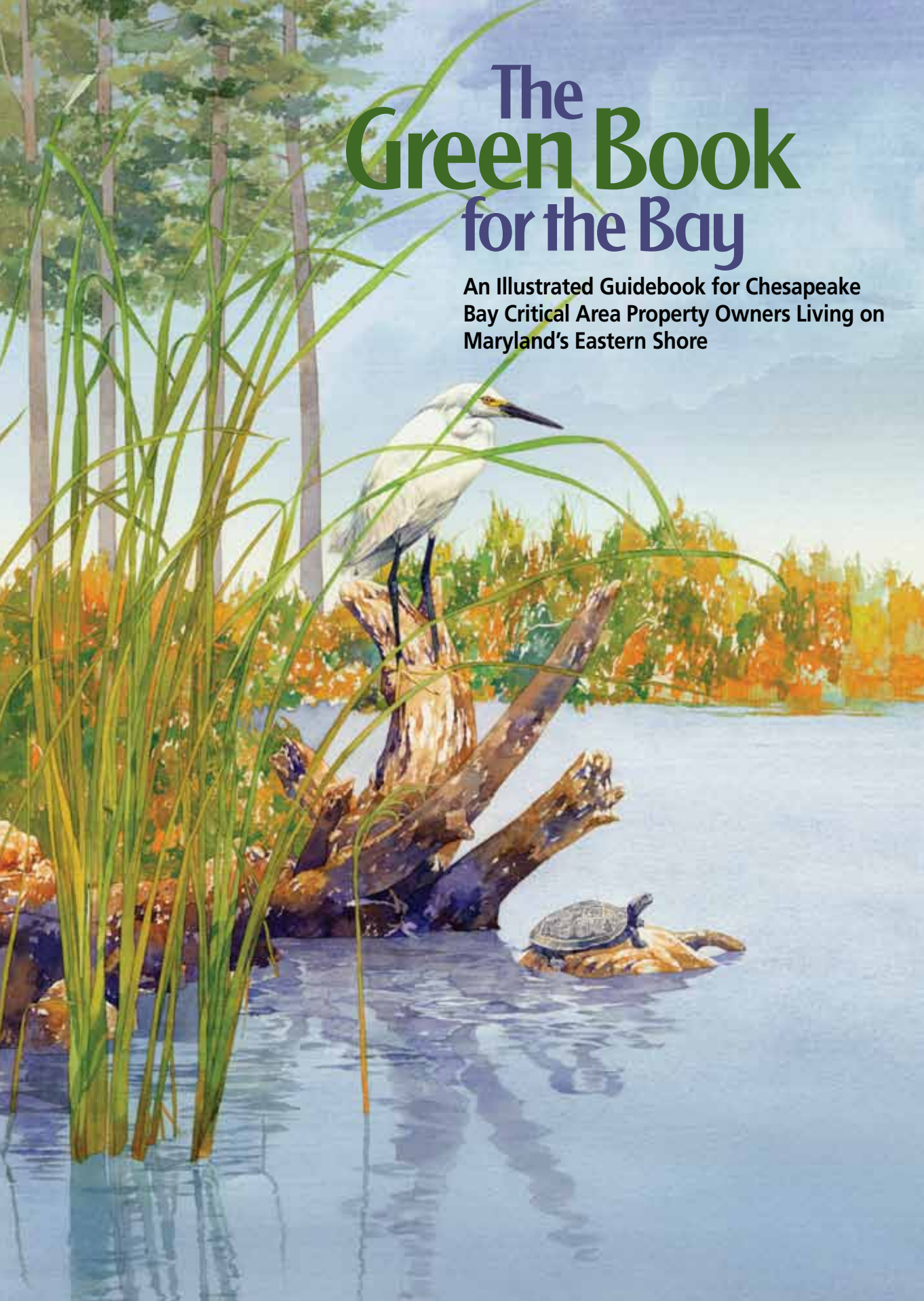

The Green Book for the Bay

An Illustrated Guidebook for Chesapeake Bay Critical Area Property Owners Living on Maryland's Eastern Shore

ADKINS ARBORETUM

Native Seed Publishing
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Adkins Arboretum is a 400-acre native garden and preserve on Maryland's Eastern Shore dedicated to promoting the appreciation and conservation of the region's native plants. Four miles of paths along streams, through meadows and native plant gardens, and under the shade of a rich bottomland forest attract nature lovers, gardeners, students, and birders.

The Arboretum offers programs year-round in ecology, horticulture, and natural history for all ages. The grounds feature over 600 species of native shrubs, trees, wildflowers, and grasses. Visit www.adkinsarboretum.org to plan a visit.

The Green Book for the Bay

An Illustrated Guidebook for Chesapeake Bay Critical Area Property Owners Living on Maryland's Eastern Shore

Special thanks to Mary Owens, Education and Conservation Coordinator, Maryland Critical Area Commission, and Amy Moredock, Environmental Planner, Kent County Department of Planning, Housing and Zoning, for assistance throughout this project.

Laws, best practice standards, websites, and contact information are subject to change. *The Green Book for the Bay* will be updated online to reflect these changes and is available at www.firststopforthebay.org.

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First Stop for the Bay

Chesapeake Bay's stunning panoramic water views and unique estuarine habitat provide a haven for migratory waterfowl and establish it as one of the world's most treasured natural waterways.

With an appreciation of the Bay's natural beauty and ecological importance comes a heightened awareness of your responsibility to be a good steward of your property. If you are a new resident on the Bay, you may have plans—gardens, a deck with a view, a path to the water's edge, or a pier for launching your boat. If you have lived along the Bay for many years, perhaps you are contemplating an addition to your home or redesigning an overgrown landscape.

The actions you take on your property affect the water quality of the Bay, which in turn impacts everyone who uses the Bay for recreation and their livelihood. Your actions also affect the Bay's fish and crabs, osprey and songbirds, butterflies, dragonflies, and even the plants.

The vulnerable band of land around the Bay and its tidal tributaries and wetlands is called the ***Critical Area*. (Definitions for bolded and italicized terms begin on page 62.)** It includes all property 1,000 feet landward from the ***Mean High Water (MHW) Line*** of the main Bay and Atlantic Coastal Bays, all tidal tributaries, and tidal wetlands. At least the first 100 feet from the MHW Line is called the Critical Area ***Buffer***.

Marylanders working to restore the Bay's health acknowledged the importance of protecting our natural resources when the state passed the Chesapeake Bay Critical Area Protection Act in 1984. The statute has been revised several times and was comprehensively amended in 2008.

The Critical Area Buffer is the most common type of ***Habitat Protection Area***. These areas are significant to Maryland's estuarine ecosystems and are designated for special protection. The Buffer and shoreline comprise an important transition zone from water to land that performs significant water quality and habitat functions. Fish spawn and crabs scavenge among the underwater and shoreline grasses. Female diamondback turtles crawl onto beaches to lay eggs. Red-winged blackbirds call from nearby marsh grasses and twisted shrubs. Great blue herons hunt minnows in wetland mud flats and nest in cedars, loblolly pines, and wax myrtles at the edge of forested wetlands.

Wisely maintaining your Critical Area property and establishing a naturally vegetated, forested Buffer can protect both the Bay and your property. Those who live within the Critical Area have a responsibility to protect the water, as well as its plants and animals. Many of these responsibilities are spelled out in the Critical Area Act, which is implemented and enforced by local governments at the county and municipal levels through Critical Area Programs. Critical Area Programs are integrated into local government zoning laws, subdivision regulations, and permitting processes. Other responsibilities are voluntary—your chance to engage in the very best practices to restore the Bay.

Local Critical Area Programs—Protecting Your Property and Your Bay

When conducting ***development activities***, such as building a house, adding a deck, or contemplating a pier, it is important to understand your local Critical Area Program and consult with local planning staff before you begin. Critical Area Programs address activities beyond local zoning regulations, including tree and vegetation removal and Buffer and shoreline erosion control measures. The Critical Area Act was developed to protect the Chesapeake Bay, Atlantic Coastal Bays, and tidal tributaries. Its goals are to:

- Minimize adverse impacts on water quality that result from pollutants discharged in runoff from surrounding lands;
- Conserve fish, wildlife, and plant habitat; and
- Establish land use policies for development in the Critical Area that accommodate growth while acknowledging that the number, movement, and activities of people can create adverse environmental impacts.

How does this affect you as a landowner on or near the shores of Chesapeake Bay, its tidal tributaries, and wetlands? Local Critical Area Programs have established requirements for lot coverage, forest clearing, habitat protection, stormwater management, and other aspects of site development that affect natural resources and ecosystem function. These requirements may be in addition to the subdivision plans, site plans, variance applications, exemptions, and other permits required to conduct development activities. Although Critical Area regulations allow for new development and redevelopment activities within the Critical Area, many activities that are located in or affect the integrity of Habitat Protection Areas, including the Critical Area Buffer, are restricted.

First Stop for the Bay

Before you begin any activities on property located within the Critical Area, your first stop is your town or county planning department.

The Shore Land Stewardship Council, an initiative of Adkins Arboretum, created *First Stop for the Bay* to provide helpful information about Critical Area rules and processes. ***First Stop for the Bay* began as a pilot program on Maryland's Mid-Shore, in Caroline, Kent, Talbot, and Queen Anne's counties.** *The Green Book for the Bay* addresses Critical Area concerns related directly to these four counties. However, the basic concept of contacting your town or county planning office to obtain information about local Critical Area regulations and permitting requirements applies throughout the Critical Area in Maryland.

Staff at local planning offices can confirm whether your property is located in the Critical Area, direct you to the appropriate regulations, and provide guidance on plans, permits, and approvals needed to meet *both* local and Critical Area requirements. A street address and/or tax map and parcel number (depending on jurisdiction) is needed for officials to identify properties in the Critical Area.

For more information about *First Stop for the Bay*, visit www.firststopforthebay.org or call Adkins Arboretum at 410-634-2847. Contact your planning office directly by following the links from the *First Stop for the Bay* website, or use the contact information listed below.

Caroline County—Planning and Codes Administration
410-479-8100
www.carolineplancode.org

Denton	410-479-3625
Federalsburg	410-754-8173
Greensboro	410-482-6222
Hillsboro	410-820-1247

Kent County—Department of Planning, Housing and Zoning
410-778-7475
www.kentcounty.com/gov/planzone

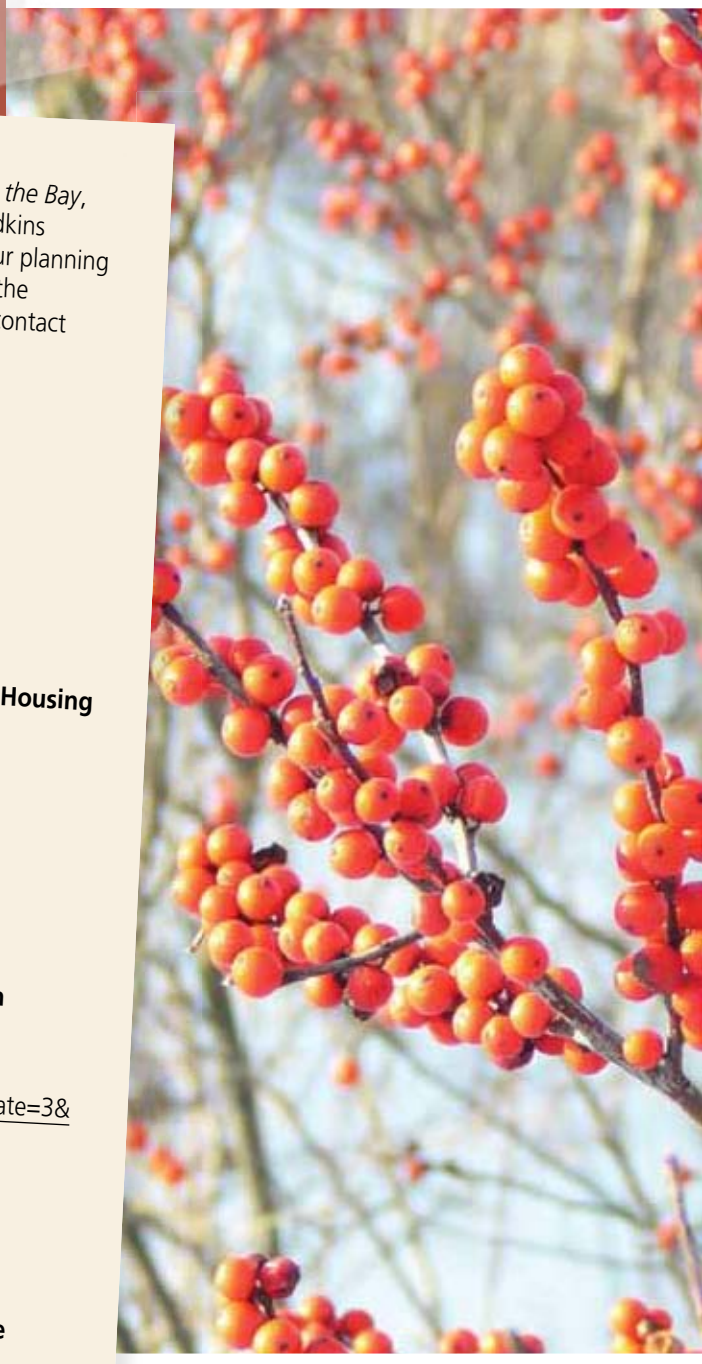
Betterton	410-348-5522
Chestertown	410-778-0500
Millington	410-928-3880
Rock Hall	410-778-7475

Queen Anne's County—Land Use, Growth Management and Environment Office
410-758-1255
www.qac.org/default.aspx?pageid=73&template=3&toplevel=34

Centreville	410-758-1224
Church Hill	410-758-3740
Queen Anne	410-364-5667
Queenstown	410-827-7647

Talbot County—Planning and Zoning Office
410-770-8030
www.talbotcountymd.gov/index.php?page=Planning_and_Zoning

Easton	410-822-1943
Oxford	410-226-5122
St. Michaels	410-745-9535



Winterberry

Plant native shrubs to provide food and cover for wildlife.

