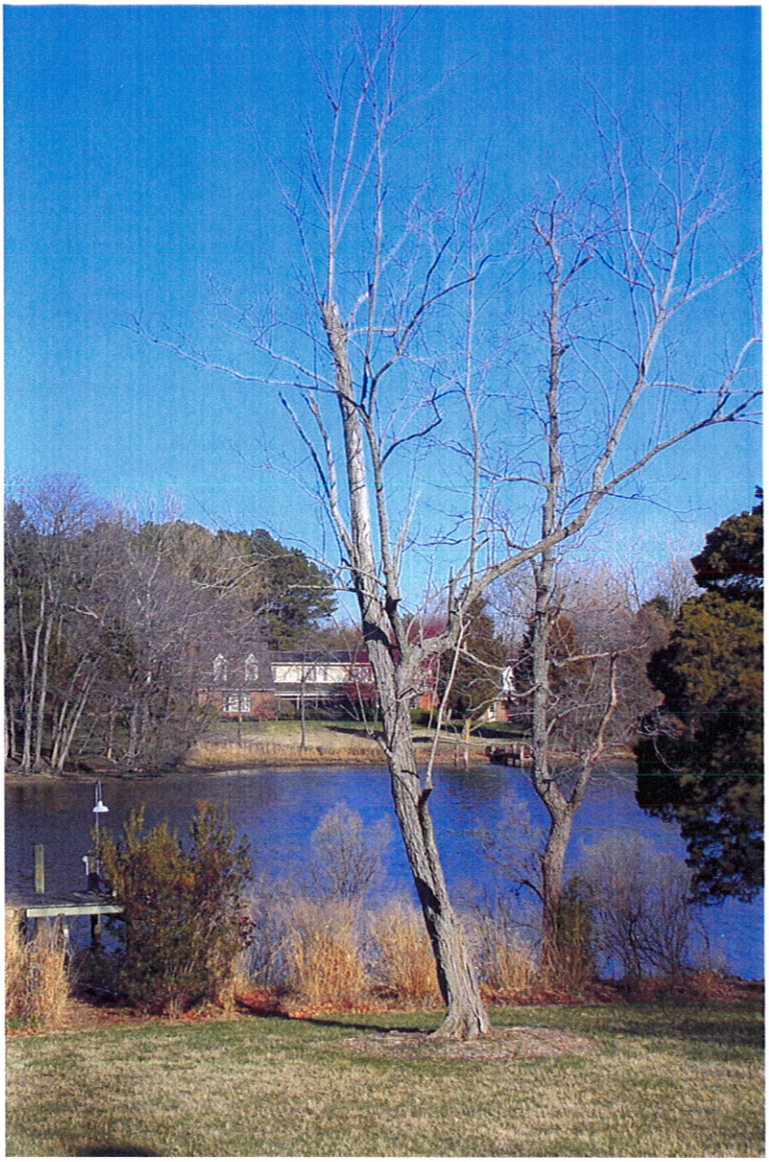
I certify that the information on this form is true and accurate to the best of my knowledge and belief. I understand that County personnel may contact me and arrange to inspect the work. I will abide by this plan if approved and will not conduct any work beyond the limits of this plan.

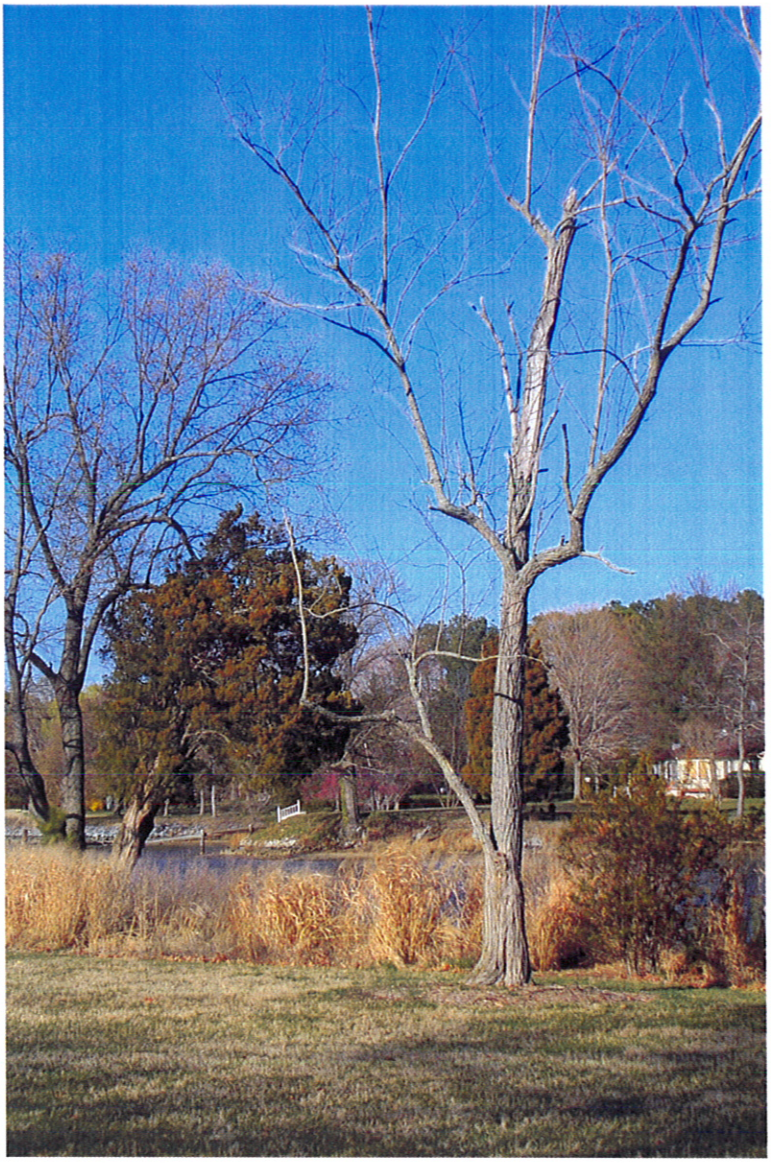
**PROPERTY OWNER SIGNATURE: Martha Washington

DATE: April 1, 2011

NOTE:

****PLAN IS CONSIDERED INVALID WITHOUT A PROPERTY OWNER SIGNATURE**





SIMPLIFIED BUFFER MANAGEMENT PLAN

Complete all sections below.

NOTE: PROPERTY OWNER MUST SIGN IN SECTION 8 OR THE PLAN WILL BE RETURNED WITHOUT APPROVAL

1. Applicant Information

Name:	
Address:	
City:	State: Zip:
Telephone: ( )	E-mail address:

2. Property address if different than above

Address:		
City:	State:	Zip:
Tax Map: Parcel: Lot:		

3. Proposed activity must be one of the following: (check all that apply)

Access to pier or shoreline ☐	Removing invasive vegetation* ☐	Filling to maintain existing lawn ☐	Removal of tree in danger of falling ☐

4. Describe proposed work within the Buffer:

_____

_____

_____

_____

_____

_____

_____

_____

PLEASE COMPLETE REVERSE SIDE

5. To minimize review time, attach photos or provide sketch of property, highlighting area of work:

6. Site restoration or replanting (must include mulch or ground cover for any areas disturbed; new lawn areas prohibited):

_____

_____

_____

*Note: For invasive vegetation removal, natural regeneration may be utilized. Area must be stabilized. If regeneration of native species does not occur within 2 years of invasive removal, the area should be replanted.

7. Estimated dates for proposed work and mitigation:

Work will be completed by: _____

Restoration will be completed by: _____

8. **Certification:**

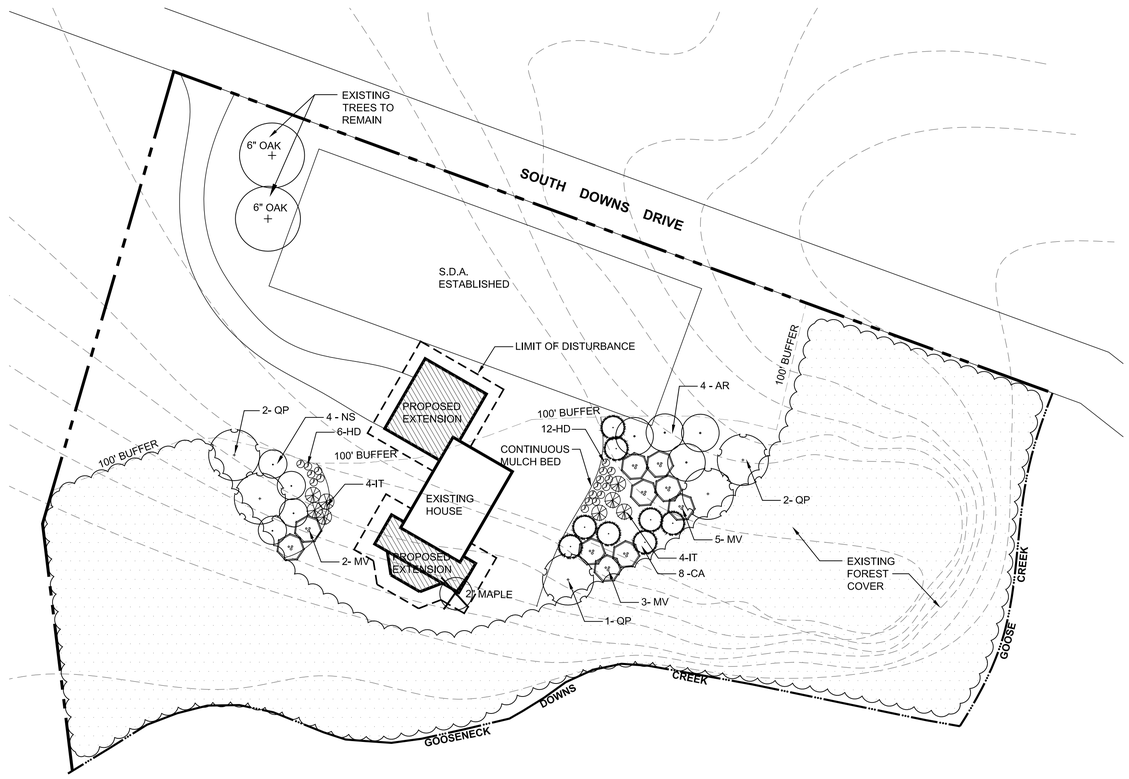
I certify that the information on this form is true and accurate to the best of my knowledge and belief. I understand that County personnel may contact me and arrange to inspect the work. I will abide by this plan if approved and will not conduct any work beyond the limits of this plan.

**PROPERTY OWNER SIGNATURE: _____

DATE: _____

NOTE:

****PLAN IS CONSIDERED INVALID WITHOUT A PROPERTY OWNER SIGNATURE**



SITE PLAN
SCALE 1" = 30'-0

N

LEGEND

- FOREST EDGE
- EXISTING TREE
- DEVELOPMENT WITHIN BUFFER = 900 SF
- STREAM
- LOT LINE
- EXISTING TREE TO BE REMOVED
- EXISTING FOREST COVER

LANDSCAPE LEGEND

CANOPY TREE 2" CAL. 8' HT.	
CANOPY TREE 1" CAL. 6' HT.	
UNDERSTORY TREE 1" CAL. 6' HT.	
LARGE SHRUB 1 GAL. 4' HT.	
SMALL SHRUB 1 GAL. 18" HT.	

GENERAL NOTES

1. THE PURPOSE OF THIS BUFFER MANAGEMENT PLAN IS TO COMPLY WITH THE BUFFER MITIGATION AND ESTABLISHMENT REQUIREMENTS FOR THE CONSTRUCTION OF A 2100 SQUARE FOOT ADDITION TO AN EXISTING DWELLING. THE EXISTING DWELLING IS LOCATED WITHIN THE BUFFER ON A GRANDFATHERED LOT, AND THE APPLICANT HAS OBTAINED A VARIANCE.
2. THE PROPERTY SHOWN HEREON IS LOCATED ENTIRELY WITHIN THE CHESAPEAKE BAY CRITICAL AREA.
3. THE CHESAPEAKE BAY CRITICAL AREA DESIGNATION IS - RCA
4. FOR CURRENT DEED REFERENCE SEE LIBER 123, FOLIO 123
5. FOR PLAT REFERENCE SEE PLAT BOOK 123, FOLIO 234
6. ACCESS TO LOTS 15 IN GOODNECK DOWNS SUBDIVISION IS FROM SOUTH DOWNS DRIVE.
7. THIS PLAT WAS PREPARED WITHOUT BENEFIT OF REVIEW OF AN ABSTRACT OF TITLE.

SEQUENCE OF IMPLEMENTATION

1. CONTRACTOR SHALL ARRANGE PRE-PLANTING MEETINGS WITH COUNTY PLANNING & ZONING DEPARTMENT STAFF, AT LEAST 5 DAYS IN ADVANCE OF DISTURBANCES OF ANY LAND ON SITE.
2. REMOVE \ ELIMINATE TURF GRASS AND TILL AREAS TO BE PLANTED TO A DEPTH OF 12 INCHES.
3. USE TREE SHELTER TUBES WITH MESH TOPS FOR SEEDLINGS PLANTING TO REDUCE ANIMAL DAMAGE.
4. MULCH AROUND LANDSCAPING STOCK TO REDUCE COMPETITION FROM INVASIVE SPECIES.
5. MONITOR THE PLANTINGS OFTEN TO REDUCE PLANT STRESS SUCH AS WATER DEFICIENCY, NUTRIENT DEFICIENCY, INVASIVE SPECIES COMPETITION, PEST DAMAGE, AND DISEASE.
6. THE CONTRACTOR TO OBSERVE MINIMAL SITE PREPARATION/DISTURBANCE, PROTECTION OF PLANTS AFTER DELIVERY UNTIL THEY ARE PLANTED, PROPER DIGGING AND HANDLING OF PLANT MATERIALS,PROPOER EXCAVATION OF PLANTING AREAS, PLANTING OPERATIONS, STABILIZATION OF THE PLANTING AREAS WITH MULCH AFTER PLANTING, STAKING AND PRUNING, AND INSTALLATION OF BUFFER PROTECTION SIGNAGE.

MAINTENANCE PLAN

1. MONITOR THE PLANTINGS OFTEN TO REDUCE PLANT STRESS SUCH AS WATER DEFICIENCY, NUTRIENT DEFICIENCY, INVASIVE SPECIES COMPETITION, PEST DAMAGE, AND DISEASE.
2. WATER ONLY AS NECESSARY BUT AT LEAST ONCE EVERY 10 DAYS WITHOUT RAINFALL FROM MAY THROUGH SEPTEMBER, DEPENDING ON SOIL MOISTURE LEVELS. MONITOR TO ENSURE THAT OVER-WATERING DOES NOT FREQUENTLY OCCUR.
3. USE LOW NITROGEN AND SLOW RELEASE FERTILIZERS AND APPLY IN LATE FALL OR EARLY SPRING.
4. AT THE END OF THE 2-YEAR MONITORING PERIOD, THE SURVIVAL OF THE PLANTINGS SHALL BE ASSESSED TO DETERMINE THE NEED FOR REPLACEMENT PLANTINGS.

REQUIRED SURVIVAL

AT THE END OF THE 2-YEAR MONITORING PERIOD FOR PLANTED LANDSCAPE STOCK, ALL OF THE PLANTS ARE REQUIRED TO SURVIVE PER COMAR 27.01.09.01-2J. ANY LANDSCAPE STOCK PLANT OR PLANTS THAT DID NOT SURVIVE SHALL BE REPLACED.
IF THE COUNTY DETERMINES THAT SURVIVAL IS NOT ADEQUATE, THE MONITORING PERIOD MAY BE EXTENDED AND ADDITIONAL INSPECTIONS MAY BE REQUIRED AT THE DISCRETION OF THE COUNTY.

BUFFER MANAGEMENT AND PROTECTION STANDARDS

1. REMOVAL OF NATURAL VEGETATION WITHIN THE 100-FOOT BUFFER AND EXPANDED BUFFER IS PROHIBITED. CUTTING AND CLEARING OF NATURAL VEGETATION WITHIN THE BUFFER AND EXPANDED BUFFER SHALL BE AS SHOWN ON THIS BUFFER MANAGEMENT PLAN AS SUBMITTED AND OR AS SUBSEQUENTLY AMENDED, SUBJECT TO APPROVAL BY THE COUNTY PLANNING AND ZONING OFFICE. ADDITIONAL INFORMATION CAN BE OBTAINED BY CONTACTING THE PLANNING AND ZONING OFFICE AT _____.
2. THE 100-FOOT BUFFER ON THIS LOT SHALL BE PLANTED IN ACCORDANCE WITH THIS PLAN. ALL EXISTING AND PLANTED VEGETATION WITHIN THE BUFFER SHALL BE MAINTAINED AND SURVIVAL OF PLANTED AND NATURALLY REGENERATED AREAS OF THE BUFFER SHALL BE AS DESCRIBED IN THIS PLAN.
3. NEW LAWN AREAS SHALL NOT BE CREATED WITHIN THE BUFFER AND EXPANDED BUFFER UNLESS SPECIFICALLY ADDRESSED IN THIS BUFFER MANAGEMENT PLAN.

INSPECTION AGREEMENT

I, JANE DOE, THE OWNER OF THE SUBJECT PROPERTY, SHOWN HEREON, DO HEREBY GRANT PERMISSION TO THE APPROVING AUTHORITY TO INSPECT THE PLANTINGS AT APPROPRIATE TIMES AT THE ADDRESS PROVIDED BELOW.
STREET ADDRESS_____
TAX MAP_____
PARCEL #_____
SECTION_____
LOT #_____

OWNER DATE

BUFFER MANAGEMENT PLAN APPROVAL

THIS MAJOR BUFFER MANAGEMENT PLAN HAS BEEN REVIEWED AND APPROVED FOR CONSISTENCY WITH THE LOCAL CRITICAL AREA PROGRAM AND THE PROVISIONS OF COMAR 27.01.09.01-1 - 7

STAFF NAME STAFF TITLE DATE

PLANTING PLAN AND LANDSCAPE SCHEDULE

STEP 1

ESTABLISHMENT OR MITIGATION

DISTURBANCE TO THE 100-FOOT AND/OR EXPANDED BUFFER? (YES / NO)
IF YES, MITIGATION IS REQUIRED, PROCEED TO STEP 2, OTHERWISE,SKIP TO STEP 5.

SELECT	ACTIVITY	ACTION
	PROJECT COMPLETELY OUTSIDE BUFFER , NO BUFFER IMPACTS	ESTABLISHMENT
	DISTURBANCE TO BUFFER OR VEGETATION REMOVAL IN BUFFER	MITIGATION
X	SOME DISTURBANCE IN BUFFER AND SOME OUTSIDE BUFFER	ESTABLISHMENT & MITIGATION

STEP 2

MITIGATION FOR WORK IN THE BUFFER

SELECT	ACTIVITY	MITIGATION RATIO
	SHORE EROSION CONTROL	1:1
	RIPARIAN WATER ACCESS	2:1
	WATER-DEPENDENT FACILITIES	2:1
X	VARIANCE	3:1
	VIOLATION	4:1

BUFFER DISTURBANCE MITIGATION:
AREA DISTURBED (SF) 900 X MITIGATION RATIO 3 = 2700 SF

STEP 3

MITIGATION FOR CLEARING TREES

2" DIAMETER TREES (1 TOTAL) = 1 X 2 = 2"
TOTAL INCHES = 2"

TOTAL INCHES X 100 SF
2 X 100 = 200 SF

0 DEAD TREES TO BE REMOVED = 0 NEW TREES PLANTED
0 INVASIVE SPECIES/ TREES REMOVED = 0 NEW TREES PLANTED

STEP 4

TOTAL MITIGATION

BUFFER DISTURBANCE MITIGATION (STEP 2) 2700 SF
TREE CLEARING MITIGATION (STEP 3) + 200 SF
TOTAL MITIGATION = 2900 SF

STEP 5

ESTABLISHMENT FOR DEVELOPMENT OUTSIDE THE BUFFER

SELECT	DEVELOPMENT CATEGORY	BEFORE PROGRAM DATE	AFTER PROGRAM DATE
	NEW DEVELOPMENT ON VACANT LOT	TOTAL LOT COVERAGE	FULL ESTABLISHMENT
	NEW SUBDIVISION OR NEW LOT	FULL ESTABLISHMENT	
	NEW LOT WITH EXISTING DWELLING UNIT	ESTABLISHMENT = TOTAL LOT COVERAGE	
	CONVERSION OF LAND USE TO ANOTHER LAND USE	FULL ESTABLISHMENT	
X	ADDITION OR ACCESSORY STRUCTURE	ESTABLISHMENT = INCREASE IN LOT COVERAGE	
	SUBSTANTIAL ALTERATION	ESTABLISHMENT = TOTAL LOT COVERAGE	

PROGRAM DATE IS THE ADOPTION DATE OF THE LOCAL CA PROGRAM

ESTABLISHMENT REQUIRED (YES / NO)
DATE LOT CREATED: JUNE 1, 2002
ESTABLISHMENT REQUIRED (FULL BUFFER/TOTAL LOT COVERAGE/ (NET INCREASE IN LOT COVERAGE)
TOTAL AREA OF BUFFER REQUIRING ESTABLISHMENT 900 (SF) / ACRES

STEP 6

ADJUST FOR EXISTING FOREST COVER

FULL ESTABLISHMENT OF BUFFER REQUIRED? (YES / NO)
IF YES:
TOTAL AREA OF BUFFER N.A. SF/ACRES
TOTAL AREA OF BUFFER IN EXISTING FOREST - N.A. SF/ ACRES
MODIFIED AREA OF BUFFER REQUIRED TO BE PLANTED = N.A. SF/ACRES

IF NO:
GO TO STEP 7

NOTE: ONCE BUFFER IS FULLY FORESTED, NO FURTHER ESTABLISHMENT IS REQUIRED

STEP 7

CLUSTER PLANTING EVALUATION

CLUSTER OPTIONS

VEGETATION TYPE	MINIMUM SIZE ELIGIBLE FOR CREDIT	MAXIMUM CREDIT ALLOWED (SF)	MAXIMUM PERCENT OF CREDIT	QUANTITY
PLANTING CLUSTER 1	1 CANOPY TREE W/ 3 LARGE SHRUBS OR 1 CANOPY TREE W/ 6 SMALL SHRUBS	300	N/A	N.A.
PLANTING CLUSTER 2	2 UNDERSTORY TREES W/ 3 LARGE SHRUBS OR 2 UNDERSTORY TREES W/ 6 SMALL SHRUBS	350	N/A	N.A.

TOTAL ESTABLISHMENT/MITIGATION < 1 ACRES? (YES) NO)

IF YES, THE FOLLOWING CAN APPLY:

PLANTING CLUSTER 1 N.A. (QUANTITY) X 300 SQ FT = N.A. SQ FT
ADD:
PLANTING CLUSTER 2 N.A. (QUANTITY) X 350 SQ FT = N.A. SQ FT
EQUALS:
TOTAL CLUSTER PLANTING = N.A. SQ FT

STEP 8

TOTAL REQUIRED BUFFER PLANTING

BUFFER DISTURBANCE MITIGATION (STEP 2) 2700 SF
ADD:
TREE MITIGATION (STEP 3) + 200 SF
ADD:
BUFFER ESTABLISHMENT (STEP 5) + 900 SF
EQUALS:

TOTAL PLANTING = 3800 SF

LANDSCAPE SCHEDULE: SPECIES, STOCK, SIZE, AND QUANTITY

SYM.	SPECIES	COMMON NAME	QNTY.	CREDIT EACH	CREDIT TOTAL	MAX % ALLOW.	% USED
CANOPY TREES - 2 " CALIPER, 8'- 0" HIGH				200	1000	N.A.	N.A.
QP	Quercus phellos	Willow Oak	5	200	1000		
CANOPY TREES - 1" CALIPER, 6'- 0" HIGH				100	800	N.A.	N.A.
AR	Acer rubrum	Red Maple	4	100	400		
NS	Nyssa sylvatica	Black Gum	4	100	400		
UNDERSTORY TREES - 1"CALIPER, 6'- 0" HIGH				75	750	N.A.	N.A.
MV	Magnolia virginiana	Sweetbay Magnolia	10	75	750		
LARGE SHRUBS - 1 GALLON, 4'- 0" HIGH				20	800	30%	18%
CA	Cornus amomum	Silky Dogwood	8	50	400		
IT	Itea virginica	Virginia Sweetspire	8	50	400		
SMALL SHRUBS - 1 GALLON, 1'-6" HIGH				25	450	20%	10%
HD	Hypericum densiflorum	Dense St. John's Wort	18	25	450		
HERBACEOUS PERENNIAL, 1 QUART			N.A.	N.A.	N.A.	10%	N.A.
TOTAL					3800 SF		

LANDSCAPE SCHEDULE NOTES

1. ALL PLANT SPECIES SHALL BE NATIVE TO THE CHESAPEAKE AND ATLANTIC COASTAL BAYS REGION BASED ON THE U.S. FISH AND WILDLIFE SERVICE PUBLICATION, NATIVE PLANTS FOR WILDLIFE HABITAT AND CONSERVATION LANDSCAPING.
2. SPECIES CLASSIFICATION (CANOPY TREE, UNDERSTORY TREE, ETC.) IS IN ACCORDANCE WITH MATURE HEIGHTS AS SET FORTH IN THE U.S. FISH AND WILDLIFE SERVICE PUBLICATION, NATIVE PLANTS FOR WILDLIFE HABITAT AND CONSERVATION LANDSCAPING.
3. SPECIES HAVE BEEN SELECTED BASED ON AN ANALYSIS OF SURROUNDING NATIVE FOREST AND DEVELOPED WOODLAND COVER.
4. SHRUB SPECIES COMPRISE ___28___ PERCENT OF THE PROPOSED PLANTING, WHICH DOES NOT EXCEED 50 PERCENT OF THE OVERALL PLANTING.
5. THE QUANTITY OF ANY SINGLE SPECIES DOES NOT EXCEED 20 PERCENT OF THE OVERALL PLANTING

NO.	DATE	DESC.
XX	XX	XX
XX	XX	XX
XX	XX	XX
XX	XX	XX

STEWARDS OF THE LAND
LANDSCAPE ARCHITECTS

SAMPLE MINOR BUFFER MANAGEMENT PLAN

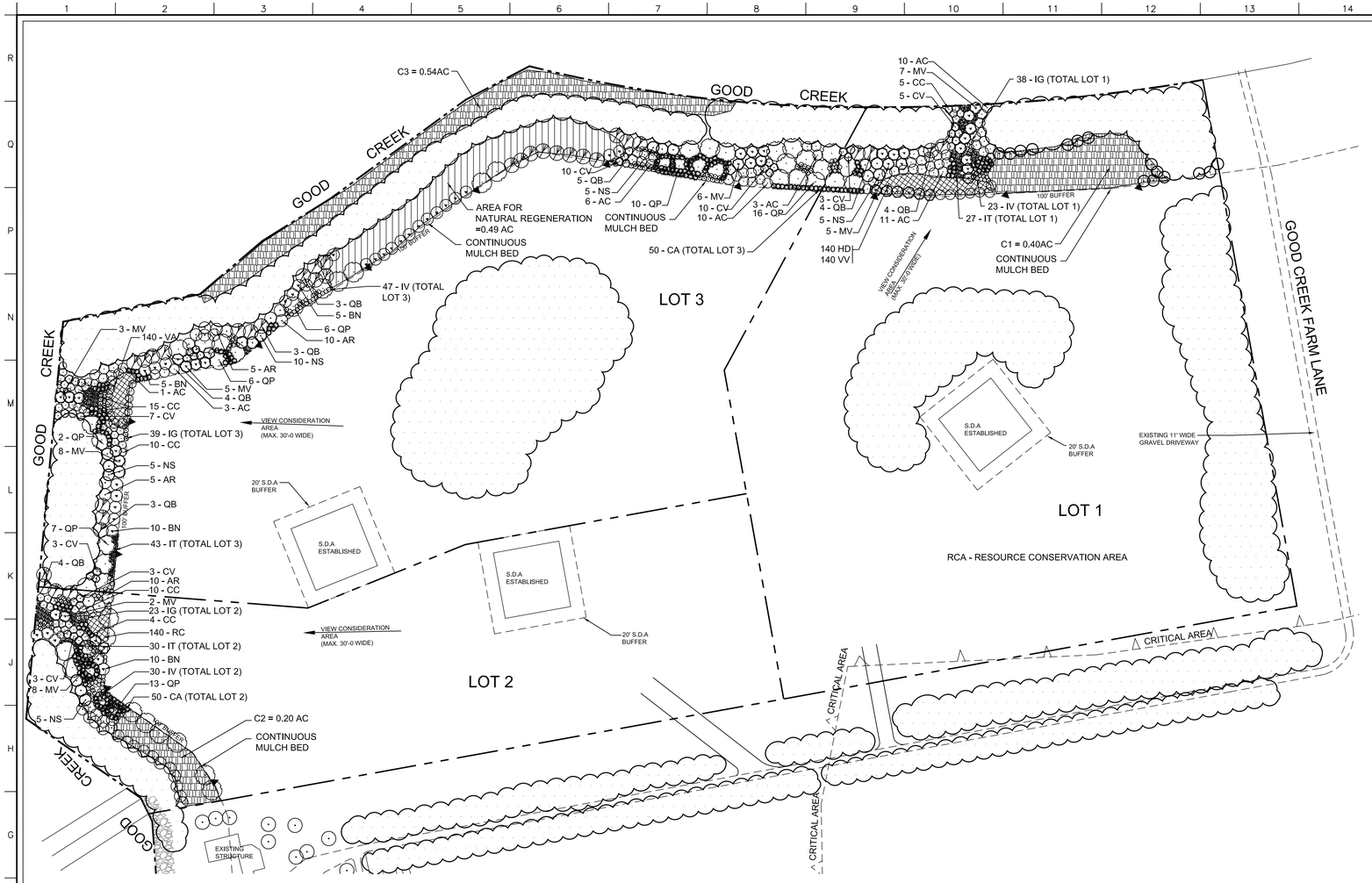
COUNTY

Drawing Title

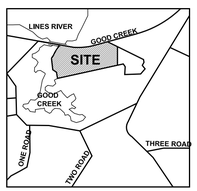
Scale : AS SHOWN
Project No.: XXXXX
Date: MARCH 2011
Drawn By: XXX
Reviewed By: XXX

REVISIONS
NO. DATE DESC.

Sheet No.



SITE PLAN
SCALE 1" = 100'-0



VICINITY MAP
SCALE 1" = 1000'-0

N

LEGEND
- FOREST EDGE
- EXISTING TREE
- SDA — SEWAGE DISPOSAL AREA
- DENOTES EASEMENT AND/OR RIGHT-OF-WAY LINE
- STREAM
- LOT BOUNDARY LINE
- EXISTING FOREST COVER
- BUFFER PROTECTION SIGNS

LANDSCAPE LEGEND

CANOPY TREE 2" CAL. 8' HT.	
CANOPY TREE 1" CAL. 6' HT.	
UNDERSTORY TREE 1" CAL. 6' HT.	
LARGE SHRUB 1 GAL. 4' HT.	
SMALL SHRUB 1 GAL. 18" HT.	
>1" CONTAINER TREE	
NATURAL REGENERATION	

GENERAL NOTES
1. THE PURPOSE OF THIS BUFFER MANAGEMENT PLAN IS TO COMPLY WITH THE BUFFER ESTABLISHMENT REQUIREMENTS FOR THE CONSTRUCTION OF THREE NEW DWELLINGS ON THREE RESIDENTIAL LOTS. THE LOTS WERE CREATED AFTER THE DATE OF LOCAL CRITICAL AREA PROGRAM ADOPTION; THEREFORE, FULL ESTABLISHMENT OF THE CRITICAL AREA BUFFER IS REQUIRED.
2. THE PROPERTY SHOWN HEREON IS LOCATED TOTALLY WITHIN THE CHESAPEAKE BAY CRITICAL AREA. AREA OF LOT 1 IS 13.9 ACRES, AREA OF LOT 2 IS 7.3 ACRES AND AREA OF LOT 3 IS 14.5 ACRES (TOTAL AREA = 35.7 ACRES)
3. THE ZONING CLASSIFICATION IS RCA - RESOURCE CONSERVATION AREA
4. FOR CURRENT DEED REFERENCE SEE LIBER 123, FOLIO 123
   FOR PLAT REFERENCE SEE PLAT BOOK 123, FOLIO 234
5. RCA - RESOURCE CONSERVATION AREA:
   MINIMUM LOT SIZE ALLOWED IS 2 ACRES, 1 DWELLING UNIT PER 20 ACRES.
   MINIMUM LOT WIDTH IS 200' FOR RCA - RESOURCE CONSERVATION AREA
6. ACCESS FOR LOTS 1,2 AND 3 SHALL BE FROM GOOD CREEK FARM LANE.

SEQUENCE OF IMPLEMENTATION
1. CONTRACTOR SHALL ARRANGE PRE-PLANTING MEETINGS WITH COUNTY PLANNING & ZONING DEPARTMENT STAFF. AT LEAST 5 DAYS IN ADVANCE OF DISTURBANCES OF ANY LAND ON SITE.
2. REMOVE \ ELIMINATE TURF GRASS AND TILL AREAS TO BE PLANTED TO A DEPTH OF 12 INCHES.
3. USE TREE SHELTER TUBES WITH MESH TOPS FOR SEEDLINGS PLANTING TO REDUCE ANIMAL DAMAGE.
4. MULCH AROUND LANDSCAPING STOCK TO REDUCE COMPETITION FROM INVASIVE SPECIES.
5. MONITOR THE PLANTINGS OFTEN TO REDUCE PLANT STRESS SUCH AS WATER DEFICIENCY, NUTRIENT DEFICIENCY, INVASIVE SPECIES COMPETITION, PEST DAMAGE, AND DISEASE.
6. THE CONTRACTOR TO OBSERVE MINIMAL SITE PREPARATION/DISTURBANCE , PROTECTION OF PLANTS AFTER DELIVERY UNTIL THEY ARE PLANTED, PROPER DIGGING AND HANDLING OF PLANT MATERIALS,PROPER EXCAVATION OF PLANTING AREAS, PLANTING OPERATIONS, STABILIZATION OF THE PLANTING AREAS WITH MULCH AFTER PLANTING, STAKING AND PRUNING, AND INSTALLATION OF BUFFER PROTECTION SIGNAGE.

MAINTENANCE PLAN
1. WATER ONLY AS NECESSARY BUT AT LEAST ONCE EVERY 10 DAYS WITHOUT RAINFALL FROM MAY THROUGH SEPTEMBER, DEPENDING ON SOIL MOISTURE LEVELS. MONITOR TO ENSURE THAT OVER-WATERING DOES NOT OCCUR.
2. USE LOW NITROGEN AND SLOW RELEASE FERTILIZERS AND APPLY IN LATE FALL OR EARLY SPRING.
3. INSPECTIONS FOR SURVIVAL SHALL BE PERFORMED ANNUALLY AND PLANTS REPLACED AS NEEDED IN THE NEXT APPROPRIATE PLANTING SEASON. THE GOAL IS THAT AT THE END OF THE 2-YEAR OR 5-YEAR PERIOD, THE SURVIVAL REQUIREMENTS CAN BE MET. IF THE COUNTY DETERMINES THAT SURVIVAL IS NOT ADEQUATE, THE MONITORING PERIOD MAY BE EXTENDED AND ADDITIONAL INSPECTIONS MAY BE REQUIRED AT THE DISCRETION OF THE COUNTY;

LONG TERM PROTECTION PLAN
1. THE PLANTINGS WILL BE PLANTED AND A BOND WILL BE POSTED COVERING THE COST OF SURVIVAL GUARANTEE PRIOR TO STARTING CONSTRUCTION OR BEFORE LOTS ARE SOLD.
2. AT THE END OF THE 2-YEAR MONITORING PERIOD FOR PLANTED LANDSCAPE STOCK, ALL OF THE PLANTS ARE REQUIRED TO SURVIVE PER COMAR 27.01.09.01-2J. ANY LANDSCAPE STOCK PLANT OR PLANTS THAT DID NOT SURVIVE SHALL BE REPLACED.
3. AT THE END OF THE 2-YEAR OR 5-YEAR MONITORING PERIOD FOR SMALLER STOCK, REQUIRED SURVIVAL SHALL BE IN ACCORDANCE WITH THE TABLE BELOW.
4. FOR NATURAL REGENERATION AREAS, AT THE END OF THE 5-YEAR MONITORING PERIOD, THE REQUIRED SURVIVAL IS 300 NATIVE WOODY STEMS PER ACRE THAT ARE AT LEAST 4 FEET IN HEIGHT.
5. IF NATURAL REGENERATION IS UNSUCCESSFUL, SUPPLEMENTAL PLANTING SHALL BE PROVIDED AS SPECIFIED FOR AREAS C1 AND C2, AND WILL MEET THE SURVIVAL REQUIREMENTS SPECIFIED FOR THOSE AREAS.

SELECT	STOCK SIZE	NUMBER/ ACRE	SURVIVABILITY	MIN. BOND PERIOD
	BARE ROOT SEEDLING / WHIP	700	50%	5 YEARS
	1/2 " TO 1" CONT. GROWN TREES	450	75%	2 YEARS
X	MORE THAN 1" CONTAINER GROWN TREES	350	90%	2 YEARS

BUFFER PROTECTION SIGNS
PERMANENT SIGNS ARE REQUIRED TO IDENTIFY THE BUFFER AS SPECIFIED IN COMAR 27.01.09.01-2. SIGNS MUST BE LOCATED AT THE UPLAND BOUNDARY OF THE BUFFER WITH AT LEAST ONE SIGN PER LOT OR PER 200 FEET OF SHORELINE, WHICH EVER IS APPLICABLE. SIGNS MUST BE AT LEAST 11" WIDE BY 15" HIGH, PLACE AT A HEIGHT OF 4.5', AND NOT ATTACHED TO A TREE. THE SIGN MUST CLEARLY STATE, "CRITICAL AREA BUFFER - NO CLEARING OR DISTURBANCE PERMITTED."

BUFFER MANAGEMENT AND PROTECTION STANDARDS
1. REMOVAL OF NATURAL VEGETATION WITHIN THE 100-FOOT BUFFER AND EXPANDED BUFFER IS PROHIBITED, CUTTING AND CLEARING OF NATURAL VEGETATION WITHIN THE BUFFER AND EXPANDED BUFFER SHALL BE AS SHOWN ON THIS BUFFER MANAGEMENT PLAN AS SUBMITTED AND OR AS SUBSEQUENTLY AMENDED, SUBJECT TO APPROVAL BY THE COUNTY PLANNING AND ZONING OFFICE. ADDITIONAL INFORMATION CAN BE OBTAINED BY CONTACTING THE PLANNING AND ZONING OFFICE AT _____.
2. THE 100-FOOT BUFFER ON LOTS 1, 2, AND 3 SHALL BE ESTABLISHED IN ACCORDANCE WITH THIS PLAN. ALL EXISTING AND PLANTED VEGETATION WITHIN THE BUFFER SHALL BE MAINTAINED AND SURVIVAL OF PLANTED AND NATURALLY REGENERATED AREAS OF THE BUFFER SHALL BE AS DESCRIBED IN THIS PLAN.
3. NEW LAWN AREAS SHALL NOT BE CREATED WITHIN THE BUFFER AND EXPANDED BUFFER UNLESS SPECIFICALLY ADDRESSED IN THIS BUFFER MANAGEMENT PLAN.

INSPECTION AGREEMENT
I, JANE DOE, THE OWNER OF THE SUBJECT PROPERTY, SHOWN HEREON, DO HEREBY GRANT PERMISSION TO THE APPROVING AUTHORITY TO INSPECT THE PLANTINGS AT APPROPRIATE TIMES AT THE ADDRESS PROVIDED BELOW.
STREET ADDRESS 111 GOOD CREEK FARM LANE
TAX MAP
PARCEL #
SECTION
LOT #

OWNER DATE

BUFFER MANAGEMENT PLAN APPROVAL
THIS MAJOR BUFFER MANAGEMENT PLAN HAS BEEN REVIEWED AND APPROVED FOR CONSISTENCY WITH THE LOCAL CRITICAL AREA PROGRAM AND THE PROVISIONS OF COMAR 27.01.09.01-1 - 7

STAFF NAME STAFF TITLE DATE

PLANTING PLAN AND LANDSCAPE SCHEDULE

STEP 1
ESTABLISHMENT OR MITIGATION
DISTURBANCE TO THE 100-FOOT AND/OR EXPANDED BUFFER? (YES) (NO)
IF YES, MITIGATION IS REQUIRED. PROCEED TO STEP 2, OTHERWISE,SKIP TO STEP 5.