Chesapeake Ecology Center

Chesapeake Bay Environmental Center

Wilmer Park

Queen Anne's County Free Library

Betterton
KENT
Millington
Chestertown
N
QUEEN ANNE'S
Rock Hall
Church Hill
Centreville
Queenstown
Greensboro
Queen Anne
Hillsboro
Denton
TALBOT
St. Michaels
Easton
CAROLINE
Federalsburg
Oxford
Chesapeake Bay

St. John's College

Chesapeake Bay Maritime Museum

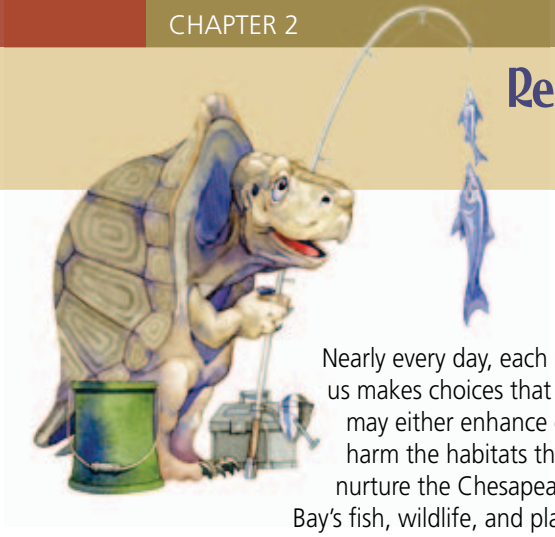
Pickering Creek Audubon Center

Adkins Arboretum

The sites noted on this map are open to the public as examples of best landscaping practices, such as native meadows, living shorelines, forested buffers, and rain gardens.

The Critical Area, designated in green on this map, is for reference only. Please consult your local government for exact location of Critical Area lines.

Regulations and Guidance



Nearly every day, each of us makes choices that may either enhance or harm the habitats that nurture the Chesapeake Bay's fish, wildlife, and plants. Recycling, energy conservation, carpooling, planting native trees—these are things our children learn about in school and that we try to practice as adults. Those of us living near the water have added responsibilities, such as reducing stormwater runoff from our properties, minimizing the use of pesticides and fertilizers on lawns and landscaping, and protecting shoreline habitat.

Maryland's Critical Area regulations were designed to protect water quality and conserve shoreline habitats. Some local jurisdictions provide guidance publications, and all will help with onsite technical assistance. With increased property values, better site drainage, and healthier landscaping, property owners can realize far greater rewards than just basic approval of their permit applications. Remember, fishing, sailing, and local seafood all depend on a clean, healthy, and productive Bay.

Developing, altering, or enhancing your Critical Area property requires that you follow county or town regulations with extra sensitivity to potential environmental impacts. Development activities include construction of new dwellings, grading, installation of walkways and driveways, and additions to existing structures. There may be limitations on ***lot coverage***, as well as requirements to manage stormwater runoff. Critical Area properties have restrictions on the removal of trees and natural vegetation, requirements for replacing trees and forest cover, and recommended species for replacement planting.

If your property is waterfront, is adjacent to tidal waters, or includes portions of a tributary stream, additional regulations apply regarding the Critical Area Buffer. In some cases, the Buffer must be expanded beyond 100 feet ***(expanded buffer)*** to protect steep slopes or other sensitive areas. New development activities are prohibited in the Buffer, and, with few exceptions, natural vegetation cannot be cut, cleared, or removed without obtaining approval of a ***Buffer Management Plan*** (called a Forest Preservation Plan in Talbot County).

Throughout the Critical Area, many jurisdictions have mapped ***Buffer Exemption Areas*** (called Buffer Modification Areas in Kent County) where development took place within the Buffer before the Critical Area Law was enacted. They are designated on local Critical Area maps available from local planning offices. Very specific development activities may be permitted within the Buffer in these areas without a variance; however, setbacks and mitigation will be required.

Your county or town staff will work with you to help you achieve your personal goals for your property while complying with the Critical Area regulations. After that initial *First Stop*—calling your county or town planning office—a staff person will walk you through filing the appropriate applications and may arrange site visits both before you begin a project and after it is completed. Local officials may also recommend contacting additional state or federal agencies, especially if you are contemplating shoreline work.

Depending on the activity and its location within the Critical Area or Buffer, review by the state ***Critical Area Commission*** (CAC) may be required; for example, the CAC reviews all Critical Area variance requests. When considering development activities, keep in mind it will take some time to move through the planning and permitting process. Thoughtful planning will help you comply with the laws and achieve better environmental results.

The Critical Area law defines lot coverage as areas occupied by structures, parking lots, driveway, walkway, or roadway; or areas covered with gravel, stone, shell, impermeable decking, pavers, permeable pavement, or any manmade material. Although a new path may add to your legal lot coverage calculation, it's still worth exploring materials that can help both slow the flow of water that runs off your property and encourage onsite infiltration. A path made of gravel, wood chips, or pavers set in gravel, wood chips, or grass can offer a solid walking surface and prevent erosion in heavily traveled areas, as well as encourage water infiltration and slow stormwater runoff. Voluntary actions, such as choice of Bay-friendly materials and designs, may help preserve your home and property, as well as the Bay's water quality, fish, and wildlife.

A Note on Natural Vegetation

Removing and installing plants are regulated in the Buffer, and the establishment of ***natural vegetation*** within the Buffer is necessary to offset impacts associated with development activities. The state and counties recommend plantings that mimic natural forest structure and include canopy trees, understory trees, shrubs, and herbaceous plants. Invasive plant removal, tree trimming, and the removal of dead or dying trees are regulated within the Buffer, require a property owner to notify local government officials, and may require a Buffer Management Plan. You may need to control the marsh grass *Phragmites* and other invasive nonnative plants. For more information on invasive plants, see the section on *Invasive Species* in *Chapter 4: Top 10 Practices.*

A manicured lawn does not offer the water quality protection or habitat benefits provided by a forest. If your property is an existing lot with lawn, you are permitted to mow and maintain your lawn. However, you may want to consider voluntarily planting native trees and shrubs along your shoreline as a way to prevent erosion and establish habitat for the Bay's wildlife. Planting does not require a Buffer Management Plan, but your family will reap the benefits of enhanced wildlife habitat.

What Plans Do I Need?

Site Plan

Most jurisdictions require a ***site plan*** or plot plan as part of your application for approval of any development activity within the Critical Area. Contact your local planning office for site plan requirements and to determine if other plans or documentation will be needed. A site plan is a drawing of your property at an appropriate scale that shows:

- Property boundaries.
- Location of all structures, driveways, and walkways.
- Shoreline access and piers, ramps, boat lifts, or launch areas.
- Stormwater practices.
- Location of existing and proposed utilities, including septic tanks, sewage disposal areas, and wells.
- Existing and proposed vegetation, including trees, shrubs, lawn areas, and gardens.
- Critical Area boundary or a note indicating that the entire property is within the Critical Area.
- Critical Area or zoning classification.
- The Critical Area Buffer.
- Tidal and nontidal wetlands and wetland buffers.
- Scale and North arrow.
- Notes concerning adjacent properties, streets, and stormwater management.

Special Habitat Plans

Depending on your proposed development activity and property location, you may be required to submit additional documentation to ensure that your proposal complies fully with the local Critical Area Program. Generally, this information must be prepared by a qualified professional. The local planning office can provide guidance about additional information that might be required and professionals that can prepare it. Typical special plans might include:

- ***Wetland Delineations*** evaluate and define the boundaries of tidal and nontidal wetland areas on your property and must be conducted by a professional. A wetland delineation may be needed as part of the permitting process if your proposed project is in or near a wetland.
- ***Habitat Protection Area Plans*** are required when a proposed project may impact a designated Habitat Protection Area. These plans are developed in coordination with the Maryland Department of Natural Resources Wildlife and Heritage Division.

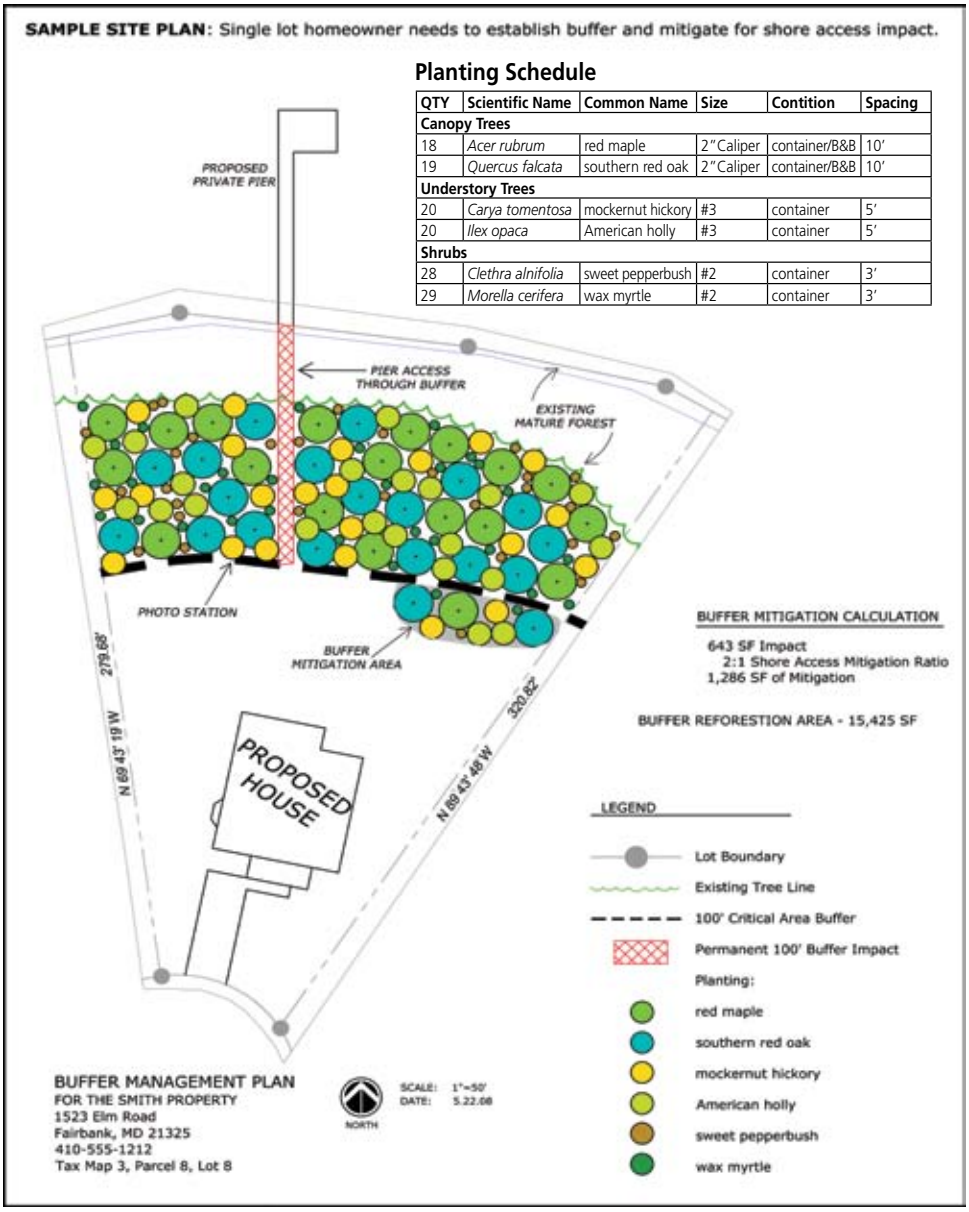
Buffer Management Plans

Any development activity, land alteration, or disturbance within the Buffer requires a plan created with input from your town or county planning department. Although the plan names differ among counties, the concept of a "Buffer Management Plan" is basically the same. Local officials can provide you with a checklist and sample plan and can help you develop your Buffer Management Plan, including proposed development activities, current and planned plantings, and anticipated needs for shoreline access. Like the State

SAMPLE SITE PLAN: Single lot homeowner needs to establish buffer and mitigate for shore access impact.

Planting Schedule

QTY	Scientific Name	Common Name	Size	Contition	Spacing
Canopy Trees					
18	*Acer rubrum*	red maple	2"Caliper	container/B&B	10'
19	*Quercus falcata*	southern red oak	2"Caliper	container/B&B	10'
Understory Trees					
20	*Carya tomentosa*	mockernut hickory	#3	container	5'
20	*Ilex opaca*	American holly	#3	container	5'
Shrubs					
28	*Clethra alnifolia*	sweet pepperbush	#2	container	3'
29	*Morella cerifera*	wax myrtle	#2	container	3'



of Maryland, most counties require planting of a structurally diverse forest vegetation (canopy trees, understory trees, shrubs, and herbaceous plants), although natural revegetation may be allowed on a site-by-site basis.

Local government staff may perform a site visit before work begins and an inspection after installation. ***Mitigation*** may be required for removal of trees or other vegetation or for any permitted disturbance or construction. Criteria for mitigation vary by county and town, and specific requirements for your site should be clarified during the permitting process and Plan creation. County plans are listed below, but if you live in an incorporated town, please contact the town office for specific requirements.

- **Caroline County** requires a Buffer Management Plan before any activities take place in the Buffer. Plans are developed on a site-by-site basis to comply with the local Critical Area regulations.

  Cost: No fee

- **Kent County** requires a Buffer Management Plan before any activities take place in the Buffer.

  Cost: No fee

- **Queen Anne's County** requires a Buffer Management Plan before any activities take place in the Buffer. Tree removal, including for storm damage, may also require approval of a Sediment and Erosion Control Plan, depending on the nature and extent of the damage.

  Cost: No fee for the Buffer Management Plan

- **Talbot County** requires a Forest Preservation Plan for any development activity or activity that disturbs vegetation in the Critical Area, including the Buffer. After a Forest Preservation Plan is submitted and approved, property owners can perform maintenance associated with storm damage, remove dead or dying trees, or eradicate invasive nonnative plants with a Property Maintenance Permit.

  Cost: $100 for the Forest Preservation Plan

  $10 for Property Maintenance Permit

Other Plans

Depending on the development or landscaping activity, a variety of plans may be required in the Critical Area, in addition to the local government's standard permitting process for development activities. Discuss these requirements with your county or town planning professionals. They can determine whether you need other approvals, plans, or permits. These might include:

- Building permit
- Site plan
- Critical Area forest clearing plan
- ***Timber harvest plan***
- ***Soil erosion and sediment control plan***

Shoreline Construction Activities

Because of the potential impacts to water resources and the Buffer, altering your shoreline—whether to protect it from erosion, to add a pier, to create access to the water, or to erect an osprey platform—often requires approval from state or federal agencies. In addition to your local county or town planning office, you may have to work with Maryland Department of Environment (MDE), Maryland Department of Natural Resources (DNR), and possibly the U.S. Fish and Wildlife Service (USFWS) and the U.S. Army Corps of Engineers (USACOE). Your local planning office will guide you through the process. For more information about practical and effective shoreline erosion control, as well as the Joint State/Federal Permit, see the *Living Shorelines* section of *Chapter 4: Top 10 Practices*.

Frequently Asked Questions Concerning Your Critical Area Property

1 What do I need to consider when planning to build on my property in the Critical Area?

Residential construction is permitted in the Critical Area in accordance with specific regulations regarding cutting and clearing of vegetation, lot coverage, stormwater management, and the protection of Habitat Protection Areas, including the 100-foot Buffer. New development activities are not permitted in the Buffer unless they are water dependent or you obtain a ***variance***. Each jurisdiction has its own Critical Area permitting process that must be followed to obtain a building permit for residential construction. For complete information about permitting requirements and development restrictions, be sure to make the *First Stop* your county or town planning office. The staff will assist you with understanding the requirements for developing and submitting appropriate plans.

For a Bay-friendly project, consider some of the following ideas you can voluntarily use to help the Bay:

- Explore a smaller footprint for buildings, driveways, decks, patios, and walkways.
- When planning an addition, consider building up, rather than out, to minimize the footprint.
- Include ***best management practices*** for stormwater, such as rain gardens and grass channels, to help protect your home as well as filter runoff before it enters waterways. With wildlife-friendly rain gardens, you can manage stormwater while providing food, water, and cover.
- Plant ***native plants***.
- Maintain and plant native trees. Trees conserve energy by shading your home in summer and buffering the wind in winter.
- Locate plants where they can absorb stormwater and take up nutrients.
- Connect gutters and downspouts to rain barrels to minimize stormwater runoff and to collect stored rainwater for watering trees, shrubs, landscape plantings, and gardens.
- Allow natural vegetation to grow in your Buffer.
- If your shoreline is eroding, consider stabilizing it with a living shoreline.
- Develop a Buffer Management Plan to improve water quality and wildlife habitat. To provide optimum coverage and diversity, include canopy and understory trees, shrubs, and herbaceous plants. The creative use of native plants, selected for their adaptability, will create a Buffer that is both beautiful and ecologically beneficial.

2 Can I construct a house, addition, porch, deck, or freestanding structure like a gazebo or shed?

The construction of attached or free-standing structures can be permitted in the Critical Area in accordance with density limits, zoning restrictions, and specific performance standards that may include cutting and clearing of vegetation, lot coverage, stormwater management, and the protection of the 100-foot Buffer.

When planning an addition, consider building up, if appropriate, rather than out, to minimize the footprint. Make Bay-friendly landscaping part of your plans by following the suggestions in question #1. You may legally be required to prevent erosion during construction by filing and implementing an approved Sediment Plan or similar permit. Take personal charge of your construction site by making sure sediment barriers are effective and maintained.

New development activities are not permitted in the Buffer unless there is no feasible alternative and unless you obtain a variance. Before implementing your construction project, make the *First Stop for the Bay* and contact your county or town planning office for guidance on processes and permit requirements.

When planning your proposed project, consider the most space-efficient and environmentally friendly structure possible. Although this may not be required by law, voluntary actions to reduce lot coverage and energy use and to improve wildlife habitat are always a great idea.

Allowing areas to revegetate naturally minimizes landscape practices that pollute and use energy.

- Do you really need a freestanding structure? For instance, do you need a shed when you can use an existing garage?
- Is the structure appropriately sized for the proposed use, or would something smaller perform the same function? For example, will a two-car garage meet your needs or is a three-car garage necessary?
- Can the functions of two structures be combined? When adding a shed, is it possible to create storage above it?
- Will your family actually use a patio beside an already-existing deck?
- Is there an opportunity when planning your project to create more habitat, eliminate lawn area, solve a stormwater problem, or better manage erosive runoff?

The permitting process is an opportunity to refine the design of your construction project and explore alternatives such as a smaller footprint, to create more wildlife habitat, or to resolve stormwater issues on your property. For information about permitting requirements and restrictions on development activities, your *First Stop* is your county or town planning office.

Goldenrod

3 Can I install recreational amenities such as a tennis court, pool, sandbox, tree house, or swing set?

Recreational amenities that require construction, such as a tennis court or pool, are subject to the same permitting process as freestanding structures. With the proper permits, they are legally allowed in the Critical Area. You may need a Buffer Management Plan and mitigation for tree or vegetation removal that occurs when constructing your project. Minor amenities that are not considered structures and do not require building permits, such as sandboxes, tree houses, and swing sets, are allowed in the Critical Area; however, you should check with the local planning office to determine if there are size limits on these amenities. Recreational amenities are not permitted in the Buffer unless they are water dependent, for example, a pier.

When planning your project, consider how much you and your family will use outdoor recreation facilities. If you live in the Critical Area, you may already have community access to recreation on the water. If you live in a planned community, you may have access to public facilities such as a swimming pool or tennis courts. Evaluate your family's needs carefully. Are your children about to head to college, forsaking backyard fun? Do you really want to maintain personal recreational facilities when the public facilities are just fine? If you decide to proceed with your planned project, size your recreation facilities for the smallest possible footprint and landscape around them with native plants. Consider using pervious surfaces wherever possible for paths and seating areas.

4 What are the regulations for installing and maintaining a septic system in the Critical Area?

New and replacement septic systems may be installed in the Critical Area, in accordance with health department regulations and after acquiring the proper local permits. New septic systems are not permitted in the Buffer unless there is no feasible alternative and a variance is obtained. The local environmental health office will conduct a site evaluation to determine feasibility, location, and type of system appropriate for your specific situation.

New or replacement septic systems should include nutrient removal technology. Installing nutrient removal technology on your new system or upgrading your older system will help keep nutrients such as nitrogen out of Chesapeake Bay and groundwater. This technology also will improve your system's operation and longevity.

MDE offers a Septic Upgrade Grant Program that assists property owners with grants to pay for voluntary nutrient removal upgrades. This program is funded by the Bay Restoration Fund, to which each septic system owner and public wastewater system user pays a fee. Preference is given to failing septic systems located in the Critical Area. The application is available at www.mde.maryland.gov/assets/document/water/MDE-WMA-FIN020.pdf or by calling MDE at 410-537-4195 or toll free at 1-800-633-6101. If you live in a county that manages the grants, your information will be forwarded to the local grant administrators.

In general, septic systems should be pumped out every 3–5 years. Some counties have a mandatory pump-out law, so contact your local planning office to determine requirements and recommendations.

Ideal Critical Area Buffer

5 Are landscape structures, like a retaining wall, planter, stairs, or paths, permitted?

The installation of landscape structures usually can be permitted, depending on the type, size, and location of the structure. Critical Area Programs do not usually restrict plantings in the Critical Area, although there may be specific requirements for the Buffer. Structures to control an erosion problem or to provide access to the shoreline will require local government review. If landscape structures are proposed in the Buffer, the applicant will need to develop a Buffer Management Plan showing the proposed structure and all alterations to the landscape, such as grading, terracing, or vegetation removal. In many cases a sediment control plan and mitigation in the form of planting will be required. It is important to contact your county or town planning office for guidance before starting any development activities related to landscaping in the Critical Area or Buffer.

In summary:

1. Installing a retaining wall requires earthmoving and construction, which are "development activities." Permits will be required in both the Critical Area and the Buffer.

2. Planting gardens, as long as you do not remove trees, is allowed in the Critical Area without any special permitting process.

3. Paths and stairs can be permitted in the Critical Area and Buffer if they are necessary to provide access to the shoreline or a pier. A Buffer Management Plan and a building permit will be required to legally install a path or stairs for access to the waterfront through the Buffer. Critical Area authorization will also be needed. If paths, stairs, or walkways encroach into tidal waters, tidal wetlands, or nontidal wetlands, additional permits from the Maryland Department of Environment or U.S. Army Corps of Engineers may be required.

Whirling butterflies

Gardens are a great way to voluntarily reduce lawn, provide wildlife habitat, and capture stormwater while providing fresh herbs, flowers, and vegetables for your family. Here are a few tips to make your gardens Bay-friendly:

- Minimize use of fertilizers by incorporating compost into your gardens. Composting reduces waste sent to a landfill.
- Minimize use of pesticides through Integrated Pest Management (IPM).
- Attract wildlife with native plants.
- Remove invasive nonnative plants such as purple loosestrife, English ivy, privet, and barberry.
- Consider planting a rain garden.
- See *Chapter 4: Top 10 Practices* for guidance on IPM, planting for wildlife, and stormwater management techniques such as rain gardens.

6 How can I manage stormwater runoff to prevent erosion and avoid standing water?

The topography of the Critical Area on Maryland's Mid-Shore is fairly flat, so diverting stormwater away from your house is essential home maintenance. In addition, because of the soil types on the Eastern Shore, heavy downpours can cause erosion on even gentle slopes. Many stormwater management strategies have the added benefit of water reuse for landscaping. Stormwater treatment practices are encouraged in the Critical Area, but should be located outside the Buffer.