SELECT	ACTIVITY	ACTION
X	PROJECT COMPLETELY OUTSIDE BUFFER , NO BUFFER IMPACTS	ESTABLISHMENT
	DISTURBANCE TO BUFFER OR VEGETATION REMOVAL IN BUFFER	MITIGATION
	SOME DISTURBANCE IN BUFFER AND SOME OUTSIDE BUFFER	ESTABLISHMENT & MITIGATION

AREA OF LOT 1 = 13.90 ACRES +/-
AREA OF LOT 2 = 7.30 ACRES +/-
AREA OF LOT 3 = 14.50 ACRES +/-

CRITICAL AREA FOREST TABLE

LOT 1
AREA OF BUFFER = 1.76 ACRES +/-
EXISTING FOREST WITHIN BUFFER = 0.91 ACRES +/-
REQUIRED PLANTING OF BUFFER = 0.85 ACRES +/-
PROPOSED PLANTING OF BUFFER = 0.85 ACRES +/-

LOT 2
AREA OF BUFFER = 0.97 ACRES +/-
EXISTING FOREST WITHIN BUFFER = 0.46 ACRES +/-
REQUIRED PLANTING OF BUFFER = 0.51 ACRES +/-
PROPOSED PLANTING OF BUFFER = 0.51 ACRES +/-

LOT 3
AREA OF BUFFER = 4.28 ACRES +/-
EXISTING FOREST WITHIN BUFFER = 2.38 ACRES +/-
REQUIRED PLANTING OF BUFFER = 1.90 ACRES +/-
PROPOSED PLANTING OF BUFFER = 1.90 ACRES +/-

STEP 2
MITIGATION FOR WORK IN THE BUFFER

SELECT	ACTIVITY	MITIGATION RATIO
--	SHORE EROSION CONTROL	1:1
--	RIPARIAN WATER ACCESS	2:1
--	WATER-DEPENDENT FACILITIES	2:1
--	VARIANCE	3:1
--	VIOLATION	4:1

THIS BUFFER MANAGEMENT PLAN DOES NOT ADDRESS MITIGATION FOR WORK IN THE BUFFER BECAUSE NO DISTURBANCE TO THE BUFFER IS PROPOSED AS PART OF THIS PROJECT.

STEP 3
MITIGATION FOR CLEARING TREES
BUFFER DISTURBANCE MITIGATION (STEP 2) -- SF
TREE CLEARING MITIGATION (STEP 3) + -- SF
TOTAL MITIGATION = -- SF

NOTE: NO EXISTING TREES THAT EXCEED 2 INCHES OR MORE IN DIAMETER ARE PROPOSED TO BE REMOVED.

STEP 4
TOTAL MITIGATION
MITIGATION FOR DISTURBANCE + MITIGATION FOR TREES REMOVED = TOTAL MITIGATION
(LOD X RATIO) + (DBH X 100 SF)

THIS BUFFER MANAGEMENT PLAN DOES NOT ADDRESS ANY MITIGATION FOR WORK IN THE BUFFER OR MITIGATION FOR REMOVAL OF EXISTING TREES 2 INCHES OR MORE IN DIAMETER BECAUSE NO DISTURBANCE OR TREE REMOVAL IN THE BUFFER IS PROPOSED AS PART OF THIS PROJECT.

STEP 5
ESTABLISHMENT FOR DEVELOPMENT

SELECT	DEVELOPMENT CATEGORY	BEFORE PROGRAM DATE	AFTER PROGRAM DATE
X	NEW DEVELOPMENT ON VACANT LOT	TOTAL LOT COVERAGE	FULL ESTABLISHMENT
	NEW SUBDIVISION OR NEW LOT	FULL ESTABLISHMENT	
	NEW LOT WITH EXISTING DWELLING UNIT	ESTABLISHMENT = TOTAL LOT COVERAGE	
	CONVERSION OF LAND USE TO ANOTHER LAND USE	FULL ESTABLISHMENT	
	ADDITION OR ACCESSORY STRUCTURE	ESTABLISHMENT = INCREASE IN LOT COVERAGE	
	SUBSTANTIAL ALTERATION	ESTABLISHMENT = TOTAL LOT COVERAGE	

PROGRAM DATE IS THE ADOPTION DATE OF THE LOCAL CA PROGRAM

AN INDIVIDUAL BUFFER MANAGEMENT PLAN MAY BE SUBMITTED FOR LOT 1, LOT 2 OR LOT 3 BY AN INDIVIDUAL LOT OWNER AS LONG AS THE PLAN MEETS OR EXCEEDS THE MINIMUM PLANTING STANDARDS ON THIS PLAN AND IS APPROVED BY THE LOCAL GOVERNMENT.

ESTABLISHMENT REQUIRED – (YES) / (NO)
DATE LOT CREATED: JUNE 1,2002
ESTABLISHMENT REQUIRED – (FULL BUFFER) /TOTAL LOT COVERAGE/ NET INCREASE IN LOT COVERAGE)
TOTAL AREA OF BUFFER REQUIRING ESTABLISHMENT 3.26 SF/(ACRES)

STEP 6
ADJUST FOR EXISTING FOREST COVER
FULL ESTABLISHMENT OF BUFFER REQUIRED? (YES)/(NO)

IF YES:

TOTAL AREA OF BUFFER (STEP 5): 7.01 SF/(ACRES)
LESS:
TOTAL AREA OF BUFFER IN EXISTING FOREST: 3.75 SF/(ACRES)
EQUALS:
MODIFIED AREA OF BUFFER REQUIRED TO BE PLANTED 3.26 SF/(ACRES)

STEP 7
ELIGIBILITY FOR NATURAL REGENERATION
IF THE PROJECT REQUIRES BUFFER ESTABLISHMENT GREATER THAN ONE ACRE, THEN 50% OF THE AREA REQUIRED CAN BE ESTABLISHED THROUGH NATURAL REGENERATION, AS LONG AS IT IS WITHIN 50 FEET OF MATURE FOREST, AND A SUPPLEMENTAL PLANTING PLAN & FINANCIAL ASSURANCE ARE PROVIDED. IF ELIGIBLE, IDENTIFY THE NATURAL REGENERATION AREA ON THE PLAN AND REDUCE THE PLANTING REQUIREMENT BY THE NATURAL REGENERATION SQUARE FOOTAGE.

TOTAL AREA OF BUFFER REQUIRED TO BE ESTABLISHED (STEP 5 OR STEP 6) 3.26 ACRES

TOTAL ESTABLISHMENT > 1 ACRE? (YES)/(NO)

NATURAL REGENERATION PERMITTED? (IF ESTABLISHMENT > 1 ACRE, YES. OTHERWISE, NO)

AREA ELIGIBLE FOR NATURAL REGENERATION 1.63 ACRES

AREA OF NATURAL REGENERATION PROVIDED 0.49 ACRES

1. IF THE AREA OF BUFFER ESTABLISHMENT EXCEEDS ONE ACRE, UP TO 50% OF THE AREA REQUIRED TO BE PLANTED MAY BE ESTABLISHED THROUGH NATURAL REGENERATION.
2. NATURAL REGENERATION AREAS MUST BE WITHIN 50' OF MATURE FOREST
3. SUPPLEMENTAL PLANTING PLAN, MONITORING, FINANCIAL ASSURANCES REQUIRED
4. MONITORING AND FINANCIAL ASSURANCE REQUIRED FOR 5 YEARS AFTER THE DATE OF PLAN APPROVAL OR UNTIL THE AREA COVERAGE OF THE BUFFER IS AT LEAST 300 NATIVE WOODY STEMS PER ACRE, THAT ARE AT LEAST 4 FEET IN HEIGHT.

STEP 8
DETERMINE STOCKING
1. IDENTIFY AREAS OF NATURAL REGENERATION
2. USE TABLE BELOW TO EVALUATE THE AREA THAT MUST BE PLANTED USING LANDSCAPING STOCK AND AREA THAT MAY BE PLANTED USING FLEXIBLE STOCKING

SELECT	REQUIREMENT	AMOUNT	OPTIONS
	ESTABLISHMENT		
--	--	LESS THAN 1/4 ACRE	LANDSCAPING STOCK
--	--	1/4 ACRE UP TO OR EQUAL TO 1 ACRE	MIN, 50% LANDSCAPING STOCK, REMAINDER FLEXIBLE
X	LOT 1, 2 & 3	MORE THAN 1 ACRE UP TO OR EQUAL TO 5 ACRES	MIN, 25% LANDSCAPING STOCK, REMAINDER FLEXIBLE
--	--	MORE THAN 5 ACRES	MIN, 10% LANDSCAPING STOCK, REMAINDER FLEXIBLE
	MITIGATION		
--	--	LESS THAN 1 ACRE	LANDSCAPING STOCK
--	--	1 ACRE OR MORE	MIN, 50% LANDSCAPING STOCK, REMAINDER FLEXIBLE

ESTABLISHMENT REQUIREMENT: LOT 1 + LOT 2 + LOT 3 = 3.26 (ACRES)

LOTS 1, 2 & 3 (AREA = 3.26 ACRES)

STOCKING REQUIREMENT: LANDSCAPE STOCK: 50 % X 3.26 (ACRES) = 1.63 (ACRES)
FLEXIBLE STOCK: 35 % X 3.26 (ACRES) = 1.14 (ACRES)
NATURAL REGENERATION: 15 % X 3.26 (ACRES) = 0.49 (ACRES)

MITIGATION REQUIREMENT: NO MITIGATION REQUIRED FOR THIS PROJECT 0 (ACRES)

STOCKING REQUIREMENT: LANDSCAPE STOCK: ___% X ____(ACRES) = ____ (ACRES)
FLEXIBLE STOCK: ___% X ____(ACRES) = ____ (ACRES)

STEP 9
CLUSTER PLANTING EVALUATION

SELECT	ACTIVITY
--	BUFFER ESTABLISHMENT LESS THAN 1 ACRE
--	PLANTS GROUPED IN MULCHED BEDS

SELECT	PLANTING CLUSTER	AREA
--	1 CANOPY TREE & 3 LARGE SHRUBS OR 6 SMALL SHRUBS	300 SF
--	2 UNDERSTORY TREES & 3 LARGE SHRUBS OR 6 SMALL SHRUBS	350 SF

CLUSTER PLANTING IS NOT PROPOSED FOR THIS PROJECT BECAUSE THE BUFFER ESTABLISHMENT REQUIREMENT EXCEEDS ONE ACRE.

STEP 10
LANDSCAPE SCHEDULE: SPECIES, STOCK, SIZE, AND QUANTITY
ESTABLISHMENT REQUIREMENT: LOT 1 + LOT 2 + LOT 3 = 1.63 (ACRES) = 50% OF 3.26 ACRES

LOT 1, LOT 2 & LOT 3

SYM.	SPECIES	COMMON NAME	QNTY.	CREDIT EACH	CREDIT TOTAL	MAX % ALLOW	% USED
CANOPY TREES - 2 " CALIPER, 8'- 0" HIGH				200 SF	12000	N.A.	N.A.
QP	Quercus phellos	Willow Oak	60	200	12000		
CANOPY TREES - 1" CALIPER, 6'- 0" HIGH				100 SF	12000	N.A.	N.A.
AR	Acer rubrum	Red Maple	30	100	3000		
NS	Nyssa sylvatica	Black Gum	30	100	3000		
BN	Betula nigra	River Birch	30	100	3000		
QB	Quercus bicolor	Swamp White Oak	30	100	3000		
UNDERSTORY TREES - 1"CALIPER, 6'- 0" HIGH				75 SF	13200	N.A.	N.A.
MV	Magnolia virginiana	Sweetbay Magnolia	44	75	3300		
AC	Amelanchier canadensis	Serviceberry	44	75	3300		
CC	Cercis canadensis	Eastern Redbud	44	75	3300		
CV	Chionanthus virginicus	White Fringetree	44	75	3300		
LARGE SHRUBS - 1 GALLON, 4'- 0" HIGH				50 SF	20000	30%	28%
CA	Cornus amomum	Silky Dogwood	100	50	5000		
IT	Itea virginica	Virginia Sweetspire	100	50	5000		
IG	Ilex glabra	Inkberry	100	50	5000		
IV	Ilex verticillata	Winterberry	100	50	5000		
SMALL SHRUBS - 1 GALLON, 1'-6" HIGH				25 SF	14000	20%	19,7%
HD	Hypericum densiflorum	Dense St. John's Wort	140	25	3500		
VV	Vaccinum vacillans	Early Lowbush Blurberry	140	25	3500		
VA	Vaccicum angustifolium	Lowbush Blueberry	140	25	3500		
RC	Rosa carolina	Pasture Rose	140	25	3500		
HERBACEOUS PERENNIAL, 1 QUART				2 SF		NA	
TOTAL					71003 SF		

LANDSCAPE SCHEDULE NOTES
1. ALL PLANT SPECIES SHALL BE NATIVE TO THE CHESAPEAKE AND ATLANTIC COASTAL BAYS REGION BASED ON THE U.S. FISH AND WILDLIFE SERVICE PUBLICATION, NATIVE PLANTS FOR WILDLIFE HABITAT AND CONSERVATION LANDSCAPING.
2. SPECIES CLASSIFICATION (CANOPY TREE, UNDERSTORY TREE, ETC.) IS IN ACCORDANCE WITH MATURE HEIGHTS AS SET FORTH IN THE U.S. FISH AND WILDLIFE SERVICE PUBLICATION, NATIVE PLANTS FOR WILDLIFE HABITAT AND CONSERVATION LANDSCAPING.
3. SPECIES HAVE BEEN SELECTED BASED ON AN ANALYSIS OF SURROUNDING NATIVE FOREST AND DEVELOPED WOODLAND COVER.
4. SHRUB SPECIES COMPRISE ___47.7_____ PERCENT OF THE PROPOSED PLANTING, WHICH DOES NOT EXCEED 50 PERCENT OF THE OVERALL PLANTING.
5. THE QUANTITY OF ANY SINGLE SPECIES DOES NOT EXCEED 20 PERCENT OF THE OVERALL PLANTING

STEP 11
FLEXIBLE STOCKING ANALYSIS
AREA ELIGIBLE FOR NATURAL REGENERATION = 1.63 ACRES (50% OF 3.26 ACRES)

AREA	AREA SIZE	SPECIES	COMMON NAME	QTY.	STOCK SIZE	SURVIV. REQ'D	FINANCIAL ASSURANCE PERIOD
A	--	--	--	0	BARE ROOT SEEDLING (700/AC.)	50%	5 YEARS
B	--	--	--	0	1/2" TO 1" CONTAINER GROWN TREES (450/AC.)	75%	2 YEARS
C1 LOT 1	0,40 AC.	PLATANUS OCCIDENTALIS ILEX OPACA	SYCAMORE AMERICAN HOLLY	70 70	MORE THAN 1" CONTAINER GROWN TREES (350/AC.)	90%	2 YEARS
C2 LOT 2	0,20 AC.	PLATANUS OCCIDENTALIS ILEX OPACA	SYCAMORE AMERICAN HOLLY	35 35	MORE THAN 1" CONTAINER GROWN TREES (350/AC.)	90%	2 YEARS
C3 LOT 3	0,54 AC.	PLATANUS OCCIDENTALIS ILEX OPACA	SYCAMORE AMERICAN HOLLY	94 95	MORE THAN 1" CONTAINER GROWN TREES (350/AC.)	90%	2 YEARS

XX	XX
XX	XX
XX	XX
XX	XX

STEWARDS OF THE LAND
LANDSCAPE ARCHITECTS

SAMPLE MAJOR BUFFER MANAGEMENT PLAN
COUNTY

Drawing Title

Scale : AS SHOWN
Project No.: XXXXX
Date: MARCH 2011
Drawn By: XXX
Reviewed By: XXX

REVISIONS
NO. DATE DESC.

Sheet No.

Step-by-Step Guide
Buffer Management Plans: Planting Plan and Landscape Schedule

Step 1: Determine Establishment, Mitigation or Combination

Disturbance to the 100-foot and/or Expanded Buffer? (Yes/No)
If yes, mitigation is required. Proceed to Step 2. Otherwise, proceed to Step 5.

Step 2: Determine Required Mitigation Area for Disturbance

Calculate the total area disturbed within the 100-foot and expanded Buffer. Multiply this area by the mitigation ratio in Table 1 below for square footage.

Table 1: Mitigation Ratios for Development Activities

Activity	Mitigation Ratio
Shore erosion control	1:1
Riparian water access	2:1
Development or redevelopment of water-dependent facilities	2:1
Variance	3:1
Violation	4:1

Buffer Disturbance Mitigation:

Area disturbed (SF) _____ x Mitigation Ratio _____ = _____ SF

Step 3: Determine Required Mitigation Area for Clearing Trees

Calculate total diameter of all trees removed within the 100-foot and expanded Buffer that are 2 inches or more in diameter. (A tree's diameter = circumference divided by 3.142.) Multiply the total number of inches by 100 SF.

Tree Clearing Mitigation:

Diameter(Inches)_____ x 100 SF = _____ SF

Step 4: Determine Total Mitigation

Add the results from Step 2 and Step 3 to determine the total mitigation requirement.

Buffer Disturbance Mitigation (Step 2) **_____ SF**
Add:
Tree mitigation (Step 3) **+_____ SF**
Equals:
Total Mitigation: **=_____ SF**

If there is an establishment requirement associated with development outside of the 100-foot and expanded Buffer, then proceed to Step 5. If no establishment is required, proceed to Step 8 to develop or review the planting plan.

Step 5: Determine Required Establishment Area for Development

Identify development category. Determine when the lot was created (grandfathered status). Use Table 2 to determine how much of the Buffer must be established. Use site plan to determine the amount of acreage located within the Buffer

Table 2: Establishment Categories and Requirements

Development Category	Before Local Program Date	After Local Program Date
New development on vacant lot	Establishment based	Full establishment

	on total lot coverage	
New subdivision or new lot	Full establishment	
New lot with an existing dwelling unit	Establishment based on total lot coverage	
Conversion of land use on a parcel or lot to another land use	Full establishment	
Addition or accessory structure	Establishment based on net increase in lot coverage	
Substantial alteration	Establishment based on total lot coverage	

Establishment Required? **(Yes/No)**

Year Lot Created: _____

Establishment Requirement: _____

Total Area of Buffer Requiring Establishment : _____ **SF/Acres**

Step 6: Adjust Full Establishment for Existing Forest Cover

If the project requires full establishment of the Buffer, and existing forested vegetation is present on the site, use the site plan, aerial imagery, and/or a site visit to determine the percentage of the Buffer that is forested. Reduce the establishment requirement by this percentage. For example, if the entire area of the Buffer is 2000 SF, and the existing tree line indicates that approximately 10 percent of the Buffer is forested, then the required Buffer establishment would be 1800 SF.

Full Establishment of Buffer Required? **(Yes/No)**

If yes:

Total Area of Buffer Required to Be Established (Step 5): _____ **SF/Acres**
Less:
Total Area of Buffer in Existing Forest: _____ **SF/Acres**
Equals:
Modified Area of Buffer Required to Be Established _____ **SF/Acres**

Step 7: Determine Eligibility for Natural Regeneration

If the project requires Buffer establishment greater than one acre, then 50% of the area required can be established though natural regeneration, as long as it is within 50 feet of mature forest, and a supplemental planting plan & financial assurance are provided. If eligible, identify the natural regeneration area on the plan and reduce the planting requirement by the natural regeneration square footage.

Total Area of Buffer Required to Be Established (Step 5 or Step 6) _____ Acres

Total establishment > 1 acre? **(Yes/No)**
Natural Regeneration Permitted? (If establishment > 1 acre, **Yes.** Otherwise, **No)**
Area Eligible for Natural Regeneration _____ **Acres**

Step 8: Determine Stocking

Use Table 3 to determine how much of the area to be planted must be landscaping stock and what area may be planted using “flexible stocking.”

Table 3: Stocking Options

Requirement	Amount	Options
Establishment	Less than ¼ acre	Landscaping stock
	¼ acre up to or equal to 1 acre	Landscaping stock = 50% Minimum Flexible stocking = Remainder
	Greater than 1 acre up to or equal to 5 acres	Landscaping stock = 25% Minimum Flexible stocking = Remainder
	Greater than 5 acres	Landscaping stock = 10% Minimum Flexible stocking = Reminder
Mitigation	Less than 1 acre	Landscaping stock
	Equal to or greater than 1 acre	Landscaping stock = 50% Minimum Flexible stocking = Remainder

Establishment Requirement: _____ **(Acres)**

Stocking Requirement: **Landscaping Stock:** _____**% x** _____**(Acres) =** _____ **(Acres)**
Flexible Stock: _____**% x** _____**(Acres) =** _____ **(Acres)**
Natural Regeneration: _____**% x** _____**(Acres) =** _____ **(Acres)**

Mitigation Requirement: _____ **(Acres)**

Stocking Requirement: **Landscaping Stock:** ____**% x** _____**(Acres) =** _____ **(Acres)**
Flexible Stock: ____**% x** _____**(Acres) =** _____ **(Acres)**
Natural Regeneration: _____**% x** _____**(Acres) =** _____ **(Acres)**

Step 9: Determine if Planting Clusters Can Be Used and Calculate Quantities

If the planting requirement for either Buffer establishment or mitigation is less than 1 acre, then planting clusters may be used. Planting clusters provide bonus credit over individual trees and shrubs because the "cluster design" maximizes the water quality and habitat benefits on smaller sites. Planting clusters are considered "landscaping stock." Using Table 4, choose a cluster type or types and divide the planting square footage by 300 or 350 to determine the number of clusters. On the planting plan, the plants in each cluster must be grouped together in a mulched bed. The planting plan should provide a schematic of how the clusters will be arranged.

Table 4: Cluster Options

Vegetation Type	Minimum Size Eligible for Credit	Maximum Credit Allowed (SF)	Maximum Percent of Credit
Planting Cluster 1	1 Canopy Tree and 3 Large Shrubs	300	N/A
Planting Cluster 1	1 Canopy Tree and 6 Small Shrubs	300	N/A
Planting Cluster 2	2 Understory Trees and 3 Large Shrubs	350	N/A
Planting Cluster 2	2 Understory Trees and 6 Small Shrubs	350	N/A

Total establishment/mitigation < 1 acres? (Yes/NO)

If **yes,** the following can apply:

Planting Cluster 1 _____ **(Quantity) x 300 SF =** _____**SF**
Add:

Planting Cluster 2 _____ **(Quantity) x 350 SF =** _____ **SF**
Equals:
Total Cluster Planting **=** _____ **SF**

Step 10: Determine Landscaping Stock Type, Size, and Quantity

Based on the results in Step 8 and Step 9, determine the remaining square footage of planting required using landscaping stock. Use Table 5 to determine the square footage credits for canopy trees, understory trees, large shrubs, small shrubs, and herbaceous perennials. Herbaceous perennials can only be used for planting requirements that are less than one acre. Use the "Maximum Percent of Credit" to determine what square footage of the required planting can be herbaceous perennials, small shrubs, or large shrubs as desired by the landowner. Divide the square footage by the maximum credit allowed to determine the number of plants of each type that are needed. Because trees maximize water quality and habitat benefits, there is no maximum on the number of canopy trees and understory trees. The area around the plantings should be mulched or established with other ground cover that will ensure long-term survivability and reduce the threat of invasive species. If full establishment is required, plantings should be evenly distributed throughout the Buffer.

Table 5: Plant Credits

Vegetation Type	Minimum Size Eligible for Credit	Maximum Credit Allowed (SF)	Maximum Percent of Credit
Canopy Tree	2-inch caliper and 8 feet high	200	N/A
Canopy Tree	2-inch caliper and 6 feet high	100	N/A
Understory Tree	1-inch caliper and 6 feet high	75	N/A
Large Shrub	1 gallon and 4 feet high	50	30
Small Shrub	1 gallon and 18 inches high	25	20
Herbaceous Perennial	1 quart	2	10

Total Area of Buffer to Be Planted: _____ **(SF/Acres)**
Less:
Natural Regeneration Area (Step 7): _____ **(SF/Acres)**
Less:
Flexible Stock (Step 8): _____ **(SF/Acres)**
Less:
Cluster Planting (Step 9): _____ **(SF/Acres)**

Equals:

Planting Required w/ Landscaping Stock: **=**_____ **(SF/Acres)**

Step 11: Determine "Flexible Stocking" Size and Quantity

If the results of Step 8 allow flexible stocking, use Table 6 to determine the number of trees that must be planted, depending on whether they are seedlings or whips, small container trees, or larger container trees. (The square footage number will need to be divided by 43,560 and then multiplied by the number of stems per acre.) Only tree species can be used. It is important to note that higher quantities are required because survival has been adjusted to address normal mortality. Monitoring and financial assurance are mandatory.

Table 6: Flexible Stocking

Stock Size (Trees Only	Required Number of Stems Per Acre	Survivability Requirement	Financial Assurance Period After Planting
Bare root seedling or whip	700	50 percent	5 years
½-inch to 1-inch	450	75 percent	2 years

container grown trees			
More than 1-inch container grown trees	350	90 percent	2 years

Flexible Stock (acres) (Step 8):_____ (acres)
Bare Root/Whip: _____ (acres) x 700 stems/acre = _____(stems)
½ in – 1 in _____ (acres) x 450 stems/acre = _____(stems)
> 1 – inch _____ (acres) x 350 stems/acre = _____(stems)

Step 12: Evaluate Species

All species used should be species native to the Chesapeake Bay and Atlantic Coastal Bays Watershed. All species in the U.S. Fish and Wildlife Service publication entitled *Native Plants for Wildlife Habitat and Conservation Landscaping – Chesapeake Bay Watershed* are acceptable species that may be used to meet Buffer mitigation or establishment requirements. The publication is available at http://www.nps.gov/plants/pubs/chesapeake/ The classifications as trees, shrubs, and herbaceous plants (including ferns, grasses and grass-like plants, emergents, and vines) used in the publication will be used to determine plant type. Heights of the various species will be used to determine which species are understory or canopy trees and which species are large or small shrubs. These classifications are based on mature size. A local government may specify the use of salt tolerant species on certain sites and in certain locations as warranted by site conditions.

Step 13: Ensure Species Diversity

It is generally advisable to plant a variety of species within the types by using a few different species of canopy trees, understory trees, large shrubs, small shrubs, and herbaceous perennials. Identifying existing species on or around the project site can provide a general indication of those that will adapt well. For Major Buffer Management Plans, shrubs may not exceed 50 percent of the planting requirement, and no single species may exceed 20 percent of the total planting requirement.

Major Buffer Management Plan (> 5,000 ft^2 of disturbance)? (Yes/No)

If yes:

Maximum percentage of shrubs: _____ (acres*) x 50% = _____(acres)
Single species: _____ (acres*) x 20% = _____(acres)

*** = Total Area of Buffer Requiring Establishment (Step 5 or Step 6)**

Step-By-Step Guide
Buffer Management Plans: Maintenance, Protection and Inspections

Step 1: Review Planting Plan, Landscape Schedule and Date

The plan must include a planting date. If the Buffer Management Plan is connected to a building permit, the planting date should be prior to the start of construction or be the next available planting season. If the Buffer Management Plan is connected to a subdivision, the planting must occur prior to the sale of a new lot or the next available planting season. The area around the plantings should be mulched or planted with ground cover to ensure long-term survivability and reduce the threat of invasive species. If full establishment of the Buffer is required, plantings should be distributed throughout the Buffer to optimize Buffer functions.

If the applicant plans to maintain the land in agricultural use after subdivision, then planting of the Buffer may be deferred until a change in land use occurs. However, this must be noted on the Buffer Management Plan. Further, the applicant must have an approved Soil Conservation and Water Quality Plan in effect for the site, and this must be noted on the Buffer Management Plan.

If natural regeneration is used on the site, a supplemental planting plan for subsequent implementation is required in case the natural regeneration does not succeed. This plan must include a financial assurance to cover the cost of planting an area equivalent to the area of natural regeneration. The assurance would specify that release of the assurance could not occur until the latter of 5 years after the date of approval of the natural regeneration plan, or at such time as the area coverage of the Buffer is at least 300 native woody stems, on a per-acre basis, that are at least 4 feet in height.

Step 2: Review Maintenance Plan

Minor and Major Buffer Management Plans require a maintenance plan to ensure plantings meet the minimum survivability requirements (see Table 1). The plan may include elements like installing tree tubes, spraying for invasive species, amending the soils, or other site preparation techniques.

Monitoring should occur on at least an annual basis, and the plan must include provisions for supplemental plantings if survival rates fall below the minimum standards. Monitoring plans also should include a list of actions in the event of the presence of invasive species or loss of plantings. Landscape stock has 100% survivability requirements for 2 years. Therefore, the plan should include replanting provisions at the end of Year 1 and Year 2. Flexible stocking has a 5 year, 50% survivability requirement for Bare-root seedling or whips, a 2 year, 75% survivability for ½-inch to 1-inch container grown trees, and a 2-year, 90% survivability for container grown trees greater than 1-inch.

Step 3: Review Survivability and Inspection Periods

The Jurisdiction must inspect the planting to determine if survivability thresholds have been met. Replacement planting must be provided if survivability is not met. Arrangements must be included in the Plan that allow for replacement planting as necessary even if there is a change in ownership of the property.

Table 1. Survivability and Financial Assurance

Stocking Type	Survivability	Minimum Monitoring and Financial Assurance Period
Landscape Stock	100%	2 years
Bare-root seedling or whip	50% (350 stems/acre)	5 years
½” to 1” container grown trees	75% (338 stems/acre)	2 years
More than 1” container grown trees	90% (315 stems/acre)	2 years
Natural Regeneration	300 stems/acre	5 years

Step: 4 Review Inspection Agreement

The plan must include a signature block to be signed by the applicant that gives the jurisdiction permission to inspect the plantings at the appropriate times. The Plan should indicate inspection date and a requirement for the applicant to call the jurisdiction to schedule inspections. It is recommended that in addition to showing all of the above information on a recorded plan, the jurisdiction require a separate document detailing the above information to be held on file with the appropriate department.

Step 5: Review Financial Assurance for Major Buffer Management Plans

For Major Buffer Management Plans, those involving 5,000 square feet or more of mitigation or establishment, the local government must also hold a bond or other financial assurance to ensure that the Buffer establishment or mitigation is implemented and survives the required period. The bond, surety, or letter of credit cannot be released until the monitoring period is complete and survivability thresholds have been met The plan should calculate the cost of site preparation, equipment and supplies, earthwork, and watering to determine how much financial assurance should be collected. Based on the planting types and monitoring periods, some portions of the financial assurance could be given back at different times.

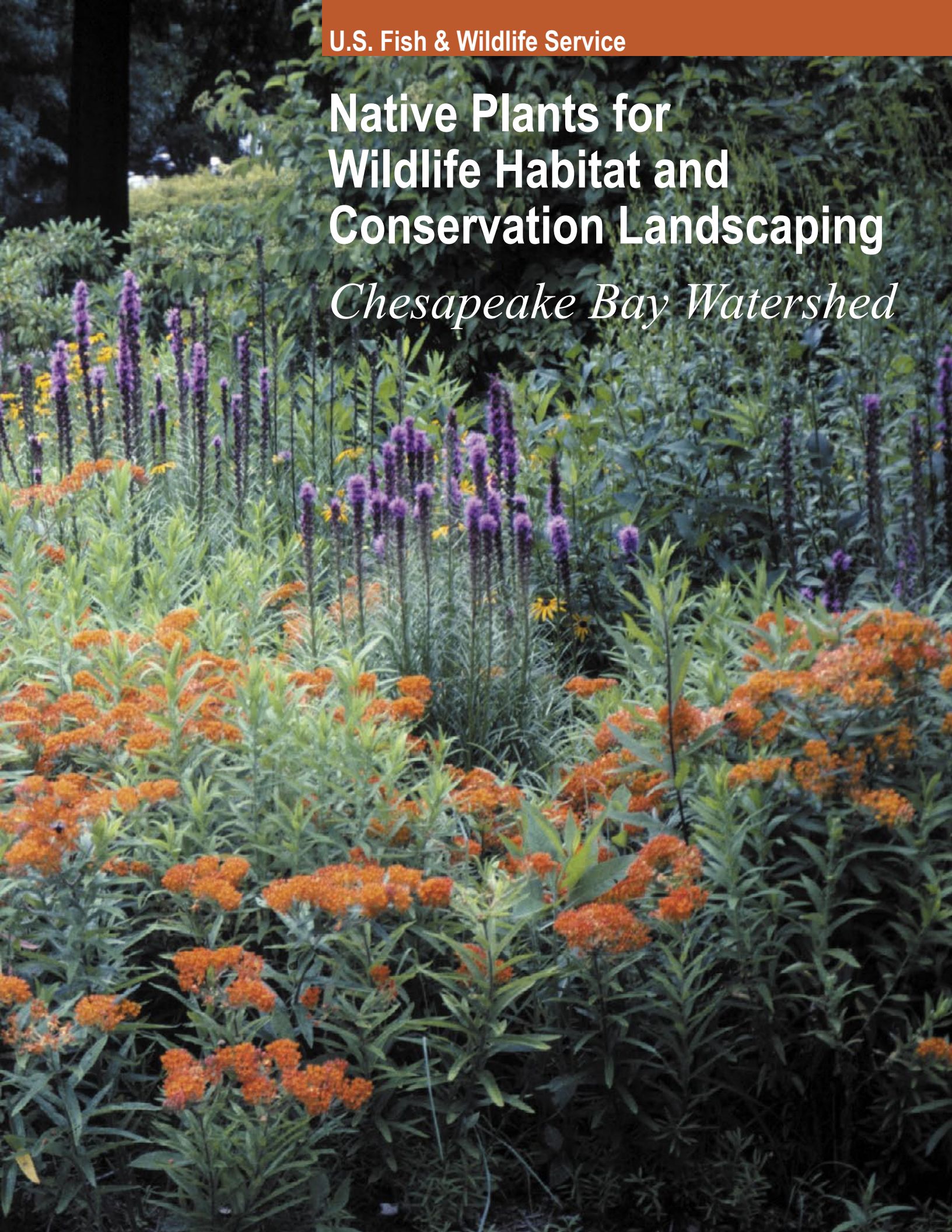
Step 6: Review Responsible Party Signature

Signature of responsible party is required for all Buffer Management Plans. This person is the primary point-of-contact for all issues relating to implementation, inspection, replacement planting, and bonding. Responsibility can be transferred to another party. This requires a formal agreement between the original responsible party, the new responsible party, and the local government.

U.S. Fish & Wildlife Service

Native Plants for Wildlife Habitat and Conservation Landscaping

Chesapeake Bay Watershed



Acknowledgments

Contributors: Printing was made possible through the generous funding from Adkins Arboretum; Baltimore County Department of Environmental Protection and Resource Management; Chesapeake Bay Trust; Irvine Natural Science Center; Maryland Native Plant Society; National Fish and Wildlife Foundation; The Nature Conservancy, Maryland-DC Chapter; U.S. Department of Agriculture, Natural Resource Conservation Service, Cape May Plant Materials Center; and U.S. Fish and Wildlife Service, Chesapeake Bay Field Office.

Reviewers: species included in this guide were reviewed by the following authorities regarding native range, appropriateness for use in individual states, and availability in the nursery trade:

Rodney Bartgis, The Nature Conservancy, West Virginia.
Ashton Berdine, The Nature Conservancy, West Virginia.
Chris Firestone, Bureau of Forestry, Pennsylvania Department of Conservation and Natural Resources.
Chris Frye, State Botanist, Wildlife and Heritage Service, Maryland Department of Natural Resources.
Mike Hollins, Sylva Native Nursery & Seed Co.
William A. McAvoy, Delaware Natural Heritage Program, Delaware Department of Natural Resources and Environmental Control.
Mary Pat Rowan, Landscape Architect, Maryland Native Plant Society.
Rod Simmons, Maryland Native Plant Society.
Alison Sterling, Wildlife Resources Section, West Virginia Department of Natural Resources.
Troy Weldy, Associate Botanist, New York Natural Heritage Program, New York State Department of Environmental Conservation.

Graphic Design and Layout: Laurie Hewitt, U.S. Fish and Wildlife Service, Chesapeake Bay Field Office.

Special thanks to: Volunteer Carole Jelich; Christopher F. Miller, Regional Plant Materials Specialist, Natural Resource Conservation Service; and R. Harrison Weigand, Maryland Department of Natural Resources, Maryland Wildlife and Heritage Division for assistance throughout this project.

Citation: Slattery, Britt E., Kathryn Reshetiloff, and Susan M. Zwicker. 2003. Native Plants for Wildlife Habitat and Conservation Landscaping: Chesapeake Bay Watershed. U.S. Fish & Wildlife Service, Chesapeake Bay Field Office, Annapolis, MD. 82 pp.

2003

Table of Contents

To the Reader

The use of native plants in landscaping and of course habitat restoration is certainly not new. In fact, their use has grown exponentially in recent years. Natural resources professionals in turn have been flooded with requests for information on native plants to use in various types of planting projects. Communities, schools, businesses, nonprofit organizations, watershed groups, local governments, state and federal agencies and many others are enhancing and restoring habitat, solving ecological problems, reducing maintenance, or just beautifying surroundings, all using locally native plants. Natural resources professionals, in turn, have been flooded with requests for information on native plants to use in various types of planting projects. There are many excellent resources available on native plants - some more technical than others, some more comprehensive than others. The frustration voiced most frequently by users is the lack of color photographs of the plants. After all, it is the striking visual quality of these plants that is their best “selling point.”

This publication includes those pictures as well as user-friendly information on native species appropriate for planting in the Chesapeake Bay watershed and adjacent coastal regions. Although one guide cannot furnish the answers to every question, we have included as much useful information as possible in a limited space. Although the large number of species of plants included here may overwhelm some readers, this guide displays the great diversity of plants available. We hope you will bypass the over-used, non-native and sometimes invasive ornamental plants, and select the equally and often more attractive native plants. Pour through this guide the same way you look through nursery catalogs. Use it to plan and design your next planting, whether it’s a small corner of your front yard, a two-acre meadow seeding, or 100 acres of wetland restoration.

Native Plants for Wildlife Habitat and Conservation Landscaping:
Chesapeake Bay Watershed

Introduction

"Conservation landscaping" refers to landscaping with specific goals of reducing pollution and improving the local environment. In the Chesapeake Bay watershed (the land that drains to the Bay and its many tributaries), this style of landscaping is sometimes called "BayScaping," or beneficial landscaping.

Conservation landscaping provides habitat for local and migratory animals, conserves native plants and improves water quality. Landowners also benefit as this type of landscaping reduces the time and expense of mowing, watering, fertilizing and treating lawn and garden areas, and offers greater visual interest than lawn. Beneficial landscaping can also be used to address areas with problems such as erosion, poor soils, steep slopes, or poor drainage.

One of the simplest ways to begin is by replacing lawn areas with locally native trees, shrubs and perennial plants. The structure, leaves, flowers, seeds, berries and other fruits of these plants provide food and shelter for a variety of birds and other wildlife. The roots of these larger plants are also deeper than that of typical lawn grass, and so they are better at holding soil and capturing rainwater.

Benefits of conservation landscaping

Americans manage approximately more than 30 million acres of lawn. We spend $750 million per year on grass seed. In managing our yards and gardens, we tend to over-apply products, using 100 million tons of fertilizer and more than 80 million pounds of pesticides annually. The average homeowner spends 40 hours per year behind a power mower, using a quart of gas per hour. Grass clippings consume 25 to 40% of landfill space during a growing season. Per hour of operation, small gas-powered engines used for yard care emit more hydrocarbon than a typical auto (mowers 10 times as much, string trimmers 21 times, blowers 34 times). A yard with 10,000 square feet of turf requires 10,000 gallons of water per summer to stay green; 30% of water consumed on the East Coast goes to watering lawns.

The practices described in this guide reduce the amount of intervention necessary to have attractive and functional landscaping. Conventional lawn and garden care contributes to pollution of our air and water and uses up non-renewable resources such as fuel and water. Many typical landscapes receive high inputs of chemicals, fertilizers, water and time, and require a lot of energy (human as well as gas-powered) to maintain. The effects of lawn and landscaping on the environment can be reduced if properties are properly managed by using organic alternatives applied correctly, decreasing the area requiring gas-powered tools, using native species that can be sustained with little watering and care, and using a different approach to maintenance practices.

With conservation landscaping, there is often less maintenance over the long term, while still presenting a "maintained" appearance. Conservation landscapes, like any new landscape, will require some upkeep, but these alternative measures are usually less costly and less harmful to the environment. New plants need watering and monitoring during the first season until they become established. Disturbed soil is prone to invasion by weeds - requiring manual removal (pulling) instead of chemical application. Over time, desired plants spread to fill gaps and natural cycles help with pest control. Garden maintenance is reduced to only minimal seasonal cleanup and occasional weeding or plant management. The savings realized by using little or no chemicals, and less water and gas, can more than make up for initial costs of installing the landscaping. Redefining landscaping goals overall and gradually shifting to using native species provide even greater rewards in terms of environmental quality, landscape sustainability, improved aesthetics, cost savings, and bringing wildlife to the property.

Why use native plants?

Native plants naturally occur in the region in which they evolved. While non-native plants might provide some of the above benefits, native plants have many additional advantages. Because native plants are adapted to local soils and climate conditions, they generally require less watering and fertilizing than non-natives. Natives are often more resistant to insects and disease as well, and so are less likely to need pesticides. Wildlife evolved with plants; therefore, they use native plant communities for food, cover and rearing young. Using native plants helps preserve the balance and beauty of natural ecosystems.