Local governments have legal requirements for stormwater management as part of the permitting process for development activities. However, you may also voluntarily enhance your property with simple strategies to protect your buildings and prevent standing water. Include stormwater management in the overall design of your project so it can be located where it will function most effectively. Existing topography, soil types, utility locations, and natural drainage patterns must be evaluated. In many cases, a civil engineer may be needed to ensure that stormwater treatment practices are properly sized, designed, and constructed. See the *Stormwater Management* section of *Chapter 4: Top 10 Practices* for details.

Stormwater strategies that may be appropriate for the Critical Area include:

- **Grass channels.** Grass channels are found along many roads in the region. These grass-covered ditches are designed to convey, infiltrate, and treat stormwater runoff. Grass channels may be part of your property's stormwater drainage system, carrying stormwater from your yard to the public stormwater management system. Existing channels should not be filled or altered; they have been designed for specific runoff quantities and velocities. Grass channels can be maintained with mowing.

- **Rain gardens.** Rain gardens are shallow landscaped depressions capable of receiving runoff. They are strategically placed away from a home and structures, in lower-lying areas of the yard. To increase infiltration, rain gardens consist of a filter bed with a mixture of sand, soil, and an organic material, covered with mulch and then planted with native plants. Rain gardens can be beautifully planted areas that attract pollinators and birds.

- **Rain barrels.** Rain barrels collect stormwater runoff from the roof of a home or accessory structure for irrigation. They must be sized correctly to handle the volume of water running off your roof surface area. This collected rainwater can be reused for landscaping.

- **Permeable pavers.** Permeable pavers can reduce the quantity, velocity, and erosion of stormwater runoff. Although they are included in lot coverage calculations, they are worth exploring as a way to help manage stormwater and minimize adverse environmental impacts from stormwater runoff.

7 Can I alter the plantings on my property?

Mowing an existing lawn and planting trees, shrubs, and herbaceous plants are allowed within the Critical Area and the Buffer without authorization; however, the removal or alteration of natural or planted vegetation requires some form of local approval. Pruning and the removal of invasive species may be permitted, but certain restrictions may apply. Replanting and mitigation may be required. Contact your county or town planning office for restrictions in the Critical Area and Buffer, clearing limits, and onsite replanting standards.

Replacing lawn areas with trees, shrubs, and herbaceous plants? You may replace lawn areas in the Critical Area and Buffer with other plantings or allow an area to revegetate naturally. No special permits are needed in the Critical Area or Buffer to install plantings voluntarily. Native plants should be used, especially in the Buffer.

Pruning or removing trees? Pruning or removing trees is allowed—for the health of the trees or for safety reasons—in both the Critical Area and the Buffer, but only in accordance with approved plans or permits. This must be done with assistance from a professional tree expert. Mitigation will be required.

Installing gardens? Traditional flower, herb, or vegetable gardens are allowed in the Critical Area, and installing them requires no special permits *unless* you are removing natural vegetation. These types of gardens generally should not be located in the Buffer.

Managing natural areas by removing invasive plants and brush? Although not required by law, removing invasive plants can enhance natural areas. Removing invasive plants from the Critical Area portions of your property may require authorization or approval of a Buffer Management Plan. Control of invasive species usually requires a combination of hand-removal and herbicide spot-treatment—and persistence. If the affected area is large, a local government may authorize alternative methods, including burning and spraying, that should be conducted by a professional. For more information, see the *Invasive Plants* section of *Chapter 4: Top 10 Practices*.

Mowing or cutting marsh vegetation? Mowing or cutting marsh vegetation within the Buffer is not permitted unless it is part of an approved Buffer Management Plan. You may receive authorization to remove invasive plants, like the common reed *Phragmites*. For more information, see the *Meadows* and *Invasive Plants* sections of *Chapter 4: Top 10 Practices*.

Removing trees on the shoreline that are being undermined by erosion? Trees located along an eroding bank can be a hazard and can exacerbate erosion. This type of shoreline maintenance often requires a Sediment Control Permit, as well as a Buffer Management Plan. Trees should be cut so the roots and stump remain in place to prevent further erosion. A licensed tree expert must be consulted to document valid reasons for woody vegetation removal.

Gardening for Habitat

There are few waterfronts more picturesque than those along Harris Creek. Mary Jo and Al Kubeluis' 1.5-acre Chesapeake garden tells a different story as seasons pass, with ever-changing blooms and fragrances. Along the creek, piers extend through natural shorelines of marsh grasses. Native loblolly pine and Atlantic white cedar tower over the marshes where the land's edge can support them. You don't have to look too hard to spot an osprey or heron.

Mary Jo began working on her yard and shoreline ten years ago. She started, like many gardeners, with herbs and perennials. After becoming a Master Gardener, Mary Jo was introduced to native plants at Adkins Arboretum. Her Critical Area property is an eclectic mix of herbs, native and ornamental flowers, shrubs, and trees.

Maintaining a natural wetland and buffer isn't effort free. The Department of Agriculture has sprayed the invasive marsh grass *Phragmites* several times, which requires a permit. Shade is forcing Mary Jo to experiment more with shade-tolerant shrubs and groundcovers. Yet she encourages others to "reduce their lawn and grow flowering plants for their beauty and for the wildlife they attract." The many birds, butterflies, and hummingbirds seen from the Kubeluises' deck are testaments to that philosophy.

8 Can I care for my lawn and gardens with fertilizers, herbicides, and pesticides?

Critical Area law does not restrict the use of legal fertilizers, herbicides, and pesticides in the Critical Area; however, some counties may require that fertilization only be done in fall. Responsible stewards of the Bay should make every effort to minimize the use of fertilizers and chemicals that may enter waterways. If it is necessary to use herbicides to remove invasive plant species in the Buffer, it is important to seek professional guidance and select a type that breaks down in water. To eliminate invasive plant species or address insect infestations, consider using Integrated Pest Management (IPM) or spot treatments with herbicides and pesticides, which are often cheaper and more effective than broader applications. Use of herbicides and pesticides may require local government authorization if you are working in the Buffer or treating large areas.

Fertilizers are a major source of water pollution in the Chesapeake Bay and its tributaries. Homeowners contribute significant amounts of nutrients that can trigger fish-killing algae blooms. County Cooperative Extension and Master Gardeners can provide specific assistance on the appropriate use and application methods of herbicides, pesticides, and fertilizers.

Try these tips for an environmentally friendly landscape:

- Use Integrated Pest Management (IPM) practices. (*See Chapter 4: Top 10 Practices.*)
- Don't over-fertilize. Many lawns and landscapes don't require any fertilizer.
- If you must fertilize, use slow release formulations.
- Apply the right fertilizer at the right time of year. Fertilize lawns in fall.
- Read labels and follow directions carefully.
- Consider using alternatives to chemical fertilizers, such as compost or other organic supplements, in your gardens to improve the fertility and soil structure.
- Use a mulching lawn mower to reduce the need for lawn fertilizer and to improve the moisture composition of your lawn.
- Check Maryland Cooperative Extension's Home and Garden Information Center at www.hgic.umd.edu or call 800-342-2507 for factsheets and guidance.

Before applying fertilizer, test your soil to see if it is needed. Contact Cooperative Extension for testing information.

9 Can I control unwanted wildlife such as groundhogs, deer, geese, or swans?

The goal of creating and enhancing habitat in the Buffer is to provide larger areas of habitat and greater species diversity. However, most wildlife cannot be confined to designated areas. By using harm-free techniques, you can deter unwanted animals from areas that you need to protect from destructive behaviors.

Natural areas and fully vegetated Buffers may attract turtles, frogs, snakes, rabbits, deer, and insects. Many people enjoy observing the Bay's wildlife and sharing their properties with the wide variety of species that inhabit the Bay's ecosystem. But sharing isn't always possible.

- Plant damage from **deer** browsing can be a problem. Fencing them out is difficult and expensive and tends to disrupt wildlife corridors used by a variety of species. Planting deer-resistant plant species is a more effective solution. The *Deer Fact Sheet* (#655) from Maryland Cooperative Extension www.agnr.umd.edu/CES/PUBS/pdf/FS655.pdf provides lists of native and ornamental plants that are rarely, seldom, occasionally, and frequently damaged by deer.

- **Geese and swans** love to feed on freshly planted marsh grasses that are part of living shoreline projects. These projects should include fencing (see picture below) until the plants are established.

- Nonnative **mute swans** can also degrade intertidal habitat by destroying underwater grasses in shallow waters and forcing native waterfowl from preferred feeding and nesting grounds. If you have concerns about mute swans, call the **Nuisance Wildlife Information Line** below for more information.

- **Nutria** is another introduced species that can destroy natural habitat and exacerbate erosion by feeding on and tunneling through marsh vegetation. Nutria are a very prolific wetland-dwelling rodent, capable of producing several litters of young each year, so control requires guidance from wildlife professionals.

- **Groundhogs and raccoons** can also create problems in residential areas by burrowing, nesting, and interacting with people and domestic animals. Call the Department of Natural Resources for assistance with nuisance wildlife removal. The *Controlling Nuisance Wildlife* factsheet (pub #HG90) by Maryland Cooperative Extension (www.hgic.umd.edu/_media/documents/hg90_001.pdf) provides guidance on dealing with nuisance wildlife.

- Many animals are protected by certain regulations and permits, and professional assistance is required to remove them. Call the **Nuisance Wildlife Information Line** at 1-877-463-6497 for information on permits to control nuisance wildlife.

10 How can I repair storm damage to my property?

Town or county government approval is required to legally remove dead or downed trees from the Buffer or Critical Area, no matter what the circumstances. If you have a Forest Preservation Plan in place, Talbot County requires a simple Maintenance Permit to remove downed trees and debris. Other counties provide approval on a case-by-case basis. Mitigation will be needed and specific requirements will be noted in your approval or permit.

In some cases, a downed tree can present an imminent threat to your home, other structures, vehicles, or family. If you sustain storm damage, photograph the damage; it will help the approval process and may be needed for insurance compensation. All counties and towns require approval to remove downed trees from the Critical Area and Buffer. Immediate threats to structures and people are handled quickly.

Downed trees are an opportunity to enhance your Buffer or Critical Area by planting new and interesting native trees and shrubs after the debris is removed. On the other hand, leaving dead trees or downed woody debris in place can improve habitat, as many wildlife species use dead trees for food and nesting. Woodpeckers, nuthatches, and owls will feed and nest in "snags," dead trees that remain standing.

If you have a living shoreline, you must conduct routine maintenance, such as removing debris. However, downed trees or trees undercut by erosion should be handled through the local government permitting process. For shoreline protection repairs, such as repairing a living shoreline or structural protections, the permitting process may involve local, state, and federal agencies. Call your town or county planning office for guidance on the process and requirements.

11 Can I preserve my view of the water?

The Critical Area Program is designed to protect natural resources and does not include provisions for maintaining a water view. Local governments cannot authorize the removal of vegetation to provide a view. It is important to note that you should not remove or prune trees or shrubs without making the *First Stop for the Bay*, and contacting your planning office regarding required plans and permits.

12 How can I create access to the water for a pier and other recreational uses of the waterfront?

Access to the water impacts the Critical Area Buffer, so although it can be legally permitted, access should be the minimum needed to reach the water. Many local governments allow a six-foot-wide path to the water to provide access to a pier, beach, or fishing area. If necessary because of topographic conditions or property owner needs, steps, wood walkways, and paved pathways may be permitted.

The path should be the shortest route to the shoreline and should be designed to weave around trees to minimize clearing and disturbance of natural vegetation. A walkway in the Buffer, including a stairway, that provides direct access to a community or private pier is not included in lot coverage calculations. Local governments require the development and submittal of a Buffer Management Plan and possibly a building permit to obtain approval of proposed shoreline access. A stairway or path onto the shoreline or through a living shoreline also may require additional state or federal permits. For details on creating access to the water, see *Chapter 4: Top 10 Practices*.

13 How can I prevent or repair shoreline erosion?

Storms and wave action from wind and boats' wakes can disturb the fragile shoreline. Shoreline erosion can be prevented or an eroding bank can be repaired and permanently stabilized with appropriate shoreline erosion control measures. Living shorelines use vegetation, sand fill, and in some cases stone sills, sand containment structures, and offshore breakwaters to control erosion and moderate wave energy. Typically, a low stone sill is placed offshore and the area behind the sill is filled with a sand mixture in which native high marsh and low marsh grasses are planted. The roots of the grasses stabilize the shoreline, the sand area is shaped to disperse wave energy, and the grasses buffer and protect the shoreline. Living shorelines provide habitat for birds, fish, amphibians, and reptiles, including diamondback terrapins that need sandy beach areas during nesting season to lay their eggs.

Living shorelines may not be appropriate on all sites due to wave energy, fetch, waterway width, and other site conditions, and some structural practices may be necessary. Revision to the Critical Area law and wetland regulations now requires installation of living shorelines, unless landowners can demonstrate that this is not a viable option for their particular shoreline. Town and county planning staff can provide additional information about resources for addressing these types of sites.

Both structural and nonstructural shoreline protection measures require site-specific design by a qualified professional; permits from the local government, the Maryland Department of the Environment, and the U.S. Army Corps of Engineers; and installation by a licensed contractor. To obtain information about shore erosion control on your property, begin with *First Stop for the Bay* by calling your county or town planning office to discuss the permitting process. A Joint Federal/State Application of the Alteration of Tidal Wetlands in Maryland may be required. A company experienced with shoreline protection can help with the design, engineering, and permitting process, as well as with the construction. For details, see the *Living Shorelines* section of *Chapter 4: Top 10 Practices.*

see next page for the preferred solution for shoreline erosion.

Newly planted living shoreline project

Top 10 Practices for Your Critical Area Property

Introduction: Make a Plan

This chapter contains suggestions for landscaping that benefit the environment. Use the checklist on the next page to identify your needs. Before you begin digging, spend time in your yard to understand what assets you have and how you want to use or enjoy your yard. Observe other people's yards, visit garden centers, and explore public places like parks, gardens, and natural areas to consider landscaping options for living on Maryland's Eastern Shore.

Before beginning a landscape project, make a master plan. It doesn't have to be elaborate. The purpose is to map out your property improvements to scale so you can visualize the entire property. Draw a map of the property, essentially sketching a simple site plan of existing conditions, including buildings, walkways and driveways, recreational facilities, gardens, lawn, trees, and the Critical Area and Buffer lines, if you have them.

Next, contemplate how you currently use your property and how you want to use it. Sketch out where you might expand your home, install trees and gardens, or access the waterfront. This will help you determine if you need to discuss tree removal or a Buffer Management Plan with your planning office staff. Developing a Buffer Management Plan and receiving approvals for tree removal and maintenance will go more smoothly when you have a plan.

Before beginning a landscape project, make a master plan. It doesn't have to be elaborate.

Property checklist for homeowners

1. Who uses your property?
- Family members only
- Guests (how many, how frequently?)
- Young children
- Adults
- Pets

2. How do you use your property?
- Recreation (what kind?)
- Walks
- Enjoying the view
- Watching wildlife
- Outdoor dining
- Entertaining (how many, how frequently?)

3. Evaluate your site.
- Identify soil type(s)
- Sunlight or shade (how many hours of sun?)
- Slopes
- Are you in the 1,000-foot Critical Area?
- Do you know where your Buffer line is?
- Identify underground and overhead utility lines.
- Map all structures.

	HAVE	NEED	WANT
Patio, deck, or gazebo			
Detached garage or shed			
Well and/or septic			
Pier			
Access to the waterfront			
View			
Boats			
Beach			
Shoreline (condition?)			
Vegetable gardens or greenhouse			
Flowers			
Trees and shrubs			
Lawn			
Existing forest, wetlands, or natural areas			
Sun or shade			
Privacy			
Erosion or standing water			

Great blue heron

Good, Better, Best Landscaping Practices

Practice	Good	Better
1. Living Shorelines	• Preserve native marsh grasses • Remove debris and trash • Preserve or plant forested Buffer	• Preserve native marsh grasses • Remove debris and trash • Preserve or plant forested Buffer • Develop Buffer Management Plan • Control invasive plants
2. Buffer Establishment	• Encourage natural revegetation	• Encourage natural revegetation • Preserve or plant forested Buffer • Develop Buffer Management Plan • Control invasive plants
3. Landscaping Around the House	• Maintain existing trees and shrubs • Plant gardens • Install onsite stormwater management	• Develop a Master Plan • Maintain or replace existing trees and shrubs • Minimize lawn • Plant natives • Install rain and pollinator gardens • Install onsite stormwater management • Minimize use of chemicals • Control invasive plants
4. Trees and Forest	• Encourage natural revegetation • Maintain existing trees • Seek help from a licensed tree expert	• Encourage natural revegetation • Maintain or replace existing trees and shrubs • Plant natives • Control invasive plants • Seek help from a licensed tree expert
5. Meadows, Grasses, and Wetlands	• Control invasive plants • Preserve wetlands	• Plant warm season grass meadows where appropriate • Maintain meadows with mowing • Control invasive plants • Preserve wetlands
6. Integrated Pest Management (IPM)	• Install a diverse mix of plants • Maintain existing plants • Use least-toxic pest control	• Install a diverse mix of plants • Maintain existing plants • Install plants properly • Learn to identify pests and beneficial insects • Use least-toxic pest control
7. Invasive Plants	• Learn to identify invasive plants • Inspect property regularly • Control invasive plants	• Learn to identify invasive plants • Inspect property regularly • Control invasive plants • Develop a plan for long-term invasive plant control
8. Stormwater Management	• Maintain grass channels	• Maintain grass channels • Install wood chip paths, if needed • Use pervious or semi-pervious material on driveways, patios, etc.
9. Landscaping for Wildlife	• Encourage natural revegetation • Maintain existing trees and shrubs • Plant natives	• Encourage natural revegetation • Maintain or replace existing trees and shrubs • Plant natives • Install wildlife feeders • Install pollinator gardens • Use IPM
10. Access to Your Waterfront	• Install a wood chip path, if needed	• Install a wood chip path, if needed • Preserve all woody vegetation • Install a best practices canoe launch instead of pier, if needed

	Best	
	• Preserve native marsh grasses • Install engineered living shoreline, if needed. • Remove debris and trash	• Preserve or plant forested Buffer • Develop Buffer Management Plan • Control invasive plants
	• Encourage natural revegetation • Preserve or plant forested Buffer • Develop Buffer Management Plan	• Control invasive plants • Expand Buffer planting beyond required areas and encourage other natural areas
	• Develop a Master Plan • Maintain or replace existing trees and shrubs • Minimize lawn • Plant natives • Install rain and pollinator gardens	• Install onsite stormwater management • Minimize use of chemicals • Control invasive plants • Encourage and connect natural areas to the Buffer and to each other
	• Develop Buffer Management Plan. • Encourage natural revegetation or plant buffer • Maintain or replace existing trees and shrubs • Plant natives	• Control invasive plants • Seek help from a licensed tree expert • Encourage and connect natural areas to the buffer and to each other
	• Plant warm season grass meadows where appropriate • Maintain meadows with mowing • Control invasive plants	• Preserve wetlands • Develop Buffer Management Plan • Preserve or plant forested Buffer
	• Install a diverse mix of plants • Maintain existing plants • Install plants properly • Learn to identify pests and beneficial insects	• Inspect property regularly for damage and insect outbreaks • Use least-toxic pest control
	• Learn to identify invasive plants • Inspect property regularly • Control invasive plants	• Develop a plan for long-term invasive plant control • Develop Buffer Management Plan that includes invasive plant control
	• Maintain grass channels • Install wood chip paths, if needed • Use pervious or semi-pervious material on driveways, patios, etc.	• Install rain gardens and rain barrels • Install engineered stormwater management, if needed
	• Develop Buffer Management Plan • Encourage natural revegetation • Maintain existing trees and shrubs • Plant natives • Install wildlife feeders • Install pollinator gardens	• Plant seed- and fruit-producing plants • Use IPM • Encourage and connect natural areas to the Buffer and to each other • Provide a fresh water source
	• Install a wood chip path, if needed • Preserve all woody vegetation • Consider no access	• Install a best practices canoe launch instead of pier, if needed

1 Living Shorelines

The shorelines of Chesapeake Bay and its tributaries are constantly disturbed and undermined by waves from wind, storms, boat wakes, and runoff from the land. A combination of erosion and sea level rise can change the shoreline dramatically in a short period of time. Until recently, shoreline protection was achieved mostly by hard structures, such as a bulkhead or stone riprap. By contrast, nature protects the Chesapeake Bay's shoreline with a "softer" version of wetland grasses with shrubs and trees on fast land. The Bay's plants and animals have adapted to this softer natural edge.

Although some areas of the Bay with high-energy waves may require a hardened shoreline for protection from erosion, Critical Area law requires installation of nonstructural "living shorelines" when protection measures are needed. Living shorelines incorporate habitat elements such as native grasses and oyster reefs, which both support the natural ecological functions of marshes and protect the shoreline. Benefits include water quality improvements and enhanced shallow water habitats that encourage diversity of plants, fish, other aquatic animals, and birds. You may see crabs, oysters, young fish, terrapins, and wading birds using your living shoreline. In some cases, installing a living shoreline may cost less than structural protection strategies.

A shoreline may be enhanced simply by planting marsh grasses on the existing substrate if the substrate elevation is already in the intertidal zone. If erosion is an issue, additional protection strategies may be needed. Your county or town planning office will help you work with Maryland Department of Environment (MDE) and, depending on the size and location of the project, possibly the U.S. Army Corps of Engineers (USACOE). To start this process, file a Joint Federal/State Application of the Alteration of Tidal Wetlands in Maryland, available at www.mde.state.md.us/assets/document/permit/alter_sf.pdf, or call 410-537-3762 or 800-876-0200 for a copy of the application.

Living shoreline protection may include:

- Marsh grass plantings
- Beach replenishment
- Low-profile stone or oyster shell breakwaters and sills
- Placement of structural and organic materials such as biologs or oyster reefs
- Submerged aquatic vegetation (SAV) plantings in shallow water
- Small artificial island systems

Installation of shoreline protection will require an experienced contractor and will take several months to acquire permits. The success of a living shoreline depends on plant establishment. Marsh grasses and other herbaceous plants can be planted any time the ground is not frozen. Trees and shrubs should be planted in spring or fall and will need to be watered and protected from deer browse until they become established. Geese and ducks love to graze on newly planted vegetation, so fence them out during the first growing season with a 3- to 4-foot string fence secured to wooden stakes (see page 28).

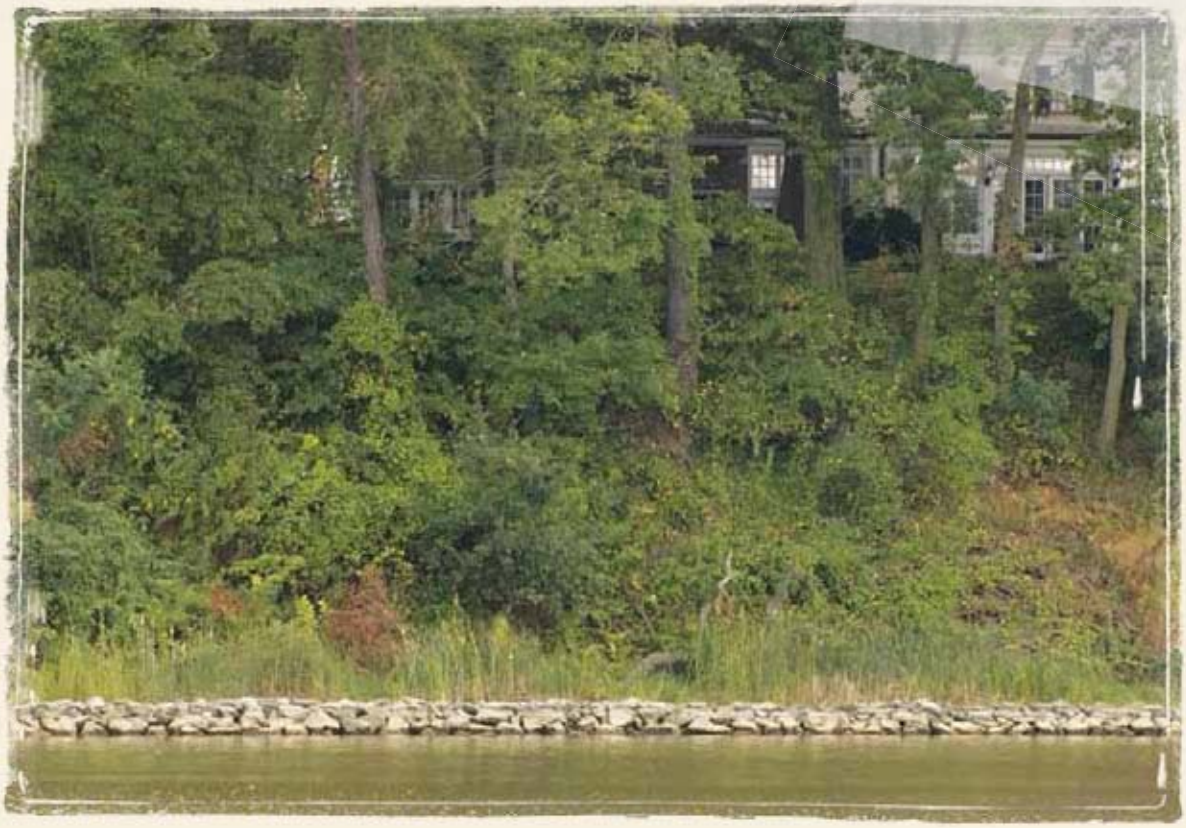
Creating a Living Shoreline

Graham and Robin Donaldson
Centreville, MD

Over the last 60 years, the Donaldsons' northwest-facing shoreline had receded 40 feet at a point where two streams join to form the Corsica River near Centreville in Queen Anne's County.