This guide provides information about native plants that can be used for landscaping projects as well as large-scale habitat restoration. All of the plants presented are native to the designated areas, however not *all* of the native species for that area have been included. Rather, plants have been included because they have both ornamental and wildlife value, and are generally available for sale. This guide covers the entire Chesapeake Bay watershed, including south central New York; most of Pennsylvania, Maryland and Virginia; the District of Columbia; Delaware, west of Delaware Bay; and the eastern panhandle of West Virginia.

The region's wildlife, plants, habitats and network of streams and rivers leading to the Bay are tremendous resources. As the human population throughout the Chesapeake Bay watershed grows and land-use pressures intensify, it is increasingly important to protect our remaining natural areas and wildlife, and restore and create habitat. By working together, these treasures can be conserved for future generations. Individual projects are great, collective measures are even better, yet every action helps no matter what size.

Conservation landscaping elements

We can incorporate elements of natural systems into the existing areas where we live, work, learn, shop and play. Landscaping provides valuable opportunities to reduce the effects of the built environment. These areas can be both aesthetically pleasing and functional. Use of native species will make your garden or landscaping more environmentally beneficial. By combining plant selection with some of the other concepts below, you can achieve more environmental benefits.

Reduce disturbance. Carefully decide where new development will occur to avoid destruction of existing habitat as much as possible. Take advantage of the site's existing natural features.

Reduce lawn or high maintenance areas. Replace turf or ornamental plantings by adding new landscaping beds and/or enlarge existing ones with native plants.

Think big, but start small. Draw up a plan for your entire yard but choose one small area for your first effort. Trial and error with the first project will help you learn without being overwhelmed. Phase in the whole project over time.

Use native plants. Start by using natives to replace dead or dying non-native plants, or as a substitute for invasive non-natives in existing gardens or landscaping. Plan to use native plants in new landscaping projects.

Avoid invasive species. Non-native plants can be invasive. They have few or no naturally occurring measures to control them, such as insects or competitors. Invasive plants can spread rapidly and smother or out-compete native vegetation. Invasive, non-native plants are not effective in providing quality habitat. A copy of the publication "Plant Invaders of Mid Atlantic Natural Areas" can be downloaded from www.nps.gov/plants/alien/pubs/midatlantic/index.htm.

Improve water quality. Native species planted on slopes, along water bodies and along drainage ditches help prevent erosion and pollution by stabilizing the soil and slowing the flow of rainwater runoff. To collect and filter runoff, depressions can be created and planted with native plants suited to temporary wet conditions. These "rain gardens" will capture water and hold it *temporarily for a*

In certain conditions, some native plants can also become aggressive spreaders, though their spread is more limited by natural controls than non-native aggressors. Plants that seed readily (such as black-eyed Susan, *Rudbeckia* species), or that spread by lateral roots (such as mint family plants *Monarda* or *Physostegia* species) should be used sparingly or controlled in gardens. Certain native species that are difficult to control or show up uninvited should not be planted, such as cattail (*Typha* species).

day or two and remove pollutants washing off of the surrounding land.

Enhance and create wildlife habitat. An animal's *habitat* is the area where it finds food, water, shelter, and breeding or nesting space, in a particular arrangement. If we want our gardens to have the greatest ecological value for wildlife, we need to mimic natural plant groupings and incorporate features that provide as many habitat features as possible.

Plants are one of the most important features of an animal's habitat, because they often provide most, or even all of the animal's habitat needs. Animals in turn help plants to reproduce through dispersal of pollen, fruits or seeds. Consequently, plants and animals are interdependent and certain plants and animals are often found together. So, it is important that plants be selected, grouped, and planted in a way that is ecologically appropriate.

Each plant prefers or tolerates a range of soil, sunlight, moisture, temperature and other conditions, as well as a variety of other factors including disturbance by natural events, animals or human activities. Plants sharing similar requirements are likely to be found together in plant *communities* that make up different habitat types - particular groupings of plant communities commonly recognized as wetlands, meadows, forests, etc. Some plants may tolerate a wider range of conditions than others, and therefore can be found at more than one type of site, in association with a different set of plants at each. By matching plants with similar soil, sunlight, moisture and other requirements, and planting them to the existing site conditions, the planted landscapes will do a good job of approximating a natural habitat.

Instead of isolated plantings, such as a tree in the middle of lawn, group trees, shrubs and perennials to create layers of vegetation. A forest has, for example, a *canopy* layer (tallest trees), *understory* layers (various heights of trees and shrubs beneath the canopy) and a ground layer or forest floor. These layers provide the structure and variety needed for shelter, breeding or nesting space for a diversity of wildlife.

To provide food and cover for wildife year-round, include a variety of plants that produce seeds, nuts, berries or other fruits, or nectar; use evergreens as well as deciduous plants (those that lose their leaves); and allow stems and seedheads of flowers and grasses to remain standing throughout fall and winter.

All animals need water year-round to survive. Even a small dish of water, changed daily to prevent mosquito growth, will provide for some birds and butterflies. Puddles, pools or a small pond can be a home for amphibians and aquatic insects. A larger pond can provide for waterfowl, such as ducks and geese, and wading birds such as herons. Running or circulating water will attract wildlife, stay cleaner and prevent mosquitoes.

Rock walls or piles, stacked wood, or brush piles provide homes for insects, certain birds and small mammals. Fallen logs and leaf litter provide moist places for salamanders, and the many organisms that recycle such organic matter, contributing nutrients to the soil. Standing dead tree trunks benefit cavity-nesting wildlife such as woodpeckers.

Consider naturalistic planting, or habitat restoration. It may be feasible to create a more natural landscape instead of a formal one. Naturalistic landscaping uses patterns found in nature, and allows some nature-driven changes to occur. Plants multiply, and succession or gradual replacement of species may take place, with less human intervention. A property located near natural areas, such as forests, wetlands and meadows, is a good candidate for a habitat project. Expand existing forest by planting trees and shrubs along the woods line, using native species that grow in the area, and allow birds and wind to bring the understory plants over time. Wet sites, areas with clay soils, or drainage ditches can be converted to wetlands. An open piece of ground or lawn can be planted as a meadow or grassland. Schools, homes, small businesses, large corporate sites, municipalities, military installations, recreational areas and other public lands can all include habitat plantings.

How to choose plants

Finding ready information about what plants "go together" for habitat restoration, enhancement, or creation projects is difficult. Often, the professional will examine a nearby natural area and try to mimic the combination of plant species found there. That may not be possible for individuals unfamiliar with natural areas. Fortunately, by following some simple guidelines, you will have garden spaces that grow well on your site and mirror the plant communities found naturally in your area. The plant lists found at the end of this guide will also help give you a start at planting appropriate groupings.

- **Know your site and plant to the existing site conditions.** Check the sun exposure, soil moisture and soil type where you plan to plant, and choose plants that will grow and thrive in those conditions. For a few dollars your state or local cooperative extension office can analyze a small soil sample you send them (for contact information, see your government listings in the phone book). The results will include soil type (sand, clay, loam, etc.), pH and fertility status and recommendations for amending the soil to make it into "average garden soil." However, by selecting native species that thrive in the *existing* conditions, you won't need to add soil, fertilizer, lime or compost. There are a wide variety of plants that will thrive in most conditions, even the driest, poorest soil or very wet clay soil. If, however, the soil test shows extreme pH - very acidic (pH of less than 5) or very basic (pH 8 or above), your plant choices will be fairly limited. In that case, you might choose to follow the instructions for making the soil more neutral. If the soil is hard, compacted fill dirt, you might want to improve it by adding organic matter and work the ground so that it can more easily be planted. If you alter the site, then select plants suited to the new conditions.

- **Choose plants native to your region of your state.** Along with planting to the existing site conditions, use locally native plants. Use the map on page 9 to identify which **physio-geographic region** the planting site lies in. If you're close to a border dividing two regions, you may choose plants from either or both regions.

- **Choose a habitat type.** Try to create or emulate a specific habitat, like woods, wetland or meadow, and choose plants that are appropriate to both your site and the habitat. Look through this guide and mark the plants with growth requirements that match conditions at the planting site. This will help improve the success of your planting, the habitat value, and the ecological functioning of the project. This publication will eventually be made available online, in a format that can be electronically sorted by plant characteristics or growth conditions.

Where to find native plants

Most nurseries carry some native plants, and some nurseries specialize and carry a greater selection. As the demand for native plants has grown, so has the supply at nurseries. Some plants will be more readily available than others. Here, we've focused on species most appropriate for planting and available through the nursery trade. A limited number of species included here are not commonly available but are able to be nursery grown. Take this guide along with you when you visit nurseries and if you need help, ask for nursery staff familiar with native plants. If you see a plant you like, check to see if it's included in the guide for your state and physiographic region. For those species that are more difficult to find, the hope and intention is that this publication will spark a demand, and hence a greater supply. If you have a favorite plant that you can't obtain, be sure to ask your local nursery to consider adding it to their stock. A list of some of the many retail and wholesale native plant nurseries in the Chesapeake Bay region is available from the U.S. Fish and Wildlife Service, Chesapeake Bay Field Office at www.fws.gov/r5cbfo/bayscapes.htm.

For the greatest ecological value, select the "true" native species, especially if planting for wildlife benefit. There are cultivated varieties (*cultivars*) available for many native plants. These are named using the scientific name (Latin genus and species, such as *Rudbeckia fulgida*) plus the cultivar name, a third word in single quotation marks (such as *Rudbeckia fulgida* 'Goldsturm'). These varieties have been grown to provide plants with certain physical characteristics, perhaps a different flower color, different foliage or a compact shape or size. Although these are suitable for gardening use, use true species (not cultivars) if you are planning a habitat project to provide

food for wildlife. These plants are most suited to use by the native wildlife, and will increase your chances of attracting them.

Native plants should never be removed from the wild unless an area is about to be developed. Even then, it is difficult to transplant wild-collected plants and to duplicate their soil and other growth requirements in a home garden. Plants that are grown from seed or cuttings by nurseries have a much greater tolerance for garden conditions. Help to preserve natural areas by purchasing plants that have been grown, not collected.

Ask nurseries about the source of the native species sold. Did they come from seed or cuttings of plants found growing locally, or are they from another region? Ideally, the plants you use should come from stock from the same region, say, within about a 200-mile radius in the same physiographic province (coastal plain, Piedmont, or mountain). Differences exist from region to region even in the same plant species, due to differences in climactic conditions between distant locations. For example, a plant grown in Maine may flower at a different time than the same species grown in Maryland. They may have slight physical differences. These characteristics make a difference in designing gardens and they matter to wildlife seeking food sources. The more consumers ask for locally grown plants or seed, the more likely it is that nurseries will carry local stock.

Once you begin to explore and experiment with native plants, you'll soon discover that many of these plants go beyond just replacing worn out selections in your yard. Native plants will eventually reduce your labor and maintenance costs while inviting wildlife to your yard helping to create your own sense of place.

How to use this guide

Plant Names and Types

Plants are organized within each section alphabetically by scientific name. All scientific plant names used are based on names accepted by ITIS, the Integrated Taxonomic Information System. Plants are indexed at the back of the book by scientific as well as frequently used common names. Scientific names are changed periodically as new information is gathered; for those commonly recognized names that changed during development of this guide, the new names are used here, with a cross reference noted in the index. For example: *Aster divaricatus* is now *Eurybia divaricata*, so the plant is listed in the index under both *Aster* and *Eurybia*.

Plants are grouped by botanical categories: Ferns; Grasses & Grasslike Plants (includes grasses and plants with long slender leaves that may appear similar to a grass); Herbaceous Plants (includes flowers and groundcovers); Herbaceous Emergents (plants that grow in moist to wet soils, wetlands or in standing water with roots and part of their stems below water but with most of the plant above the water); Shrubs; Trees; and Vines.

A note about groundcovers: English ivy, periwinkle, creeping lily turf and Japanese pachysandra are some commonly used groundcovers, particularly for shade. However, these species are non-natives that are invasive in the landscape, so they should be *avoided*. What native alternatives can be used instead? A groundcover can be any plant that would physically cover or hide the bare ground from view. For the purposes of environmentally beneficial landscaping and habitat enhancement, any plant in the "herbaceous"category would make a good groundcover. For those gardeners and landscapers still seeking a low-growing, creeping, spreading, or clump-forming plant for a groundcover, these plants are marked with a GC symbol in the Notes column and a list is included at the end of the guide.

Characteristics

- **Height and/or Spread** The typical mature height or possible range of heights is given in feet, to the nearest half (0.5) foot. Height may vary depending on conditions (e.g., amount of moisture or sun). For trees and vines, spread is also given in feet. For trees, spread is the measurement of the crown of the plant; for vines, spread is the length a vine will grow along a surface.

- **Flowers: bloom period and flower color** The typical months in which the plant blooms are given. The exact time and duration of bloom may be shifted by days or weeks for different areas and/or depending on seasonal weather conditions and climactic trends. The basic, overall color of the flower is noted. The color of a flower's center or throat may not be included due to limited text space. For simplicity, some shades or tones of colors have been grouped, e.g. lavender, pale purple, bluish purple, even fuchsia may have been listed simply as purple; tan, brown, dark brown are all listed as brown; yellows and pinks may be similarly condensed.

- **Fruit: fruiting period, color and type** This information is provided for plants with more conspicuous fruits or visually interesting seeds. Terms used include: Achene, a dry flat seed such as in clematis; Berry, which includes small single berries such as blueberry, larger berries such as persimmon, aggregates such as blackberry and hips such as a rose hip; Capsule, including various types and sizes of dry fruits with two or more compartments containing seeds, such as iris, sweet pepperbush, hibiscus, or black-eyed Susan; Cone/cone-like such as pines, hemlock, or alder; fleshy pomes or drupes such as hawthorn, beach plum, paw paw, passion flower, or cherry; Nut/nut-like, as in acorns (oaks) or hickory; Pod, which may include pea-like legumes such as partridge pea or wild senna, *follicles* or other long pod-like *capsules* such as milkweeds, delphinium, or trumpet creeper; and Winged, such as the *samaras* of maples or elm.

- **Fall Color** The color listed indicates the fall color of the leaves, or of the stems for certain plants such as grasses. Some color shades have been grouped by the basic color, as for flower color. Evergreens, species that retain their leaves throughout the winter (in all plant categories), are designated with a ▲ symbol in the Notes column. Evergreens are popular for various landscaping uses and valuable for year-round cover for wildlife.

Growth Conditions

- **Light** The amount of sunlight a plant requires is defined as: Full Sun ☼, the site is in direct sunlight for at least six hours a day during the growing season; Partial shade ◐, the site receives approximately three to six hours of direct sunlight; and Shade ●, the site receives less than three hours of direct sunlight or filtered light.

- **Moisture** The amount of soil moisture a plant requires is defined as: Dry (D), areas where water does not remain after a rain (areas may be in full sun or in a windy location, on a steep slope, or have sandy soil); Moist (M), areas where the soil is damp, and may be occasionally saturated; and Wet (W), areas where the soil is saturated for much of the growing season, except in droughts. Many of the plants designated for wet areas tolerate specific ranges of water depths (see Flood Depth). Plants with the Dry designation can be considered drought tolerant.

- **Soil pH and Type** Many of the native plants listed will tolerate a range of soil types. Soil types are listed here as Organic (O), containing a high amount of organic material such as decayed leaves and bark; Clay or fine-textured (C) soils with a high clay content and some silt - very fine soil particles; Loamy or medium-textured (L) soils that contain a mix of mostly silt and sand but may contain some clay; and Sandy or coarse-textured (S) soils with larger particles. Soil information has necessarily been simplified for this guide, and lumped into these main categories, which will suffice for the novice. Soils in actuality are often a mixture or gradations of types, categorized by the percentages they contain of clay, silt or sand, for example clay loam (a certain mix of clay and sand); sandy clay; silt loam; or silty clay loam. For best results, select plants suited to existing site conditions rather than amending the soil. However, be aware that plant selection may be limited if your site has very sandy soil, heavy clay, compacted soil, or extreme soil pH (above 8 or below 5.5). In these cases, seek advice from a nurseryman, horticulturist, botanist, Cooperative Extension agent, or other expert.

- **Flood Depth** Some plants tolerate prolonged standing water, and occur in specific water depths or range of depths. In the Herbaceous Emergents section, the depth of water tolerated is indicated (in inches). Other types of wetland plants that can tolerate only intermittent flooding appear in other sections of the guide, and their flood tolerance

information is included in the Notes column. For more complete information on planning and planting wetlands, see the references listed at the end of this guide.

- **Salt Tolerance** Some plants that tolerate prolonged standing water can tolerate saltwater or brackish (partly salty) water. For plants in the Herbaceous Emergents section, the salinity range in which each of these plants will grow is given in parts (of salt) per thousand parts (of water) or ppt, from 0 ppt (fresh water) to the maximum salinity tolerated. For plants in other sections of the guide, the maximum salinity is given in the Notes column. Full seawater is approximately 32 ppt. If salinity is not given, then the plant grows in fresh water only or in drier conditions.

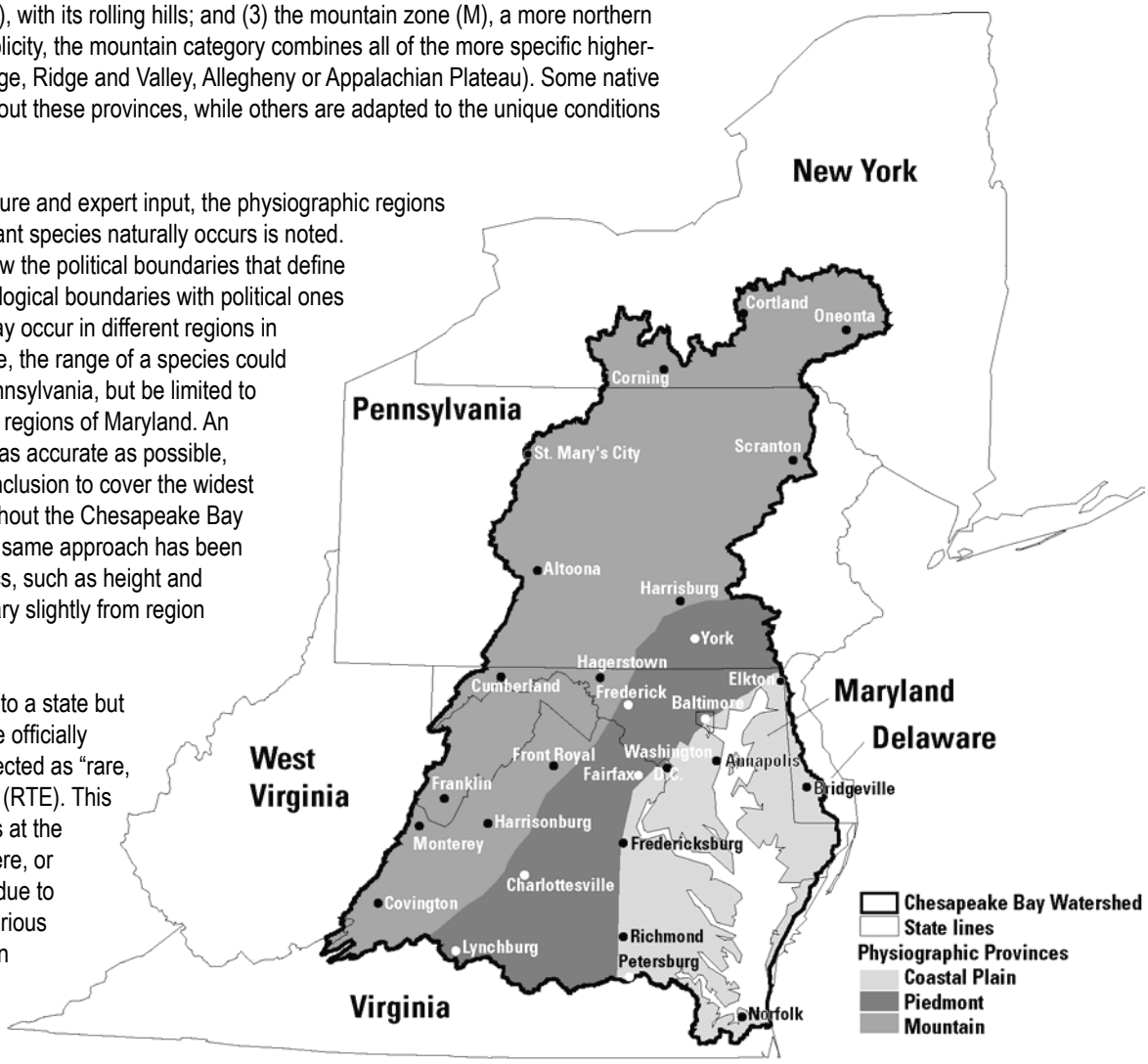
Habitat

For each plant in this guide, we include a description of habitats in which that plant may be found. Several habitat types may be mentioned as each plant is rarely found in one and only one habitat type. There are dozens of forest types, several types of wetlands including forested wetlands and even wet meadows. The habitats described include those that provide the conditions most preferred by each plant species. To help with planning projects, sample lists of plants to use in certain habitat types, or certain site conditions, are given in the back of this guide. More technically detailed information on plant communities can be found in resources listed in the references section.

Native To (Where To Use) - States and Physiographic Regions

From the sandy dunes of the coast to the rocky slopes of the mountains, the rich variety of habitats found throughout the region is strongly linked to its geology, topography and climate. For this guide, the states in the Chesapeake Bay watershed have been divided into three regions or provinces: (1) the coastal plain (C), an area with fairly flat topography and more southern climate; (2) the Piedmont plateau (P), with its rolling hills; and (3) the mountain zone (M), a more northern climate (see map). For simplicity, the mountain category combines all of the more specific higher-altitude provinces (Blue Ridge, Ridge and Valley, Allegheny or Appalachian Plateau). Some native plants are common throughout these provinces, while others are adapted to the unique conditions found only in one or two.

Based on the existing literature and expert input, the physiographic regions and states in which each plant species naturally occurs is noted. However, plants do not follow the political boundaries that define our states, so matching ecological boundaries with political ones is difficult. Certain plants may occur in different regions in different states. For example, the range of a species could extend throughout all of Pennsylvania, but be limited to the mountain and Piedmont regions of Maryland. An effort has been made to be as accurate as possible, while erring on the side of inclusion to cover the widest range of possibilities throughout the Chesapeake Bay watershed as a whole. This same approach has been used for other characteristics, such as height and bloom period, which may vary slightly from region to region.



Note: Some species native to a state but not commonly found may be officially designated and legally protected as "rare, threatened, or endangered" (RTE). This may be because the plant is at the edge of its natural range there, or its population has declined due to loss of habitat caused by various natural events and/or human activities in that region. Species that are listed in a state as RTE should

generally not be planted there, because importing species from elsewhere could potentially lead to damaging alteration of the gene pool of the remaining population. This guide lists only those states in which a plant is common and recommended for planting. As a general rule of thumb, if a plant you like is not designated in this guide for your state or your region of the state, we strongly encourage you to forego planting that and select another plant suited to your site.

Wildlife Value
The notation "high wildlife value" is based mainly on the value of the fruits, seeds and/or nectar used as food for wildlife, and the relative number of species using the plant for food. But remember that animals use leaves, twigs, roots and shoots for food or nesting material, and every plant has value as cover and/or nesting sites. In that respect, although we've marked those of higher wildlife (food) value, every plant in this guide has value to wildlife, as well as other environmental values.

The **types of wildlife** noted here are those desirable species that are likely to use the plants for food, including pollinators which are critical to plant reproduction, for gardens, natural areas and agricultural crops. The information here is fairly general. The songbird icon indicates use of a plant by small usually migratory birds, but may include upland game birds. The waterfowl icon may include shorebirds and wading birds along with ducks and geese. The hummingbird icon has been indicated separately because many people are interested specifically in attracting them. The butterfly icon may refer to the adults or to the larval stage that uses the plant as a host. The beneficial insect icon, besides butterflies, includes ladybugs, bees (essential pollinators) and other insects that serve as a pest control or other desirable role. The small mammal icon is noted for plants used by any of a variety of small animals, such as raccoons, opossums, foxes, etc., depending upon location and surrounding habitat.

Absent but not forgotten: Certain wildlife species are not represented, due in part to a lack of available information for every plant related to all types of animals. However, these are all likely to inhabit or occasionally visit a native plant garden or habitat planting, and their importance in the web of life should not be underestimated. Many insects have not been represented here, though they certainly use a wide variety of plants throughout their life cycles and are an integral part of the ecosystems we're trying to protect, conserve and enhance. Reptiles and amphibians, particularly salamanders, frogs and turtles, inhabit our yards as well as natural areas. They use plants for food and cover, and especially need water sources such as lakes, ponds, streams, puddles or even a small dish of water (aerated or changed daily to prevent mosquito breeding). Bats provide a valuable service as insect pest controllers and pollinators.

Notes
This catchall includes pertinent information that bears emphasizing or is not reflected in the other categories. It may include additional notes or clarification about the plant's characteristics, growth, and spread; tips or suggestions on cultivation; cultivars; or general use of the plant.

By providing these characteristics for each plant species we hope to provide you with a variety of choices to meet the conditions of your property as well as your personal preferences. Whether you are replacing a few individual plants, designing a new bed or planning for an entirely new look, this guide can help narrow the choices to plants most likely to thrive in your environment and create the landscape you desire.


Songbird


Waterfowl


Hummingbird


Butterfly


Beneficial insect


Small mammal

Providing the basic habitat structures described earlier and planting a diversity of plants (and therefore food sources) will bring a surprising and beneficial array of life to your property.

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Adiantum pedatum *northern maidenhair fern*	 UWI MC	Height: 1-2' Fruit:	Light: ◐ ● Moisture: M Soil pH: 4.5-6.5 Soil type: L S O	moist woods, rocky shaded habitats	Region: M P C States: DC MD NY PA VA WV		grows in clumps; delicate texture; herbal uses GC
Asplenium platyneuron *ebony spleenwort*	 RHW	Height: 0.5-1.5' Fruit:May-Sep	Light: ○ ◐ ● Moisture: M Soil pH: 4.5-7 Soil type: C L S	banks, open woods and thickets, slopes, rocky ledges, swamps	Region: M P C States: DC MD NY VA WV		easily transplanted; only moderate care needed; evergreen ▲ GC
Athyrium filix-femina *northern lady fern*	 UWI KJS	Height: 1-3' Fruit:	Light: ◐ Moisture: M W Soil pH: Soil type: L S	woods, banks, wooded hillsides, sandy bogs	Region: M P C States: DC DE NY WV		varieties occur throughout region; in MD, VA can also use subspecies asplenioides (southern lady fern) GC
Botrychium virginianum *rattlesnake fern*	 RHW	Height: 1-2' Fruit:	Light: ◐ ● Moisture: D M Soil pH: 5.6-6.9 Soil type: L O	rich, woods	Region: M P C States: DC DE MD NY VA WV		GC
Dennstaedtia punctilobula *hay-scented fern*	 UWI RWF	Height: 1-3' Fruit:Jul-Oct	Light: ○ ◐ Moisture: D M Soil pH: Soil type: L	open woods and fields	Region: M P C States: DC MD NY VA WV		can spread over large areas of open understory or pasture GC
Dryopteris carthusiana (D. spinulosa) *toothed or spinulose woodfern*	 UWI RWF	Height: 1-2.5' Fruit:Jun-Aug	Light: ◐ ● Moisture: M W Soil pH: 5-6 Soil type: L O	low woods, thickets, swamps, rich woods, rocky slopes	Region: M P States: DC DE MD NY PA VA WV		forms colonies; semi-evergreen ▲ GC
Dryopteris cristata *crested wood or shield fern, narrow swamp fern*	 UWI RWF	Height: 1.5-2.5' Fruit:Jun-Sep	Light: ○ ◐ ● Moisture: M W Soil pH: 3.5-6.5 Soil type: C L	shallow emergent marshes, shrub swamps, wooded swamps, open shrubby wetlands	Region: M P C States: DC DE MD NY PA VA WV		small rosette fronds ▲ GC
Dryopteris intermedia *evergreen wood-fern*	 UWI EJJ	Height: 2.5' Fruit:	Light: ◐ ● Moisture: D M W Soil pH: Soil type: L O	rich, moist to dry woods	Region: M P C States: DC DE NY PA VA WV		clump-former; not common on coastal plain; hybridizes with eight species ▲ GC

Ferns

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Dryopteris marginalis *marginal or evergreen shield fern, evergreen wood fern*	 UWI RWF	Height: 1-3' Fruit:Jun-Oct	Light: ◐ ● Moisture: D M Soil pH: Soil type: C L S	moist woods, clearings	Region:M P C States: DC DE MD NY PA VA WV		clump-former; attractive; easily transplanted ▲ GC
Onoclea sensibilis *sensitive fern*	 UWI KJS	Height: 1-3.5' Fruit:Jun-Oct	Light: ○ ◐ ● Moisture: M W Soil pH: Soil type: C L S	fresh tidal and nontidal marshes, meadows, swamps, woods	Region:M P C States: DC DE MD NY PA VA WV		spreads in wet areas; fertile fronds dark brown, erect GC
Osmunda cinnamomea *cinnamon fern*	  RHW, UWI TK	Height: 2-5' Fruit:Apr-May	Light: ○ ◐ ● Moisture: M W Soil pH: 4.5-7 Soil type: C L	woods, marshes, swamps, bogs, streamsides	Region:M P C States: DC DE MD NY PA VA WV		tolerates drought; fertile fronds reddish brown, wooly GC
Osmunda claytoniana *interrupted fern*	 UWI EJJ	Height: 1-4' Fruit:	Light: ◐ ● Moisture: M Soil pH: 4-6 Soil type: C L	fields, forest and swamp edges	Region:M P States: DC DE MD PA VA WV		grows in clumps GC
Osmunda regalis *royal fern*	 UWI EJJ	Height: 1.5-6' Fruit:Apr-Jun	Light: ○ ◐ ● Moisture: M W Soil pH: 4-6 Soil type: C L S	fresh tidal and nontidal marshes and swamps, woods, irregularly, seasonally, or permanently saturated (up to 100% of growing season)	Region:M P C States: DC DE MD NY PA VA WV		tolerates full sun if moist; tolerates drought; tolerates irregular, seasonal or permanent saturation; only tolerates flooding for a few days GC
Polystichum acrostichoides *Christmas fern*	 USFWS BES	Height: 0.5-2' Fruit:Jun-Oct	Light: ◐ ● Moisture: M Soil pH: 4.5-7 Soil type: L S	woods, thickets, rocky slopes	Region:M P C States: DC DE MD NY PA VA WV		grows in clumps; easily grown in rock gardens and shaded places; impartial to soil type ▲ GC
Pteridium *bracken fern*	 CM NRCS	Height: 1.5-6' Fruit:	Light: ○ ◐ Moisture: D M W Soil pH: Soil type: C L S	dry pine woods, swamps, marshes, fields, waste places	Region:M P C States: DC DE MD NY PA VA WV		forms large colonies; host for several ant types GC
Thelypteris noveboracensis *New York fern*	 USFWS BES	Height: 1-2.5' Fruit:Jun-Sep	Light: ◐ ● Moisture: M W Soil pH: 4-7 Soil type: C L S	forested wetlands, dry to damp woods, thickets	Region:M P C States: DC DE MD NY VA WV		tolerates drought; easily transplanted; forms large colonies; spreads easily GC

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Thelypteris palustris *marsh fern*	Height: 2-3' Fruit:Jun-Oct	Light: Moisture: M W Soil pH: Soil type: C L S	swamps, bogs, fields, thickets, fresh marshes, wooded streambank	Region:M P C States: DC DE MD NY VA WV		spreads GC
Woodwardia areolata *netted chain fern*	Height: 0.5-2' Fruit:Jul-Oct	Light: Moisture: M W Soil pH: Soil type:	bogs, swamps, woods	Region: P C States: DC DE MD VA		spreads by creeping rhizome GC
Woodwardia virginica *Virginia chain fern*	Height: 3-6' Fruit:Jul-Sep	Light: Moisture: M W Soil pH: Soil type:	swampy places, woods	Region: P C States: DC DE MD NY VA		spreads by creeping rhizome GC


UWI RWF


PLANTS RM91


PLANTS


RHW

Osmunda regalis


RHW

Osmunda cinnamomea


RS MNPS

Polystichum acrostichoides


USFWS BES

New fern fiddleheads emerging.

Grasses & Grasslike Plants

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Agrostis perennans *autumn bentgrass*	 PLANTS RM95	Height: 1-3' Flowers: Jun-Oct	Light: ☼ ◐ ● Moisture: D M W Soil pH: 5.5-7.5 Soil type: C L	dry or moist thickets, open woods	Region: M P C States: DC DE PA VA WV		
Ammophila breviligulata *dunegrass, American beachgrass*	 UWI RRK	Height: 1.5-3.5' Flowers: Jul-Sep	Light: ☼ Moisture: D Soil pH: 5.8-7.8 Soil type: L S	maritime beaches, dunes, grasslands, shrublands	Region: C States: VA		prefers well-drained, sandy sites; spreads rapidly by rhizomes
Andropogon gerardii *big bluestem*	 RHW	Height: 2-6.5' Flowers: Jun-Sep	Light: ☼ ◐ Moisture: D M W Soil pH: 6-7.5 Soil type: C L S	dry or wet open woods, prairies, swales, shores; dry open areas	Region: M P States: DC DE NY PA VA WV		clump forming; attractive, with winter interest
Andropogon glomeratus (A. virginicus var. abbreviatus) *bushy bluestem*	 PLANTS	Height: 1.5-5' Flowers: Aug-Oct, reddish brown	Light: ☼ ◐ Moisture: M W Soil pH: 5-6.3 Soil type: C L S	fresh marshes, coastal areas	Region: M P C States: DC DE VA WV		tolerates drought; grows in tufts; reddish fall color
Andropogon virginicus *broomsedge*	 PLANTS JS	Height: 1-3' Flowers: Aug-Nov, reddish brown	Light: ☼ Moisture: D M W Soil pH: 4.9-7 Soil type: C L S	wet meadows, transition areas	Region: M P C States: DC DE MD NY VA WV		wildlife food and cover; tolerates drought; grows in tufts; reddish-tan fall color
Calamagrostis canadensis *bluejoint reedgrass*	 PLANTS 1995	Height: 1.5-5' Flowers: Jun-Aug	Light: ☼ ◐ Moisture: M W Soil pH: 4.5-8 Soil type: C L	meadows, bogs, thickets	Region: M States: DC DE NY VA WV		
Carex crinita var. crinita *long hair sedge*	 RHW	Height: 1-5' Flowers: Jun-Aug	Light: ☼ ◐ Moisture: M W Soil pH: 4-7.5 Soil type: C L	swales, thickets, low woods	Region: M P C States: DC DE NY VA WV		
Carex glaucodea *blue wood sedge*	 NYNHP NYNHP	Height: 0.5-2' Flowers: May-Jul, brown to reddish	Light: ◐ ● Moisture: D M Soil pH: Soil type:	moist to dry woods and fields	Region: P C States: DC DE MD VA		clump-forming; alternative to Liriope GC

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Carex lurida *sallow sedge, lurid sedge*  RHW	Height: 1-3.5' Flowers: Jun-Oct	Light: ☼ ◐ Moisture: W Soil pH: 4.9-6.8 Soil type: C L S	swales, swamps, woods	Region: M P C States: DC DE NY PA VA WV		wetland plant; interesting seeds
Carex pensylvanica *Pennsylvania sedge*   CM NRCS, CM NRCS	Height: 0.5-1.5' Flowers: Apr-Jul, reddish to white	Light: ◐ ● Moisture: D M Soil pH: Soil type: S	open, dry, sandy or rocky woods, wooded slopes	Region: P C States: DC DE MD NY PA VA WV		alternative to lawn; plant densely; fine textured leaves less than 6 inches GC
Carex stricta *tussock sedge*  CM NRCS	Height: 1-3.5' Flowers: May-Aug, reddish to purple brown	Light: ☼ Moisture: M W Soil pH: 3.5-7 Soil type: C L S	fresh tidal and nontidal marshes, shrub swamps, forested wetlands, swales, fields	Region: M P C States: DC DE MD NY VA WV		grows in clumps; partly persists in winter; tolerates flooding to 6 inches
Carex vulpinoidea *fox sedge*  UWI RWF	Height: 0.5-3.5' Flowers: Jun-Aug	Light: ☼ ◐ Moisture: W Soil pH: 6.8-8.9 Soil type: C L	shallow emergent marshes, shrub swamps, floodplain forests, hardwood swamps	Region: M P C States: NY VA WV	 high wildlife value	grows in clumps; tolerates saturation and flooding to 6 inches
Chasmanthium latifolium *wild oats, river oats, sea oats, spanglegrass*  USFWS BES, USFWS BES	Height: 2-5' Flowers: Jul-Sep, green then tan	Light: ☼ ◐ Moisture: D M Soil pH: 5-7 Soil type: C L S	streambanks, alluvial woods	Region: M P C States: DC DE MD VA WV		
Danthonia spicata *poverty oatgrass, poverty grass*  UWI RWF	Height: 0.5-2' Flowers: May-Jul	Light: ☼ ◐ ● Moisture: D M Soil pH: Soil type: S	open woods, pastures, meadows	Region: M P C States: DC DE NY PA VA WV		GC
Dichanthelium clandestinum *deer-tongue*  USDA JE	Height: 2-5' Flowers: May-Oct	Light: ☼ ◐ Moisture: D M W Soil pH: 4-7.5 Soil type: C L S	moist woods, roadsides	Region: M P C States: DC DE NY PA VA WV		
Dichanthelium commutatum *variable panicgrass*  PLANTS 1997	Height: 1-2.5' Flowers: May-Oct	Light: ◐ ● Moisture: D M Soil pH: 4-6.5 Soil type: L S	rocky or sandy woods	Region: M P C States: DC DE NY PA VA WV		

Grasses & Grasslike Plants

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Elymus canadensis *Canada wild rye*	 CM NRCS	Height: 2-6.5' Flowers: Jun-Oct	Light: Moisture: D M Soil pH: 5-7.9 Soil type: C L S	dry, sandy, gravely, or rocky soil	Region: M P C States: DC MD VA WV		
Elymus hystrix (Hystrix patula) *bottlebrush grass*	 RHW	Height: 2-4' Flowers: Jun-Aug	Light: Moisture: M Soil pH: Soil type: L	alluvial woods	Region: M P C States: DC DE MD NY PA VA WV		
Elymus riparius *riverbank wild-rye*	 UWI EJJ	Height: 0.5-5' Flowers: Jul-Sep	Light: Moisture: D M W Soil pH: 4.5-7.2 Soil type: C L S O	rich thickets, streamsides, alluvial flats, meadows	Region: P C States: DE PA VA WV		good for streambank conditions
Elymus virginicus *Virginia wild rye*	 CM NRCS	Height: 1-5.5' Flowers: Jun-Oct	Light: Moisture: D M Soil pH: 5-7 Soil type: C L S O	rich thickets, shores, meadows	Region: M P C States: DC DE MD PA VA WV		tolerates a wide range of conditions; forms clumps
Festuca rubra *red fescue*	 RS MNPS	Height: 0.5-3' Flowers: May-Jul	Light: Moisture: M W Soil pH: 5-8 Soil type: C L	dry woods, roadsides, waste areas	Region: M States: DC DE MD VA		can be used as turf grass; grows best in part shade GC
Leersia oryzoides *rice cutgrass*	 PLANTS 1995	Height: 5' Flowers: Jun-Oct	Light: Moisture: M W Soil pH: 5.1-8.8 Soil type: C L S	fresh tidal and nontidal marshes, meadows, ditches, muddy shores	Region: M P C States: DC DE NY PA VA WV		good for sediment stabilization, erosion control; tolerates drought; tolerates flooding to 6 inches
Panicum amarum *bitter or coastal panic grass, beachgrass*	 CM NRCS	Height: 1-3' Flowers: Aug-Oct	Light: Moisture: D M Soil pH: 5-7.5 Soil type: L S	sandy coastal shores and dunes	Region: C States: DC DE MD VA		prostrate form, produces little viable seed, use transplants; Panicum amarum var. amarulum (coastal panicgrass), taller form, can be seeded.
Panicum virgatum *switchgrass*	 USFWS BES	Height: 3-6' Flowers: Jul-Oct	Light: Moisture: D M W Soil pH: 4.5-8 Soil type: C L S	fresh and brackish tidal and nontidal marshes, wet meadows, open woods, prairies, dunes	Region: M P C States: DC DE MD NY PA VA WV		food for sparrow species; grows in clumps; controls erosion

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Saccharum giganteum (Erianthus giganteus) *giant plumegrass, sugar cane*  USDA NRCS	Height: 3.5-10' Flowers: Aug-Oct	Light: ☼ ◐ Moisture: M W Soil pH: 3.5-7 Soil type: L S	swamps, low woods, swales	Region: P C States: DC DE VA		
Schizachyrium scoparium (Andropogon scoparius) *little bluestem*   USFWS BES, USFWS BES	Height: 1.5-4' Flowers: Aug-Oct	Light: ☼ Moisture: D Soil pH: Soil type: L S	open woods, pinelands, clearings	Region: M P C States: DC DE MD NY PA VA WV		tolerates poor soil; clump grass; winter interest and wildlife cover; excellent forage grass
Sorghastrum nutans *Indiangrass*  RHW	Height: 2.5-8' Flowers: Aug-Sep	Light: ☼ Moisture: D M Soil pH: 4.8-8 Soil type: C L S	dry slopes, prairies, borders of woods	Region: M P C States: DC DE MD NY PA VA WV		tall clump grass with beautiful seed head; nutritious for livestock
Tridens flavus *redtop, purpletop*  UWI EJU	Height: 2-6.5' Flowers: Aug-Oct	Light: ☼ ◐ Moisture: D M Soil pH: 4.5-6.5 Soil type: C L S	dry fields, roadsides, openings, forest	Region: M P C States: DC DE VA WV		
Tripsacum dactyloides *gama grass*  CM NRCS	Height: 6-10' Flowers: Jun-Oct	Light: ☼ ◐ Moisture: M W Soil pH: 5.7-7.5 Soil type: C L	swales, fields, forest edges, shores	Region: M P C States: DC DE MD VA WV		excellent forage grass; often grows wild near corn fields; can hybridize with corn

See also:

In the *Herbaceous Plants* section:
Allium cernuum
Liatris pilosa v. pilosa (graminifolia), scariosa, spicata, squarrosa
Sisyrinchium angustifolium (graminoides), atlanticum

In the *Herbaceous Emergents* section:
Distichlis spicata
Dulichium arundinaceum
Iris prismatica, versicolor, virginica
Juncus canadensis, effusus
Schoenoplectus pungens v. pungens (Scirpus pungens, americanus), validus (Scirpus validus)
Scirpus atrovirens, cyperinus
Sparganium americanum
Spartina alterniflora, cynosuroides, patens, pectinata
Zizania aquatica

Andropogon virginicus provides a transition between the road and woods.


CM NRCS

Schizachyrium scoparium in a garden with **Liatris spicata** and **Asclepias tuberosa**.


USFWS BES


USFWS

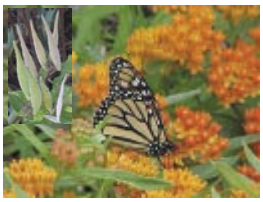
Schizachyrium scoparium in fall.


USFWS BES

Characteristic swirls of **Carex stricta**.

Herbaceous Plants

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Actaea pachypoda *doll's eyes*	 RHW, RHW	Height: 1-3' Flowers: Apr-Jun, whitish Fruit: Jul-Oct, white or red, berry	Light: ◐ ● Moisture: M Soil pH: Soil type: C L S	rich open woods, thickets	Region: C States: DE NY PA VA WV		interesting berries; infrequent in Piedmont and mountain regions
Agalinis purpurea *purple false foxglove*	 RHW	Height: 1-4' Flowers: Jul-Sep, rose-purple, white Fruit: capsule	Light: ○ Moisture: M W Soil pH: Soil type: S	moist fields, rocky shores, serpentine barrens	Region: P C States: DC DE MD NY VA WV		
Ageratina altissima var. altissima (Eupatorium rugosum) *white snakeroot*	 UWI KJS, USFWS BES	Height: 1-5' Flowers: Jul-Oct, white Fruit: capsule	Light: ○ ◐ ● Moisture: D M Soil pH: Soil type: C L S	rich woods, thickets, clearings, meadows	Region: M P C States: DC DE MD NY PA VA WV		tough plant; cultivars available; prefers basic soils
Allium cernuum *nodding onion*	 RHW	Height: 0.5-2.5' Flowers: Jun-Aug, pink, rose, white Fruit: capsule	Light: ○ ◐ Moisture: M Soil pH: Soil type: L S	ledges, gravels, rocky or wooded slopes	Region: M States: DC MD VA WV		
Anemone canadensis *round-leaved or Canadian anemone, thimbleweed*	 RHW	Height: 0.5-3' Flowers: May-Jul, white Fruit:	Light: ○ ◐ Moisture: M Soil pH: Soil type: C L	damp thickets, meadows, gravelly shores	Region: P States: DC NY VA		
Anemone virginiana *thimbleweed, tall anemone*	 RHW	Height: 1-2.5' Flowers: May-Aug, whitish Fruit:	Light: ○ ◐ Moisture: D M Soil pH: Soil type: C L S	dry rocky open woods, slopes, thickets	Region: M P States: DC DE MD NY PA VA WV		
Antennaria neglecta *field pussytoes*	 UWI JRS	Height: 0.5-1.5' Flowers: Apr-Jul, white Fruit:	Light: ○ ◐ Moisture: D M Soil pH: 5.5-7.5 Soil type: C L	upland meadows, pastures, open woods	Region: M P States: DC DE MD NY PA VA WV		
Aquilegia canadensis *eastern or wild columbine*	  RHW, USFWS BES	Height: 0.5-3' Flowers: Apr-Jul, red-yellow Fruit: capsule	Light: ○ ◐ Moisture: D M Soil pH: Soil type: L	rich rocky woods, slopes, cliffs, ledges, pastures, roadside banks	Region: M P C States: DC DE MD NY PA VA WV		commonly cultivated; spreads by seed GC

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Aralia nudicaulis *wild sarsaparilla*  RHW	Height: 0.5-1.5' Flowers: May-Jul, white or green Fruit: May-Jul, purple-black, berry	Light: ◐ ● Moisture: D M Soil pH: 5-7.2 Soil type: C L S	dry to moist woods	Region: M P C States: DC DE MD NY PA VA WV		aromatic; single-leaved; lacks an above-ground stem; not common in coastal plain
Aralia racemosa *spikenard*  RHW, RHW	Height: 1.5-6.5' Flowers: Jun-Aug, greenish-white Fruit: dark purple, berry	Light: ◐ ● Moisture: M Soil pH: Soil type: C L S	rich woods, thickets, wooded slopes and edges	Region: M P C States: DC DE MD PA VA WV		not common in coastal plain
Arisaema triphyllum *Jack-in-the-pulpit*  USFWS BES, RHW	Height: 1-3' Flowers: Mar-Jun, striped, purple or green Fruit: berry	Light: ◐ ● Moisture: M W Soil pH: 4.8-7 Soil type: L S	woods, bogs swamps	Region: M P C States: DC DE MD NY PA VA WV		red berry clusters appear late summer to fall; unusual flower; spreads rapidly from seed
Aruncus dioicus *goat's-beard*  USFWS BES	Height: 3.5-6.5' Flowers: May-Jul, white Fruit: pod	Light: ☼ ◐ Moisture: M W Soil pH: Soil type: C L S	wooded roadsides, rich woods, ravines	Region: M States: DC VA WV		
Asarum canadense *wild ginger*  USFWS BES	Height: 0.5' Flowers: Apr-May, brownish-purple Fruit: brown, capsule	Light: ◐ ● Moisture: M Soil pH: Soil type: C L S	rich woods	Region: M P C States: DC DE MD NY PA VA WV		flower inconspicuous; attractive leaves; will spread; semi-evergreen GC ▲
Asclepias incarnata *swamp milkweed*  USFWS RL	Height: 4-6' Flowers: May-Jun, pink to reddish Fruit: Aug-Nov, pod	Light: ☼ ◐ Moisture: M W Soil pH: 5-8 Soil type: C L	fresh tidal and nontidal marshes, meadows, shrub swamps, woods, shores, ditches	Region: M P C States: DC DE MD NY PA VA WV	 	can tolerate drought; interesting seed pod
Asclepias syriaca *common milkweed*  RHW, RHW	Height: 3.5-6.5' Flowers: May-Aug, pale purple Fruit: Aug-Nov, pod	Light: ☼ Moisture: D Soil pH: Soil type: L S	thickets, roadsides, fields	Region: M P C States: DC DE MD NY PA VA WV	 	interesting seed pods; fragrant flower
Asclepias tuberosa *butterflyweed, butterfly milkweed, butterfly flower*  USFWS RL, USFWS BES	Height: 1-3' Flowers: May-Jul, orange Fruit: Aug-Nov, pod	Light: ☼ ◐ Moisture: D M Soil pH: 4.8-6.8 Soil type: L S	dry fields, roadsides, shale barrens	Region: M P C States: DC DE MD NY PA VA WV	 	taproot does not transplant well but seedlings do; attractive seed pod

Herbaceous Plants

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Baptisia australis *wild blue indigo, false blue indigo* USFWS BES, USFWS BES 	Height: 3-5' Flowers: May-Jun, blue, purple Fruit:	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: S	open woods, alluvial thickets, streambanks, floodplains	Region: M P States: DC MD VA WV		tolerates poor soils; flowers very showy; shrublike form
Baptisia tinctoria *yellow wild indigo* RHW 	Height: 1-3' Flowers: May-Sep, yellow Fruit:	Light: ☼ ◐ Moisture: D Soil pH: 5.8-7 Soil type: L S	open woods, clearings	Region: M P C States: DC DE MD PA VA WV		tolerates poor soils
Bidens cernua *nodding beggar-ticks, nodding bur marigold* RHW 	Height: 0.5-3' Flowers: Aug-Oct, yellow Fruit:	Light: ☼ ◐ Moisture: D M Soil pH: 5.1-7 Soil type: C L S	tidal marsh, sloughs, springs, pools, shore	Region: M P C States: DC DE MD NY PA VA WV		
Boltonia asteroides *star boltonia, white doll's daisy* USFWS BES 	Height: 0.5-2.5' Flowers: Jul-Sep, white Fruit:	Light: ☼ ◐ Moisture: D M W Soil pH: 5.3-7 Soil type: L S	gravelly shores, sandy thickets	Region: C States: DC DE VA WV		
Caltha palustris *marsh marigold* RHW 	Height: 1-2' Flowers: Apr-Jun, bright yellow Fruit:	Light: ☼ ◐ Moisture: W Soil pH: 4.9-6.8 Soil type: C L	forested wetlands, shrub swamps, streambanks, seeps, meadows	Region: M C States: DC DE MD NY VA WV		clump-forming; needs some periods of drier soil; tolerates flooding to 6 inches
Campanulastrum americanum (Campanula americana) *American or tall bellflower* RHW 	Height: 1.5-6.5' Flowers: Jun-Aug, light blue Fruit: capsule	Light: ◐ ● Moisture: M Soil pH: 5.5-7.5 Soil type: C L S	rich moist woods, rocky wooded slopes, streambanks	Region: M P States: DC MD NY VA WV		
Cardamine concatenata (Dentaria laciniata) *toothwort* RHW 	Height: 1-1.5' Flowers: Apr-Jun, white, purplish Fruit:	Light: ● Moisture: M Soil pH: Soil type: L S	rich woods, wooded bottoms, calcareous rocky banks	Region: M P States: DC DE MD NY VA WV		
Caulophyllum thalictroides *blue cohosh* RHW 	Height: 1-2.5' Flowers: Apr-Jun, green-yellow, green-purple Fruit: dark blue, berry	Light: ☼ ◐ Moisture: M Soil pH: 4.5-7 Soil type: L	rich woods	Region: M P C States: DC DE MD NY PA VA WV		

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Chamaecrista fasciculata (Cassia fasciculata) *partridge pea, prairie senna*  RHW	Height: 0.5-3' Flowers: Jul-Sep, yellow Fruit: pod	Light: Moisture: D Soil pH: Soil type: S	upland meadows, fields, streambanks	Region: M P C States: DC DE MD PA VA WV		pods coil after split open; spreads
Chamerion angustifolium spp. angustifolium (Epilobium angustifolium) *fireweed*  RHW, PLANTS GAM	Height: 3-10' Flowers: Jun-Sep, magenta, pink, rarely white Fruit: capsule	Light: Moisture: D M Soil pH: Soil type: C L S	recent clearings, burned woodlands, damp ravines, open sandy areas	Region: M States: DC DE MD PA VA WV		
Chelone glabra *white turtlehead, turtlehead*  RHW	Height: 1.5-6.5' Flowers: Jul-Oct, white Fruit: capsule	Light: Moisture: M W Soil pH: Soil type: C L S	woods, streambanks, swamps, thickets	Region: M P C States: DC DE MD NY PA VA WV		strong grower; herbal uses; host for Baltimore checkerspot butterfly
Chimaphila maculata *striped wintergreen, striped prince's pine*  RHW	Height: 0.5' Flowers: Jun-Aug, white Fruit: capsule	Light: Moisture: D Soil pH: Soil type: C L S	acidic woods, frequently under pines	Region: M P C States: DC MD NY PA VA WV		flowers fragrant GC
Chrysogonum virginianum *green-and-gold, golden knees*  USFWS BES	Height: 0.5-1' Flowers: Mar-Jun, yellow Fruit:	Light: Moisture: D M Soil pH: Soil type: L	open woods on limestone, rocky open woods	Region: M P C States: DC MD VA WV		will bloom longer if kept moist GC
Chrysopsis mariana *golden aster, Maryland golden aster*  RHW	Height: 0.5-2.5' Flowers: Jul-Oct, yellow Fruit:	Light: Moisture: D Soil pH: Soil type: S	woods, openings, roadsides, serpentine barrens	Region: P C States: DC DE MD VA		GC
Cimicifuga racemosa *black snakeroot, black cohosh, fairy candles*  RHW	Height: 2.5-8.5' Flowers: Jun-Sep, white Fruit: pod	Light: Moisture: M Soil pH: Soil type: C L S	rich woods, wooded slopes, ravines, thickets	Region: M P C States: DC DE MD NY PA VA WV		
Claytonia virginica *narrowleaf spring beauty, spring beauty*  RHW	Height: 0.5-1' Flowers: Mar-May, white with pink Fruit: capsule	Light: Moisture: M Soil pH: Soil type: L	rich woods, thickets, clearings	Region: M P C States: DC DE MD NY PA VA WV		

Herbaceous Plants

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Clitoria mariana *Maryland butterfly pea*  RHW	Height: 6' Flowers: Jun-Sep, pale blue or pinkish Fruit: pod	Light: ☼ ◐ Moisture: D Soil pH: Soil type: S	open areas	Region: M P C States: DC DE VA WV		vine-like
Conoclinium coelestinum (Eupatorium coelestinum) *mistflower, wild ageratum*  RHW	Height: 1-3.5' Flowers: Jul-Oct, blue, violet or purple Fruit: capsule	Light: ◐ ● Moisture: D M W Soil pH: Soil type: C L	old fields, meadows; dry sandy woods and clearings, damp thickets, streambanks	Region: C States: DC DE VA WV		
Coreopsis tripteris *tall coreopsis, tall tickseed*  RHW	Height: 3.5-10' Flowers: May-Sep, yellow Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: L S	thickets, old fields, forest edges, roadsides	Region: M P C States: DC VA WV		flower has anise scent
Coreopsis verticillata *threadleaf coreopsis*  USFWS BES	Height: 0.5-3.5' Flowers: Jun-Oct, yellow Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: L	dry open woods, clearings, roadsides	Region: P States: DC MD VA WV		GC
Delphinium tricorne *dwarf larkspur*  RHW	Height: 0.5-3' Flowers: Apr-Jun, blue, violet, white, variegated Fruit: pod	Light: ◐ ● Moisture: M Soil pH: Soil type:	rich woods, calcareous slopes, thickets, river bluffs	Region: M P States: DC VA WV		
Desmodium paniculatum *panicled or narrow-leaf tick-trefoil*  RHW	Height: 1-3.5' Flowers: Jul-Sep, purplish or green Fruit: pod	Light: ☼ ◐ Moisture: D Soil pH: 6-7 Soil type: C L	clearings, edges of moist or dry woods	Region: M P C States: DC DE MD NY VA WV		not found near coast
Dicentra canadensis *squirrel corn*  RHW	Height: 0.5-1' Flowers: Apr-May, greenish-white, rose tinge Fruit: capsule	Light: ◐ ● Moisture: M Soil pH: Soil type: L	rich woods	Region: M P States: DC MD NY PA VA WV		flowers hyacinth scented
Dicentra cucullaria *Dutchman's breeches*  RHW	Height: 0.5-1' Flowers: Apr-Jun, white to cream Fruit: capsule	Light: ◐ ● Moisture: M Soil pH: Soil type: L S	rich woods	Region: M P States: DC DE MD NY PA VA WV		leaves basal; dormant in summer

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Dicentra eximia *wild bleeding heart*  RHW	Height: 1.5-2' Flowers: Apr-Sep, pink/white Fruit: capsule	Light: ◐ ● Moisture: D M Soil pH: Soil type: L	rocky woods and cliffs, rich woods	Region: M P States: DC MD VA WV		sometimes cultivated
Dodecatheon meadia *shooting star*   RHW, RHW	Height: 0.5-2' Flowers: Apr-Jun, white with yellow, lilac Fruit: capsule	Light: ☼ ◐ ● Moisture: M Soil pH: Soil type: L S	open woods, meadows, slopes, prairies	Region: M States: DC MD VA WV		
Doellingeria umbellata var. umbellata (Aster umbellatus) *flat-top white aster, parasol whitetop*  RHW	Height: 1-7.5' Flowers: Aug-Oct, white Fruit:	Light: ☼ ◐ Moisture: M W Soil pH: Soil type: L S	open areas, woods	Region: M P States: DC DE MD NY PA VA WV		
Erigeron pulchellus *robin's plantain*  RHW	Height: 0.5-1.5' Flowers: Apr-Sep, blue, pink, white Fruit: capsule	Light: ◐ Moisture: D M Soil pH: Soil type: L S	open woods, meadows, wooded slopes, roadsides	Region: M P C States: DC DE MD NY PA VA WV		GC
Erythronium americanum *trout lily, yellow trout lily, dogtooth violet*  RHW	Height: 0.5-1' Flowers: Mar-Jun, yellow Fruit: capsule	Light: ◐ ● Moisture: M W Soil pH: Soil type: L S	woods, rich slopes, bottomlands, meadows	Region: M P States: DC DE MD NY PA VA WV		
Eupatorium dubium *Joe-Pye weed*  RHW	Height: 2-5' Flowers: Jul-Oct, purple, rarely white Fruit: capsule	Light: ☼ ◐ Moisture: M W Soil pH: Soil type: S	swamps, bogs, marshes, swales	Region: M P C States: DC DE MD VA		
Eupatorium fistulosum *Joe-Pye weed, trumpet weed*  RHW	Height: 1.5-10' Flowers: Jul-Oct, pink-purple Fruit: capsule	Light: ☼ ◐ Moisture: D M W Soil pH: 4.5-7 Soil type: C L	floodplains, meadows, thickets, roadsides	Region: M P C States: DC DE MD NY PA VA WV		herbal uses
Eupatorium hyssopifolium *hyssop-leaved thoroughwort, hyssop-leaved eupatorium*  RHW	Height: 1-4.5' Flowers: Jul-Oct, white Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: S	dry fields, roadsides, railroad right of ways, woods, fields, salt meadows	Region: C States: DC DE MD VA		

Herbaceous Plants

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Eupatorium maculatum *spotted Joe-Pye weed*	 CAB	Height: 2-6.5' Flowers: Jul-Sep, purple to pale lavender Fruit: capsule	Light: ☼ ◐ Moisture: M Soil pH: 5.5-7 Soil type: C L	floodplains, swamps, alluvial thickets, grasslands	Region: M P States: DC NY WV		
Eupatorium perfoliatum *common boneset*	 RHW	Height: 1-5' Flowers: Jul-Oct, white Fruit: capsule	Light: ☼ ◐ ● Moisture: M W Soil pH: Soil type: C L S	floodplains, swamps, bogs, streambanks, meadows	Region: M P C States: DC DE MD NY PA VA WV		
Eupatorium purpureum *green-stemmed Joe-Pye weed*	 RHW	Height: 2-6.5' Flowers: Jul-Oct, pink, purple, cream Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: C L S	open woods, fields, floodplains	Region: M P C States: DC DE MD NY PA VA WV		occurs in drier, shadier habitats than other joe-pye-weeds; injured or dried plant has vanilla scent
Eurybia divaricata (Aster divaricatus) *white wood aster*	 RHW, USFWS BES	Height: 0.5-3' Flowers: Jul-Oct, white Fruit:	Light: ◐ ● Moisture: D M Soil pH: Soil type:	dry woods, clearings	Region: M P States: DC DE MD NY PA VA WV		GC
Gentiana clausa *closed gentian, bottle gentian*	 USFWS BES	Height: 1-3.5' Flowers: Aug-Oct, blue Fruit: capsule	Light: ◐ Moisture: M W Soil pH: 5.8-7.2 Soil type: L	moist open woods, streambanks, meadows	Region: M P C States: DC MD PA VA WV		
Geranium maculatum *wild geranium, wood geranium*	 RHW	Height: 1-2' Flowers: Apr-Jul, lavender or pink Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: L	woods, roadsides, fields	Region: M P C States: DC DE MD NY PA VA WV		adaptable plant; long bloom time; spreader; herbal uses; explosive seed capsule GC
Goodyera pubescens *downy rattlesnake plantain*	 USFWS BES	Height: 0.5-1.5' Flowers: Jun-Aug, whitish Fruit:	Light: ◐ Moisture: D M Soil pH: Soil type: C L S	dry to moist woods	Region: M P C States: DC DE MD NY VA WV		very handsome throughout winter
Helenium autumnale *yellow or common sneezeweed*	 USFWS BES	Height: 1.5-6' Flowers: Jul-Nov, yellow Fruit: capsule	Light: ☼ ◐ ● Moisture: M Soil pH: 4-7.5 Soil type: C L S	woods, swamps, riverbanks, alluvial thickets, meadows, marshes, ditches	Region: M P C States: DC DE MD NY PA VA WV		tolerates wet areas; showy flowers; herbal uses

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Helianthus angustifolius *swamp sunflower*  RHW	Height: 1.5-5.5' Flowers: Aug-Oct, yellow Fruit: capsule	Light: Moisture: M W Soil pH: 4-7 Soil type: L S	swamps, moist, sandy areas	Region: C States: DC DE MD VA		
Helianthus decapetalus *ten-petaled or thin-leaved sunflower*  BZ	Height: 1.5-5' Flowers: Jul-Oct, yellow Fruit: capsule	Light: Moisture: M Soil pH: Soil type: S	fields, bottomlands, stream banks, roadsides	Region: M P C States: DC DE NY PA VA WV		
Helianthus divaricatus *woodland sunflower, rough sunflower*  RHW	Height: 1.5-6.5' Flowers: Jul-Sep, yellow Fruit: capsule	Light: Moisture: D M Soil pH: Soil type: S	dry open woods, wooded slopes, shale barrens, roadsides	Region: M P C States: DC DE MD NY PA VA WV		
Heliopsis helianthoides *oxeye sunflower, oxeye*  RHW	Height: 1-5' Flowers: Jun-Sep, pale yellow Fruit: capsule	Light: Moisture: D M Soil pH: 5.6-6.8 Soil type: L S	fields, open woods, floodplains, thickets, streambanks	Region: P C States: DC DE MD PA VA WV		long bloom time
Hepatica nobilis var. acuta (H. acutiloba) *sharp-lobed hepatica*  UWI KJS, UWI KJS, UWI JRS	Height: 0.5-2' Flowers: Mar-Jun, bluish, white, pink Fruit: capsule	Light: Moisture: D M Soil pH: Soil type: L S	rich upland woods, rocky slopes	Region: M States: NY PA VA		may bloom throughout year (rarely) GC
Hepatica nobilis var. obtusa (H. americana) *round-lobed hepatica, liverleaf*  RHW	Height: 0.5-2' Flowers: Mar-Jun, white to lavender Fruit: capsule	Light: Moisture: D M Soil pH: Soil type: L S	dry or rocky woods, dry upland slopes	Region: M P C States: DC DE MD NY PA VA WV		GC
Heracleum maximum (H. lanatum) *cow parsnip*  RHW	Height: 3.5-10' Flowers: May-Aug, white to pink Fruit:	Light: Moisture: M W Soil pH: 5.4-7.3 Soil type: C L S	rich woods, wooded roadside banks, marshy flats, streambanks, ditches	Region: M P C States: DC DE MD NY PA VA WV		can cause a dermatitis (skin) reaction
Heuchera americana *alumroot*  MOBOT	Height: 1-3.5' Flowers: Apr-Jun, green, white, pink, purple Fruit: capsule	Light: Moisture: D M Soil pH: Soil type: L S	rich woods, rocky slopes, shale cliffs	Region: M P States: DC DE MD NY PA VA WV		long bloom time; many cultivars and hybrids; semi-evergreen GC

Herbaceous Plants

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Heuchera villosa *hairy heuchera, hairy alumroot*  PLANTS JSP	Height: 1-2.5' Flowers: Jun-Oct, white to greenish to pinkish Fruit: capsule	Light: ◐ ● Moisture: D M Soil pH: Soil type:	damp rocks, rich wooded slopes	Region: M States: DC MD VA		GC
Houstonia caerulea *bluet, innocence, Quaker-ladies*  RHW	Height: 0.5-1' Flowers: Apr-Jun, blue, lilac, white Fruit: capsule	Light: ○ ◐ Moisture: M Soil pH: Soil type:	meadows, fields, and thickets, open woods, forest edges	Region: M P C States: DC DE MD VA WV		
Hydrophyllum virginianum *Virginia waterleaf*  RHW	Height: 1-2.5' Flowers: May-Aug, lavender, white Fruit: capsule	Light: ◐ ● Moisture: M Soil pH: Soil type: C L S	woods, thickets, streambanks	Region: M P C States: DC DE MD NY PA VA WV		
Hylotelephium telephioides (Sedum telephioides) *Allegheny stonecrop*  RHW	Height: 0.5-1.5' Flowers: Aug-Sep, pale pink Fruit: pod	Light: ○ ◐ ● Moisture: Soil pH: Soil type:	dry rocky places	Region: M States: DC MD NY VA WV		naturally occurs in bare rock outcrops, but does well in garden; rare in PA, threatened in NY GC
Impatiens capensis (I. biflora) *jewelweed, touch-me-not*  USFWS BES	Height: 1.5-5' Flowers: May-Oct, orange, yellow, white Fruit: capsule	Light: ◐ ● Moisture: M W Soil pH: 5.4-7.4 Soil type: C L S	moist meadows, swamps, streambanks, open woods	Region: M P C States: DC DE MD NY PA VA WV		ripe seed pod explodes with contact; remedy for poison ivy itching
Ionactis linariifolius (Aster linariifolius) *stiff-leaf aster, flaxleaf whitetop aster*  RHW	Height: 0.5-2' Flowers: Aug-Oct, blue, yellow eye Fruit:	Light: ○ Moisture: D M Soil pH: Soil type: S	grasslands, successional shrublands, oak-hickory forest, dry rocky woods and edges	Region: M P C States: DC DE MD NY VA WV		
Jeffersonia diphylla *twinleaf*  RHW	Height: 0.5-1' Flowers: Apr-May, white Fruit: capsule	Light: ◐ ● Moisture: M Soil pH: Soil type: L	rich woods	Region: M P States: DC MD VA WV		
Lespedeza capitata *round-head bush clover*  UWI KJS	Height: 2-6' Flowers: Jul-Sep, yellowish white Fruit:	Light: ○ Moisture: D Soil pH: Soil type: L S	fields, thin woods	Region: M P C States: DC DE NY PA VA WV		

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Liatris pilosa var. pilosa (L. graminifolia) *grass-leaf blazingstar*  RHW	Height: 1-3.5' Flowers: Aug-Oct, purple Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: C L S	open woods, forest edge, salt marsh edges, dune hollows	Region: P C States: DC DE MD VA		
Liatris scariosa *eastern or northern blazing star, tall gayfeather*  RHW	Height: 1-3.5' Flowers: Aug-Sep, lavender to rose-purple Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: L S	dry upland woods	Region: M P C States: DC DE MD VA WV		
Liatris spicata *gayfeather, blazingstar, spiked blazing star*  USFWS RL	Height: 1-6.5' Flowers: Jul-Aug, rose-purple or white Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: 5.6-7.5 Soil type: C L S	moist meadows, open areas	Region: P C States: DC DE VA WV		
Liatris squarrosa *plains blazing star*  RHW	Height: 0.5-2.5' Flowers: Jul-Sep, rose Fruit: capsule	Light: ☼ ◐ Moisture: M Soil pH: Soil type: L S	dry open fields and banks	Region: P C States: DC DE VA		
Lilium canadense *Canada lily*  RHW	Height: 1.5-6.5' Flowers: Jun-Aug, yellow, orange, red Fruit: capsule	Light: ☼ ◐ Moisture: M W Soil pH: Soil type: L	fields, thickets, woods	Region: M P States: DC DE MD NY PA VA WV		
Lilium philadelphicum *wood lily*  RHW	Height: 1-3.5' Flowers: Jun-Aug, yellow, red-orange Fruit: capsule	Light: ☼ ◐ Moisture: D Soil pH: Soil type: L S	open woods, forest edges, thickets	Region: M P C States: DC DE NY PA VA WV		
Lilium superbum *Turk's cap lily*  RS MNPS	Height: 4-8' Flowers: Jul-Aug, yellow-orange, orange-red Fruit: capsule	Light: ☼ ◐ Moisture: M W Soil pH: Soil type: L S	meadows, streamsides	Region: M P C States: DC DE MD NY PA VA WV		leaves in whorl around stem; takes several years to bloom
Limonium carolinianum *sea lavender*  PLANTS LA	Height: 0.5-2' Flowers: Jul-Oct, lavender Fruit:	Light: ☼ Moisture: M W Soil pH: 6-8.5 Soil type: C L S	irregularly flooded high salt marshes	Region: C States: DE MD NY VA		tolerates salinity to 30 ppt

Herbaceous Plants

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Lobelia cardinalis *cardinal flower*  RHW	Height: 2-4' Flowers: Jul-Oct, red Fruit:	Light: ☼ ◐ Moisture: M W Soil pH: 5.8-7.8 Soil type: C L	fresh tidal and nontidal marshes, wooded swamps, seeps, banks of ponds, rivers, streams	Region: M P C States: DC DE MD NY PA VA WV		long bloom time; biennial, must reseed
Lobelia siphilitica *great blue lobelia*  RHW, USFWS BES	Height: 1-5' Flowers: Aug-Oct, blue, violet Fruit: capsule	Light: ☼ ◐ ● Moisture: M W Soil pH: Soil type: C L S	woodlands, meadows, swamps	Region: M P States: DC DE MD NY PA VA WV		long bloom time; white cultivars available
Lupinus perennis *lupine, sundial lupine*  RHW	Height: 1-2' Flowers: Apr-Jul, blue, rarely pink or white Fruit: pod	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: S	open woods, fields, roadsides, streambanks	Region: M P C States: DC DE NY VA WV		prefers acidic soil
Maianthemum canadense *Canada mayflower*  RHW	Height: 0.5' Flowers: May-Jul, white Fruit: pale red speckled, berry	Light: ◐ ● Moisture: M Soil pH: Soil type: C L S	woods	Region: M P C States: DC DE MD NY PA VA WV		fragrant flowers GC
Maianthemum racemosum ssp. racemosum (Smilacina racemosa) *false Solomon's seal*  PLANTS JA, PLANTS WSJ	Height: 1-3.5' Flowers: May-Jul, white Fruit: red, berry	Light: ◐ ● Moisture: M Soil pH: Soil type: C L S	dry to moist woods, clearings, bluffs	Region: M P C States: DC DE MD NY PA VA WV		flowers in plume-like clumps at tip of stem; herbal uses
Medeola virginiana *Indian cucumber*  RHW, RHW	Height: 1-3.5' Flowers: May-Jun, yellowish Fruit: dark purple or black, berry	Light: ☼ ◐ Moisture: M Soil pH: Soil type: L S	woods	Region: M P C States: DC DE MD NY PA VA WV		rhizome is edible
Melanthium virginicum *Virginia bunchflower*  RHW	Height: 2.5-6.5' Flowers: Jun-Aug, greenish Fruit: capsule	Light: ☼ ◐ Moisture: M Soil pH: Soil type: C L S	woods, seepages, clearings	Region: P C States: DC DE MD VA WV		
Mertensia virginica *Virginia bluebells*  RHW	Height: 1-2.5' Flowers: Mar-Jun, pink turning blue Fruit: Mar-May, nut/nut-like	Light: ◐ ● Moisture: M W Soil pH: 4.5-8 Soil type: C L	rich wooded slopes, floodplains	Region: M P C States: DC DE MD NY PA VA WV		dormant in summer; flower color blue, pink, or white according to soil acidity

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Mimulus ringens *monkeyflower, Allegheny monkeyflower*  RHW	Height: 1-3' Flowers: Jun-Oct, blue Fruit: capsule	Light: Moisture: W Soil pH: Soil type: L	open swamps, meadows, shores	Region: M P C States: DC DE NY PA VA WV		interesting flowers
Mitchella repens *partridgeberry*  USFWS, RHW	Height: 0.5' Flowers: May-Jul, white Fruit: July-Dec, scarlet, berry	Light: Moisture: D M Soil pH: Soil type: L S	dry acidic woods	Region: M P C States: DC DE MD NY PA VA WV		two flowers form one fruit; berry edible; slow creeper, forms mats under trees GC
Mitella diphylla *twoleaf miterwort, bishop's cap*  RHW, RHW	Height: 0.5-1.5' Flowers: Apr-Jun, white Fruit: capsule	Light: Moisture: M Soil pH: Soil type: C L S	rich, woods	Region: M P C States: DC DE MD NY PA VA WV		
Monarda bradburiana (M. fistulosa) *wild bergamot, horsemint*  RS MNPS	Height: 1.5-5' Flowers: Jun-Sep, pink to purple Fruit: nut/nut-like	Light: Moisture: D M Soil pH: 6-8 Soil type: C L	fields, thickets, roadsides, forest edges	Region: M P C States: DC DE MD NY PA VA WV		confused with bee-balm (M. didyma); aromatic; herbal uses
Monarda didyma *beebalm, Oswego tea*  USFWS BES	Height: 2-5' Flowers: Jul-Sep, red Fruit: nut/nut-like	Light: Moisture: M W Soil pH: Soil type: L	creek banks, floodplains, woods	Region: M States: DC MD NY PA VA WV		showy flowers; aromatic; herbal uses
Monarda punctata *horsemint, spotted bee-balm*  RHW	Height: 0.5-3.5' Flowers: Jun-Oct, yellow and purple Fruit: nut/nut-like	Light: Moisture: D Soil pH: Soil type: L S	open sandy fields	Region: M P C States: DC DE MD NY VA		
Nuttallanthus canadensis (Linaria canadensis) *blue, old-field, or Canada toadflax*  PLANTS WSJ	Height: 0.5-2.5' Flowers: Apr-Sep, light blue Fruit: capsule	Light: Moisture: D M Soil pH: Soil type: L S	maritime grasslands and shrublands, successional shrubland, woods, fields	Region: M P C States: MD NY VA WV		delicate flowers; prefers well-drained soil
Oenothera biennis *common evening primrose*  RHW	Height: 1.5-6.5' Flowers: Jun-Oct, yellow Fruit: capsule	Light: Moisture: D Soil pH: 5-7 Soil type: C L S	cultivated fields, waste ground, roadsides	Region: M P C States: DC DE MD NY PA VA WV		flowers open in evening; biennial

Herbaceous Plants

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Oenothera fruticosa *narrow-leaved sundrops*	 RHW	Height: 1-3' Flowers: May-Sep, yellow Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: 4.5-7 Soil type: C L S	fields, meadows, roadsides	Region: M P C States: DC DE MD NY PA VA WV		
Oenothera perennis *sundrops*	 UWI RWF	Height: 0.5-3' Flowers: May-Aug, yellow Fruit: capsule	Light: ☼ Moisture: D M Soil pH: Soil type: L S	fields, pastures, roadsides, shaly slopes	Region: M P States: DC DE MD NY PA VA WV		similar to evening primrose (O. biennis); long bloom time; spreader
Opuntia humifusa (O. compressa) *eastern prickly-pear cactus*	 RHW	Height: 0.5-1' Flowers: Jun-Jul, yellow Fruit: purplish to deep red, fleshy	Light: ☼ Moisture: D Soil pH: Soil type: L S	sandy coastal dunes, shaly soils	Region: M C States: DC DE MD VA WV		fruit edible, used for jelly GC
Osmorhiza longistylis *sweet cicely, anise root*	 RHW	Height: 1.5-4' Flowers: May-Jun, white to green Fruit:	Light: ◐ ● Moisture: M Soil pH: Soil type: C L S	rich woods, wooded slopes, thickets	Region: M P C States: DC DE MD NY VA WV		all plant parts have anise scent
Oxalis violacea *violet wood sorrel*	 RHW	Height: 0.5' Flowers: Apr-Jul, violet Fruit: capsule	Light: ◐ ● Moisture: D M Soil pH: Soil type: L	woods	Region: M P States: DC DE MD PA WV		GC
Packera aurea (Senecio aureus) *golden ragwort, golden groundsel*	 RHW	Height: 0.5-2.5' Flowers: Apr-Aug, yellow Fruit: capsule	Light: ☼ ◐ ● Moisture: M W Soil pH: Soil type: L	moist fields, woods, floodplains, roadsides	Region: M P C States: DC DE MD NY PA VA WV		wetland plant; long bloom time; aggressive spreader
Penstemon digitalis *beardtongue, tall white or foxglove beardtongue*	 USFWS BES, RHW	Height: 2-5' Flowers: Jun-Aug, white or faintly purple Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: 5.5-7 Soil type: C L S	open woods, meadows	Region: M P C States: DC DE MD NY PA VA WV		tolerates poor drainage; variety of cultivars
Penstemon laevigatus *smooth or eastern beardtongue*	 UWI MRB	Height: 1-3.5' Flowers: May-Jul, purplish Fruit: capsule	Light: ☼ ◐ ● Moisture: M Soil pH: Soil type:	rich woods, fields	Region: M States: DC MD VA WV		

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Phlox carolina *thick-leaved phlox*	 PLANTS WSJ	Height: 1-2.5' Flowers: May-Jun, pink to purple, rarely white Fruit: capsule	Light: Moisture: D M W Soil pH: Soil type: L S	open woods	Region: M States: DC VA		GC
Phlox divaricata *woodland or wild blue phlox, wild sweet William*	 RHW	Height: 1.5' Flowers: Apr-Jun, blue, lavender, white Fruit: capsule	Light: Moisture: M Soil pH: 5.5-7.2 Soil type: C L S	rich woods	Region: M P States: DC MD NY PA VA WV		aromatic; showy flower; dormant in summer (leaves disappear); frequently cultivated; evergreen
Phlox maculata *phlox, meadow phlox, wild sweet William*	 PLANTS WSJ	Height: 1-3' Flowers: May-Sep, rose, pink, purple, rarely white Fruit: capsule	Light: Moisture: M W Soil pH: 5.9-6.8 Soil type: C L	meadows, streambanks, thickets	Region: M P C States: DE PA VA WV		aromatic; showy flowers; a frequent escapee from cultivation
Phlox paniculata *summer phlox, garden phlox*	 RHW, USFWS BES	Height: 1.5-6.5' Flowers: Jul-Oct, pink, red-purple, white Fruit: capsule	Light: Moisture: M Soil pH: Soil type: L	rich, open woods, roadsides, streambanks, thickets	Region: M P C States: DC PA VA WV		aromatic; showy flowers frequently escapes from cultivation
Phlox stolonifera *creeping phlox*	 RHW, USFWS BES	Height: 0.5-1.5' Flowers: Apr-Jun, blue, red-purple, violet Fruit: capsule	Light: Moisture: D M Soil pH: Soil type: L S	rich woods	Region: M States: DC MD VA WV		GC
Phlox subulata *moss phlox, moss-pink*	 USFWS BES, USFWS BES, RHW	Height: 0.5' Flowers: Apr-Jun, rose, pink, white Fruit: capsule	Light: Moisture: D Soil pH: 5.7-7.5 Soil type: C L S	rock crevices, ledges	Region: M P States: DC MD NY VA WV		nice rock garden plant GC
Physostegia virginiana *obedient plant, false dragonhead*	 USFWS BES, USFWS BES	Height: 1.5-5' Flowers: Jun-Sep, pink to purple Fruit: nut/nut-like	Light: Moisture: D M Soil pH: Soil type: C L S	moist open areas, streambanks, shorelines	Region: M P States: DC MD PA VA WV		flowers showy; spreads rapidly by underground stems; best in full sun; can escape cultivation
Podophyllum peltatum *Mayapple*	 RHW	Height: 1-2' Flowers: Apr-May, white Fruit: yellow, berry	Light: Moisture: M Soil pH: Soil type: L	rich woods, open fields	Region: M P C States: DC DE MD NY PA VA WV		ripe fruit edible; woodland groundcover; mottled foliage GC