The original bank was undercut 8–12 feet, and when six feet of cliff collapsed in 2001, the Donaldsons decided it was time to take measures to protect it. Work on their living shoreline took nine months, but the results are impressive. As Graham Donaldson notes, the shoreline is "aesthetically pleasing, biologically successful, and ecologically effective."

An experienced contractor built out the shoreline 30 feet, with sand 3 feet deep, then added a sill of rock to keep the sand in place. Two types of cordgrass were planted in July 2003. The newly established shoreline survived the tidal surge from Hurricane Isabel later that fall and today is a thriving marsh that adjoins a natural wetland, providing significant fish and wildlife habitat. The Donaldsons are required to maintain the shoreline by removing debris, including trash, and trimming tree branches to allow sunlight to reach the grasses. At $150/foot, the 500 linear feet of shoreline protection cost about $75,000 to install. Now the Donaldsons can enjoy their beautiful home without worrying that it might slip into the Corsica River in their lifetime.



2 Buffer Establishment

Native plants along tidal shorelines are home to many creatures essential to Chesapeake Bay's web of life.

Although it is hard to put monetary value on the migrating cedar waxwings feeding on seeds from the tops of sweetgum trees or butterflies flocking to sweet pepper bush for nectar, these sights are what many residents and visitors enjoy about the Bay region.

Creating an ecologically healthy Buffer with tall canopy and understory trees, shrubs, and groundcovers requires planning and can be an ambitious undertaking. Growing a Buffer can be unpredictable and can take time. If you are not legally required to develop a Buffer Management Plan, you may want to stage your Buffer project over several years. Consider the process a long-term gardening project with an opportunity to learn about native plants and create beautiful wildlife habitat. Be careful what you plant, however, because tree removal years later will trigger the need for a local government-approved Buffer Management Plan.

If you are conducting development activities or altering vegetation in the Buffer, you will need to work with your local government to develop a Buffer Management Plan. They can help you make plant choices and develop planting strategies. Whether you are legally required to develop a Buffer Management Plan or are enhancing your Buffer voluntarily, consider consulting a professional landscape designer, nurseryman or contractor, factsheets, or other resources to develop the most effective strategy for establishing a Buffer.

Voluntarily, you can plant a Buffer without local government approval if you are not conducting development activities or removing vegetation. You may want to

(continued on page 38)

Tips for establishing a successful Buffer

- Choose native plants best suited for your location, sun exposure, and soils.
- Time plant installation for optimum growing conditions. If you plant during the spring, you will need to water through the summer. If you plant in the fall, the plants will begin to become established over the winter and will need less care during their first growing season.
- Water plants until they are established, especially during the first growing season.
- Protect your new plantings from grazing deer, rabbits, and groundhogs. This may require tree tubes, fencing, or selecting plants animals do not prefer.
- Control invasive plants with hand-removal or spot-spraying herbicides that are not harmful to fish and other aquatic life. Contact your local planning office before spraying. You may need a weed control plan and spraying permit for the Buffer.
- An approved Buffer Management Plan may involve removing vegetation, replanting, and mulching. A strategy for managing nonnative invasives will be required as part of the Buffer Management Plan.
- If a Buffer Management Plan is not legally required, you may be able to first establish a native groundcover by planting a seed mix of native grasses and perennials. This will take at least two years to become established. Including native perennial flowers in the seed mix will attract pollinators and enhance the aesthetic appeal. After this base is established, plant trees and shrubs. This strategy will help prevent erosion, as well as provide quality habitat for birds while the trees and shrubs mature.

Planting a Buffer

Janet and Bill Walczak
Queenstown, MD

Janet Walczak noted, "the most enjoyable benefit of a buffer is the wildlife habitat." As if on cue, we looked up and noticed a great blue heron preening in the sweetgum branches above us.

The Walczaks' quarter-acre backyard is fenced for the family Labrador Retriever and is planted with an impressive array of native and noninvasive ornamental flowers and shrubs that need protection from browsing deer.

Between the backyard fence line and Queenstown Creek is a fully vegetated Buffer of naturally growing oaks, sweetgum, black cherry, persimmon, walnut, sassafras, and white cedar. The Buffer Management Plan that the Walczaks developed with the town of Queenstown was approved in summer 2007. A huge mulberry tree had fallen several years before, allowing space and sun for new plantings. The Plan allows Janet to remove invasive species, and she has planted sea oats, hawthorne, chokeberry bush, asters, and goldenrod around the oak and tulip poplar "volunteers" that grew in the sunny area created by the felled mulberry. A mulched walkway through the Buffer provides the only access to the waterfront and a view of the water during the growing season, when leaves are on the trees.

Wildlife-watching abounds—from butterflies and hummingbirds sipping flower nectar from the gardens near the house, to osprey and eagles hunting the creek waters below. The forested Buffer hosts migrating hawks, cedar waxwings, brown trashers, kinglets, and occasional wild turkeys, demonstrating just how important and effective a fully developed, naturally growing Buffer is to the Bay's creatures.

consider planting wildflowers, shrubs, and trees directly into existing lawn. If you are not conducting other development activities and are not legally required to implement a Buffer Management Plan, you can mow around islands of trees, shrubs, and groundcovers to control weeds until plants are well established.

Naturalizing—allowing nature to take its course undisturbed—is also an option. This may create a thicket until trees mature to shade it, but it will be ideal habitat for wildlife and birds. Naturalizing may require invasive plant control. Consult your local government for permits before conducting invasive plant removal.

3 Landscaping Around the House

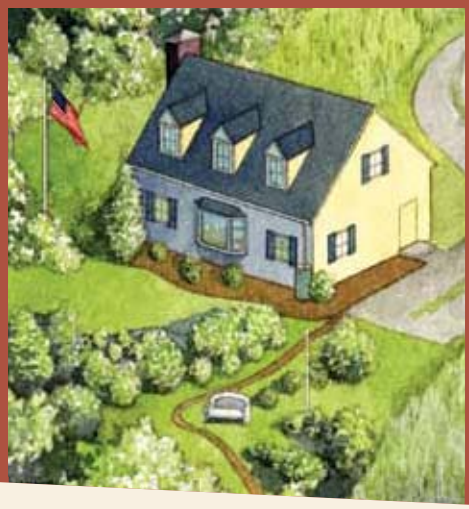
One of the joys of homeownership is landscaping your property.

Some like it simple—lawn and a few shrubs will do. Others may want privacy, outdoor living space, gardens, and shade trees. Nearly every property owner should consider planting trees. Trees save money by shading your home in summer. A combination of deciduous and evergreen trees block punishing winds year-round and reduce your heating and cooling needs.

The Critical Area law is clear about protecting trees. To prune or remove a tree from both the Buffer and the Critical Area, you need local government approval and, likely, a mitigation plan for replacing the tree. Seek the assistance of a licensed tree expert to determine the best options for your trees. They can also help secure proper approvals.

Landscaping is frequently an experiment. Not every plant will be well adapted to your yard's conditions, so before planting large areas, consider a "test" of two or three favorite plants. A professional landscape designer, garden center staff, or Master Gardener can help you choose plants and develop ideas for a Bay-friendly yard. If you specifically want wildlife diversity, seek a professional with wildlife habitat experience. Most importantly, create a landscape that you will enjoy and can maintain.

Bay-friendly landscaping is beautiful—
see next page.



Bay-friendly tips are listed below. For additional information, see the *Resources* section.

- Minimize lawn. Diversity in your landscape is more interesting and better for the Bay and its inhabitants.
- Minimize the use of fertilizers and chemicals.
- When installing walkways, driveways, decks, and patios, choose surfaces that allow water to infiltrate.
- Stormwater management is important for protecting your home as well as the Bay. Make it part of your landscape by planting a rain garden and implementing other runoff control strategies.
- Take advantage of Mother Nature by preserving wetlands, meadows, or forests already present on your property.
- Choose native plants. They are adapted to the region's soils, rainfall, and pests.
- Plant islands of natural areas or connect your natural areas to the Buffer or neighboring natural areas.
- Plant for wildlife and provide food and cover for animals you want to attract to your yard.
- For privacy, install a mix of native evergreen and deciduous trees and shrubs. This combination will also attract many bird species.
- Use Integrated Pest Management throughout your landscape.
- Control invasive nonnative plant species.

Landscaping for the Bay

Barbara and Jack Clarke
Stevensville, MD

With one acre of Kent Island waterfront as her canvas, Barbara Clarke is creating a masterpiece.

As you enter the property, newly planted islands showcase native shrubs and many varieties of native and noninvasive ornamental flowers. Native pin oaks and ornamental trees frame the house, while borders of Atlantic white cedar, American holly, winterberry, viburnums, and American beautyberry offer privacy for humans and habitat for wildlife.

Barbara began with a blank slate almost 10 years ago. Today, pollinator gardens have replaced the lawn, and native trees and shrubs flower in the summer and provide berries for birds in winter. Patches of lawn are filled with clover, which rabbits seem to prefer to the flowering gardens. Paths of grass, flagstone, and mulch provide access to the gardens, which helps with garden maintenance as well as enjoyment.

Barbara notes that "Kent Island is a challenging place to garden." Poor soils and a variety of aggressive weeds make occasional watering and frequent weeding necessary in natural areas. The butterfly gardens also require weeding throughout the growing season. After the growing season, the Clarkes choose a low-maintenance approach to their gardens. Although some seed heads are left for the birds, many of the dead flowers are mowed, with the mowed plants left as mulch. To save time, Barbara is transitioning some of the flowering beds to more low-maintenance flowering shrubs.

4 Trees and Woodlands

Creating a woodland is an exercise in patience and a commitment to the future. The benefits abound for your family, Chesapeake Bay, and even the climate.

Woodlands provide wildlife habitat, store carbon, and cool the air and water. They also capture runoff, preventing nutrients from entering surface waters. Trees shade your property and home, reducing your home energy and outdoor water use.

Chesapeake Bay's woodlands can be lush ecosystems where flowers bloom on the forest floor in spring, birds sing from treetops in summer, brilliant leaves decorate the fall landscape, and birds and other animals feed on berries and nuts during winter.

If you already have trees or a woodland on your property, be grateful and nurture them. Establishing a diverse forest with trees, shrubs, and groundcovers requires many years of planting, watering, weeding, and managing pests. Although allowing your Buffer to grow naturally or planting native trees does not require local government approval, tree removal and invasive species control of your Critical Area Buffer does require a Buffer Management Plan. For Critical Area properties beyond the Buffer, tree removal and pruning also require local government approval.

For Existing Woodlands. Consider working with a state forester or professional arborist if you need help managing your trees and forest. You may want to remove some downed wood for firewood, but resist the urge to remove all downed trees and brush. Many species of birds and other wildlife, as well as plants, depend on forest habitat. Here are a few tips:

- Tree maintenance and removal anywhere in the Critical Area requires local government approval. Call your county or town planning office for guidance.
- Timber harvest of more than one acre in the Critical Area will require additional plans or permits.
- Save *snags*, which are standing dead trees. Woodpeckers, nuthatches, and cavity-nesting birds and mammals need them.
- Control invasive plant species. If you have a Buffer Management Plan, invasive species removal will be included.
- Selective planting of desired species or removal of undesirable species can enhance the woodland. Shade, however, can inhibit growth, so evaluate sun before planting. Remember, these activities cannot be conducted in the Buffer or Critical Area without local government approval.

If you are installing trees in your yard or establishing a Buffer, research the options. If possible, use only native trees and shrubs that are grown from local seed sources. Seedlings are suitable for a children's Earth Day project, whereas containerized trees will jump-start your Critical Area Buffer project. Many local governments and nonprofits maintain lists of appropriate native species.

Types of Tree Stock

- **Seedlings** have a bare root, may be up to 3 feet tall, and can be planted at relatively low cost with minimum labor. However, losses can be high.
- **Bare-root saplings** are 3–7 feet tall, with bare roots that have been removed from their growing medium. They are easy to transport and relatively inexpensive, but do require preparing a larger hole than bare-root seedlings.
- **Containerized trees** are grown in containers and usually are greater than 4 feet tall. Containerized trees have greater upfront costs and increased effort to install, but because roots have not been disturbed, survival rates are generally better than bare-root seedlings or saplings.
- **Balled and burlapped** (B & B) trees have a root ball encased in burlap wrapping. Their large size of 4 feet or more creates instant curb appeal. However, balled trees are usually expensive, difficult to transport, and labor intensive to install.