Herbaceous Plants

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Polemonium reptans *Jacob's ladder, Greek valerian*	 RHW	Height: 0.5-1.5' Flowers: Apr-Aug, blue Fruit: capsule	Light: ◐ ● Moisture: M Soil pH: Soil type: L S	rich or rocky woods, wooded floodplains	Region: M P States: DC DE MD PA VA WV		attractive flowers; slow spreader; herbal uses GC
Polygonatum biflorum *Solomon's seal, dwarf Solomon's seal*	 RHW	Height: 0.5-6.5' Flowers: Apr-Jun, white or green Fruit: blue to black, berry	Light: ◐ ● Moisture: D M Soil pH: Soil type: L	woods	Region: M P C States: DC DE MD NY PA VA WV		flowers dangle along stalk
Polygonatum pubescens *Solomon's seal, downy Solomon's seal*	 UWI KJS	Height: 1-3.5' Flowers: Apr-Jun, yellowish-green Fruit: blue to black, berry	Light: ☼ ◐ ● Moisture: D M Soil pH: Soil type: C L S	dry to moist woods	Region: M P C States: DE NY PA VA WV		herbal uses; edible
Porteranthus trifoliatus (Gillenia trifoliata) *Bowman's root*	 RHW	Height: 1.5-4' Flowers: May-Jul, white Fruit: pod	Light: ☼ ◐ Moisture: M Soil pH: Soil type: C L S	open upland woods, clearings, rocky slopes, roadsides	Region: M P States: DC DE MD PA VA WV		established plants drought tolerant; spreads to form tight clumps; seldom needs dividing; yellow fall color
Pycnanthemum incanum *hoary mountain mint*	 RHW	Height: 3' Flowers: Jul-Sep, white to lavender, purple spots Fruit: nut/nut-like	Light: ● Moisture: D Soil pH: Soil type: C L S	upland woods, fields, thickets, barrens	Region: M P C States: DC DE MD NY PA VA WV		
Pycnanthemum tenuifolium *narrow-leaved mountain mint*	 PLANTS RM89	Height: 1.5-2.5' Flowers: Jul-Sep, purple to white Fruit: nut/nut-like	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: S	streambanks, floodplains, moist fields	Region: M P C States: DC DE NY PA VA WV		
Rhexia virginica *Virginia meadow-beauty*	 RHW	Height: 1-3.5' Flowers: Jun-Sep, dark pink Fruit: capsule	Light: ☼ Moisture: W Soil pH: Soil type: L	open areas	Region: M P C States: DC DE VA WV		also R. mariana for MD
Rudbeckia fulgida *early, eastern, or orange coneflower*	 USFWS RL	Height: 1.5-3.5' Flowers: Jul-Oct, yellow-orange, black eye Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: L	moist fields, meadows	Region: P States: DC DE MD VA		cultivars have nice foliage

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Rudbeckia hirta *black-eyed Susan*  USDA MG	Height: 1-3.5' Flowers: Jun-Oct, yellow, black eye Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: 6-7 Soil type: C L	fields, meadows, roadsides	Region: M P C States: DC DE MD NY PA VA WV		
Rudbeckia laciniata *tall, green-headed, or cutleaf coneflower*  RHW	Height: 1.5-10' Flowers: Jul-Sep, yellow Fruit: capsule	Light: ☼ ◐ Moisture: M W Soil pH: 4.5-7 Soil type: C L S	floodplains, streambanks, fields	Region: M P C States: DC DE MD NY PA VA WV		herbal uses
Rudbeckia triloba *three-lobed coneflower*  PLANTS WSJ	Height: 1.5-4.5' Flowers: Jun-Oct, yellow or orange Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: L S	fields, open woods, rocky slopes	Region: M P States: DC MD NY PA VA WV		
Ruellia caroliniensis *Carolina wild petunia*  RHW	Height: 0.5-3' Flowers: May-Aug, lavender-blue Fruit: capsule	Light: ☼ ◐ Moisture: M Soil pH: Soil type: C L S	woods, roadsides, thickets, waste places	Region: C States: DC DE MD VA WV		actually in the nightshade family, flower fragile; a highly variable species
Sabatia angularis *rose pink, common marsh-pink*  RHW	Height: 1-3' Flowers: Jul-Oct, pink or white Fruit: capsule	Light: ☼ ◐ Moisture: M Soil pH: Soil type: C L S	moist open woods, fields, marshes, meadows; uplands, shores	Region: M P C States: DC DE MD VA WV		
Salvia lyrata *lyre-leaf sage*  RHW	Height: 1-2' Flowers: Apr-Jun, violet Fruit: nut/nut-like	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: L S	moist pastures, upland woods, thickets, waste areas	Region: M P C States: DC DE VA WV		
Sanguinaria canadensis *bloodroot*  RHW	Height: 0.5' Flowers: Mar-May, white Fruit: capsule	Light: ● Moisture: M Soil pH: Soil type: L	rich woods, open roadsides	Region: M P C States: DC DE MD NY PA VA WV		showy flowers, but blooms fleetingly; herbal uses
Saxifraga pensylvanica *eastern swamp saxifrage*  RHW	Height: 1-3' Flowers: Apr-Jun, white to green Fruit: capsule	Light: ☼ ◐ Moisture: W Soil pH: Soil type: C L S	wet woods, bogs, swamps	Region: M P C States: DC DE MD NY PA VA		

Herbaceous Plants

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Saxifraga virginiensis *early saxifrage*	 RHW	Height: 0.5-1' Flowers: Mar-May, white Fruit: capsule	Light: ☼ ◐ ● Moisture: D M Soil pH: Soil type:	rock crevices, dry slopes, woods	Region: M P C States: DC DE MD NY PA VA WV		
Scutellaria integrifolia *rough or hyssop skullcap, helmet flower*	 RHW	Height: 1-2.5' Flowers: May-Jul, blue, pink, white Fruit: blackish, nut/nutlike	Light: ☼ ◐ Moisture: D M W Soil pH: Soil type:	swamps, bogs, moist woods, fields	Region: M P C States: DC DE MD VA WV		
Sedum ternatum *mountain stonecrop, wild stonecrop*	 RHW	Height: 0.5' Flowers: Apr-Jun, greenish-white Fruit: pod	Light: ◐ ● Moisture: M Soil pH: Soil type:	damp rocks, rocky banks, cliffs, woods	Region: M P C States: DC DE MD NY PA VA WV		creeping stems; used in rock gardens GC ▲
Senna marilandica (Cassia marilandica) *Maryland or southern wild senna*	  USFWS BES, USFWS BES	Height: 3-6.5' Flowers: Jul-Aug, yellow Fruit: pod	Light: ☼ ◐ Moisture: D M Soil pH: 4-7 Soil type: L S	dry roadsides, thickets, open woods	Region: M P C States: DC DE MD VA WV		pods important food for upland gamebirds
Silene caroliniana *wild pink*	 RHW	Height: 0.5-1' Flowers: Apr-Jun, white to pink Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: L	dry open woods, rocky slopes, roadside banks, shale barrens	Region: M C States: DC DE MD VA		semi-evergreen; native to limestone areas GC ▲
Silene stellata *starry campion, widow's frill*	 RHW	Height: 1-3.5' Flowers: Jun-Sep, white Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type:	wooded slopes, roadside banks, barrens	Region: M P C States: DC DE MD NY PA VA WV		drought-tolerant; naturalizes in woods
Silene virginica *fire pink*	 RHW	Height: 1-3' Flowers: Apr-Jul, dark pink to red Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: L	upland woods, wooded slopes, streambanks, clearings	Region: M P States: DC DE VA WV		
Silphium perfoliatum *cup plant*	 PLANTS DL	Height: 3-8' Flowers: Jul-Oct, yellow Fruit: capsule	Light: ☼ ◐ ● Moisture: D M Soil pH: Soil type: L	floodplains, fields, moist meadows, woods	Region: M P States: DC VA WV		

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Sisyrinchium angustifolium (S. graminoides) *blue-eyed grass*  CM NRCS	Height: 0.5-1.5' Flowers: Apr-Jun, blue-violet Fruit: brown, capsule	Light: ☼ ◐ Moisture: D M Soil pH: 5-7 Soil type: C L	grassy areas, damp woods	Region: M P C States: DC DE MD NY VA WV		grasslike leaves; also S. montanum in NY
Sisyrinchium atlanticum *coastal or eastern blue-eyed grass*  UWI JS	Height: 0.5-2.5' Flowers: May-Jul, blue-violet Fruit: capsule	Light: ☼ Moisture: M W Soil pH: Soil type:	marshes, meadows, low woods	Region: P C States: DC DE MD VA		leaves grasslike, more slender than S. angustifolium
Solidago caesia *bluestem goldenrod, wreath goldenrod*  RHW	Height: 1-3.5' Flowers: Aug-Oct, yellow Fruit: capsule	Light: ☼ ◐ ● Moisture: D M Soil pH: 5.5-7 Soil type: C L	rich deciduous woods	Region: M P C States: DC DE MD NY PA VA WV		stems bluish or purplish
Solidago canadensis var. scabra (S. altissima) *tall or late goldenrod*  UWI, RRK	Height: 3.5-6.5' Flowers: Jul-Nov, yellow Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: L	woods, fields, riverbanks, roadsides	Region: M P C States: DC DE MD NY PA VA WV		
Solidago canadensis *Canada goldenrod*  UWI MRB	Height: 1-6.5' Flowers: Jul-Oct, yellow Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: 4.8-7.5 Soil type: C L S	fields, roadsides	Region: M P C States: DE NY VA WV		
Solidago flexicaulis *broad leaf or zig zag goldenrod*  RHW	Height: 1-3.5' Flowers: Jun-Oct, yellow Fruit: capsule	Light: ◐ ● Moisture: D M Soil pH: 5.3-7 Soil type: L	moist woods, rocky wooded slopes	Region: M P States: DC DE MD NY PA VA WV		
Solidago juncea *early goldenrod*  RHW	Height: 1-4' Flowers: Jun-Oct, yellow Fruit: capsule	Light: ☼ Moisture: D M Soil pH: Soil type: S	fields, meadows, rocky slopes, roadsides	Region: M P C States: DC DE MD NY PA VA WV		
Solidago nemoralis *gray, dwarf, old-field, or one-sided goldenrod*  RHW	Height: 0.5-3' Flowers: Jun-Nov, yellow Fruit: capsule	Light: ☼ ◐ Moisture: D Soil pH: 6.5-7.5 Soil type: L S	fields, open woods, roadsides	Region: M P C States: DC DE MD NY PA VA WV		tolerates poor soils

Herbaceous Plants

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Solidago odora *sweet goldenrod*	Height: 1.5-5' Flowers: Jul-Oct, yellow Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: C L S	dry open woods, barrens	Region: M P C States: DC DE NY VA WV		
Solidago rugosa *wrinkle-leaf or rough-stemmed goldenrod*	Height: 1-6.5' Flowers: Aug-Nov, Fruit: capsule	Light: ☼ ◐ Moisture: M W Soil pH: 5-7.5 Soil type: L S	fields, woods, floodplains, roadsides, waste places	Region: M P C States: DC DE MD NY PA VA WV		tough plant; aggressive; strongly colonial
Solidago sempervirens *seaside goldenrod*	Height: 1-6.5' Flowers: Jul-Nov, yellow Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: 5.5-7.5 Soil type: L S	coastal areas, dunes	Region: C States: DC DE MD VA		coastal plant, may occur where road salts are used
Solidago speciosa *showy or slender goldenrod*	Height: 2-6.5' Flowers: Jul-Oct, yellow Fruit: capsule	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: L S	dry to moist open woods and fields	Region: M P States: DC MD NY VA		
Spiranthes cernua *nodding ladies' tresses*	Height: 0.5-2' Flowers: Jul-Nov, white Fruit:	Light: ☼ ◐ Moisture: M W Soil pH: 4.5-6.5 Soil type: C L S	meadows, open woods, roadsides, bogs	Region: M P C States: DC DE MD NY PA VA WV		orchid flowers; herbal uses
Stachys tenuifolia (S. hispida) *hedge nettle*	Height: 1.5-3.5' Flowers: Jun-Aug, white to pink Fruit: nut/nut-like	Light: ☼ ◐ ● Moisture: M W Soil pH: 5.7-7.4 Soil type: C L S	wooded bottomlands, streambanks, meadows, fields	Region: P C States: DC DE MD VA WV		
Stellaria pubera *star chickweed, great chickweed*	Height: 0.5-1.5' Flowers: Mar-Jun, white Fruit: capsule	Light: ● Moisture: M Soil pH: Soil type:	woods, shaded rocky areas	Region: M P ? States: DC MD VA WV		
Symphyotrichum cordifolium (Aster cordifolius) *heart-leaved aster*	Height: 1-5' Flowers: Aug-Oct, blue-violet to rose Fruit:	Light: ◐ ● Moisture: D M Soil pH: Soil type: C L S	upland meadows, woods	Region: M P C States: DC NY PA VA WV		

RHW

RHW

RHW

PLANTS TGB

USFWS BES

RHW

RHW

RHW

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Symphyotrichum ericoides var. ericoides (Aster ericoides) *heath, white heath, or dense-flowered aster; frostweed*  RHW	Height: 0.5-6.5' Flowers: Jul-Nov, white, rarely blue, violet, rose Fruit:	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: L S	dry fields, forest edges, woods, thickets	Region: M P States: DC DE MD NY WV		forms dense mounds
Symphyotrichum laeve var. laeve (Aster laevis) *smooth blue aster*  MOBOT	Height: 1-5' Flowers: Aug-Oct, pale blue, violet, white Fruit:	Light: ☼ ◐ Moisture: D Soil pH: Soil type: C L S	open areas, forest edges	Region: M P C States: DC DE MD NY PA VA WV		
Symphyotrichum novae-angliae (Aster novae-angliae) *New England aster*  USFWS	Height: 1-6' Flowers: Aug-Oct, violet capsule Fruit:	Light: ☼ ◐ Moisture: M Soil pH: Soil type: L	open woods, seasonal wetlands, shores, meadows	Region: M P C States: DC DE MD NY PA VA WV		showy, frequently cultivated; tolerates drier soils and seasonal flooding GC
Symphyotrichum novi-belgii var. novi-belgii (Aster novi-belgii) *New York aster*  RHW	Height: 1-4.5' Flowers: Jul-Oct, blue-violet Fruit:	Light: ☼ ◐ Moisture: M W Soil pH: Soil type: L	thickets, meadows, shores	Region: P C States: DC DE MD NY VA		
Symplocarpus foetidus *skunk cabbage*  RHW, USFWS BES	Height: 1-3' Flowers: Feb-May, green to purple-brown Fruit:	Light: ◐ ● Moisture: W Soil pH: 4-7 Soil type: C L S	fresh tidal and nontidal marshes and shrub swamps, forested wetlands, seeps	Region: M P C States: DC DE MD NY VA WV		flower inconspicuous, emerges before leaves; sap has skunk-like odor
Thalictrum dioicum *early meadow rue*  RHW	Height: 1-2.5' Flowers: Apr-May, green to purple Fruit: capsule	Light: ● Moisture: M Soil pH: Soil type: L	rich rocky woods, ravines, alluvial terraces	Region: M P C States: DC MD NY PA VA WV		
Thalictrum pubescens (T. polygamum) *tall meadow rue*  RHW	Height: 1.5-9' Flowers: Jun-Aug, white Fruit:	Light: ☼ ◐ ● Moisture: M W Soil pH: Soil type:	rich woods, low thickets, swamps, meadows, streambanks	Region: M P C States: DC DE MD NY PA VA WV		foliage similar to columbines; clump-forming; delicate flowers; species very variable
Thalictrum thalictroides (Anemonella thalictroides) *rue anemone, windflower*  RHW	Height: 0.5-1' Flowers: Apr-Jun, white Fruit:	Light: ◐ ● Moisture: D M Soil pH: Soil type: C L S	wooded banks and thickets	Region: M P C States: DC DE MD NY PA VA WV		foliage similar to columbines

Herbaceous Plants

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Tiarella cordifolia *foamflower, false miterwort*  USFWS BES	Height: 0.5-1' Flowers: Apr-Jul, white Fruit: capsule	Light: ◐ ● Moisture: M Soil pH: Soil type: L	rich woods, moist rocky wooded slopes	Region: M P C States: DC MD NY PA VA WV		attractive, long-blooming; creeping, clump-forming; many cultivars GC
Tradescantia virginiana *Virginia spiderwort, widow's tears*  RHW	Height: 1-3' Flowers: Apr-Jul, deep blue-purple Fruit: capsule	Light: ◐ ● Moisture: M Soil pH: 4-8 Soil type: C L	wooded slopes, shale outcrops, fields, roadsides	Region: M P C States: DC DE MD VA WV		flowers showy
Trillium erectum *purple or red trillium, wakerobin*  RHW	Height: 1-1.5' Flowers: Apr-Jun, purple or greenish to white Fruit: dark red, berry	Light: ● Moisture: M Soil pH: Soil type: L	woods	Region: M P States: DC MD NY PA VA WV		flowers ill-scented
Trillium grandiflorum *white or large-flowered trillium*  RHW	Height: 0.5-1.5' Flowers: Apr-Jun, white then pink Fruit: black, berry	Light: ● Moisture: M Soil pH: Soil type: L	woods	Region: M P C States: DC MD NY PA VA WV		showy flowers; common, often in large colonies
Trillium sessile *toadshade*  RHW	Height: 0.5-1' Flowers: Apr-May, maroon, purple, green Fruit: berry	Light: ◐ ● Moisture: M Soil pH: Soil type: L	woods, floodplains	Region: M P States: DC MD VA WV		
Trillium undulatum *painted trillium*  RHW	Height: 1-1.5' Flowers: May-Jun, white with purple Fruit: bright red, berry	Light: ◐ ● Moisture: M Soil pH: Soil type: L	woods	Region: M P States: DC MD NY PA VA WV		
Uvularia grandiflora *large-flowered bellwort*  RHW	Height: 2.5' Flowers: Apr-Jun, orange-yellow Fruit: capsule	Light: ● Moisture: M Soil pH: Soil type: L	woods	Region: M States: DC NY VA WV		rhizome can be cooked and eaten; young shoots can be substituted for asparagus
Uvularia perfoliata *perfoliate bellwort, mealy bellwort*  RHW	Height: 0.5-2' Flowers: Apr-Jul, yellow Fruit: capsule	Light: ◐ Moisture: M Soil pH: Soil type: L	woods	Region: M P C States: DC DE MD NY PA VA WV		rhizome can be cooked and eaten; young shoots maybe substituted for asparagus

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Uvularia sessilifolia *straw lily*  RHW	Height: 0.5-1' Flowers: May-Jun, yellow Fruit: capsule	Light: ☼ ◐ ● Moisture: D M Soil pH: Soil type: L S	dry to moist woodlands	Region: M P C States: DC DE MD NY PA VA WV		rhizomes may be cooked and eaten; young shoots may be substituted for asparagus GC
Veratrum viride *green false hellebore, white hellebore*  RHW	Height: 2-5' Flowers: May-Jul, yellow-green Fruit: capsule	Light: ☼ ◐ ● Moisture: M W Soil pH: Soil type: C L S	swamps, woods	Region: M P C States: DC DE MD NY PA VA WV		leaf edges will brown if soil dries and plant is in windy area; does best in cooler temps; slugs like the foliage
Verbena hastata *blue vervain, simpler's joy*  RHW	Height: 1.5-5' Flowers: Jun-Oct, blue to purple Fruit: nut/nut-like	Light: ☼ ◐ Moisture: M W Soil pH: Soil type: C L S	meadows, swamps, floodplains, ditches, roadsides	Region: M P C States: DC DE MD NY PA VA WV		bright flowers; herbal uses
Verbesina alternifolia *wingstem, yellow ironweed*  RHW	Height: 3.5-8' Flowers: Aug-Oct, yellow Fruit: capsule	Light: ☼ Moisture: M Soil pH: Soil type:	wooded slopes, open woodlands, riverbanks, shaded lowlands, roadsides, fields	Region: M P C States: DC DE MD NY VA WV		threatened in NY
Vernonia noveboracensis *New York ironweed*  RHW	Height: 3.5-8' Flowers: Aug-Oct, purple Fruit: capsule	Light: ☼ ◐ Moisture: M W Soil pH: Soil type: L	streambanks, fields, freshwater marshes	Region: M P C States: DC DE MD NY PA VA WV		brilliant flowers; tall upright form adds structure to garden; spreads
Veronicastrum virginicum (Veronica virginica) *Culver's root*  RHW	Height: 3-6.5' Flowers: Jun-Sep, white, pink Fruit: capsule	Light: ☼ ◐ Moisture: M W Soil pH: Soil type: C L S	rich woods, meadows, thickets, swamps	Region: M P States: DC DE MD NY VA WV		
Viola conspersa *American dog violet*  UWI RWF	Height: 0.5-1' Flowers: Apr-Jul, pale blue, violet Fruit: green, capsule	Light: ☼ ◐ ● Moisture: M W Soil pH: Soil type:	woods, fields, swamps	Region: M P C States: NY PA VA WV		delicate plant and flower; edible GC
Viola cucullata *marsh blue violet, blue marsh violet*  RHW	Height: 0-0.5' Flowers: Apr-Jul, pale purple Fruit: green, capsule	Light: ◐ ● Moisture: M W Soil pH: Soil type: C L S	bogs, meadows, swamps	Region: M P C States: DC DE PA VA WV		stemless; self-sows; can become a nuisance GC

Herbaceous Plants

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Viola hastata *halberdleaf yellow violet*	 RHW	Height: 0.5-1' Flowers: Apr-May, yellow w/ violet Fruit: green, capsule	Light: Moisture: D Soil pH: Soil type:	rich deciduous woods	Region: M States: DC MD VA WV		GC
Viola pedata *bird's foot violet*	 RHW	Height: 0-0.5' Flowers: Mar-Jun, pale blue or w/ purple-black tips Fruit: green, capsule	Light: Moisture: D M Soil pH: Soil type: L S	sandy or rocky barrens, dry forested slopes	Region: M P C States: DC DE MD VA WV		stemless GC
Viola pubescens var. pubescens (V. pennsylvanica) *yellow violet, downy violet*	 RHW	Height: 0.5-1.5' Flowers: May-Jun, yellow, purple veins Fruit: green, capsule	Light: Moisture: M Soil pH: 6-7 Soil type: L	moist or dry woods, swamps	Region: M P States: DC DE NY PA VA WV		
Viola sororia (V. papilionacea) *common blue violet*	 RHW	Height: 0.5' Flowers: Mar-Jun, dark blue, violet Fruit: green with purple, capsule	Light: Moisture: M Soil pH: 6-7.8 Soil type: C L	dry to moist woods, swamps, thickets	Region: M P C States: DC DE MD NY PA VA WV		delicate plant and flower; edible; spreader; stemless
Viola striata *striped cream violet, striped violet*	 MP	Height: 0.5-1' Flowers: Apr-Jun, ivory w/ purple Fruit: green, capsule	Light: Moisture: M W Soil pH: Soil type: L	alluvial woods, swamps, fields	Region: M P C States: DC DE MD NY PA VA WV		
Yucca filamentosa (Y. flaccida) *Adam's needle*	 RHW	Height: 2-2.5' Flowers: Jun-Sep, white Fruit:	Light: Moisture: D Soil pH: 5.5-7.5 Soil type: L S	coastal sand dunes, outcroppings on thin rocky soils	Region: C States: DC DE MD VA		flower stalk can rise 5-15 feet above foliage
Zizia aurea *golden-alexanders*	 RHW	Height: 1-2.5' Flowers: Apr-Jun, yellow Fruit:	Light: Moisture: D M Soil pH: Soil type: C L S	wooded bottomlands, streambanks, moist meadows, floodplains	Region: M P C States: DC DE NY PA VA WV		

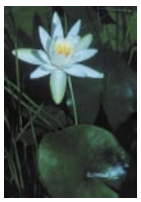
See also:

In the *Vines* section:
Smilax herbacea

In the *Herbaceous Emergents* section:
Iris prismatica, versicolor, virginica

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Distichlis spicata *saltgrass*  UWI EJJ	Height: 0.5-1.5' Flowers: Aug-Oct Fruit: pod	Light: Moisture: M W Soil pH: 6.4-10.5 Soil type: C L Flood Depth: Salinity: 0-50 ppt	tidal salt marshes, from Mean High tide above to spring tide level; high salinity; wet depressions	Region: C States: DC DE MD VA		often intermixed with Spartina patens, forms dense mats
Dulichium arundinaceum *three-sided sedge*  UWI AH	Height: 1-3.5' Flowers: Jul-Oct Fruit: brown, nut/nut-like	Light: Moisture: W Soil pH: 4.7-7.5 Soil type: C L S Flood Depth: 0-12"	fresh tidal and nontidal marshes, bogs, swamps, pond edges	Region: M P C States: DC DE NY PA VA WV		grows best where water rarely draws down
Hibiscus moscheutos (H. palustris) *rose mallow, eastern rosemallow*  CM NRCS	Height: 3-6' Flowers: Jul-Sep, cream, pink Fruit: Sep-Mar, brown, capsule	Light: Moisture: M W Soil pH: 4-7.5 Soil type: C L Flood Depth: 0-6" Salinity: 0-15 ppt	fresh to brackish tidal marshes, occasionally nontidal marshes	Region: C States: DC DE MD VA WV		common along coast; persists in winter; split seed capsules; use H. laevis in Piedmont
Iris prismatica *slender blueflag*  RHW	Height: 1-3' Flowers: May-Jun, blue Fruit: green to brown, capsule	Light: Moisture: M W Soil pH: Soil type: Flood Depth: 0-6" Salinity: 0-0.5 ppt	fresh to moderately brackish tidal marshes, meadows, shores, swamps, forested wetlands	Region: C States: DC DE VA		leaves 1/4-inch wide, narrower than Iris versicolor
Iris versicolor *blue flag*  RHW	Height: 3' Flowers: May-Jun, blue Fruit: green to brown, capsule	Light: Moisture: M W Soil pH: Soil type: L S Flood Depth: 0-6" Salinity 0-0.5 ppt	fresh to moderately brackish tidal marshes, meadows, shores, swamps, forested wetlands	Region: M P C States: DC DE MD NY PA VA		
Iris virginica *Virginia blue flag*  RHW	Height: 1-2' Flowers: May-Jul, blue Fruit: green to brown, capsule	Light: Moisture: W Soil pH: 4.8-7.3 Soil type: C L Flood Depth: 0-6" Salinity: 0-0.5 ppt	fresh to moderately brackish tidal marshes, meadows, shores, swamps, forested wetlands	Region: P C States: DC VA WV		
Juncus canadensis *Canada rush*  UWI AH	Height: 1-4' Flowers: Jul-Oct, greenish brown Fruit: brown, capsule	Light: Moisture: M W Soil pH: 4.5-5.9 Soil type: C L S Flood Depth: Salinity: 0-0.5 ppt	fresh to slightly brackish tidal and nontidal marshes, swamps, ponds and pond borders, shores, wet meadows, shallow water	Region: P C States: DC DE MD NY PA WV		
Juncus effusus *soft rush*   CM NRCS, USFWS BES	Height: 1-4' Flowers: Jun-Sep, greenish brown Fruit: brown, capsule	Light: Moisture: M W Soil pH: 5.5-7 Soil type: C L S Flood Depth: 0-12"	fresh tidal and nontidal marshes, shrub swamps, meadows, ditches	Region: M P C States: DC DE MD NY PA VA WV		often grows in clumps

Herbaceous Emergents

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Juncus roemerianus *black needlerush, needlegrass rush, needlegrass rush*	 PLANTS LA	Height: 1-4' Flowers: May-Oct, yellow-green Fruit: July-Nov, brown, capsule	Light: Moisture: M W Soil pH: 3.5-7 Soil type: C L Flood Depth: Salinity: 0-25 ppt	brackish and salt marshes, above Mean High tide to spring tide level	Region: C States: DE MD VA		some nitrogen fixing value
Justicia americana *American water-willow*	 RHW	Height: 1-3' Flowers: Jun-Oct, white with purple Fruit: achene (dry, flat seed)	Light: Moisture: W Soil pH: 5.4-7.6 Soil type: C L S Flood Depth:	muddy edges of shallow freshwater streams, lakes, ponds; shores	Region: M P States: DC MD PA VA WV		has underground stems and forms colonies
Kosteletzkya virginica *seashore mallow*	 RHW	Height: 1.5-4.5' Flowers: Jul-Sep, pink Fruit: brown, capsule	Light: Moisture: W Soil pH: Soil type: Flood Depth: Salinity: 0-10 ppt	irregularly flooded salt and brackish marshes, above Mean High tide to spring tide level	Region: C States: DC DE MD VA		common near the coast; looks similar to Hibiscus
Nuphar lutea (N. advena) *spatterdock, yellow water lily, cow-lily, American lotus*	 RHW	Height: 1-1.5' Flowers: May-Oct, yellow Fruit: green, berry	Light: Moisture: W Soil pH: Soil type: C L S Flood Depth: 12-36"	fresh tidal and nontidal marshes, swamps, ponds	Region: M P C States: DC DE MD NY VA WV		large leaves floating but rooted; fruit berry-like, many seeded, somewhat flattened, leathery
Nymphaea odorata *fragrant water lily, American water lily, white water lily*	 RHW	Height: 1-4' Flowers: Jun-Sep, white Fruit: green, berry	Light: Moisture: W Soil pH: Soil type: C L S Flood Depth: 12-48"	tidal and nontidal fresh waters, shallow lakes, ponds	Region: P C States: DC DE MD NY VA		large leaves floating but rooted; fruit berry-like, many seeded, somewhat flattened, leathery
Orontium aquaticum *golden club*	 RHW	Height: 1.5-2' Flowers: Apr-Jun, yellow Fruit: green, berry	Light: Moisture: W Soil pH: Soil type: C L S Flood Depth:	edges of regularly flooded tidal fresh marshes, inland shores, pond borders, on mud or in shallow water	Region: C States: DC DE MD VA WV		fruit is a thick fleshy spike covered with small dark green berry-like structures
Peltandra virginica *arrow arum*	  RHW, RHW	Height: 2' Flowers: Apr-Jul, green to white Fruit: green or black	Light: Moisture: W Soil pH: 5.2-9.5 Soil type: C L S Flood Depth: 0-12" Salinity: 0-2 ppt	fresh to moderately brackish tidal and nontidal marshes, swamps, shallow waters of lakes and ponds	Region: C States: DC DE MD NY VA WV		globular head of berries enclosed in green leathery case, curved downward
Pontederia cordata *pickerelweed*	 UWI MC	Height: 3.5' Flowers: Jun-Nov, purple Fruit:	Light: Moisture: W Soil pH: 6-8 Soil type: C L S Flood Depth: 0-18" Salinity: 0-3 ppt	fresh to moderately brackish, tidal and nontidal marshes, shallow water of ponds or lakes	Region: P C States: DC DE MD NY VA		spreads vigorously; a small bladder-like structure crested with toothed ridges holds one seed

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Sagittaria latifolia *duck potato, arrowhead, broadleaf arrowhead*	 RHW	Height: 0.5-4' Flowers: Jul-Sep, white Fruit: green, achene (dry, flat seed)	Light: Moisture: W Soil pH: 4.7-8.6 Soil type: C L Flood Depth: 0-24" Salinity:	fresh tidal and nontidal marshes, swamps; borders of lakes, streams and ponds	Region: P C States: DC DE MD NY PA VA WV		
Saururus cernuus *lizard's tail*	 RHW	Height: 1.5-4.5' Flowers: Jun-Sep, greenish white Fruit: capsule	Light: Moisture: W Soil pH: Soil type: C L S Flood Depth: 0-12"	fresh tidal and nontidal marshes, swamps, shallow water	Region: C States: DC DE MD VA WV		fragrant flower; often forms extensive colonies
Schoenoplectus pungens var. pungens (Scirpus pungens, Scirpus americanus) *common three-square*	 CM NRCS	Height: 4' Flowers: Jun-Sep, brown Fruit: Jun-Sep, brown, achene (dry, flat seed)	Light: Moisture: W Soil pH: Soil type: C L S Flood Depth: 0-6" Salinity: 0-15 ppt	fresh and brackish tidal and nontidal marshes, shores, shallow water	Region: M P C States: DC DE MD VA	high wildlife value	spike above flower is up to 5 inches tall
Schoenoplectus validus (Scirpus validus) *great bulrush, soft stem bulrush*	 PLANTS 1995	Height: 6-10' Flowers: Jun-Sep, brown Fruit: Jun-Sep, brown, achene (dry, flat seed)	Light: Moisture: W Soil pH: Soil type: C L S Flood Depth: 0-12" Salinity: 0-5 ppt	fresh to brackish tidal and nontidal marshes, pond edges, quiet waters, emergent marshes	Region: M P C States: MD NY PA VA	high wildlife value	spreads rapidly
Scirpus atrovirens *black or green bulrush, dark green bulrush*	 PLANTS JA	Height: 3-6' Flowers: Jun-Aug, brown Fruit: Jun-Aug, brown, achene (dry, flat seed)	Light: Moisture: W Soil pH: 4-8 Soil type: C L Flood Depth: Salinity:	shallow emergent marshes, shrub swamps, floodplain forests, wooded swamp, bogs, wet meadows, swales, ditches	Region: M P C States: MD NY PA VA WV	high wildlife value	grows in clumps or sod-forming
Scirpus cyperinus *woolgrass, woolgrass bulrush*	 USDA JK	Height: 4-5' Flowers: Aug-Sep, brown Fruit: Aug-Sep, brown, achene (dry, flat seed)	Light: Moisture: M W Soil pH: 4.8-7.2 Soil type: C L S Flood Depth: Salinity:	fresh tidal and nontidal marshes, swamps, forested wetlands, meadows, ditches, ponds, bogs	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	grows in large clumps, often extensive colonies
Sparganium americanum *American bur-reed*	 RHW	Height: 5' Flowers: May-Aug, greenish Fruit: green to brown, achene (dry, flat seed)	Light: Moisture: W Soil pH: 4.9-7.3 Soil type: C L S Flood Depth: 0-6"	fresh nontidal marshes, shallow waters, muddy shores	Region: M P C States: DC DE NY PA VA WV		good for sediment stabilization
Spartina alterniflora *salt marsh or smooth cordgrass*	 USFWS	Height: 2-7' Flowers: Jul-Sep Fruit:	Light: Moisture: M W Soil pH: 5.4-7 Soil type: C L S Flood Depth: Salinity: 0-35 ppt	salt and brackish tidal marshes (mid-tide up to Mean High tide level)	Region: C States: DC DE MD VA		good for shore stabilization; important in seaside habitats; short form (<1.5 ft) found in irregularly flooded high marsh, tall form in regularly flooded low marsh

Herbaceous Emergents

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Spartina cynosuroides *big cordgrass*  PLANTS LA	Height: 3.5-10' Flowers: Aug-Oct Fruit:	Light: Moisture: M W Soil pH: 5.8-7.5 Soil type: C L S Flood Depth: Salinity: 0-10 ppt	fresh and brackish tidal marshes, near Mean High tide and above to spring tide level	Region: C States: DC DE MD NY PA VA		soil stabilizer; not drought tolerant
Spartina patens *salt meadow hay*  CM NRCS	Height: 1-3' Flowers: Jul-Sep Fruit: achene (dry, flat seed)	Light: Moisture: M W Soil pH: 5.3-7.5 Soil type: C L S Flood Depth: Salinity: 0-35 ppt	coastal salt and brackish tidal marshes; irregularly flooded high marsh at or above Mean High tide line	Region: C States: DC DE MD VA		forms large mats; good for shore erosion control
Spartina pectinata *freshwater cordgrass, prairie cordgrass*  CM NRCS	Height: 4' Flowers: Jul-Sep Fruit: achene (dry, flat seed)	Light: Moisture: M W Soil pH: 6-8.5 Soil type: L Flood Depth: 0-6" Salinity: 0-3 ppt	brackish and fresh tidal and nontidal marshes, shores, wet meadows; upper half of intertidal zone and above to spring tide level	Region: M P C States: DC DE MD NY PA VA WV		shore stabilizer; low drought tolerance
Zizania aquatica *wild rice*  RHW	Height: 6-10' Flowers: Jun-Sep Fruit: achene (dry, flat seed)	Light: Moisture: M W Soil pH: 6.4-7.4 Soil type: C L S Flood Depth: 0-36" Salinity:	fresh tidal and nontidal marshes, streamsides, shallow waters	Region: C States: DC DE MD NY VA		annual; edible

See also:

In the *Ferns* section:
- **Dryopteris cristata**
- **Onoclea sensibilis**
- **Osmunda cinnamomea, regalis**
- **Thelypteris palustris**
- **Woodwardia areolata, virginica**

In the *Grasses & Grasslike Plants* section:
- **Andropogon glomeratus (virginicus var abbreviatus), virginicus**
- **Calamagrostis canadensis**
- **Carex crinita var. crinita, lurida, stricta, vulpinoidea**
- **Elymus virginicus**
- **Leersia oryzoides**
- **Panicum amarum, virgatum**

In the *Herbaceous Plants* section:
- **Asclepias incarnata**
- **Bidens cernua**
- **Caltha palustris**
- **Doellingeria umbellata var. umbellata (Aster umbellatus)**
- **Lobelia cardinalis**
- **Sabatia angularis**
- **Symphyotrichum novae-angliae (Aster novae-angliae)**
- **Symplocarpus foetidus**
- **Verbena hastata**
- **Vernonia noveboracensis**

Wetland plants (**Spartina alterniflora**, here) stabilize the shoreline without obstructing the homeowner's view.


USFWS

Wetlands of any size provide valuable habitat for wildlife.