Woodlands provide wildlife habitat, store carbon, and cool the air and water.

Planting and Maintenance

- **Plant diversity.** A naturally growing forest has many types of plants. It is stratified vertically and horizontally. Vertical stratification includes canopy and understory trees, shrubs, and groundcovers. Horizontal stratification means the tree, shrub, and groundcover species composition will vary throughout the forest, depending on local seed stock, sunlight, water, and soils.
- **Weed control.** Weeds can outcompete smaller seedlings and saplings, so control weeds around new plantings by pulling or mowing. Mowing may be prohibited in the Buffer, so call your county or town planning office for guidance. Do not spray, as herbicides may kill small trees. Invasive species are a problem in any naturalized setting. They must be controlled by hand-removing or spot-treatment with herbicides, which also requires local government approval. See the section on *Invasive Species* in this chapter for more information.
- **Watering.** New plantings require watering during the first, and possibly second, growing season. Soaking the ground to a depth of several inches once a week is more effective than daily watering.
- **Pruning.** Trees and shrubs in natural forest settings normally don't require pruning. Pruning is generally not allowed in the Critical Area or Buffer and may be conducted only with local government approval. However, pruning for the health of the tree is permitted. If you must prune trees in your yard, consult a professional tree expert.
- **Pests.** Regularly examine your trees for signs of pests, such as presence of insects, bore holes in branches, or dying tips. See the section in this chapter on *Integrated Pest Management* for more information.

American beech

5 Meadows, Grasses, and Wetlands

Meadows and wetlands have something in common—grasses. Otherwise, the types of plants, maintenance, and legal requirements are quite different.

Wetlands are characterized by saturated or flooded soils, which result in specific plant communities. They are legally protected by state and federal laws. Tidal wetlands are influenced by changing tides and can be found in many Critical Area properties. Nontidal freshwater wetlands can be found almost anywhere, the result of depressions, seeps, or poor drainage.

Wetlands are home to many unique plants and wonderful animals. Herons, egrets, shorebirds, songbirds, waterfowl, frogs, turtles, and fish depend on wetlands for shelter, breeding, and food. Wetlands help mitigate flooding, remove nutrients, and buffer upland property from wind and waves.

Meadows, comprised of grasses, legumes, and wildflowers, grow best in well-drained soils. These grasslands are rapidly declining throughout the United States and are essential habitat for ground-nesting birds. Meadows do not require fertilizer or other soil amendments and can be maintained with periodic mowing.

Wetlands

- Presence of a wetland on your Critical Area property may extend the Buffer line.
- Both tidal and nontidal wetlands are protected by law, so any activity on them must be permitted through the appropriate agencies, including local government offices, Maryland Department of Environment, and possibly the U.S. Army Corps of Engineers.
- The invasive grass *Phragmites* can take over native wetlands, especially in disturbed or recently restored areas. Control is recommended before it becomes a problem. This requires permits from the agencies mentioned above.
- Wetland restoration is complicated and should only be done by experienced contractors.
- State and federal programs are available to assist with funding wetland restoration. See *Resources* for guidance.

Meadows

- Counties do not allow meadow establishment as part of a Buffer Management Plan, but a meadow can be included voluntarily in the rest of your Critical Area landscaping.
- Meadows may not be permitted in some communities due to property maintenance regulations. Contact your local government office and community association to determine feasibility.
- Meadows require sun and well-drained, but not sandy, soils. Do not fertilize or lime the soil. Warm season grass meadows are great cover for marginal soils.
- Successful establishment requires significant weed control before planting and during the first two years of growth. Consult your local Natural Resources Conservation Service or Department of Natural Resources website for guidance (www.dnr.state.md.us/wildlife).
- To make your meadow more attractive, mow around the perimeter, include wildflowers in your seed mix, and control invasive plants.
- After establishment, meadows can be maintained by mowing before or after ground bird nesting season (approximately before April 1 and after August 31; consult your local Natural Resources Conservation Service Office for dates in your county). A strategy of mowing one-third of the meadow in strips each year will control woody plants, while maintaining natural habitat for birds year-round.

Creating a Native Meadow

Adkins Arboretum
Ridgely, MD

To the south of the Adkins Arboretum Visitor's Center is a 15-acre meadow of native warm season grasses and flowers. A second, larger meadow—Nancy's Meadow—is located along the forested buffer of the Arboretum's northern border, the Piney Branch. With the technical expertise of the Easton-based nonprofit organization Chesapeake Wildlife Heritage, Inc. and financial support from government and private conservation programs, Adkins Arboretum established these meadows in the late 1990s. Today the Arboretum's meadows are important education tools for children, who love milkweed and Monarch butterflies, as well as birds, mammals, and insects that prefer meadow habitat.

Growing a meadow is not just letting the lawn grow. The Arboretum established its warm season grass meadows by first spraying herbicides on abandoned agricultural fields, then planting warm season grasses and flowering plants with a drill-seeder. Initially, regular mowing kept weeds at bay until the warm season grasses became established. Since then, the meadows have been maintained by rotational mowing (a portion of the meadow is mowed once every three years) and controlled burning. Managing invasive plants is an ongoing challenge that the Arboretum achieves with the help of volunteers using herbicides and manual removal techniques.

The Adkins Arboretum experience shows that meadows can enhance a landscape along driveways, forest edges, and walking paths. A successful meadow requires a planned program for establishment, periodic maintenance, invasive plant control, and sometimes replanting for plant diversity. The rewards are reflected in the soft glow of grasses at sunset and the summer gatherings of dragonflies and butterflies.

Meadows can be planted in the Critical Area, but are not permitted in the Buffer. Most homeowners will want to maintain their meadow with rotational mowing instead of burning. Burning is certainly a viable strategy for meadow maintenance and weed control, but requires professional assistance and local government permits.

6 Integrated Pest Management

Integrated Pest Management (IPM) is an environmentally sensitive approach to pest management with common-sense practices. IPM uses information on the life cycles of pests and how they interact with plants and the environment. It is not a single pest control method, but rather a series of evaluations, decisions, and controls. With a little practice, you can learn to use IPM to manage your landscaping. Think of IPM as a great excuse to walk your yard, admire plants up close, and learn about insects.

IPM is not a single pest control method, but rather a series of evaluations, decisions, and controls.

The basic four steps include:

1. **Prevention.** The front line of pest control is to prevent pests from becoming a threat. Cultural methods, such as rotating annual plants, selecting pest-resistant varieties, and diversified plantings, all help. Proper tree-pruning, which prevents damage that may encourage insects; proper tree and plant installation; not over-fertilizing; and removal of diseased plant parts all encourage healthy plant growth.

2. **Set Action Thresholds.** An *action threshold* is a point at which pest populations or environmental conditions suggest that action should be taken. A single insect or small population of insects does not always mean control is needed. This threshold may depend on YOUR tolerance level, as well as expert opinion on when to take action. A single

Beneficial Insects


Ladybird beetles


Assassin bugs


Praying mantids

Common Pests


Slugs


Aphids


Bark beetles

Invasive Pests to Watch


Emerald ash borer


Wooly adelgid


Asian long horned beetle

branch of leaf-munching insects may be tolerable, whereas an infestation on an entire shrub may require action. In fact, the presence of some insects is desirable, as many types of birds eat insects.

3. **Monitor and Identify Pests.** Not all insects or plant diseases require control. Many insects are innocuous or even beneficial. Regularly walk your property and observe the insects and plant conditions. Look for physical evidence of a problem, including plant injury, damaged leaves, large populations of a single type of insect, and patterns of damage. Try to identify the insects, using a simple insect guide or the University of Maryland's Home and Garden Information Center Plant Diagnostic website (http://plantdiagnostics.umd.edu/index.cfm). Don't jump to conclusions. A large population of beneficial insects, such a ladybird beetles, may be doing their job of consuming plant-damaging aphids. Swallowtail caterpillars may be eating your parsley, but since they will eventually become beautiful butterflies sipping nectar in your pollinator garden, you will want to tolerate them in your garden.

4. **Control.** When prevention doesn't work and monitoring, identification, and action thresholds suggest pest control is needed, it may be time to take action. Choose less risky pest controls first, such as biocontrols like pheromones to disrupt pest mating, or mechanical control, such as trapping or weeding. If further monitoring indicates these strategies are not working, then pest control methods such as targeted spraying of pesticides may be needed. Broadcast spraying of non-specific pesticides is not recommended and can kill beneficial insects as well as pests.


Dragonflies and damselflies


Lacewings


Parasitic wasps


Spiders


Cabbage moths


Eastern tent caterpillars


Japanese beetles


Gypsy moths

7 Invasive Plants

Invasive plants are nonnative plant species that grow aggressively and can outcompete native plant communities.

Invasives generally reproduce prolifically and spread aggressively; adapt to a wide variety of conditions; are difficult to control naturally; and are extremely difficult to control or eliminate once established. Natural and recently disturbed areas in the Critical Area, including wetlands and forests, are particularly vulnerable to invasive plants. Controlling invasive plant species on your property should be part of your Integrated Pest Management (IPM) strategy. Both start with a walk: Regularly explore your property and examine the plants.

Japanese honeysuckle

See page 50 to identify common nonnative invasive plants.

1. **Prevention.** Efforts to establish full ground coverage of healthy native plants is your best deterrent against invasive species. Proper plant installation, plant choices, and care will help prevent invaders.

2. **Monitor and Identify.** Regularly walk your property. Take note of any invasive species on adjoining properties as well as on your own. Learn to identify common invasive plants. The chart on pages 50 and 51 shows the Mid-Shore's most common problem plants in residential areas.

3. **Address the Problem Early.** Research the options and talk with professionals. Critical Area properties are located where chemical treatments may contaminate surface water. Mechanical control techniques such as digging can cause erosion. Both strategies may disturb wildlife. By tackling small clusters of early invaders, you can save time and money, and minimize excessive damage to potentially sensitive habitats.

4. **Secure Proper Approvals.** Invasive plant removal in the Buffer will require the *First Stop for the Bay*—calling your county or town planning office for guidance on the approval process. Invasive plant control should be included in any Buffer Management Plan. Removal of invasive plants in the Critical Area may require local government approval, depending on the species and the extent of the affected area.

5. **Treat and Repeat.** Invasive plant species often require several treatments to eliminate them successfully and permanently. Treatments are often plant specific, so do your research and consult a professional if necessary.

Purple loosestrife

Autumn olive

Top Invasive Plants of the Mid-Shore and Control Strategies

	Common name	Scientific name	Form
	Oriental bittersweet	*Celastrus orbiculatus*	Woody vine
	Spotted knapweed	*Centaurea stoebe L. ssp. micranthos*	Herbaceous biennial
	Autumn olive	*Elaeagnus umbellata*	Shrub
	English ivy	*Hedera helix*	Woody vine
	Japanese honeysuckle	*Lonicera japonica*	Woody vine
	Purple loosestrife	*Lythrum salicaria*	Herbaceous perennial
	Common reed	*Phragmites australis*	Herbaceous perennial
	Japanese knotweed	*Polygonum cuspidatum*	Herbaceous perennial
	Callery or Bradford pear	*Pyrus calleryana*	Flowering tree
	Multiflora rose	*Rosa multiflora*	Shrub

Adapted from *Invasive Plants of Maryland, Pennsylvania, and Virginia. Citizen's Guide to the Control of Invasive Plants and Wetland and Riparian Areas.*

	Notes	Control methods
	Rapidly takes over trees and shrubs. Reproduces through roots and berries. Spread by wildlife.	Cut vine and vegetation to the ground in early spring. Apply triclopyr to freshly cut stumps or foliage regrowth.
	Grows in tufted clumps. Rapidly colonizes disturbed areas.	Hand-pulling, cutting, or mowing over several years. Wear gloves.
	Invades a variety of habitats. Berries spread by wildlife.	Hand-pull seedlings. Apply triclopyr to freshly cut stumps.
	Invades forests, eventually shading and killing plants. Berries spread by wildlife.	Hand-pull vines. In trees, cut vines and remove by prying. Recut root sprouts repeatedly or apply triclopyr to cut stem.
	Other invasive *Lonicera* species are shrubs.Highly aggressive. Very persistent root systems and seeds.	Hand-pull to remove entire root system. Apply glyphosate or triclopyr to cut stem and resprouted foliage.
	Overtakes native wetlands. Reproduces through seeds and underground stems.	Hand-pull before seed set or spray with glyphosate.
	Forms large colonies in wetland ecosystems.	Use glyphosate in late summer or early fall. Repeat over several years.
	Invades a variety of habitats. Forms large colonies, especially near waterways and ditches. Spreads by roots and seeds. Extremely difficult to control.	Cut at least three times during the growing season or apply black plastic to weaken rhizomes. Spray glyphosate in July and spot-treat in September. Requires treatment over several years
	Commercial cultivar that flowers in April. Invades a variety of sunny habitats. Seed spread by birds.	Difficult to control due to popularity as a landscape tree. Cut tree and treat stump with triclopyr or glyphosate. Educate your neighbors.
	Invades open and semi-open habitats. Can form dense thickets. Fruits spread by wildlife.	Plants can be pulled with chain and tractor. Goats will eat all parts of the plant. Basal bark and foliage treatment with glyphosate or triclopyr.