USFWS BES


USFWS RM

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Alnus serrulata *smooth alder, hazel alder*  USFWS BES, PLANTS WSJ	Height: 12-20' Flowers: Mar-Apr, purple Fruit: Aug-Feb, brown, cone/cone-like Fall color: yellow, red	Light: Moisture: M W Soil pH: 5.5-7.5 Soil type: C L	fresh tidal and nontidal marshes, shrub swamps, forested wetlands	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	forms thickets along watercourses; nitrogen fixing; tolerates flooding to 3 inches
Aralia spinosa *Devil's walking stick*  RHW	Height: 20-30' Flowers: Jul-Aug, white Fruit: Aug-Sep, black, berry Fall color: yellow	Light: Moisture: D M Soil pH: 5.5-7.1 Soil type: C L S	moist woods, stream banks, roadsides	Region: M P C States: DC DE MD VA WV	high wildlife value	seeds are poisonous if chewed; low maintenance; spreads from new shoots; thorny, clublike stem
Baccharis halimifolia *high-tide bush, groundsel tree, sea myrtle*  USFWS BES	Height: 6-12' Flowers: Aug-Sep, white Fruit: Oct-Nov, silvery white, achene Fall color: purple	Light: Moisture: D M W Soil pH: 7-8.5 Soil type: C L S O	fresh to salt marshes, ditches, shores, dunes	Region: C States: DE MD VA		volunteers in disturbed places; shallow, lateral roots; tolerates flooding to 6 inches; tolerates salinity to 15 ppt
Callicarpa americana *American beautyberry, French mulberry*  USFWS BES	Height: 6' Flowers: Jun-Aug, lavender-pink Fruit: Sep-Mar, lavender, berry Fall color:	Light: Moisture: D M Soil pH: 4.8-7 Soil type: C L S		Region: C States: DC VA		flowers from new growth; if overgrown prune to 6-18 inches tall; will regain height in one season
Ceanothus americanus *New Jersey tea*  RHW	Height: 3' Flowers: May-Sep, white Fruit: Sep-Oct, black Fall color: yellow to tan	Light: Moisture: D Soil pH: 4.3-6.5 Soil type: C L S	meadows, fields, glades, open woods, borders, rocky areas, openings	Region: M P C States: DC DE MD NY PA VA WV		tough; tolerates moist soil if well drained; fixes nitrogen; tolerates dryness
Cephalanthus occidentalis *buttonbush*  RHW	Height: 6-12' Flowers: Jul-Aug, creamy white Fruit: Sep-Jan, green to brown Fall color: yellow-green	Light: Moisture: M W Soil pH: 6.1-8.5 Soil type: C L S O	fresh tidal and nontidal marshes, shrub swamps, forested wetlands; stream, lake and pond edges	Region: M P C States: DC DE MD NY PA VA WV		needs sun to flower; flowers fragrant; interesting fruit; tolerates drought; leaves may persist into winter; tolerates flooding to 36 inches
Clethra alnifolia *sweet pepperbush, summersweet*  USFWS	Height: 6-12' Flowers: Jul-Aug, white/pink Fruit: Sep-Feb, brown, capsule Fall color: yellow	Light: Moisture: M W Soil pH: 4.5-6.5 Soil type: C L S	tidal and nontidal forested wetlands, shrub swamps, bogs, woods, coastal river floodplains, lakeshores	Region: C States: DC DE MD NY VA		very fragrant; tolerates some flooding by partly salty water
Comptonia peregrina *sweetfern*  USFWS BES	Height: 3' Flowers: Apr-May, yellow-green Fruit: Aug-Oct, green to brown, cone/cone-like Fall color: brown	Light: Moisture: D Soil pH: 4-7 Soil type: L S O	hillsides, cliffs, woods openings, sand flats and barrens, fields, dunes	Region: M P C States: DC DE MD NY PA VA WV		fragrant; fixes nitrogen, leaves may persist into winter

Shrubs

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Cornus amomum *silky dogwood, red willow, silky cornel*  RHW	Height: 6-12' Flowers: May-Jun, white Fruit: Aug, blue, berry Fall color: orange, red or purple	Light: ☼ ◐ Moisture: M W Soil pH: 6.1-7.5 Soil type: C L S	forested wetlands, floodplains, shrub wetlands, stream and pond banks, clearings	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	
Cornus racemosa *red-panicled or gray dogwood*  UWI KJS, UWI KJS	Height: 6-12' Flowers: May-Jun, white Fruit: Aug-Sep, white, red stems, berry Fall color: purple	Light: ☼ ◐ ● Moisture: D M Soil pH: 6.1-8.5 Soil type: C L	open wooded floodplains, forested wetlands, shrub swamps, rocky woods or ledges, fencerows	Region: M P States: NY VA WV	high wildlife value	tolerates a variety of conditions; berries are food for many songbirds and small mammals
Corylus americana *American hazelnut or filbert*  UCONN, UCONN, UCONN	Height: 10-15' Flowers: Mar-Apr, brown or red Fruit: Aug-Sep, light brown, nut/nut-like Fall color: yellow orange	Light: ◐ Moisture: D M Soil pH: 6.1-7.5 Soil type: C L	dry woodlands, forest edges, hillsides, fence rows, ravines, floodplain woods, brushy pastures	Region: M P States: DC DE MD NY PA VA WV		forms large thickets; edible nut; male catkins brown, female red
Gaultheria procumbens *wintergreen, checkerberry*  RHW, RHW	Height: 0.5' Flowers: May-Aug, white to pink Fruit: Jul-Apr, red, berry Fall color: evergreen	Light: ◐ ● Moisture: D M Soil pH: 4-6.5 Soil type: L S O	clearings, steep rocky open slopes, sandy oak woods, hummocks in bogs	Region: M P C States: DC DE MD NY PA VA WV		dense, mat-like form; forms colonies; edible fruits, leaves; wintergreen taste and scent GC ▲
Gaylussacia baccata *black huckleberry*  RHW	Height: 1.5-3' Flowers: May-Jun, white to pink Fruit: Jul-Sep, black, berry Fall color: reddish-purple	Light: ◐ ● Moisture: D M W Soil pH: 4.5-6.5 Soil type: C L S	woods, thickets	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	very common; fruits edible but many-seeded
Gaylussacia frondosa *dangleberry*  CM NRCS	Height: 2-4' Flowers: Apr-Jun, greenish to purple Fruit: Jul-Oct, blue, berry Fall color: reddish-purple	Light: ☼ ◐ ● Moisture: D M W Soil pH: 4.5-6.5 Soil type: S	woods and thickets	Region: M C States: DC DE MD NY VA	high wildlife value	berries borne on long, drooping stems
Hamamelis virginiana *witch hazel*  RHW	Height: 15-30' Flowers: Sep-Dec, yellow Fruit: Oct-Nov, tan brown, capsule Fall color: yellow	Light: ◐ ● Moisture: D M Soil pH: 5.5-6.5 Soil type: C L S	woods or brushy fields, moist or dry	Region: M P C States: DC DE MD NY PA VA WV		noted for fall/winter bloom; medicinal uses, leaves may persist into winter
Hydrangea arborescens *wild or smooth hydrangea*  RHW	Height: 3-6' Flowers: Jun-Aug, white Fruit: Oct-Jan, brown, capsule Fall color: yellow	Light: ◐ ● Moisture: M Soil pH: 6.1-8.5 Soil type: L S	rich upland or floodplain woods, streambanks	Region: M P States: DC MD PA VA WV		eaves poisonous to humans; does best on loamy soils

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Hypericum densiflorum *dense St. John's wort*	 RHW	Height: 1.5-6' Flowers: Jul-Sep, yellow Fruit: Oct-Apr, brown, capsule Fall color: yellow green	Light: Moisture: D M W Soil pH: 5.5-7 Soil type: C L S O	low boggy places, seepage slopes, pond and lake edges, wet meadows, streambanks, ditches, moist pinelands	Region: M P C States: DC DE MD VA		blooms small but form dense flat-topped clusters; can spread aggressively
Ilex glabra *inkberry*	 USFWS BES, USFWS BES	Height: 6-10' Flowers: May-Jun, greenish white Fruit: Sep-Mar, black, berry Fall color: evergreen	Light: Moisture: D M Soil pH: 4.5-6 Soil type: C L S O	forested wetlands, shrub swamps, sandy woods	Region: C States: DE NY VA	high wildlife value	berries persist through winter; male and female flowers on separate plants; tolerates some salt flooding; short cultivars (4-5') available
Ilex laevigata *smooth winterberry*	 RHW, RHW	Height: 10-12' Flowers: May-Jul, white to cream Fruit: Sep-Feb, red, scarlet, berry Fall color: yellow	Light: Moisture: M Soil pH: 4.5-6.5 Soil type: C L S O	wooded swamps	Region: C States: DC DE MD VA	high wildlife value	berries provide winter bird food; prefers soil with a calcareous layer
Ilex verticillata *winterberry, winterberry holly, black alder*	 USFWS BES	Height: 6-12' Flowers: Jun-Jul, greenish white Fruit: Aug-Feb, red, Fall color:yellow to brown	Light: Moisture: M W Soil pH: 4.5-6.5 Soil type: C L S O	fresh tidal swamps, shrub swamps, forested wetlands	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	berries provide winter bird food, poisonous to humans; berries on female plants, need male plant to pollinate
Itea virginica *tassel-white, Virginia sweetspire*	 USFWS BES	Height: 6-10' Flowers: Jun-Jul, white Fruit: Aug-Mar, brown, capsule Fall color: red to purple	Light: Moisture: M W Soil pH: 5.1-7.5 Soil type: C L S	forested wetlands, shrub swamps, streambanks, shallow water	Region: C States: DC DE MD VA		fruit capsules on stalk; plant will sucker, form thickets; tolerates flooding to 6 inches
Iva frutescens *marsh elder, high tide bush*	 PLANTS LA, RHW	Height: 2-10' Flowers: Aug-Oct, greenish white Fruit: not conspicuous, capsule Fall color:	Light: Moisture: D M Soil pH: 5-5.7 Soil type: C L S	tidal brackish and salt marshes	Region: C States: DE MD VA		similar to Baccharis halimifolia but with opposite leaves; tolerates salinity to 15 ppt
Kalmia angustifolia *sheep laurel, lambkill*	 CM NRCS	Height: 2-3' Flowers: May-Jul, white, pink, purple, red Fruit: Sep-Mar, brown, capsule Fall color: evergreen	Light: Moisture: M W Soil pH: 4.5-6 Soil type: C L S O	pastures, barrens, slow wooded streams, swamp borders, bogs, thickets	Region: C States: DC DE MD NY PA VA		foliage poisonous to hoofed browsers (not eaten by deer)
Kalmia latifolia *mountain laurel*	 USFWS BES	Height: 12-20' Flowers: May-Jul, white to pink/purple Fruit: May-Jun, brown, capsule Fall color: evergreen	Light: Moisture: D M W Soil pH: 4.5-6 Soil type: C L S O	woods, ridge tops, fields, swamps, mountain meadows and slopes	Region: M P C States: DC DE MD NY PA VA WV		foliage poisonous to hoofed browsers; PA state flower

Shrubs

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Leucothoe racemosa *fetterbush, sweetbells* RHW, PLANTS WSJ 	Height: 13' Flowers: May-Jun, white, pinkish Fruit: brown, capsule Fall color:	Light: ◐ ● Moisture: M W Soil pH: 4.5-6 Soil type: C L	swamps, woods, thickets	Region: M P C States: DC DE MD NY PA VA		zig-zag twigs, reddish or greenish; tends to sucker, forming thickets
Lindera benzoin *spicebush* CM NRCS, RHW, CM NRCS 	Height: 6.5-16' Flowers: Mar-May, yellow Fruit: Sep-Oct, scarlet, berry Fall color: yellow	Light: ◐ ● Moisture: M W Soil pH: 4.5-6.5 Soil type: L S	woods, wooded slopes, dunes, floodplain forests	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	all parts edible and aromatic; herbal uses
Lyonia ligustrina *male-berry* RHW 	Height: 6-12' Flowers: May-Jul, white Fruit: Sep-Mar, brown, capsule Fall color: orange to red	Light: ◐ ● Moisture: M Soil pH: 4-6 Soil type: C L S O	open areas, swamps, woods	Region: M P C States: DC DE MD NY PA VA WV		berry-like capsules persist through winter
Lyonia mariana *stagger-bush* RHW, CM NRCS 	Height: 0.5-6.5' Flowers: May-Jun, white, pale pink Fruit: Sep-Feb, brown, capsule Fall color: red	Light: ◐ ● Moisture: D M Soil pH: 4-6 Soil type: S	swamps, moist or dry woods	Region: C States: DC DE MD VA		interesting woody capsules persist through winter
Morella caroliniensis (Myrica heterophylla) *southern or swamp bayberry* PLANTS 	Height: 8-12' Flowers: Apr-Jun, yellowish-green Fruit: Sep-Apr, bluish white, berry Fall color: evergreen	Light: ○ ◐ ● Moisture: D M W Soil pH: 4.5-7 Soil type: C L S	dry or moist thickets, woods, bogs	Region: C States: DE VA		glossy dark green leaves, leaves larger than M. cerifera, plants fuller
Morella cerifera (Myrica cerifera) *wax myrtle, southern bayberry* USFWS BES, PLANTS 	Height: 6-15' Flowers: Mar-Jun, yellowish-green Fruit: Sep-Apr, bluish white, berry Fall color: evergreen in southern areas	Light: ○ ◐ Moisture: D M W Soil pH: 5.5-7 Soil type: C L S	tidal and nontidal fresh and brackish marshes, swamps, sandy dune swales, upland woods	Region: C States: DE MD VA		fragrant; loses leaves north and west of Ches. Bay, MD north; may reach 30 feet; can be pruned as hedge; nitrogen fixer; tolerates salinity to 10 ppt
Morella pensylvanica (Myrica pensylvanica) *northern bayberry, candleberry* CM NRCS 	Height: 5-10' Flowers: Mar-Apr, yellowish-green Fruit: Sep-Apr, bluish white, berry Fall color:	Light: ○ ◐ Moisture: D M W Soil pH: 5.1-6.5 Soil type: C L S	tidal and nontidal fresh and brackish marshes, swamps, sand flats, dunes	Region: C States: DC DE MD NY VA	high wildlife value	fragrant leaves; tends to sucker and form large colonies; waxy berries persist through winter; tolerates salinity to 20 ppt
Photinia melanocarpa (Aronia melanocarpa) *black chokeberry* USFWS BES 	Height: 3-6' Flowers: Apr-May, white or pink-tinged Fruit: Sep-Nov, black, berry Fall color: crimson red	Light: ○ ◐ Moisture: D M W Soil pH: 5.1-6.5 Soil type: C L S O	bogs, swamps, springs, dunes, cliffs, fields, clearings, wet or dry thickets, creek banks, balds, rock outcroppings	Region: M P C States: DE MD NY PA VA WV		can be pruned as hedge

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Photinia pyrifolia (Aronia arbutifolia) *red chokeberry* USFWS BES, VT 	Height: 1.5-13' Flowers: Mar-May, white, purple-tinged Fruit: Sep-Dec, red, berry Fall color: orange to red	Light: ◐ ◑ Moisture: D M W Soil pH: 5.1-6.5 Soil type: C L S	forested wetlands, shrub bogs, upland forests, fields, dunes	Region: M P C States: DC DE MD NY PA VA WV		tolerates infrequent flooding by water with some salt; can be pruned as hedge
Physocarpus opulifolius *ninebark* USFWS BES 	Height: 5-12' Flowers: May-Jul, white, pink Fruit: Jul-Mar, orange to red, capsule Fall color:yellow to purple	Light: ◐ ◑ Moisture: M W Soil pH: 6.1-8.5 Soil type: C L	thickets, along streams in sand or gravel bars, rocky slopes	Region: M P States: DC NY PA VA WV		papery bark continually molts in thin strips; very drought tolerant; adaptable
Prunus maritima *beach plum* CM NRCS 	Height: 1-8' Flowers: Apr-May, white Fruit: Aug, blue-purple, fleshy Fall color:	Light: ◐ ◑ Moisture: D M Soil pH: 5.8-7.7 Soil type: L S	ocean dunes, roadsides, hedgerows	Region: C States: DE MD	high wildlife value	edible fruit, prized for jams and jellies; salt tolerant
Rhododendron atlanticum *dwarf or coast azalea* GM ARS, USFWS BES 	Height: 1-2.5' Flowers: Apr-May, white, purple-tinged Fruit: brown, capsule Fall color:	Light: ◑ ● Moisture: M Soil pH: 4.2-5.7 Soil type: S	coastal, sandy soils	Region: C States: DE MD VA		flowers very fragrant; colonial, arising from spreading underground stems;
Rhododendron calendulaceum *flame azalea* RHW 	Height: 5-9' Flowers: May-Jun, yellow, orange, red Fruit: Aug-Feb, brown, capsule Fall color: yellow green	Light: ◑ Moisture: D M Soil pH: 5.1-6 Soil type: C L	open oak woods, dry rocky woodlands, damp slopes, mountain streambanks, heath balds	Region: M States: VA WV		
Rhododendron canescens *sweet azalea* PLANTS, PLANTS 	Height: 3-10' Flowers: Apr-May, white or pink Fruit: brown, capsule Fall color:	Light: ◑ Moisture: M Soil pH: 4.2-5.7 Soil type: S	woods	Region: C States: DC DE MD		
Rhododendron maximum *great laurel, rosebay rhododendron* RHW, USFWS BES 	Height: 15-20' Flowers: May-Aug, white, pink Fruit: Sep-Nov, tan to red, capsule Fall color: evergreen	Light: ◑ ● Moisture: M W Soil pH: 4.5-6 Soil type: L	mountain slopes, woods, sheltered coves, ravines, streamsides	Region: M P States: DC MD NY PA VA WV		needs space; may form dense thicket
Rhododendron periclymenoides *pinxterbloom, pink azalea, pinxter flower* RHW 	Height: 3-10' Flowers: Apr-May, pink, purple, white Fruit: Aug-Mar, brown, capsule Fall color: dull yellow	Light: ◐ ◑ ● Moisture: D M W Soil pH: 4.5-5.5 Soil type: L	woods, low swampy areas, limestone cliffs	Region: M P C States: DC DE MD NY PA VA WV		will tolerate thin soils over bedrock; open, airy quality; susceptible to disease and insects

Shrubs

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Rhododendron prinophyllum *rose, roseshell, mountain or early azalea*	 PLANTS	Height: 2-8' Flowers: May-Jun, pink Fruit: May-Sep Fall color:	Light: ◌ ◑ ● Moisture: D M Soil pH: Soil type: O	rocky or rich woods	Region: M States: PA VA WV		may reach 15 feet tall, but rarely; flowers have clove-like scent
Rhododendron viscosum *swamp azalea*	 RHW	Height: 6.5-10' Flowers: May-Aug, white, pink Fruit: Aug-Mar, brown, capsule Fall color: yellow, orange, to purple	Light: ◌ ◑ Moisture: M W Soil pH: 4-6 Soil type: C L S O	wet floodplain woods, streambanks, swamp edges, hillside bogs, ditch banks, clearings	Region: M P C States: DC DE MD NY VA		attractive spreading, loose-branched habit; demands acid soil; susceptible to disease and insects
Rhus aromatica *fragrant sumac*	 RHW, RHW	Height: 6' Flowers: Mar-May, greenish yellow Fruit: Jul-Mar, dark wine red, berry Fall color: red	Light: ◌ ◑ Moisture: D Soil pH: 6.1-8.5 Soil type: L S	limestone cliffs, open upland woods, rocky bluffs, oak barrens, foredunes, barren rock	Region: M P States: DC MD NY VA WV	high wildlife value	fuzzy edible berry clusters; aromatic leaves; shorter cultivars available; male and female separate plants
Rhus copallina *shining, winged, flameleaf, or dwarf sumac*	 RHW, CM NRCS	Height: 20-35' Flowers: Jul-Sep, greenish yellow Fruit: Oct-Nov, red, berry Fall color: rich red	Light: ◌ ◑ Moisture: D Soil pH: 5.3-7.5 Soil type: C L S	thickets, fields, open woods, roadsides, fencerows	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	forms large colonies; winter food for wildlife
Rhus glabra *sweet or smooth sumac*	 CM NRCS	Height: 2-20' Flowers: Jun-Jul, greenish Fruit: Aug-Oct, red, berry Fall color: red	Light: ◌ Moisture: D M Soil pH: 5.3-7.5 Soil type: L S	dry or moist open areas, shale barrens, fields, dry open slopes, roadsides, fencerows	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	fuzzy berry clusters; male and female may be on separate plants; extremely drought resistant
Rhus hirta (R. typhina) *staghorn sumac*	 RHW	Height: 35-50' Flowers: Jun-Jul, yellow-green Fruit: Jul-Feb, red, berry Fall color: orange-red	Light: ◌ Moisture: D M Soil pH: 4.5-7.2 Soil type: C L S	fields, roadsides, forest edges	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	spreads by lateral roots to form colonies; female plants produce seed; winter food for wildlife
Ribes rotundifolium *Appalachian or eastern gooseberry*	 USFWS BES	Height: 3-6' Flowers: May-Jul, greenish purple Fruit: Jul-Aug, purple or greenish, berry Fall color: red	Light: ◑ Moisture: D Soil pH: 6.1-8.5 Soil type: C L S	rocky upland woods	Region: M P States: DC MD NY VA WV		do not use near apple orchards; may spread cedar apple rust
Rosa carolina *pasture rose*	 RHW, RS MNPS	Height: 0.5-3' Flowers: May-Jun, pale pink Fruit: Aug-Mar, red, berry Fall color: yellowish to orange	Light: ◌ ◑ Moisture: D M Soil pH: 6.1-8.5 Soil type: C L S	dry fields, open woods; rocky banks, shale barrens	Region: M P C States: DC DE MD NY VA WV	high wildlife value	edible fruit is a berry-like hip; thorns

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Rosa palustris *swamp rose*	 PLANTS WSJ	Height: 8' Flowers: Jun-Aug, pink Fruit: Jul-Mar, red, berry Fall color:	Light: ◌ ◑ ● Moisture: M W Soil pH: 4-7 Soil type: C L	fresh tidal and nontidal marshes, forested wetlands, shrub swamps, streambanks	Region: M P C States: DC DE MD NY PA VA WV	 high wildlife value	edible fruit is a berry-like hip; thorns; tolerates flooding to 3 inches
Rubus allegheniensis *Allegheny blackberry*	 USFWS BES, RHW	Height: 3-9' Flowers: May-Jun, white Fruit: Jul-Sep, black, berry Fall color: orange, red, to purple	Light: ◌ ◑ Moisture: D M Soil pH: 4.5-7.5 Soil type: C L	roadsides, fence rows, fields, thickets, open woods, clearings	Region: M P States: DC DE MD NY PA VA WV	 high wildlife value	prickly; juicy edible fruit used by people and wildlife
Rubus odoratus *purple flowering raspberry, fragrant thimbleberry*	 PLANTS WSJ	Height: 3-6' Flowers: Jun-Sep, rose purple Fruit: Jul-Sep, dull red, berry Fall color: pale yellow	Light: ◑ ● Moisture: M Soil pH: 5.1-6 Soil type: C L S	forest edges, rocky ledges, rocky wooded slopes	Region: M P States: DC DE MD NY PA VA WV	 high wildlife value	feels sticky; fruit edible; spreads by suckers
Salix humilis *prairie willow*	 PLANTS 1997	Height: 6-12' Flowers: Apr-May, greenish yellow Fruit: May-Jun, brown, capsule Fall color: dull yellow	Light: ◌ Moisture: D M W Soil pH: 6.1-7.5 Soil type: C L S O	dry thickets, openings, boggy swales; mountain ridges, barrens, meadows, roadsides	Region: M P C States: DC DE PA VA WV	 high wildlife value	typically spreads up to twice it's height; flowers are catkins
Sambucus nigra ssp. canadensis (S. canadensis) *common elderberry, American elder*	 RS MNPS, USFWS	Height: 6-12' Flowers: Jun-Jul, white Fruit: Aug-Sep, purple to black, berry Fall color: yellow green	Light: ◌ ◑ ● Moisture: D M W Soil pH: 6.1-7.5 Soil type: C L S O	fresh tidal and nontidal marshes, swamps, wet meadows, moist woods, fields	Region: M P C States: DC DE MD NY PA VA WV	 high wildlife value	berries eaten by 48 species of birds
Sambucus racemosa var. racemosa (S. pubens) *red elderberry, scarlet elder*	 RHW, RHW	Height: 6-12' Flowers: May, white Fruit: Jun-Jul, red, berry Fall color: yellow green	Light: ● Moisture: D M Soil pH: 6.1-8.5 Soil type: L	rich woods, dry rocky woods, along creeks, rock crevices, sheltered coves, ravines	Region: M States: PA VA WV	 high wildlife value	important summer wildlife food; one of earliest blooming shrubs; fragrant
Spiraea alba var. latifolia (Spiraea latifolia) *broad-leaved meadow-sweet*	 RHW	Height: 3-6' Flowers: Jun-Sep, white or pinkish Fruit: Sep-Mar, brown, capsule Fall color: yellow	Light: ◌ Moisture: M Soil pH: Soil type: L S	bogs, woods, barrens, swamps	Region: M States: DC DE MD NY VA WV		similar to S. alba but twigs more purplish or red
Spiraea alba *narrow-leaved meadow-sweet*	 RHW	Height: 3-6' Flowers: Jun-Sep, white Fruit: Sep-Mar, brown to red brown, capsule Fall color: yellow	Light: ◌ Moisture: M Soil pH: 6.6-7.5 Soil type: C L S O	bogs, swamps, meadows	Region: M States: DC DE MD NY VA WV		bark may be shaggy, orange-brown

Shrubs

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Spiraea tomentosa *steeplebush, hardback spirea*	 RHW	Height: 3-6' Flowers: Jul-Sep, pink to purple Fruit: Sep-Mar, brown, capsule Fall color: yellow green	Light: ☼ Moisture: M W Soil pH: 5.1-6 Soil type: C L S O	meadows, fields, bogs, swamps, lake edges, marshes, dunes, swales	Region: M P C States: DC DE MD NY VA WV		cultivars available with white or red flowers
Staphylea trifolia *American bladdernut*	 RHW	Height: 3-15' Flowers: May, greenish white Fruit: Aug-Dec, red-brown, capsule Fall color: yellow	Light: ● Moisture: M Soil pH: 6.1-8 Soil type: L	rich woods, floodplain woods, ravines, shores of lakes and ponds, rocky wooded streambanks, shaded dunes	Region: M P States: DC MD PA VA WV		fruit is 3-lobed, papery, balloon-like capsule; branches green-white striped
Vaccinium angustifolium *lowbush blueberry*	 BES	Height: 1-2' Flowers: May-Jun, white or pink-tinged Fruit: Jul-Aug, blue to black, berry Fall color: red	Light: ☼ ◐ Moisture: D M Soil pH: 4-6 Soil type: C L S	dry woods, barrens, rock outcroppings	Region: M P States: DC MD NY PA VA WV	high wildlife value	edible berries often harvested, makes a nice ground layer GC
Vaccinium corymbosum *highbush blueberry*	 USFWS BES, USFWS BES	Height: 6-12' Flowers: Apr-Jun, white or pink-tinged Fruit: Jul-Aug, blue to black, berry Fall color: yellow to red	Light: ☼ ◐ ● Moisture: D M W Soil pH: 4-6.5 Soil type: L S O	forested wetlands, shrub swamps, bogs, dry to wet woods, thickets, streambanks, rock outcroppings	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	edible berries commonly cultivated
Vaccinium macrocarpon *cranberry*	 RHW	Height: 0.5-1' Flowers: Jun-Jul, white to pink Fruit: Sep-Nov, red, berry Fall color: dark green to purple to red	Light: ☼ ◐ Moisture: W Soil pH: 4-6 Soil type: L S O	sphagnum bogs, cool swampy areas	Region: M C States: DC DE MD NY PA WV		low mat form, can spread indefinitely; edible cranberries GC ▲
Vaccinium pallidum (V. vacillans) *early lowbush blueberry*	 RHW	Height: 1.5-2' Flowers: Apr-May, white, reddish Fruit: Jul-Aug, blue, berry Fall color:	Light: ☼ ◐ Moisture: D M Soil pH: Soil type: L S	dry woods and barrens	Region: M P C States: DC DE MD PA VA WV	high wildlife value	sweet berries GC
Vaccinium stamineum *deerberry*	 RHW	Height: 6-12' Flowers: Apr-Jun, white or purple Fruit: Sep-Oct, bluish black, berry Fall color: red	Light: ☼ ◐ Moisture: D M Soil pH: 4-6.5 Soil type: C L S	dry woods, openings, barrens; uplands, floodplain forests, clearings, thickets, rock outcroppings	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	berries edible but sour
Viburnum acerifolium *maple-leaved arrowwood*	 RHW, RHW	Height: 3-6' Flowers: Jun, creamy-white, pink Fruit: Aug-Dec, blue to black, berry Fall color: orange, red, purple	Light: ☼ ◐ ● Moisture: D M Soil pH: 5.1-6 Soil type: C L	floodplain forests, dry wooded slopes, woods,rocky slopes, rock outcrops, wooded ravines	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	dry, edible berries

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Viburnum dentatum (V. recognitum) *southern arrowwood* USFWS BES, RS MNPS 	Height: 10-15' Flowers: May-Jun, white Fruit: Sep-Nov, blue to black, berry Fall color: reddish-purple	Light: ☼ ◐ ● Moisture: D M W Soil pH: 5.1-6.5 Soil type: L S O	swamps, wet woods, bogs, floodplain forests, streambanks, low, wet acid-sand habitats	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	stems very straight, nice structure in winter
Viburnum nudum var. cassinoides (V. cassinoides) *witherod* USFWS BES 	Height: 6-12' Flowers: May-Jun, creamy white Fruit: Aug-Sep, pink to blue-black, berry Fall color: orange-red to purple	Light: ◐ Moisture: D M W Soil pH: 5.1-6.5 Soil type: L O	swamps, bogs, moist woods, barrens	Region: M P C States: MD PA		handsome stature; multiple fruit colors at once
Viburnum nudum *naked witherod, possum-haw viburnum* RHW 	Height: 6.5-20' Flowers: Jun-Jul, white to cream Fruit: Sep-Oct, red to blue, then black, berry Fall color: red to purple	Light: ◐ ● Moisture: M W Soil pH: 5.1-6 Soil type: L S	wet woods, rich upland woods, swamps, margins of vernal ponds, heath bogs	Region: M P C States: DC DE MD VA	high wildlife value	edible fruit but very acidic; shallow fibrous roots, transplants well
Viburnum prunifolium *black haw* RHW 	Height: 12-24' Flowers: Apr-May, white Fruit: Jul-Nov, pink to bluish-black, berry Fall color: reddish purple	Light: ◐ ● Moisture: D M W Soil pH: 4.8-7.5 Soil type: C L	woods, thickets, fields, roadsides	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	fruits edible, used for preserves

See also:

In the *Trees* section:
- **Castanea pumila**
- **Cornus alternifolia**
- **Juniperus virginiana**
- **Magnolia virginiana**
- **Malus (Pyrus) coronaria**
- **Quercus ilicifolia**
- **Salix sericea**

Rhus copallina
CM NRCS 

Rosa palustris
CM NRCS 

Itea virginica
USFWS BES 

Vaccinium corymbosum in fall.
USFWS BES 

Kalmia angustifolia
RHW 

Kalmia latifolia
RHW 

Trees

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Acer negundo *box elder, ash leaf maple, Manitoba maple*	 USFWS BES, RHW	Height: 30-60' Spread: 30-60' Flowers: Apr-May, yellow-green Fruit: Jul-Sep, tan brown, winged Fall color: yellow, red	Light: ◌ ◑ Moisture: M W Soil pH: 5.2-7 Soil type: C L S	along rivers, streams, ponds, and seasonally flooded areas	Region: M P C States: DC DE MD NY PA VA WV		brittle wood; thicket-forming
Acer rubrum *red, scarlet, swamp, or soft maple*	 USFWS BES, RHW	Height: 40-100' Spread: 30-75' Flowers: Mar-Apr, (inconspicuous) Fruit: Apr-Jun, red-brown or yellow, winged Fall color: red, orange, yellow	Light: ◌ ◑ Moisture: M W Soil pH: 5.4-7.1 Soil type: C L S	swamps, uplands, rocky hillsides, dunes	Region: M P C States: DC DE MD NY PA VA WV		earliest spring bloomer; adaptable
Acer saccharinum *silver, white, river, or soft maple*	 PLANTS DEH	Height: 50-100' Spread: 75-100' Flowers: Feb-Mar, greenish yellow Fruit: Apr-May, tan brown, winged Fall color: yellow	Light: ◌ ◑ Moisture: M W Soil pH: 5.2-7.1 Soil type: C L S	floodplains, streamsides, river bottoms, pond and lake edges	Region: M P States: DC DE MD NY PA VA WV		
Acer saccharum *sugar maple*	 USDA JE	Height: 60-100' Spread: 50-75' Flowers: Apr-May, yellow-green Fruit: Sep-Oct, green, tan at maturity, winged Fall color: yellow, orange, red	Light: ◌ ◑ ● Moisture: M Soil pH: 4-7.3 Soil type: L S	upland woods, mountain coves and slopes	Region: M P States: DC DE NY PA VA WV	high wildlife value	fall color; maple syrup; state tree of New York and West Virginia
Acer spicatum *mountain maple*	 RHW	Height: 20-35' Spread: 20-35' Flowers: May-Jun, yellow green Fruit: Jul-Sep, red or yellow, winged Fall color: orange to red	Light: ◑ ● Moisture: M Soil pH: 5.5-7 Soil type: L	cool rich woods, moist rocky slopes and flats, along small streams	Region: M States: MD NY PA VA WV	high wildlife value	short-lived, strong acid preference
Amelanchier arborea *downy serviceberry, shadbush*	 RHW	Height: 15-25' Spread: Flowers: Mar-May, white Fruit: red to dark purple, fleshy Fall color: yellow, red	Light: ◑ ● Moisture: D M Soil pH: 5.5-7.5 Soil type: L S	wooded river banks, swamps, rocky slopes	Region: M States: DC DE MD NY PA VA WV		used by 58 wildlife species; 35 bird species; important early summer food; berries edible to people
Amelanchier canadensis *serviceberry, shadbush, shadblow*	 CM NRCS	Height: 35-50' Spread: 35-50' Flowers: Apr-May, white Fruit: Jun-Jul, red to purple, fleshy Fall color: orange to red	Light: ◑ ● Moisture: M W Soil pH: 5.6-7.5 Soil type: C L S	swamps, low ground, woods, thickets	Region: M P C States: DC DE MD NY VA		
Asimina triloba *paw-paw*	 PLANTS JSP, USFWS BES	Height: 20-35' Spread: 20-35' Flowers: Apr-Jun, purple Fruit: Aug-Sep, yellow, berry Fall color: yellow/ copper-red	Light: ◌ Moisture: M Soil pH: 5.2-7.2 Soil type: L S	river valleys, bottomlands, understory of woods	Region: C States: DC DE MD PA VA WV		

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Betula alleghaniensis *yellow birch*  PLANTS RM	Height: 60-80' Spread: 35-50' Flowers: Apr-May, yellow green Fruit: Jul-Oct, green to tan, cone/cone-like Fall color: golden yellow	Light: ◐ Moisture: M W Soil pH: 4.6-8 Soil type: L S	rich uplands, low swamps, streamsides, elevated floodplain terraces and knobs	Region: M States: MD NY PA VA WV	high wildlife value	fall color; attractive winter texture and color; prefers cool, moist conditions, common on calcareous
Betula lenta *sweet birch, black birch, cherry birch*   USFWS BES, RHW	Height: 50-75' Spread: 35-50' Flowers: Apr-May, yellow green Fruit: Aug-Nov, green to tan, cone/cone-like Fall color: golden yellow	Light: ☼ ◐ Moisture: D M Soil pH: 4.8-6.8 Soil type: L S	steep rocky land and lower	Region: M P States: DE MD NY PA VA WV	high wildlife value	excellent fall color; prefers moist sites, tolerates dry; colonizes open or disturbed areas
Betula nigra *river birch, red birch, black birch*   USFWS BES, USFWS BES	Height: 50-75' Spread: 35-50' Flowers: Apr-May, dark brown Fruit: Jun-Aug, tan brown, cone/cone-like Fall color: yellow	Light: ☼ ◐ Moisture: M W Soil pH: 4-6 Soil type: C L	along streams, rivers, ponds and swamps	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	attractive peeling bark;
Carpinus caroliniana *American hornbeam, musclewood, ironwood*  USFWS BES	Height: 13-40' Spread: 35-50' Flowers: Apr-May, red or reddish-green Fruit: Jun-Oct, nut/nut-like Fall color: orange, red	Light: ◐ ● Moisture: M Soil pH: 4-7.4 Soil type: L S	river margins, bottomlands, swamps	Region: M P States: DC DE MD NY PA VA WV		slow growing and short lived
Carya alba (C. tomentosa) *mockernut hickory*  USDA NRCS	Height: 60-100' Spread: 35-50' Flowers: May-Jun, light green Fruit: Sep-Oct, light reddish brown, nut/nut-like Fall color: yellow	Light: ◐ ● Moisture: D M Soil pH: 6.5-7.4 Soil type: L S	ridges, dry hills, hillsides	Region: M P C States: DC DE MD NY PA VA WV		good fall color
Carya cordiformis *bitternut or swamp hickory, pignut*  PLANTS	Height: 60-100' Spread: 60-100' Flowers: Apr-May, yellow-green Fruit: Aug-Oct, yellowish green, nut/nut-like Fall color: yellow	Light: ☼ Moisture: M W Soil pH: 6.5-7.4 Soil type: C L S	rich bottomlands, swamps, frequently flooded areas, dry hillsides	Region: M P C States: DC DE MD NY PA VA WV		
Carya glabra *pignut, sweet pignut, or smooth bark hickory*  CM NRCS	Height: 60-100' Spread: 35-50' Flowers: Apr-May, yellow-green Fruit: Sep-Oct, dark brown, nut/nut-like Fall color: yellow	Light: ☼ ◐ Moisture: D M W Soil pH: 6.5-7.4 Soil type: L	dry woods on hillsides and ridges	Region: M P C States: DC DE MD NY PA VA WV		
Carya ovata *shagbark, scalybark, or shellbark hickory*  USDA NRCS	Height: 70-100' Spread: 35-50' Flowers: May-Jun, yellow-green Fruit: Sep-Oct, dark or reddish brown, nut/nut-like Fall color: brown	Light: ☼ Moisture: M Soil pH: 4-6.7 Soil type: L S	dry upland slopes, lowlands, valleys	Region: M P C States: DC DE MD NY PA VA WV		attractive peeling bark

Trees

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Castanea pumila *chinquapin, eastern or Allegany chinkapin*  RHW	Height: 12-20' Spread: 12-20' Flowers: Jun, pale yellow Fruit: Sep-Oct, dark brown, nut/nut-like Fall color: yellow or purple	Light: ☼ ◐ Moisture: D Soil pH: 4.5-7.5 Soil type: L S	rocky slopes, steep rocky land, rocky streambanks, sandy ridges, swamp edges, open woods	Region: M P C States: DC DE MD VA WV		sweet, edible fruit
Celtis occidentalis *common hackberry, sugarberry, nettletree*  UWI KK	Height: 40-100' Spread: 40-100' Flowers: Apr-May, yellow green, brown tint Fruit: Sep-Dec, purple brown, berry Fall color: yellow	Light: ☼ ◐ ● Moisture: D M W Soil pH: 6-7.8 Soil type: C L S	drainage basins, floodplains, wooded slopes, high rocky limestone bluffs bordering streams, windbreaks	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	butterfly larval host; drought tolerant; tolerates occasional flooding; saplings can sprout in deep shade, common on limestone soils
Cercis canadensis *eastern redbud*   USFWS BES, USFWS BES	Height: 20-35' Spread: 20-35' Flowers: Apr-May, pink to lavender Fruit: Jul-Dec, black, pod Fall color: golden yellow	Light: ◐ ● Moisture: D M Soil pH: 4.5-7.5 Soil type: L S	river bottoms and streambanks	Region: M P C States: DC DE MD PA VA WV		fixes nitrogen
Chamaecyparis thyoides *Atlantic white cedar*   PLANTS 1997, PLANTS GFR	Height: 75' Spread: Flowers: Mar-Apr, greenish brown Fruit: bluish, cone/cone-like Fall color: evergreen	Light: ◐ ● Moisture: M W Soil pH: 4.5-5.5 Soil type: C L S	freshwater swamps, woods	Region: C States: DE MD VA		
Chionanthus virginicus *white fringetree*   USFWS RS, RHW	Height: 20-35' Spread: 20-35' Flowers: May-Jun, white Fruit: Sep-Oct, bluish black, berry Fall color: yellow	Light: ☼ ◐ ● Moisture: D M Soil pH: 4.5-6.5 Soil type: L S	moist streambanks, ridges, hillsides in sandy to deep-rich soils	Region: M P C States: DC DE MD VA WV		
Cornus alternifolia *alternate-leaf or pagoda dogwood*  CM NRCS	Height: 15-25' Spread: 15-35' Flowers: May-Jun, creamy white Fruit: Jul-Aug, bluish black, berry Fall color: maroon	Light: ◐ ● Moisture: M Soil pH: 5.8-7.5 Soil type: L	dry woods, forest edges, rocky slopes	Region: M States: DE MD NY PA VA WV	high wildlife value	used by 64 wildlife species; 43 bird species; keep root zone moist and acidic; tolerates full sun; young stems often purple
Cornus florida *flowering dogwood*   RHW, USFWS RM	Height: 20-50' Spread: 20-50' Flowers: Apr-May, white Fruit: Sep-Dec, red to orange, berry Fall color: scarlet red	Light: ◐ Moisture: D M Soil pH: 5-7 Soil type: L	woods, woodland edges and openings, mountain slopes, coves	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	fall migrant birds eat berries; tolerates sun, best in moist, well-drained, acidic soil with organic matter, VA state tree
Crataegus crus-galli *cockspur hawthorn*  USDA JE	Height: 20-35' Spread: 20-35' Flowers: May-Jun, white Fruit: Aug-Jan, dull red or green, fleshy Fall color: orange to red	Light: ☼ ◐ Moisture: D M Soil pH: 4.5-7.2 Soil type: C L S	thickets, open areas, especially in dry or rocky places, low rich slopes	Region: M P C States: DC DE MD NY PA VA WV		

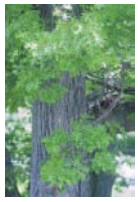
		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Crataegus viridis *southern thorn, green hawthorn*	 PLANTS	Height: 20-35' Spread: Flowers: Apr, white Fruit: bright red to orange, fleshy Fall color: purple, scarlet	Light: ◐ ● Moisture: M W Soil pH: 6-7.3 Soil type: C L	lowlands and valleys	Region: C States: DE MD NY VA		
Diospyros virginiana *common persimmon*	  PLANTS 1997, PLANTS 1997	Height: 50-75' Spread: 35-50' Flowers: Jun, greenish yellow to cream Fruit: Sep-Nov, orange purple, berry Fall color: yellow or purple	Light: ○ ◐ Moisture: D M Soil pH: 5-7 Soil type: C L	open, disturbed areas, deciduous woods	Region: M P C States: DC DE MD PA VA WV	high wildlife value	edible fruits
Fagus grandifolia *American beech*	 CM NRCS, CM NRCS	Height: 50-100' Spread: 50-75' Flowers: Apr-May, yellow-green Fruit: Sep-Nov, orange-green, nut/nut-like Fall color: yellow/ tan; retains leaves till spring	Light: ○ ◐ Moisture: M Soil pH: 4.1-6.5 Soil type: L S	rich uplands and lowlands	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	edible nuts; attractive bark; leaves may persist into winter
Fraxinus americana *white ash*	 UWI KJS	Height: 50-100' Spread: 50-75' Flowers: Apr-May, deep purple Fruit: Aug-Feb, tan brown, winged Fall color: yellow, maroon	Light: ○ ◐ Moisture: M Soil pH: 5-7.5 Soil type: C L S	upland slopes, valleys, coves, bottomlands	Region: M P C States: DC DE MD NY PA VA WV		fast growth; fall color
Fraxinus pennsylvanica *green ash, red ash, swamp ash*	 UWI KK	Height: 50-75' Spread: 35-50' Flowers: Apr-May, purple Fruit: Aug-Dec, tan brown, winged Fall color: yellow to orange	Light: ○ ◐ Moisture: D M W Soil pH: 5-8 Soil type: C L S	tidal and nontidal freshwater forested wetlands; seasonally to regularly flooded or saturated	Region: M P C States: DC DE MD NY PA VA WV		tolerates drought; tolerates infrequent flooding and some salt; male and female flowers on separate plants
Ilex opaca *American holly*	 USFWS BES	Height: 15-50' Spread: 18-40' Flowers: May-Jun, white or cream Fruit: red, fleshy Fall color: evergreen	Light: ○ ◐ ● Moisture: M Soil pH: 4-7.5 Soil type: C L	sandy woods	Region: M P C States: DC DE MD VA		birds eat berries; state tree of Delaware
Juglans nigra *black walnut, American walnut*	 PLANTS DEH	Height: 70-90' Spread: 75-100' Flowers: May-Jun, yellow-green Fruit: Aug-Sep, yellow-green, nut/nut-like Fall color: yellow	Light: ○ Moisture: M Soil pH: 5.5-8 Soil type: L	woods, slopes, streamsides	Region: M P C States: DC DE MD NY PA VA WV		may stunt growth of nearby planst
Juniperus virginiana *eastern red cedar*	 RHW, CM NRCS	Height: 50-75' Spread: 35-50' Flowers: Mar-Apr, red purple Fruit: Jul-Mar, pale green to dark blue, cone/cone-like Fall color: evergreen	Light: ○ Moisture: D M Soil pH: 5-8 Soil type: C L S	broad range of habitats	Region: M P C States: DC DE MD NY PA VA WV		berries consumed by over 50 species of birds; berries have culinary use

Trees

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Liquidambar styraciflua *sweet gum, red gum, sap gum*  CM NRCS	Height: 60-100' Spread: 50-75' Flowers: Apr-May, yellow-green Fruit: Jul-Jan, brown, capsule Fall color: yellow, red	Light: ☼ ◐ Moisture: M W Soil pH: 4.5-7 Soil type: C L S	upland woods, slopes, ravines, floodplains, streambanks	Region: M P C States: DC DE MD NY VA		
Liriodendron tulipifera *tulip tree, tulip poplar, yellow poplar*  RHW	Height: 70-100' Spread: 35-50' Flowers: Jun, greenish yellow Fruit: Aug-Nov, brown, winged Fall color: yellow	Light: ☼ ◐ Moisture: M Soil pH: 4.5-6.5 Soil type: L S	bottomland woods, mountain coves, lower slopes	Region: M P C States: DC DE MD NY PA VA WV		fast growth
Magnolia acuminata *cucumber magnolia*  DFT DL, DFT HW, DFT HW	Height: 70-100' Spread: 35-50' Flowers: May-Jun, greenish-yellow Fruit: Sep-Nov, brown cone w/ scarlet seed, pod Fall color: ashy brown	Light: ☼ Moisture: M Soil pH: 5.2-7 Soil type: C L S	slopes, ravines, valleys, streamsides	Region: M States: MD NY VA WV		
Magnolia virginiana *sweetbay magnolia*  RHW, USFWS BES	Height: 12-30' Spread: 12-30' Flowers: May-Jul, white to cream Fruit: Sep-Oct, red, berry Fall color: semi-evergreen	Light: ☼ ◐ ● Moisture: M W Soil pH: 5-6.5 Soil type: C L S	forested wetlands, seeps, stream and pond edges, sandy woods	Region: P C States: DC DE MD VA		semi-evergreen; fragrant flowers; tolerates occasional flooding, some salt ▲
Malus coronaria (Pyrus coronaria) *sweet crabapple, American crabapple*  PLANTS WSJ	Height: 10-30' Spread: 20-30' Flowers: Apr-May, pink to white Fruit: Sep-Oct, greenish, fleshy Fall color:	Light: ☼ Moisture: M Soil pH: Soil type: C L S	forest edges, rocky streams, fields	Region: M P C States: DC DE MD PA VA WV	high wildlife value	flowers fragrant; susceptible to insects and diseases; plant at least 500 feet from cedars; attracts bees and wasps; fruit sour;
Morus rubra *red mulberry, moral*  UWI KK	Height: 35-60' Spread: 35-60' Flowers: May-Jun, greenish Fruit: Jun-Jul, red, berry Fall color: yellow	Light: ☼ ◐ Moisture: M Soil pH: 5-7 Soil type: C L S	floodplains, river valleys, hillsides	Region: M P C States: DC DE MD PA VA WV		fruit sweet
Nyssa sylvatica *black gum, sourgum, black or swamp tupelo*  CM NRCS, RHW	Height: 30-75' Spread: 20-50' Flowers: Apr-Jun, greenish white Fruit: Sep-Oct, blue-black, fleshy Fall color: red	Light: ☼ ◐ Moisture: D M W Soil pH: 4.5-6 Soil type: L S	forested seasonal wetlands, swamp borders, upland woods, dry slopes; seasonally flooded or saturated	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	outstanding fall color
Ostrya virginiana *eastern hop-hornbeam, ironwood*  PLANTS WSJ	Height: 25-50' Spread: 20-35' Flowers: May, red-brown Fruit: Jun-Oct, green turning brown, nut/nut-like Fall color: yellow	Light: ◐ ● Moisture: M Soil pH: 4.2-7.6 Soil type: C L S	slopes and ridges	Region: M P C States: DC DE MD NY PA VA WV		leaves may persist into winter

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Pinus echinata *shortleaf pine, shortstraw pine, southern yellow pine*	 BUG RFW	Height: 100' Spread: Flowers: Fruit: reddish brown, cone/cone-like Fall color: evergreen	Light: Moisture: D M Soil pH: 4.6-6 Soil type: C L S	dry mountain ridges, fields, floodplains	Region: M P C States: DC DE MD VA WV		best used for naturalizing
Pinus rigida *pitch pine*	 CM NRCS	Height: 50-75' Spread: 50-75' Flowers: May, red- purple Fruit: light brown, cone/ cone-like Fall color: evergreen	Light: Moisture: D Soil pH: 3.5-5.1 Soil type: L S	slopes and ridges of mountains, river valleys, and swamps	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	many birds feed on the seeds; provides winter cover; old trees are fire resistant due to thick bark
Pinus serotina *pond pine, marsh pine, pocosin pine*	 VT	Height: 50-60' Spread: Flowers: Fruit: yellowish brown, cone/cone-like Fall color: evergreen	Light: Moisture: M W Soil pH: 4.8-6.8 Soil type: L S	swamps, pocosins, bays, pond margins, flatwoods	Region: C States: DE PA VA	high wildlife value	many birds feed on the seeds; provides winter cover
Pinus strobus *white pine, Eastern white pine*	 USDA NRCS	Height: 75-100' Spread: 50-75' Flowers: May-Jul, red to purplish Fruit: Aug-Oct, green to light brown, cone/cone-like Fall color: evergreen	Light: Moisture: D M Soil pH: 4-6.5 Soil type: L	variety of habitats; does best on moist, well drained, sandy loam soils of ridges	Region: M P States: DC MD NY PA VA WV	high wildlife value	many birds feed on the seeds; provides winter cover
Pinus taeda *loblolly, old field, or North Carolina pine*	 USFWS BES	Height: 70-90' Spread: Flowers: Fruit: yellowish, cone/ cone-like Fall color: evergreen	Light: Moisture: D M W Soil pH: 4.5-7 Soil type: C L S	floodplains fields, slopes	Region: C States: DE MD VA	high wildlife value	many birds feed on the seeds; provides winter cover
Pinus virginiana *Virginia pine, scrub pine, Jersey pine*	 USDA NRCS	Height: 50-80' Spread: Flowers: Fruit: reddish brown, cone/cone-like Fall color: evergreen	Light: Moisture: D M Soil pH: 4.5-7.5 Soil type: C L S	well drained sites; often a pioneer species	Region: M P C States: DC DE MD PA VA WV	high wildlife value	many birds feed on the seeds; provides winter cover
Platanus occidentalis *American sycamore, American planetree*	 PLANTS LA, USDA NRCS	Height: 75-100' Spread: 75-100' Flowers: Apr-Jun, yellow-green Fruit: Aug-Dec, brown, achene (dry, flat seed) Fall color: yellow	Light: Moisture: M W Soil pH: 4.9-6.5 Soil type: L S	river bottoms, lake shores	Region: M P C States: DC DE MD NY PA VA WV		leafs out late spring; showy bark; leaves may persist into winter
Populus deltoides *eastern or southern cottonwood, Carolina poplar*	 UWI JK	Height: 75-100' Spread: 50-100' Flowers: Mar-Apr, red Fruit: May-Jul, yellow-green, capsule Fall color: yellow	Light: Moisture: M W Soil pH: 5.2-7.3 Soil type: C L S	along waterways	Region: P States: DC DE MD NY VA WV	high wildlife value	best used for naturalizing; grows fast but short lived

Trees

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Populus heterophylla *swamp cottonwood, swamp poplar, black cottonwood, downy poplar*  VT, PLANTS 1997	Height: 80' Spread: Flowers: Mar Fruit: Apr-May, , capsule Fall color: yellow	Light: Moisture: W Soil pH: 4.6-5.9 Soil type: C L	swamps and bottomlands	Region: P States: DE MD VA		
Prunus americana *American wild plum*  RHW	Height: 20-35' Spread: 20-35' Flowers: Apr-May, white Fruit: Aug-Sep, orange to red, fleshy Fall color: pale yellow	Light: Moisture: D M Soil pH: 5-7 Soil type: L S	woods, pastures, fencerows, streamsides	Region: M P States: DC DE MD NY PA VA WV	high wildlife value	edible fruit, used for making pies and jellies
Prunus pensylvanica *pin cherry, fire cherry*  RHW	Height: 20-35' Spread: 20-35' Flowers: May, white Fruit: Jul-Sep, bright red, fleshy Fall color: yellow	Light: Moisture: D Soil pH: 4.3-6.6 Soil type: C L S	woods	Region: M States: MD NY PA VA WV	high wildlife value	
Prunus serotina *black or wild cherry, black chokecherry*  CM NRCS, RHW	Height: 40-75' Spread: 20-35' Flowers: May-Jun, white Fruit: Aug-Sep, black, fleshy Fall color: yellow/ red	Light: Moisture: D M Soil pH: 5-7.5 Soil type: L	forests, fence rows, fields, forest edges	Region: M P C States: DC DE NY VA WV	high wildlife value	birds eat fruit
Prunus virginiana *choke cherry*  RHW	Height: 25-50' Spread: 20-35' Flowers: May-Jun, white Fruit: Aug-Sep, red, black, or yellow, fleshy Fall color: dark red-purple	Light: Moisture: M Soil pH: 5.2-8.4 Soil type: C L S	open moist sites; pioneer species after fires	Region: M States: DC DE MD NY PA VA WV		fast growing, short lived; fruit sometimes used for making jelly
Quercus alba *white oak, stave oak*  CM NRCS	Height: 75-100' Spread: 75-100' Flowers: Mar-May, yellow-green Fruit: Sep-Oct, brown, nut/nut-like Fall color: red	Light: Moisture: D M Soil pH: 4.5-6.8 Soil type: L S	dry to moist woods	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	acorns food for wildlife; majestic; MD state tree; leaves may persist into winter
Quercus bicolor *swamp white oak, swamp oak*  PLANTS RM89, OSU	Height: 60-100' Spread: 50-75' Flowers: May, yellow-green Fruit: Sep-Oct, tan brown, nut/nut-like Fall color: red/brown	Light: Moisture: W Soil pH: 4.3-6.5 Soil type: C L S	bottomlands, swamp and stream edges	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	acorns food for wildlife
Quercus coccinea *scarlet oak, red oak, black oak*  CM NRCS	Height: 40-75' Spread: 50-75' Flowers: May-Jun, yellow-green Fruit: Sep-Oct, reddish brown, nut/nut-like Fall color: scarlet	Light: Moisture: D M Soil pH: 4.5-6.9 Soil type: L S	dry uplands and slopes	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	acorns food for wildlife

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Quercus falcata *southern or swamp red oak, Spanish oak*	 DFT HW	Height: 70-80' Spread: Flowers: Apr-May Fruit: Oct, orange brown, nut/nut-like Fall color: brown	Light: Moisture: D M Soil pH: 4.8-7 Soil type: C L S	uplands	Region: C States: DC DE MD VA		acorns food for wildlife
Quercus ilicifolia *bear oak, scrub oak*	 CM NRCS	Height: 12-20' Spread: 12-20' Flowers: May-Jun, yellow-green or reddish Fruit: Sep-Jan, light brown, nut/nut-like Fall color: yellow, scarlet red to purplish	Light: Moisture: D Soil pH: 4-7.5 Soil type: C L S	barrens, balds, woods, dunes, fields	Region: M P States: PA VA WV	high wildlife value	leaves may persist into winter
Quercus marilandica *blackjack oak, Jack oak*	 CM NRCS	Height: 35-50' Spread: 35-50' Flowers: Apr-Jun, yellow-green Fruit: Sep-Oct, tan brown, nut/nut-like Fall color: yellow/brown	Light: Moisture: D Soil pH: 4.6-5.6 Soil type: L S	woods, ridges, slopes, sandy flatwoods	Region: P C States: DC DE MD VA WV	high wildlife value	acorns food for wildlife, leaves may persist into winter
Quercus michauxii (Q. montana) *swamp chestnut oak, basket oak, cow oak*	 PLANTS 1995	Height: 50-80' Spread: 75-100' Flowers: May, yellow-green Fruit: Sep-Oct, tan brown, nut/nut-like Fall color: red/ brown	Light: Moisture: M W Soil pH: 4.5-6.5 Soil type: L	bottomlands, ravine slopes, flatwoods over limestone	Region: M P C States: DE MD NY VA WV	high wildlife value	acorns food for wildlife
Quercus muehlenbergii *Chinquapin or chinkapin oak, yellow oak, chestnut oak*	 UWI KJS	Height: 35-50' Spread: 35-50' Flowers: May-Jun, yellow-green Fruit: Sep-Oct, light brown, nut/nut-like Fall color: yellow-brown	Light: Moisture: D M Soil pH: 6.5-8 Soil type: L	rich, woods, uplands, outcrops, dry bluffs, slopes	Region: M P C States: DC MD NY VA WV	high wildlife value	
Quercus nigra *water oak*	 PLANTS LA	Height: 50-80' Spread: Flowers: Apr-May Fruit: Oct, black, nut/nut-like Fall color: green persists late	Light: Moisture: M W Soil pH: 4.8-5.8 Soil type: C L	upland woods, bottomlands, hammocks, fields	Region: C States: DC DE MD VA		acorns food for wildlife
Quercus palustris *pin oak, swamp oak, Spanish oak*	 PLANTS RM91	Height: 50-80' Spread: 50-75' Flowers: Apr-May, yellow-green Fruit: Sep-Oct, light brown, nut/nut-like Fall color: red	Light: Moisture: M W Soil pH: 4.5-6.5 Soil type: C L	bottomlands or upland flats	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	popular shade tree; fall color; acorns food for wildlife; leaves may persist into winter
Quercus phellos *willow oak, pin oak, peach oak*	 USFWS BES	Height: 80-100' Spread: Flowers: Feb-May Fruit: light yellow or greenish brown, nut/nut-like Fall color: red	Light: Moisture: M W Soil pH: 4.5-5.5 Soil type: C L	bottomlands, low flatwoods, upland fields	Region: P C States: DC DE MD VA WV		acorns food for wildlife

Trees

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Quercus prinus (Q. montana) *chestnut oak, rock oak*  PLANTS 1997	Height: 40-80' Spread: Flowers: May-Jun, yellowish Fruit: Sep-Oct, brown, nut/nut-like Fall color: yellow/orange	Light: ☼ ◐ ● Moisture: D Soil pH: 4.5-7 Soil type: L S	rocky ridges and slopes	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	acorns food for wildlife; fall color
Quercus rubra *northern red oak*  UWI KJS	Height: 90' Spread: Flowers: Apr-May Fruit: scales reddish-brown, nut/nut-like Fall color: red or yellow	Light: ☼ ◐ Moisture: D M Soil pH: 4.3-6.5 Soil type: C L	slopes, coves, and drier ridges	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	acorns food for wildlife; hardy and long-lived; fall color
Quercus stellata *post oak, iron oak*  CM NRCS	Height: 35-50' Spread: 35-50' Flowers: Apr-Jun, yellow-green Fruit: Sep-Oct, light brown to almost black, nut/nut-like Fall color: brown	Light: ☼ Moisture: D M Soil pH: 4.8-7 Soil type: C L S	upland dry ridges to moist flatwoods	Region: M P C States: DC DE MD VA WV	high wildlife value	acorns food
Quercus velutina *black oak, yellow bark oak, quercitron oak*  BUG DJM	Height: 75-100' Spread: 75-100' Flowers: Apr-May, yellow-green Fruit: Sep-Oct, light red-brown, nut/nut-like Fall color: red/brown	Light: ☼ Moisture: D M Soil pH: 4.5-6 Soil type: C L S	dry upland ridges and slopes, flatwoods	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	acorns food for wildlife; leaves may persist into winter
Salix nigra *black willow, swamp willow*  CM NRCS	Height: 35-50' Spread: 20-35' Flowers: Mar-Apr, yellow green Fruit: Apr-May, green yellow, cone/cone-like Fall color: yellow green	Light: ☼ ◐ Moisture: M W Soil pH: 6-8 Soil type: C L S	fresh tidal marshes and swamps, forested wetlands, floodplains, wet meadows; seasonally to regularly flooded or saturated	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	streambank stabilizer; spreads by suckers; preferred food of ruffed grouse and pine grosbeak; tolerates flooding; tolerates salinity to 0.5 ppt
Salix sericea *silky willow*  CM NRCS	Height: 12' Spread: Flowers: Jun-Jul Fruit: Fall color: yellow	Light: ☼ ◐ ● Moisture: M W Soil pH: 5.2-7 Soil type: C L S	marshes, ditches, low woods	Region: M P States: DC DE MD NY PA VA WV	high wildlife value	
Sassafras albidum *sassafras*  USFWS BES, RHW	Height: 35-50' Spread: 35-50' Flowers: Apr, yellow-green Fruit: Sep-Oct, dark blue, fleshy Fall color: yellow, orange, purple	Light: ☼ ◐ Moisture: D M Soil pH: 4.5-7.2 Soil type: L S	moist, open woods	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	edible and medicinal uses; provides spring and fall color
Sorbus americana (Pyrus americana) *American mountain ash*  RHW, RHW	Height: 30-40' Spread: Flowers: May-Jul, white Fruit: Aug-Dec, orange, fleshy Fall color: orange, purple	Light: ☼ Moisture: M Soil pH: 5.3-6.8 Soil type: C L S	areas from borders of swamps to rocky hillsides; openings, uplands along forest edges, roadsides	Region: M States: MD VA WV	high wildlife value	slow-growing, short-lived; not drought or heat tolerant; plant at least 500 feet from cedars

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Taxodium distichum *bald cypress, cypress, swamp cypress* USFWS BES, USFWS BES	Height: 50-100' Spread: 20-35' Flowers: Mar-Apr, deep purple Fruit: Oct-Dec, brown, cone/cone-like Fall color: purple to brown	Light: Moisture: W Soil pH: 4.5-6 Soil type: C L S	rivers, lake and pond margins, swamps, coastal marshes, pocosins, river bottoms	Region: C States: DE MD VA		deciduous conifer
Thuja occidentalis *arborvitae, northern white cedar* USFWS BES, USFWS BES	Height: 50-75' Spread: 35-50' Flowers: May, red brown Fruit: Aug-Dec, reddish-brown, cone/cone-like Fall color: evergreen	Light: Moisture: M W Soil pH: 5.2-7 Soil type: C L S	calcareous areas	Region: M States: NY VA		prefers wet calcareous areas
Tilia americana *American basswood, linden* PLANTS DEH, PLANTS DEH	Height: 70-100' Spread: 50-75' Flowers: Jun-Jul, yellow Fruit: Sep-Oct, tan brown, winged Fall color: yellow or brown	Light: Moisture: M Soil pH: 4.5-7.5 Soil type: L S	woods, slopes	Region: M States: DC DE MD NY PA VA WV		fragrant flowers; important pollen source for honey
Tsuga canadensis *eastern hemlock* USDA NRCS	Height: 75-100' Spread: 35-50' Flowers: May-Jun, tan brown Fruit: Sep-Jan, light brown, cone/cone-like Fall color: evergreen	Light: Moisture: M Soil pH: 4.2-5.7 Soil type: L S	cool valleys	Region: M P States: DE MD NY PA VA WV	high wildlife value	susceptible to wooly adelgid and red spider mite; also T. caroliniana for VA
Ulmus americana *American elm, white elm, soft elm* USDA NRCS	Height: 75-100' Spread: 75-100' Flowers: Mar-Apr, red brown Fruit: May, tan brown, winged Fall color: bright yellow	Light: Moisture: M W Soil pH: 5.5-8 Soil type: C L S	river bottoms, swamps, disturbed fields, road sides, cutover forests	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	Dutch elm disease caused decline; distinctive vase shape; favorite nesting site of Baltimore oriole
Ulmus rubra *slippery elm, red elm, soft elm* UWI DWW	Height: 70' Spread: Flowers: Mar-May Fruit: winged Fall color: yellow	Light: Moisture: D M Soil pH: 5.5-7 Soil type: C L S	moist slopes and bottomlands, drier sites on calcareous soils	Region: P States: DC DE MD NY PA VA WV	high wildlife value	

See also:

In the *Shrubs* section:
Hamamelis virginiana
Morella (Myrica) cerifera
Rhododendron maximum
Rhus copallina, hirta (typhina)
Viburnum prunifolium

Cornus florida

USFWS BES

A diverse forest offers food and cover throughout all seasons.

USFWS RM

Ilex opaca

CM NRCS

Vines

		Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Aristolochia macrophylla (A. durior) *pipevine, Dutchman's pipe*	 RHW	Spread: Flowers: May-Jun, yellowish to purplish Fruit: green to brown, pod Fall color: yellow green	Light: Moisture: M Soil pH: 6.1-8.5 Soil type: L O	rich woods, streambanks	Region: M States: VA WV		occasionally escapes from cultivation; host for pipevine swallowtail butterfly
Bignonia capreolata *crossvine*	 USFWS BES	Spread: 20-35' Flowers: May-Jun, orange with red Fruit: Aug-Oct, brown, pod Fall color: semi-evergreen; reddish-purple	Light: Moisture: D M W Soil pH: 6.1-8.5 Soil type: C L S	swampy forests, calcareous river banks, cliffs, dry open woods, bogs, fence rows, rock outcrops	Region: C States: MD VA		spreads across ground and climbs any structure it meets (control by cutting); semi-evergreen GC
Campsis radicans *trumpet vine, trumpet creeper*	 USFWS BES	Spread: 20-35' Flowers: Jul-Sep, orange Fruit: Aug-Mar, brown, pod Fall color: yellow green	Light: Moisture: D M Soil pH: 6.1-7.5 Soil type: C L S	moist woods, fence rows, roadside thickets, floodplain forests, rocky hillsides, open woods, streambanks, fields	Region: M P C States: DC DE MD PA VA		thick, twisted, aged woody vines; leaves/flowers may cause dermatitis (skin irritation) GC
Celastrus scandens *American bittersweet*	 PLANTS TGB, UWI DK	Spread: 6-20' Flowers: May-Jun, greenish Fruit: Sep-Dec, orange and red, capsule Fall color: yellow	Light: ● Moisture: D M Soil pH: 6.1-7.5 Soil type: C L S	roadsides, forest edges, fence rows, pastures, hedges, bluffs, rocky slopes, dunes, sandy oak woods	Region: M P C States: DC DE MD NY PA VA WV		distinguished from nonnative invasive Oriental bittersweet by flowers/fruits in clusters at ends of twigs GC
Clematis viorna *leather flower, vasevine*	 RHW	Spread: Flowers: May-Aug, purple Fruit: Aug-Nov, dark brown, achene (dry, flat seed) Fall color:	Light: ● Moisture: D M Soil pH: Soil type:	rich wooded banks, thickets	Region: P States: DC DE MD VA WV		feathery seeds
Clematis virginiana *virgin's bower*	 USFWS BES	Spread: 6-12' Flowers: Jul-Sep, white Fruit: Aug-Nov, brown, achene (dry, flat seed) Fall color: yellow, green or purplish	Light: ● Moisture: D M Soil pH: 6.1-8.5 Soil type: C L S O	fencerows, riverbanks, thickets, woods edge, roadside swales, swamps, overhanging cliffs	Region: M P C States: DC DE MD NY PA VA WV		fragrant flowers; feathery seeds; young plants can be transplanted; yellow, green or purplish fall color
Lonicera sempervirens *trumpet or coral honeysuckle*	 RHW, USFWS BES	Spread: 6-12' Flowers: Apr-Oct, coral to red with yellow Fruit: Aug-Mar, red, berry Fall color: semi-evergreen	Light: Moisture: D M Soil pH: 6.1-7.5 Soil type: C L S	thickets, fence rows, open woods, dry stony woods, forest edges, cliffs	Region: M P C States: DC DE MD NY VA		flowers intermittently until frost; flowers/fruits present together; transplants well; may have aphids - hose off, snip new growth and damaged buds; semi-evergreen
Mikania scandens *climbing hempvine*	 RHW	Spread: Flowers: Jun-Oct, pink or whitish Fruit: blue Fall color:	Light: Moisture: M W Soil pH: 5.7-7.5 Soil type: C L	swamps, thickets	Region: M P C States: DC DE MD NY VA		vines herbaceous, not woody

	Characteristics	Conditions	Habitat	Native to	Wildlife	Notes
Parthenocissus quinquefolia *Virginia creeper* RHW, USFWS BES	Spread: 25-35' Flowers: Jun-Aug, greenish white Fruit: Sep-Feb, bluish black, berry Fall color: purple to crimson	Light: ☼ ◐ ● Moisture: D M W Soil pH: 5.1-7.5 Soil type: C L S	fence rows, forest edges, open woods, ravines, bluffs, cliffs	Region: M P C States: DC DE MD NY PA VA WV	high wildlife value	bank stabilizer; control by trimming; fruits eaten by variety of wildlife; purple to crimson fall color GC
Passiflora incarnata *passionflower, Maypops* RHW	Spread: Flowers: Jun-Sep, purple and white Fruit: Sep-Oct, yellow, fleshy Fall color:	Light: ☼ Moisture: D M Soil pH: Soil type: C L S	fields, rocky slopes, thin woods, roadsides, fencerows, thickets	Region: C States: MD VA		herbaceous vine; large fleshy berry edible; fragrant
Smilax herbacea *smooth carrion flower* RHW, RHW	Spread: Flowers: Apr-Jun, greenish-yellow Fruit: Jul-Nov, blue-black, berry Fall color:	Light: ◐ Moisture: M Soil pH: Soil type: C L S	thickets, woods, floodplains	Region: M P C States: DC DE MD NY WV		herbaceous, climbing vine, not prickly; flower malodorous; male and female plants separate
Wisteria frutescens *Atlantic wisteria, American wisteria* SMSU, SMSU	Spread: Flowers: Apr-Aug, lilac Fruit: brown, pod Fall color:	Light: ☼ ◐ Moisture: M W Soil pH: 4-7 Soil type: C L S	forest and forested swamp edges, streambanks, thickets	Region: C States: DE VA		

See also:

In the *Herbaceous Plants* section:
Clitoria mariana

Characteristic pipe-shaped flower of **Aristolochia macrophylla.**

RHW

Lonicera sempervirens may bloom year-round.

USFWS BES

Bignonia capreolata in bloom adorns a porch.

USFWS BES

Parthenocissus quinquefolia used as a groundcover.

USFWS BES

Plants With a Purpose

This section includes lists of plant combinations that can be used to mimic the natural communities of plants found in wetlands, meadows, forests, etc. They can be used to create, restore or enhance existing habitat for wildlife. Also included are plants that can be used in solving problems such as stabilizing soils, or for specific landscaping uses. No matter what the purpose, it is imperative that species are chosen to suit planting site conditions and the physiographic location of the site. None of these lists are complete – there are additional suitable plants in this guide (and even more native species not included in this publication) that would suit these purposes. This document is intended to give project planners guidance in choosing appropriate plants for various projects, and additional learning is encouraged. For the most ecologically "correct" habitat restoration projects, consultation with professionals is recommended, as there are other factors to consider that are not addressed here.

Plants For Coastal Dunes

Note: the shrubs and trees listed would occur on the inner or secondary dunes and/or on interdunal swales.

Grasses and Grasslike Plants
Ammophila breviligulata
Panicum amarum (and var. amarulum)
Spartina patens
Panicum virgatum

Herbaceous Plants
Baptisia tinctoria
Liatris pilosa v. pilosa (graminifolia)
Nuttallanthus canadensis (Linaria canadensis)
Opuntia humifusa (compressa)
Oenothera biennis
Solidago sempervirens
Yucca filamentosa (flaccida)

Shrubs
Baccharis halimifolia
Morella (Myrica) cerifera, pensylvanica
Prunus maritima
Rhus copallina
Rosa carolina

Trees
Acer rubrum
Amelanchier arborea
Diospyros virginiana
Juniperus virginiana
Pinus rigida
Prunus pensylvanica, serotina

Vines
Celastrus scandens
Parthenocissus quinquefolia

Plants For Saltwater or Brackish Water Marshes

Plants in this list can be used for marsh plantings or to stabilize tidal fresh, brackish or saltwater shorelines based on salinity and wetness tolerances. Check the salinity and moisture requirements given in this publication for each plant, so they will be planted in the appropriate conditions. Those species for use in salinity greater than 15 ppt are marked (*).

Grasses and Grasslike Plants
Ammophila breviligulata *
Distichlis spicata *
Juncus canadensis
Juncus roemerianus *
Panicum amarum (and var. amarulum) *
Panicum virgatum
Schoenoplectus pungens v. pungens (Scirpus pungens, americanus)
Schoenoplectus (Scirpus) validus
Spartina alterniflora *
Spartina cynosuroides
Spartina patens *
Spartina pectinata

Note: Although grasslike, *Distichlis, Juncus, Schoenoplectus,* and *Spartina* species information can be found in the Herbaceous Emergents section of the guide.

Herbaceous Plants
Agalinus purpurea
Limonium carolinianum
Solidago sempervirens *

Herbaceous Emergents
Hibiscus moscheutos (palustris)
Iris prismatica, versicolor, virginica
Kosteletzkya virginica
Peltandra virginica
Pontederia cordata

Shrubs
Baccharis halimifolia *
Iva frutescens *
Morella (Myrica) cerifera *, *pensylvanica* *

Plants for Freshwater Wetlands and Other Wet Sites

The following plants may be used to create or enhance freshwater marshes or swamps or to stabilize and enhance streambanks, riverbanks or pond edges.

Remember to match the plants' growth requirements with the site conditions. Wetness tolerated by these plants is provided in this guide in terms of frequency and duration of soil saturation or inundation (flooding), and depth of standing water.

Ferns

Athyrium filix-femina
Dryopteris carthusiana (spinulosa), cristata, intermedia
Onoclea sensibilis
Osmunda cinnamomea, regalis
Pteridium aquilinum
Thelypteris noveboracensis, palustris
Woodwardia areolata, virginica

Grasses and Grasslike Plants

Agrostis perennans
Andropogon gerardii, glomeratus, virginicus
Calamagrostis canadensis
Carex crinita var. crinita, lurida, stricta, vulpinoidea
Dichanthelium clandestinum
Elymus riparius
Festuca rubra
Leersia oryzoides
Panicum virgatum
Saccharum giganteum (Erianthus giganteus)
Tripsacum dactyloides

Herbaceous Plants

Arisaema triphyllum
Asclepias incarnata
Caltha palustris
Chelone glabra
Conoclinium (Eupatorium) coelestinum
Doellingeria umbellata var. umbellata (Aster umbellatus)
Eupatorium dubium, perfoliatum
Gentiana clausa
Helianthus angustifolius
Heracleum maximum (lanatum)
Impatiens capensis (biflora)
Lobelia cardinalis, siphilitica
Mertensia virginica
Mimulus ringens
Monarda didyma
Packera aurea (Senecio aureus)
Phlox maculata
Rudbeckia laciniata
Saxifraga pensylvanica
Scutellaria integrifolia
Sisyrinchium atlanticum
Spiranthes cernua
Stachys tenuifolia (hispida)
Symphyotrichum (Aster) novae-angliae, novi-belgii
Symplocarpus foetidus
Thalictrum pubescens (polygamum)
Veratrum viride
Verbena hastata
Vernonia noveboracensis
Veronicastrum virginicum (Veronica virginica)
Viola conspersa, cucullata, striata

Herbaceous Emergents

Dulichium arundinaceum
Hibiscus moscheutos (palustris)
Iris prismatica, versicolor, virginica
Juncus effusus
Justicia americana
Nuphar lutea (advena)
Nymphaea odorata
Orontium aquaticum
Peltandra virginica
Pontederia cordata
Sagittaria latifolia
Saururus cernuus
Schoenoplectus (Scirpus) validus
Scirpus atrovirens, cyperinus
Sparganium americanum
Spartina pectinata
Zizania aquatica

Shrubs

Alnus serrulata
Cephalanthus occidentalis
Clethra alnifolia
Cornus amomum
Gaylussacia baccata, frondosa
Hypericum densiflorum
Ilex verticillata
Itea virginica
Kalmia angustifolia, latifolia
Leucothoe racemosa
Lindera benzoin
Lyonia ligustrina
Morella (Myrica) caroliniensis (heterophylla), cerifera, pensylvanica
Photinia (Aronia) melanocarpa, pyrifolia (arbutifolia)
Physocarpus opulifolius
Rhododendron maximum, periclymenoides, viscosum
Rosa palustris
Rubus allegheniensis
Salix humilis
Sambucus nigra ssp. canadensis (S. canadensis)
Spiraea alba v. latifolia (latifolia), tomentosa
Vaccinium corymbosum, macrocarpon
Viburnum dentatum (recognitum), nudum, nudum v. cassinoides (cassinoides), prunifolium

Trees

Acer negundo, rubrum, saccharinum
Amelanchier canadensis
Betula alleghaniensis, nigra
Carpinus caroliniana
Carya cordiformis, glabra
Celtis occidentalis
Chamaecyparis thyoides
Crataegus viridis
Fraxinus pennsylvanica
Liquidambar styraciflua
Magnolia virginiana
Nyssa sylvatica
Pinus serotina, strobus, taeda
Platanus occidentalis
Populus deltoides, heterophylla
Quercus bicolor, michauxii (montana), nigra, palustris, phellos
Salix nigra, sericea
Taxodium distichum
Thuja occidentalis
Tsuga canadensis
Ulmus americana

Vines

Bignonia capreolata
Mikania scandens
Parthenocissus quinquefolia
Wisteria frutescens

Plants Appropriate for Bogs or Bog Gardens

Ferns
Athyrium filix-femina
Onoclea sensibilis
Osmunda cinnamomea
Thelypteris noveboracensis , palustris
Woodwardia areolata

Grasses and Grasslike Plants
Calamagrostis canadensis
Carex stricta
Leersia oryzoides

Herbaceous Plants
Arisaema triphyllum
Caltha palustris
Chelone glabra
Doellingeria umbellata var. umbellate (Aster umbellatus)
Eupatorium dubium, perfoliatum
Gentiana clausa
Saxifraga pensylvanica
Scutellaria integrifolia
Spiranthes cernua
Symplocarpus foetidus
Veratrum viride
Viola cucullata

Herbaceous Emergents
Dulichium arundinaceum
Juncus effusus
Orontium aquaticum
Sagittaria latifolia
Scirpus atrovirens, cyperinus
Sparganium americanum

Shrubs
Clethra alnifolia
Gaultheria procumbens
Hypericum densiflorum
Kalmia angustifolia
Morella caroliniensis (Myrica heterophylla)
Photinia (Aronia) melanocarpa, pyrifolia (arbutifolia)
Rhododendron viscosum
Salix humilis
Spiraea alba, alba v. latifolia (latifolia)
Spiraea tomentosa
Vaccinium corymbosum, macrocarpon
Viburnum dentatum (recognitum), nudum, nudum v. cassinoides (cassinoides)

Trees
Acer rubrum
Chamaecyparis thyoides
Nyssa sylvatica

Vines
Bignonia capreolata

Plants for Dry Meadows

Grasses and Grasslike Plants
Andropogon gerardii
Danthonia spicata
Elymus canadensis, riparius, virginicus
Schizachyrium scoparium (Andropogon scoparius)
Sorghastrum nutans
Tridens flavus

Herbaceous Plants
Ageratina altissima v. altissima (Eupatorium rugosum)
Antennaria neglecta
Asclepias syriaca, tuberosa
Chamaecrista (Cassia) fasciculata
Conoclinum (Eupatorium) coelestinum
Coreopsis tripteris, verticillata
Desmodium paniculatum
Dodecatheon meadia
Erigeron pulchellus
Eupatorium hyssopifolium, purpureum
Heliopsis helianthoides
Ionactis (Aster) linariifolius
Lespedeza capitata
Liatris spicata, squarrosa
Lupinus perennis
Monarda bradburiana (fistulosa), punctata
Nuttallanthus (Linaria)canadensis
Oenothera biennis, fruticosa, perennis
Penstemon digitalis
Pycnanthemum incanum
Rudbeckia fulgida, hirta, triloba
Solidago canadensis, canadensis v. scabra (altissima), juncea, nemoralis, speciosa
Symphyotrichum (Aster) cordifolius, ericoides var. ericoides, laeve var. laeve (laevis), novae-angliae

Shrubs
Note: Listed are a few of the shorter shrubs that may appear in or at the edges of meadows. Using shrubs in a planting that is to remain as a meadow is not recommended, as they provide perching spots for birds, whose droppings will seed in unwanted plants, including trees. If the meadow is to be allowed to succeed eventually to forest, then adding shrubs is one prescribed method.

Ceanothus americanus
Comptonia peregrina
Rhus glabra
Rosa carolina
Rubus allegheniensis

Plants for Wet Meadows

Ferns
Onoclea sensibilis
Osmunda cinnamomea
Thelypteris palustris

Grasses and Grasslike Plants
Andropogon gerardii, virginicus
Calamagrostis canadensis
Carex glaucodea, stricta
Elymus riparius
Leersia oryzoides
Panicum virgatum
Tripsacum dactyloides

Herbaceous Plants
Agalinis purpurea
Asclepias incarnata
Caltha palustris
Doellingeria umbellata var. umbellata (Aster umbellatus)
Gentiana clausa
Eupatorium fistulosum, maculatum, perfoliatum
Helenium autumnale
Impatiens capensis (I. biflora)
Lilium canadense, superbum
Lobelia cardinalis, siphilitica
Mimulus ringens
Packera aurea (Senecio aureus)
Phlox maculata
Rudbeckia laciniata
Sabatia angularis
Scutellaria integrifolia
Silphium perfoliatum
Sisyrinchium atlanticum
Solidago rugosa
Spiranthes cernua
Stachys tenuifolia (hispida)
Symphyotrichum (Aster) novi-belgii
Thalictrum pubescens (polygamum)
Verbena hastata
Viola conspersa
Viola striata

Herbaceous Emergents
Iris prismatica, versicolor, virginica
Juncus effusus
Scirpus atrovirens, cyperinus
Spartina pectinata

Shrubs
Note: Listed are a few of the shorter shrubs that may appear in or at the edges of meadows. Using shrubs in a planting that is to remain as a meadow is not recommended, as they provide perching spots for birds, whose droppings will seed in unwanted plants, including trees. If the meadow is to be allowed to succeed eventually to forest, then adding shrubs is one prescribed method.

Cephalanthus occidentalis
Ilex verticillata
Rhododendron viscosum
Rosa palustris
Spiraea tomentosa

Plants for Forest or Woodland Plantings

Forests contain a diversity of plant types arranged in vertical layers, from the tallest (canopy or overstory) trees, through the understory of shorter trees and shrubs, to the forest floor or ground layer of low shrubs and herbaceous plants. Forest types are classified by the dominant trees present (e.g., oak-hickory-pine forest). Plant species occurring together in these different forest types are a function of the climate, altitude, geology and physiographic location, soil type, moisture, sunlight, and other conditions. So many combinations of plants occur in these different forests that space limitations prevent listing them all. Instead, the following represent plants found in a few of the more common forest types in the Chesapeake Bay watershed. These lists provide the basis for a viable forest or woodland project. Common ferns, grasses and herbaceous plants for the ground layer are listed separately, as they may occur in many of the forest types in various combinations. Remember to match the plants' growth requirements with the site conditions.

For new projects at open sites, it may take years for young trees to provide adequate shade. Consult other restoration resources and/or professionals for alternative methods of developing the ground layer, and for more comprehensive forest community information.

Forest Types, Basic Structure

Oak-Mixed Forest (Coastal Plain)
Canopy trees for well-drained sites
Carya cordiformis, tomentosa
Quercus alba, falcata, marilandica, phellos, prinus, stellata, velutina
Pinus species, occasional intermixed with the above

Canopy trees for moist sites
Acer rubrum
Fagus grandifolia
Quercus bicolor, michauxii, nigra, palustris, phellos
Liquidambar styraciflua
Liriodendron tulipifera
Nyssa sylvatica

Understory trees
Asimina triloba
Cercis canadensis
Cornus florida
Ilex opaca
Magnolia virginiana

Understory shrubs
Comptonia peregrina
Gaylussacia frondosa
Ilex glabra
Kalmia angustifolia, latifolia
Morella (Myrica) cerifera, pensylvanica
Vaccinium pallidum (vacillans), stamineum
Viburnum dentatum (recognitum), prunifolium

Pine Forest (Coastal Plain)
Overstory trees
Pinus taeda, virginiana, rigida (occasional)

Understory trees
Ilex opaca
Sassafras albidum

Understory shrubs
Clethra alnifolia
Morella (Myrica) cerifera, pensylvanica
Rhus copallina

Oak-Hickory Forest (Piedmont and Mountain, occasional on Coastal Plain)

Dominant overstory trees

Carya cordiformis, ovata
Quercus alba, prinus, rubra, velutina

Other trees

Amelanchier arborea, canadensis
Carya alba, glabra, tomentosa
Celtis occidentalis
Cercis canadensis
Cornus florida
Crataegus viridis
Fraxinus Americana
Juglans nigra
Prunus serotina
Quercus coccinea, falcata, lyrata, marilandica, muhlenbergii, stellata
Sassafras albidum
Tilia americana
Ulmus Americana

Additional trees for more moist sites

Acer rubrum
Liquidambar styraciflua
Liriodendron tulipifera
Ulmus americana

Shrubs

Kalmia latifolia
Vaccinium angustifolium, corymbosum, pallidum (vacillans), stamineum
Viburnum acerifolium

Red Oak - Mixed Hardwood Forest (Piedmont)

Dominant overstory trees

Acer rubrum
Carya ovata, tomentosa
Betula alleghaniensis (lutea), lenta
Fraxinus americana
Fagus grandifolia
Liriodendron tulipifera
Quercus alba, rubra, velutina
*Pinus strobus**
*Tsuga canadensis**

* These would be in the Hemlock-White Pine-Red Oak-Mixed Hardwood Forest (Piedmont and Mountain regions).

Understory trees and shrubs

Amelanchier species
Carpinus caroliniana
Hamamelis virginiana
Lindera benzoin
Viburnum acerifolium, dentatum (recognitum)

Hemlock-White Pine Forest (Mountain)

Dominant overstory trees

Acer saccharum
Betula alleghaniensis (lutea)
Fagus grandifolia
Pinus strobus
Tilia americana
Tsuga canadensis
also *Picea* rubens (red spruce, not included in this guide, but native in the Bay watershed in mountain region)

Other trees

Acer rubrum
Betula lenta
Liriodendron tulipifera
Quercus rubra, velutina

Shrubs

Hamamelis virginiana
Rhododendron maximum
Viburnum acerifolium

Mixed Mesophytic Forest (Mountain)

These forests are relicts of ancient mesic (moist) broadleaf deciduous forests. They can be very diverse.

Dominant overstory trees

Acer saccharum
Betula lenta
Carya ovata
Carpinus caroliniana
Fagus grandifolia
Fraxinus americana
Juglans nigra
Liriodendron tulipifera
Magnolia acuminata
Prunus serotina
Quercus rubra
Tilia americana

Understory trees and shrubs

Cercis canadensis
Hamamelis virginiana
Hydrangea arborescens
Lindera benzoin
Rhododendron maximum
Staphylea trifolia

Woodland Floor or Ground Layer Plants

These plants can also be used for gardens in or adjacent to wooded areas. Refer to specific habitat and growing conditions to match plants in appropriate groupings.

Ferns

All species included in this guide occur in woodlands.

Grasses and Grasslike Plants

Agrostis perennans
Andropogon gerardii
Carex crinita var. crinita, glaucodea, lurida, pensylvanica, vulpinoidea
Chasmanthium latifolium
Danthonia spicata
Dichanthelium clandestinum, commutatum
Elymus hystrix (Hystrix patula)
Festuca rubra
Panicum virgatum
Saccharum giganteum (Erianthus giganteus)
Schizachyrium scoparium (Andropogon scoparius)
Sorghastrum nutans
Tridens flavus
Tripsacum dactyloides

Herbaceous Plants

Actaea pachypoda
Ageratina altissima v. altissima (Eupatorium rugosum)
Aquilegia canadensis
Aralia nudicaulis, racemosa
Arisaema triphyllum
Aruncus dioicus
Asarum canadense
Campanulastrum americanum (Campanula americana)
Cardamine concatenata (Dentaria laciniata)
Caulophyllum thalictroides
Chelone glabra
Chimaphila maculata
Chrysogonum virginianum
Cimicifuga racemosa
Claytonia virginica
Delphinium tricorne
Dicentra canadensis, cucullaria, eximia
Erythronium americanum
Eurybia divaricata (Aster divaricatus)
Geranium maculatum
Helenium autumnale
Helianthus divaricatus
Heliopsis helianthoides
Hepatica nobilis var. acuta (acutiloba), var. obtusa (americana)
Heracleum maximum (lanatum)
Heuchera americana, villosa

(continued)

Hydrophyllum virginianum
Impatiens capensis (biflora)
Ionactis (Aster) linariifolius
Jeffersonia diphylla
Liatris scariosa
Lilium canadense, philadelphicum
Maianthemum canadense, racemosum (Smilacina racemosa)
Medeola virginiana
Melanthium virginicum
Mertensia virginica
Mitchella repens
Mitella diphylla
Monarda didyma
Osmorhiza longistylis
Oxalis violacea
Packera aurea (Senecio aureus)
Penstemon laevigatus
Phlox carolina, divaricata, stolonifera
Podophyllum peltatum
Polemonium reptans
Polygonatum biflorum, pubescens
Sanguinaria canadensis
Saxifraga pensylvanica, virginiensis
Scutellaria integrifolia
Sedum ternatum
Silene caroliniana, stellata, virginica
Solidago caesia, flexicaulis, rugosa
Stachys tenuifolia (hispida)
Stellaria pubera
Thalictrum dioicum, pubescens (polygamum), thalictroides (Anemonella t.)
Tiarella cordifolia
Tradescantia virginiana
Trillium erectum, grandiflorum, sessile, undulatum
Uvularia grandiflora, perfoliata, sessilifolia
Veratrum viride
Viola conspersa, hastata, pubescens (pennsylvanica), sororia (papilionacea), striata
Zizia aurea

Vines
Any of the vines included in this guide may be found in woodlands, occupying various vegetative layers, from the ground up.

Solutions for Slopes

Slopes of any kind are prone to erosion from rain, runoff; wave action, stream or river currents, and foot or lawnmower traffic. Plants with deep, spreading root systems help prevent erosion by holding soil in place. Some plants that are particularly well suited to and recommended for holding or stabilizing soils on a dry upland slope or hillsides such as a sloping yard or road embankment are listed below.

However, any plant suited to the site's sun, soil, and moisture conditions that could be planted on a flat surface could be planted on a slope, as long as the slope is accessible. Plants that naturally occur on slopes or hillsides can be found by searching the "habitat" notes provided with each plant in this guide.

For plants to use on a tidal shoreline, see the list of saltmarsh or freshwater marsh plants. For plants to use on a stream, pond or riverbank, see the list of freshwater marsh plants.

Plants That Provide Stabilization on Dry, Sunny Slopes or Hillsides

Grasses & Grasslike Plants
Ammophila breviligulata
Andropogon gerardii
Dichanthelium clandestinum
Elymus canadensis
Panicum virgatum
Panicum amarum
Schizachyrium scoparium

Herbaceous Plants
Any of the herbaceous plants that thrive in a sunny, dry site tend to be deep-rooted and would provide good slope stabilization. See the dry meadow plants list on for additional choices.

Baptisia tinctoria
Lespedeza capitata
Chamaecrista (Cassia) fasciculata

Shrubs
Comptonia peregrina
Ceanothus americanus
Clethra alnifolia
Cornus racemosa
Gaylussacia baccata, frondosa
Hypericum densiflorum
Kalmia latifolia
Morella pensylvanica
Physocarpus opulifolius
Rhus aromatica
Rhus copallina
Rhus glabra
Rosa carolina
Rubus allegheniensis
Vaccinium angustifolium
Viburnum acerifolium

Trees
The following are some of the tree species that may occur on slopes. However, for stabilization purposes, practitioners recommend planting herbaceous plants and shrubs, as trees will appear in time through succession.

Acer rubrum, saccharum, spicatum
Amelanchier arborea
Betula lenta
Carya alba (tomentosa), cordiformis, glabra, ovata
Castanea pumila
Celtis occidentalis
Chionanthus virginicus
Cornus alternifolia, florida
Crataegus crus-galli
Fraxinus americana
Juglans nigra
Liquidambar styraciflua
Liriodendron tulipifera
Magnolia acuminata
Morus rubra
Nyssa sylvatica
Ostrya virginiana
Pinus rigida, taeda
Quercus coccinea
Quercus marilandica, michauxii, muehlenbergii, prinus, rubra, velutina
Sorbus (Pyrus) americana
Ulmus rubra

Vines
Campsis radicans
Celastrus scandens
Passiflora incarnata
Parthenocissus quinquefolia

Evergreens

Ferns
Asplenium platyneuron
Dryopteris carthusiana (spinulosa), cristata, intermedia, marginalis
Polystichum acrostichoides

Herbaceous Plants
Asarum canadense
Goodyera pubescens
Heuchera americana
Mitchella repens
Phlox carolina, stolonifera, subulata
Sedum ternatum
Silene caroliniana
Solidago sempervirens
Yucca filamentosa (flaccida)

Shrubs
Gaultheria procumbens
Ilex glabra
Kalmia angustifolia, latifolia
Morella (Myrica) caroliniensis (heterophylla), cerifera
Rhododendron maximum
Vaccinium macrocarpon

Trees
Chamaecyparis thyoides
Ilex opaca
Juniperus virginiana
Magnolia virginiana
Pinus any species in this guide
Thuja occidentalis
Tsuga canadensis

Vines
B*ignonia capreolata*
Lonicera sempervirens

Plants to use as Groundcovers

Ferns
Any species in this guide

Grasses and Grasslike Plants
Carex glaucodea, pensylvanica
Danthonia spicata
Festuca rubra

Herbaceous Plants
Aquilegia canadensis
Asarum canadense
Chimaphila maculata
Chrysogonum virginianum
Chrysopsis mariana
Coreopsis verticillata
Erigeron pulchellus
Eurybia divaricata (Aster divaricatus)
Geranium maculatum
Hepatica nobilis var. acuta (acutiloba), nobilis var. obtusa (americana)
Heuchera americana, villosa
Hylotelephium (Sedum) telephioides
Maianthemum canadense
Mitchella repens
Opuntia humifusa (compressa)
Oxalis violacea
Phlox carolina, stolonifera, subulata
Podophyllum peltatum
Polemonium reptans
Sedum ternatum
Silene caroliniana
Tiarella cordifolia
Uvularia sessilifolia
Viola conspersa, cucullata, hastata, pedata

Shrubs
Gaultheria procumbens
Vaccinium angustifolium, macrocarpon
Vaccinium pallidum (vacillans)

Vines
Bignonia capreolata
Campsis radicans
Celastrus scandens
Parthenocissus quinquefolia

Plants for Spring and Fall Color

A search through this guide will reveal literally hundreds of plants of all types that will flower or fruit in spring or fall, providing a wide variety of choices to color a native landscaping project and to offer a diversity of food for wildlife. Remember to consider trees, shrubs and vines when choosing plants for their flower color; and to include fruit color in the palette. The fall color of many plants, particularly grasses, trees, shrubs and vines adds interest to the landscape. A landscape planned for seasonal color, throughout *all* seasons of the year, can also provide year-round food, cover and nesting structure for wildlife.

Deer Resistant Plants

Gardeners challenged by browsing deer often look for a definitive list of plants that deer will leave alone. Unfortunately, deer are not quite that predictable. In areas where high populations of deer have over-browsed the woodland understory, they are likely to eat any plant they can find to survive. Gardeners and habitat restorationists are strongly encouraged to use other appropriate barriers to exclude deer, in consultation with a local wildlife agency. Plants marked with an asterisk (*) may be browsed occasionally.

The list below was compiled from Bowman's Hill Wildflower Preserve and Deer Proofing Your Yard (Hart), see references.

Grasses and Grasslike Plants
Andropogon gerardii
Panicum virgatum

Herbaceous Plants
Actaea pachypoda
Allium cernuum
Aquilegia canadensis
Arisaema triphyllum
Aruncus dioicus
*Asarum canadense **
Asclepias tuberose
Baptisia australis
Campanulastrum americanum (Campanula americana)
Coreopsis tripteris
Dicentra eximia
Geranium maculatum
Helenium autumnale
Hibiscus moscheutos (H. palustris)
Jeffersonia diphylla
*Lobelia cardinalis *, siphilitica **
Lupinus perennis
Monarda didyma
Phlox divaricata, stolonifera
*Podophyllum peltatum **
Polemonium reptans
Rudbeckia fulgida, hirta
Solidago species
Symphyotrichum (Aster) novae-angliae
Veronicastrum virginicum (Veronica virginica)

Herbaceous Emergents
Iris prismatica, versicolor, virginica

Shrubs
Aralia spinosa
Clethra alnifolia
Cornus amomum
Hamamelis virginiana
Hypericum densiflorum
Ilex glabra, laevigata, verticillata
Kalmia latifolia
Leucothoe racemosa
Lindera benzoin
Morella (Myrica) cerifera, pensylvanica
Ribes rotundifolium
Spiraea alba, alba v. latifolia (latifolia), tomentosa
Viburnum acerifolium, dentatum (recognitum), prunifolium

Trees
Acer negundo, rubrum
Amelanchier canadensis
Betula nigra
Carpinus caroliniana
Cercis canadensis
Cornus alternifolia
*Cornus florida **
Diospyros virginiana
Fagus grandifolia
Fraxinus americana, pennsylvanica
Ilex opaca
Juniperus virginiana
Magnolia acuminata, virginiana
Nyssa sylvatica
Pinus — any species in this guide
Quercus — any species in this guide
Sambucus racemosa v. racemosa (S. pubens)

Vines
Celastrus scandens
*Clematis virginiana **
Lonicera sempervirens
*Wisteria frutescens **

Photographic Credits

All photographs in this publication were used with permission of the photographers. Most images are copyrighted by the photographers and/or the sources listed below, and may not be used for commercial purposes without prior written permission of the copyright holders. The U.S. Fish and Wildlife Service is grateful for the generosity and cooperation of these photographers.

Each photograph is marked with an abbreviated form for the corresponding photographer, due to space limitations. Those abbreviations are listed here in alphabetical order, followed by the full credit information.

The Bugwood Network and Forestry Images Image Archive and Database Systems, The University of Georgia-Warnell School of Forest Resources and College of Agricultural and Environmental Sciences-Department of Entomology. www.bugwood.org

BUG DJM David J. Moorhead
BUG RFW Robert F. Wittwer

BZ Bob Zuberbuhler, www.westernpawildflowers.com

CAB Carole Ann Barth, Heal Earth Gardens, Silver Spring, Maryland.

CM NRCS Christopher F. Miller, Regional Plant Materials Specialist, U.S. Department of Agriculture, Natural Resources Conservation Service, Somerset, New Jersey.

Digital Flora of Texas Vascular Plant Image Library. www.csdl.tamu.edu/FLORA/galfolks.htm, or www.texasflora.org

DFT DL David Lemke, The State University-San Marcos, Department of Biology Herbarium.
DFT HW Hugh Wilson, TAMU Herbarium, Texas A&M University.

GM ARS George McLellan, Species Study Group of the Middle Atlantic Chapter, American Rhododendron Society. tjhsst.edu/~dhyatt/azaleas/atlanticum.html

MOBOT Missouri Botanical Garden. www.mobot.org/gardeninghelp/plantfinder/service.shtml. Digital images in this database were contributed by Martha Hill, Glenn Kopp and Alan Stentz.

MP Dan Tanaglia, Missouriplants. www.missouriplants.com

NYNHP Stephen M. Young, New York Natural Heritage Program. www.dec.state.ny.us/website/dfwmr/heritage

OSU Scott Biggs, Ohio State University. http://PlantFacts.osu.edu

PLANTS **USDA-NRCS. 2003. The PLANTS Database,** plants.usda.gov/plants. National Plant Data Center. Baton Rouge, LA 70874-4490 USA. PLANTS Database images that were used in this guide were contributed by the following:
PLANTS 1995 U.S. Department of Agriculture Natural Resources Conservation Service. 1995 Midwestern Wetlands Flora.
PLANTS 1997 U.S. Department of Agriculture Natural Resources Conservation Service. 1997 Northeastern Wetlands Flora.
PLANTS DEH Herman, D.E. et.al. 1996 North Dakota Tree Handbook. USDA NRCS. ND State Soil Conservation Committee. NDSU Extension and Western Area Power Administration. Bismark, ND.
PLANTS DL Douglas Ladd. U.S. Department of Agriculture Soil Conservation Service. 1989 Midwest Wetland Flora: Field Office Illustrated Guide to Plant Species. Midwest National Technical Center, Lincoln, NE.
PLANTS GAM Gary A. Monroe
PLANTS GFR George F. Russell
PLANTS JA Jennifer Anderson
PLANTS JS Jim Stasz
PLANTS JSP J.S. Peterson
PLANTS LA Larry Allain
PLANTS RM89 Robert H. Mohlenbrock. U.S. Department of Agriculture, Soil Conservation Service. 1989 Midwest Wetland Flora: Field Office Illustrated Guide to Plant Species. Midwest National Technical Center, Lincoln, NE.
PLANTS RM91 Robert H. Mohlenbrock. U.S. Department of Agriculture, Soil Conservation Service. 1991 Southern Wetland Flora: Field Office Guide to Plant Species. South National Technical Center, Fort Worth, TX.
PLANTS RM95 Robert H. Mohlenbrock. U.S. Department of Agriculture,Natural Resources Conservation Service. 1995 Northeast Wetland Flora: Field Guide to Plant Species. Northeast Technical Center, Chester, PA.
PLANTS TGB Thomas G. Barnes
PLANTS WSJ William S. Justice

RHW R. Harrison Wiegand, Maryland Department of Natural Resources, Wildlife and Heritage Service. www.dnr.state.md.us

RS MNPS Rod Simmons, Maryland Native Plant Society. www.mdflora.org

SMSU Paul Redfearn, Ozarks Regional Herbarium, Southwest Missouri State University. biology.smsu.edu/Herbarium

UCONN Mark Brand, UConn Plant Database, University of Connecticut. www.hort.uconn.edu/plants/about.html

USDA NRCS **U.S. Department of Agriculture, Natural Resources Conservation Service,** National Plant Materials Center, Beltsville, MD. www.plantmaterials.nrcs.usda.gov/mdpmc
USDA JE John Englert
USDA JK Jennifer Kujawski
USDA MG Martin van der Grinten

USFWS **U.S. Fish and Wildlife Service Chesapeake Bay Field Office,** Annapolis, MD 21401. www.fws.gov/r5cbfo
USFWS BES Britt Slattery
USFWS RL Randy Loftus
USFWS RM Rich Mason
USFWS RS Rich Starr

University of Wisconsin, Wisconsin State Herbarium, Madison, WI 53706-1381. www.botany.wisc.edu/herbarium
UWI AH Andrew Hipp, University of Wisconsin-Madison.
UWI DK Darrin Kimbler, University of Wisconsin-Madison.
UWI DWW Dennis W. Woodland, Andrews University.
UWI EJJ Emmet J. Judziewicz University of Wisconsin-Stevens Point and Madison.
UWI JK John Kohout, donated to Wisconsin Department of Natural Resources.
UWI JRS James R. Sime, Middleton, Wisconsin.
UWI JS Janice Stiefel, Bailey's Harbor, Wisconsin.
UWI KJS Kenneth J. Sytsma, University of Wisconsin-Madison.
UWI KK Kitty Kohout, donated to Wisconsin Department of Natural Resources.
UWI MC Michael Clayton, University of Wisconsin-Madison.
UWI MRB Merel R. Black, University of Wisconsin-Madison.
UWI RRK Robert R. Kowal, University of Wisconsin-Madison.
UWI RWF Robert W. Freckmann, University of Wisconsin-Stevens Point.
UWI TK Tim Kessenich, Wisconsin Department of Natural Resources.

VT Virginia Tech (Virginia Polytechnic Institute and State University), College of Natural Resources, Forest Biology and Dendrology Educational Sites. www.cnr.vt.edu/dendro/wwwmain.html

References

Bowman's Hill Wildflower Preserve. *Deer Tolerant/Resistant Native Plants* (information sheet). New Hope, PA. 2002.

Brown, Russel G. and Melvin L. Brown. *Herbaceous Plants of Maryland*. Port City Press, Baltimore, MD. 1984.

Brown, Russel G. and Melvin L. Brown. *Woody Plants of Maryland*. Port City Press, Baltimore, MD. 1972.

Burrell, C. Colston. *A Gardener's Encyclopedia of Wildflowers: An Organic Guide to Choosing and Growing over 150 Beautiful Wildflowers*. Rodale Press, Inc., Emmaus, PA. 1997.

Dirr, Michael A. *Manual of Woody Landscape Plants*. Fifth Edition. Stipes Publishing LLC, Champaign, IL. 1998.

Elias, Thomas S. *The Complete Trees of North America*. Gramercy Publishing Company, New York, NY. 1987.

Flora of North America Editorial Committee. *Flora of North America North of Mexico. Volume 2: Pteridophytes and Gymnosperms*. Oxford University Press, New York, NY. 1993.

Fernald, Merritt L. *Gray's Manual of Botany*. Eighth Edition. D. Van Nostrand Company, New York, NY. 1970.

Fike, Jean. *Terrestrial and Palustrine Plant Communities of Pennsylvania*. Pennsylvania Bureau of Forestry, Harrisburg, PA, The Nature Conservancy, Middletown, PA and Western Pennsylvania Conservancy, Pittsburgh, PA. 1999.

Gleason, Henry A. and Arthur Cronquist. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. Willard Grant Press, Boston, MA 1963.

Harlow, William M., Ellwood S. Harrar, James W. Hardin, and Fred M. White. *Textbook of Dendrology* Eighth Edition. McGraw-Hill, Inc., New York, NY. 1996.

Hart, Rhonda Massingham. *Deer-Proofing Your Yard & Garden*. Storey Books, Pownal, VT. 1997.

Hightshoe, Gary L. *Native Trees, Shrubs, and Vines for Urban and Rural America*. Van Nostrand Reinhold, New York, NY. 1988.

Johnson, Lorraine. *100 Easy-To-Grow Native Plants For American Gardens in Temperate Zones*. Firefly Books Ltd., Buffalo, NY. 1999.

Jones, Samuel B. Jr. and Arlen E. Luchsinger. *Plant Systematics*. Second Edition. McGraw-Hill Book Company, New York, NY. 1986.

Kricher, John C. *The Peterson Field Guide Series. A Field Guide to Eastern Forests: North America*. Houghton Mifflin Company, Boston, MA. 1988.

Little, Elbert L. *The Audubon Society Field Guide to North American Trees: Eastern Region*. Alfred A. Knopf, Inc., New York, NY. 1980.

Luttenberg, Danielle, Deborah Lev and Michael Feller. *Native Species Planting Guide for New York City and Vicinity*. City of New York Parks and Recreation, New York, NY. 1993.

Magee, Dennis W. Freshwater Wetlands: *A Guide to Common Indicator Plants of the Northeast*. University of Massachusetts Press, Amherst, MA. 1981.

Martin, Alexander C. and A. L. Nelson. *American Wildlife and Plants: A Guide to Wildlife Food*. Dover Publications, Minneola, NY. 1985.

Newcomb, Lawrence. *Newcomb's Wildflower Guide*. Little, Brown and Company, Boston, MA. 1977.

Niering, William A. *The Audubon Society Nature Guides: Wetlands*. Alfred A. Knopf, Inc., New York, NY. 1985.

Phillips, Ellen and C. Colston Burrell. *Rodale's Illustrated Encyclopedia of Perennials*. Rodale Press, Inc., Emmaus, PA. 1993.

Redington, Charles B., Ph.D. *Plants in Wetlands*. Kendall/Hunt Publishing Company, Dubuque, IA. 1994.

Reed, Clyde F. *The Ferns and Fern Allies of Maryland and Delaware including District of Columbia*. The Science Press, Lancaster, PA. 1953.

Rhoads, Ann F. and Timothy A. Block. *The Plants of Pennsylvania: An Illustrated Manual.* University of Pennsylvania Press, Philadelphia, PA. 2000.

Still, Steven M. *Manual of Herbaceous Ornamental Plants*. Fourth Edition. Stipes Publishing Company, Champaign, IL. 1994.

Swearingen, J., K. Reshetiloff, B. Slattery, and S. Zwicker. 2002. *Plant Invaders of Mid-Atlantic Natural Areas*. National Park Service and U.S. Fish & Wildlife Service, 82 pp.

Thurnhorst, Gwendolyn *A. Wetland Planting Guide for the Northeastern United States*. Environmental Concern, Inc., St. Michaels, MD. 1993.

Tiner, Ralph W. *A Field Guide to Coastal Wetland Plants of the Northeastern United States*. University of Massachusetts Press, Amherst, MA. 1987.

Tiner, Ralph W. *Field Guide to Nontidal Wetland Identification*. Maryland Department of Natural Resources, Annapolis, MD and U.S. Fish and Wildlife Service, Newton Corner, MA. 1988.

Tyning, Thomas F. *A Guide to Amphibians and Reptiles*. Stokes Nature Guides. Little, Brown and Company, Boston, MA. 1990.

Water and Ecosystems Team. *Roadside Use of Native Plants*. Federal Highway Administration. Washington D.C. 1999.

Internet References

American Forests (www.americanforest.org/resources/bigtrees/register.php).

Bowman's Hill Wildflower Preserve (www.bhwp.org).

Brooklyn Botanic Garden (www.bbg.org).

Connecticut Botanical Society (www.ct-botanical-society.org).

Harvard University Herbaria (www.huh.harvard.edu).

Horticopia (www.horticopia.com).

Horticopia Plant Information (www.hortpix.com).

Kentucky Native Plant Society (www.knps.org).

Missouri Botanical Garden (www.mobot.org).

NatureServe (www.natureserve.org).

Nearctica (www.nearctica.com/nathist/nathist.htm).

Ohio State University (ohioline.osu.edu).

Plant America (www.plantamerica.com).

Plant File (www.plantfile.com).

Plants For a Future (www.pfaf.org).

Saw Mill River Audubon, Pruyn Sanctuary Butterfly and Hummingbird Garden 2001 Plant List (www.sawmillriveraudubon.org/downloads/GardenList.doc).

South Carolina Forestry Commission (www.state.sc.us/forest/tidtsim.htm).

Sustainable Urban Landscape Information Series (www.sustland.umn.edu).

Toadshade (www.toadshade.com).

USDA Silvics of North America (www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm) Burns, Russell M., and Barbara H. Honkala, tech. coords. Silvics of North America: 1. Conifers; 2. Hardwoods. Agriculture Handbook 654. U.S. Department of Agriculture, Forest Service, Washington, DC. 1990.

USDA, NRCS. 2001 The PLANTS Database, version 3.1 (plants.usda.gov/plants). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

University of Minnesota, Sustainable Urban Landscape Information Series (www.sustland.umn.edu).

University of Wisconsin Botanical Garden (www.botany.wisc.edu/Garden).

Washington State Department of Ecology (www.ecy.wa.gov/programs/wq/plants/native/brasenia.html).

The Xerces Society (www.xerces.org).

Catalogs

Adkins Arboretum. Fall 2001 Native Plant Sale: Plant Sale List. Ridgely, MD (www.adkinsarboretum.org).

Bluemount Nuseries, Inc. Catalog 2001. Monkton, MD (www.bluemount.com).

Carroll Gardens. America's Selection of Rare and Unusual Plants 1997. Westminster, MD (www.carrollgardens.com).

Environmental Concern. 2001 Nursery Catalog. St. Michaels, MD (www.wetland.org).

Environmental Concern, Inc. 1996 Nursey Catalog. St. Michaels, MD. 1996 (www.wetland.org).

Ernst Conservation Seeds. Wholesale Price List – Spring/Summer 2003. Meadville, PA (www.ersntseed.com).

Ernst Conservation Seeds. Wholesale 2002 Catalog and Information Guide. Meadville, PA (www.ersntseed.com).

Ernst Conservation Seeds. 1999 Information Guide. Meadville, PA (www.ersntseed.com).

Lower Marlboro Nursery. Spring 1999. Dunkirk, MD (www.lowermarlboronursery.com).

Maryland Natives Nursery, Inc. 2002 Catalog. Baltimore, MD (www.marylandnativesnursery.com).

North Creek Nurseries, Inc. 2001 Wholesale Catalog. Landenberg, PA (www.northcreeknurseries.com).

North Creek Nurseries, Inc. 1999 Wholesale Starters. Landenberg, PA (www.northcreeknurseries.com).

Octoraro Native Plant Nursery. 2002 Wholesale Nursery Catalog. Kirkwood, PA (www.octoraro.com).

Talmage Farm. Native Plants Naturally 2000 Wholesale Catalog. Riverhead, NY (www.talmagefarm.com).

Virginia Natives. 2001 Catalog. Hume, VA. (www.vnps.org).

Wild Earth Native Plant Nursery. 1999 Catalog. Freehold, NJ.

Index

Latin name

Common Name

U.S. Fish & Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Dr.
Annapolis, MD 21401
410/573 4500
www.fws.gov/r5cbfo

Adkins Arboretum
P.O. Box 100
Ridgely, MD 21660
410/634 2847
www.adkinsarboretum.org

Baltimore County Department of Environmental Protection and Resource Management
401 Bosley Ave., Ste. 416
Towson, MD 21204
410/887 4488
www.baltimorecountyonline.info

Chesapeake Bay Trust
60 West Street, Ste. 200-A
Annapolis, MD 21401
410/974 2941
www.chesapeakebaytrust.org

Irvine Nature Center
8400 Greenspring Avenue
Stevenson, MD 21153
410/484 2413
www.explorenature.org

Maryland Native Plant Society
P.O. Box 4877
Silver Spring, MD 20914
301/809 0139
www.mdflora.org
mnps@toad.net

National Fish and Wildlife Foudation
1120 Connecticut Ave. NW, Ste. 900
Washington, DC 20036
202/857 0166
www.nfwf.org

The Nature Conservancy
Maryland/DC Chapter
5410 Grosvenor Ln., Ste. 100
Bethesda, MD 20814
301/897 8570
www.nature.org

USDA NRCS
Cape May Plant Materials Center
1536 Rt. 9 North
Cape May Court House, NJ 08210
609/465 5901
plant-materials.nrcs.usda.gov

Frequently Asked Questions about the Buffer

Buffer Establishment and Agriculture

Is Buffer establishment required for a subdivision that creates a lot around an existing house(s) and the remaining land will remain in agricultural use?

Yes. Subdividing existing houses from a larger parcel is considered a change in use and the Buffer must be established on the new lots. Buffer establishment on the area of the property that remains in agricultural use can be deferred until such time as the agricultural use ceases.

Is Buffer establishment required for new lots that will not be developed and will continue to be farmed for an extended period of time?

Yes, the Buffer must be established. However, establishment (planting) of the Buffer can be deferred on those portions of the property that continue to be farmed until there is a change in land use (from agricultural to residential). The Buffer Management Plan must include the following information:

- A list of the lots that will remain in agricultural use;
- A Soil Conservation and Water Quality Plan that has been approved by the local Soil Conservation District;
- A graphic depiction of the areas where the planting will be deferred;
- A landscape plan and schedule showing how the areas will be planted when the lots are to be developed ;
- Appropriate notes requiring establishment of the Buffer prior to the issuance of a final use and occupancy permit for the residence constructed on the lots.

If an applicant purchases a 50-acre farm that was subdivided after local Critical Area Program adoption and wants to build a house on the property, does the Buffer on the entire 50 acres have to be established if most of the property will continue to be farmed?

No, the applicant can work with the local government to identify a reasonable “development envelope” on the farm that would include the house, related residential structures such as sheds, and the sewage reserve area, and establish the area of the Buffer within the development envelope. As long as the applicant obtains approval of a Soil Conservation and Water Quality Plan from the Soil Conservation District, establishment of the Buffer on the remaining farmland can be deferred until there is a change in land use. See the previous question for the Buffer Management Plan requirements when planting will be deferred.

How is Buffer establishment handled for a subdivision where all or a portion of the Buffer is currently covered by a CRP or CREP easement?

The subdivision of land to create residential lots is considered a change in land use and potentially creates conflicts with CRP and CREP objectives. A property owner that is subdividing land that is covered by a CRP or CREP easement will be required to terminate or amend the easement agreement and establish the Buffer.

Residential Buffer Establishment

If an applicant is building a house or constructing an addition and all disturbance is outside the Buffer, is Buffer planting still required?

Yes, unless the Buffer is currently fully forested. The new regulations for the Buffer require planting for all development activities on lots that include land area within the Buffer adjacent to tidal waters, tidal wetlands, and tributary streams. The area of planting required depends on the proposed activity, when the lot was recorded, and the area of existing forest cover that exists within the Buffer. The local planning office can assist permit applicant in determining how much planting is required.

If an applicant is proposing to replace a 4,000 square foot house outside the Buffer with a 5,500 square foot house outside the Buffer, how much Buffer establishment is required?

This type of redevelopment would fall under the category of "Addition or Accessory Structure" in the table found in COMAR 27.01.09.01-1.C. Unless the Buffer is fully forested, the area of establishment required is equal to the net increase in lot coverage or 1,500 square feet.

An applicant has a one acre, grandfathered lot with 5,000 square feet of Buffer and is developing the property outside of the Buffer with a house and driveway that totals 3,000 square feet of lot coverage. If the Buffer consists of a grassed lawn, how much Buffer establishment is required?

This applicant would be required to provide 3,000 square feet of Buffer establishment.

In this same situation, if 2,000 square feet of the Buffer is already forested and 3,000 square feet is grassed lawn, how much Buffer establishment is required?

This applicant would still be required to provide 3,000 square feet of Buffer establishment.

In this same situation, if 2,000 square feet of the Buffer is already forested and 1,000 square feet consists of randomly spaced trees and some grassed lawn, how much Buffer establishment is required?

This applicant would be required to provide up to 3,000 square feet of Buffer establishment. Depending on the existing vegetation, the actual area of planting could be less than 3,000 square feet as long as the planting resulted in a fully forested Buffer.

In this same situation, if 4,000 square feet of the Buffer is already forested and 1,000 square feet is grassed lawn, how much Buffer establishment is required?

This applicant would be required to provide 1,000 square feet of Buffer establishment so that the Buffer is fully forested.

What is the difference between "Buffer establishment" and "Buffer mitigation?"

"Buffer establishment" is required when development activity takes place outside the Buffer on a property that includes a Buffer adjacent to tidal waters, tidal wetlands, or tributary streams. The purpose of Buffer establishment is to enhance the quality and function of the Buffer. "Buffer mitigation" is required when development activity or land disturbance takes place in the Buffer. The purpose of Buffer mitiogation is to offset adverse impacts to water quality and habitat resulting from the permanent or temporary disturbance to the Buffer.

Is it possible that both Buffer mitigation and establishment could be required for a project?

Yes, if a project involves both disturbance within the Buffer and lot coverage outside the Buffer. However, if the required Buffer mitigation results in full establishment of the Buffer, additional planting is not required because the establishment requirement has been met.

Buffer Establishment with Natural Regeneration

When natural regeneration is proposed in a Buffer Management Plan, what information must be provided?

The required elements of a Buffer Management Plan with natural regeneration are outlined in the Buffer Regulations in the Code of Maryland Regulations 27.01.09.01-1D. These elements are described below:

- The total acreage of Buffer establishment planting required
    - Natural regeneration is only available as an option to meet Buffer establishment planting requirements. It cannot be used to meet mitigation planting requirements.
- The acreage within the Buffer proposed for natural regeneration
    - If establishment requirement is greater than 1 acre, up to ½ acre of the requirement can be addressed with natural regeneration
- No new managed lawn or turf shown on the Buffer Management Plan
- Documentation that all of the natural regeneration area is within 50 feet of a mature forest that contains a seed bank of native species adequate for natural regeneration
- A supplemental planting plan for the area in the event that natural regeneration does not succeed
- Financial assurance for implementation of the supplemental planting plan that can not be released until the later of five years after the date of the Buffer Management Plan approval or the time at which natural regeneration is successful
    - Natural regeneration is considered successful if there are at least 300 native woody stems per acre that are at least four feet in height within the natural regeneration area

Residential Buffer Mitigation

If an applicant is requesting a variance to replace a 2,500 square foot house within the Buffer with a 3,000 square foot house within the Buffer, how much mitigation is required?

This type of application would require mitigation planting at a 3:1 ratio based on the area disturbed within the Buffer. The disturbed area would include sufficient area around the house (usually a minimum of 10 feet) that is necessary to construct footings and ensure positive drainage away from the dwelling. If there is insufficient area within the Buffer to plant the required square footage the plantings can be located outside the Buffer on the applicant's property.

Is an applicant required to obtain a variance for construction activity in the Buffer even if there is no ground disturbance, such as a second story cantilevered (no supporting structure) deck?

Yes, a variance is required for the area of the proposed construction.

Buffer Maintenance Activities

What can a property owner do about trees damaged by storms?

If the tree is considered a hazardous tree or is dead or dying, a property owner can submit a Simplified Buffer Management Plan, have the tree removed, and replace it with a six-foot tall nursery stock tree. One replacement tree is required for each tree removed. If the tree removal involves more than five trees, a local government may require a site visit, additional documentation, or a Minor Buffer Management Plan at their discretion. If the tree can be saved by careful pruning, the property owner can submit a Simplified Buffer Management Plan and have the tree pruned. Replacement planting is not required for pruning as long as the tree is not removed.

Can a property owner trim shrubs and prune trees within the Buffer?

Yes, a property owner can trim shrubs and prune trees within the Buffer using hand tools as long as the pruning and trimming does not affect the water quality and habitat functions of the Buffer. Depending on the number of trees and shrubs to be trimmed or pruned and the size of the area of the Buffer affected, a Simplified or Minor Buffer Management Plan may be required. Check with the local planning staff before starting work.

Is mitigation required for trimming and pruning trees within the Buffer?

No, mitigation is not required as long as the pruning and trimming is limited to the first one-third of the height of the tree, and no more than 25% of the canopy is affected.

How should trees that have been damaged by storms be addressed?

Every effort should be made to conserve mature trees in the Buffer, even if substantial trimming and pruning is necessary to ensure stability of the tree. If the damage is significant, and a landscape or forestry professional determines that the tree is unlikely to survive, it can be removed with a Simplified Buffer Management Plan. The mitigation requirement is one tree for each tree removed.

Shore Erosion Control and Buffer Impacts

Is mitigation required for Buffer impacts associated with the installation of shore erosion control practices?

Yes, mitigation is required at a one-to-one ratio for the square footage of shoreline disturbance associated with the project. Typically this is calculated as the linear feet of shoreline multiplied by the work area along the shoreline or 10 feet, whichever is greater.

Why is mitigation required for shore erosion control projects when the project is being installed to help the Bay by reducing sedimentation?

Mitigation is required to offset temporary impacts to habitat and water quality associated with the construction activity itself and to facilitate the rapid stabilization of the disturbed shoreline area. Mitigation by planting in the Buffer also improves the habitat and water quality benefits of most shore erosion control practices by stabilizing soils, promoting infiltration, building natural resilience, and enhancing nutrient uptake.

Is mitigation required for access to the shoreline and for stockpile areas?

No, as long as the access and stockpile areas do not involve clearing, grading, or the installation of a temporary road. If clearing is required, tree removal must be mitigated at one-to-one. If a temporary road is installed, the road must be removed and the area fully restored.

Cluster Planting Specifications

How should the trees and shrubs of a planting cluster be arranged?

The trees and shrubs of a planting cluster must be planted together in a group such that they mimic and establish a small multistory vegetative forest canopy system. When multiple clusters are proposed in a Buffer Management Plan, they should be clustered together to maximize the contiguous tree canopy established, and in effect, maximize the wildlife habitat and water quality value of the plantings. The benefits of properly planted clusters are reflected in the extra planting credit offered for using planting clusters rather than individual trees or shrubs to meet planting requirements where feasible. As a result of this extra planting credit, planting clusters are frequently used to meet requirements on Buffer Management Plans.

How far apart should the trees and shrubs within a planting cluster be planted?

The trees and shrubs of a planting cluster should be provided within a 300 to 350 square foot area, depending on the type of cluster used. Generally, the trees should be planted in the center of the planting area to provide the tree roots and canopy with enough space to grow. The shrubs can be randomly located around or under the trees. The area around the plantings should be mulched.

CRITICAL AREA BUFFER

THIS AREA PROTECTED TO IMPROVE WATER QUALITY AND HABITAT IMPORTANT TO TIDAL WATERS IN MARYLAND

DO NOT DISTURB

VIOLATORS ARE SUBJECT TO FINES UP TO $10,000 AS IMPOSED BY § 8-1808(c)(1)(iii)(14) OF THE NATURAL RESOURCES ARTICLE OF THE ANNOTATED CODE OF MARYLAND