April 2003. Alliance for the Chesapeake Bay, Baltimore, MD.

8 Stormwater Management

Stormwater management is not just an urban necessity—even large rural and suburban lots need to manage, treat, and infiltrate or convey storm runoff.

In an extreme storm event, homeowners in the Critical Area need to consider the possibility of tributary or coastal flooding in addition to runoff from their properties. Flooding and risk of erosion should be considered when planning your lot's stormwater strategies.

Understanding lot coverage is essential to understanding your stormwater management needs—the greater the lot coverage, the greater the need for stormwater management. Lot coverage includes areas covered by manmade materials, such as structures and accessory buildings, parking, driveways, walkways, and roadways. Materials such as gravel, stone, shell, impermeable decking, pavers, and permeable pavement are included in lot coverage calculations. Access paths through the Buffer and stairs to the water are ***not*** calculated in lot coverage. Lot coverage limits may not apply to small lots in intensely developed areas, so check your *First Stop for the Bay* to verify. Your contractor or town or county planning office can help you calculate the lot coverage as part of any plans or permits needed for a new residence or development activities.

Nearly every property needs some form of stormwater management to protect structures, prevent erosion, and promote infiltration. Stormwater runoff control should be designed to perform several functions, including:

- Appropriately manage stormwater near your home and other structures;
- Treat stormwater or allow it to flow over a vegetated area before entering a public stormwater system;
- Disperse and slow the flow of water;
- Collect water to be recycled; and
- Remove pollutants from runoff.

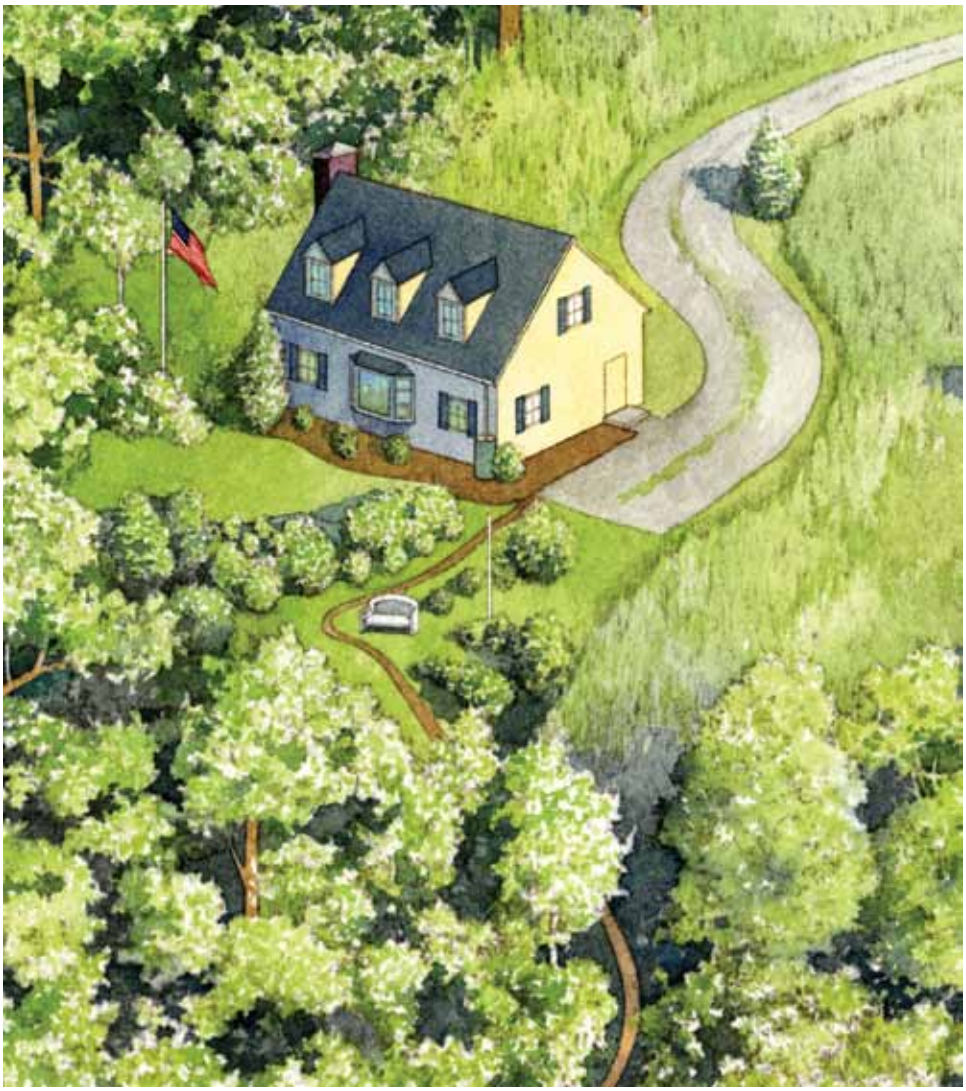
Materials—Surface Coverage and Benefits

Materials	Count this as lot coverage?	Stormwater benefits
Building/roofs	Yes	None, unless a vegetated roof
Asphalt and concrete	Yes	None
Gravel	Yes	Even with compaction, rough surface can help slow water flow and some infiltration may occur.
Flagstone, pavers, brick	Yes	Infiltration may occur between stones if no landscaping cloth is used underneath the walkway.
Pervious parking structures	Yes	Some infiltration may occur despite compaction. Vegetated components will slow runoff.
Wood chips	No	Infiltration and slows runoff
Grass	No	Infiltration and slows runoff

As noted in *Chapter 3: Frequently Asked Questions*, a variety of stormwater management strategies are appropriate for the Critical Area. These strategies are adaptable, and some serve multiple functions. Combine several strategies and size them to fit your lot and needs. Stormwater management strategies should be included in site plans or other documents when seeking permits in the Critical Area.

Grass channels. Grass channels or swales reduce runoff and do a better job of encouraging infiltration and removing pollutants from stormwater than a traditional curb and gutter system. Grass channels in yards and along residential road frontages are usually shallow enough that they can be mowed as part of your normal yard maintenance.

On the Eastern Shore of Maryland, grass channels are common in residential areas because they function well in relatively flat coastal plain geography. In some areas, it may be illegal to block grass swales that are part of a public stormwater conveyance system. Although your local government may clean out ditches occasionally, it is the responsibility of local homeowners to maintain grass channels on their road frontage by keeping them clear of debris and blockages.



Rain gardens. Rain gardens, also called "bioretention areas," are constructed shallow depressions landscaped with plants that tolerate temporary standing water. Well-designed rain gardens are beautiful flowering areas that attract pollinators and birds. Although most residential rain gardens include shrubs and flowers or groundcovers, larger bioretention areas can be adapted to accommodate trees and shrubs.

Rain gardens often require professional design and construction, although many excellent designs are available on the Internet and an experienced gardener may be able to install a small one without assistance. To increase infiltration, constructed rain gardens have a filter bed made from a mixture of sand, soil, and organic material, covered with mulch. Plants are installed after the filter bed and organic material are in place. Some rain gardens require structural components and should be designed and installed by a professional.

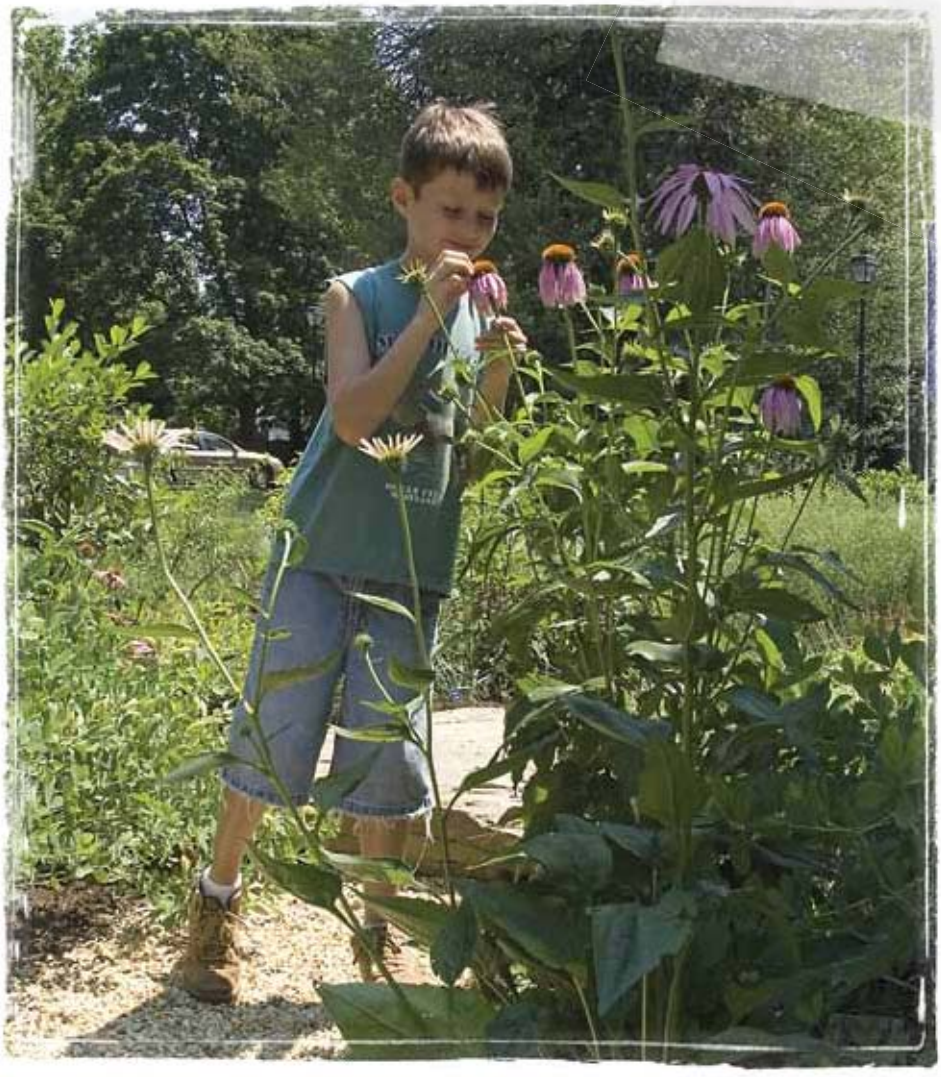
Plant your rain garden with natives or well-adapted nonnative beneficial plants. Plants should tolerate "wet feet." When there is a risk of flooding from the Bay or its tributaries, it is wise to include plants that will tolerate low-level salinity.

Tips for rain garden installation

- A little slope conveying water to your rain garden is good, but slopes greater than 5% may cause erosion and are not recommended.
- The bottom of your rain garden filter bed should not be as deep as the water table.
- Identify all underground utilities before digging by calling Miss Utility at 800-257-7777. You do not want water and sewer lines running through your filter bed.
- Locate the rain garden in a sunny area, not under large trees.
- The size of a rain garden is based on the area of impervious surface draining into the rain garden.
- Rain gardens should not be linked to structural foundations or pavement with ditches or pipes. At a minimum, a rain garden should be located at least 100 feet from any water supply well and 50 feet from septic systems. Other setbacks are determined by the size of the rain garden and, possibly, by county or town permits.
- Rain gardens should be constructed outside the 100-year floodplain.
- Although you may need to water until plants become established, a rain garden should not receive base flow from permanent irrigation, wash water, or other water flows.

Rain barrels. Rain barrels or cisterns can collect the stormwater runoff from the roof of a home or auxiliary structure for reuse later. If you live in an urban area, with rooftop downspouts connected directly into the public stormwater conveyance system, rain barrels offer a way to reduce the runoff burden into the public system. Rain barrels are positioned at the bottom of downspouts. Lids are recommended to prevent debris from falling in and mosquitoes from breeding. You can connect a hose to a tap at the bottom or dip water from the top. Although rain barrels cannot handle a significant amount of stormwater runoff, they do provide a free source of water that can be recycled for gardens and landscaping.

Permeable pavement. Permeable pavement can help manage runoff on your property by allowing stormwater runoff to filter through the voids in the pavement surface. A variety of options exist that can replace blacktop or cement driveways and walkways.



Queen Anne's County Master Gardeners maintain this rain garden at the Queen Anne's County Free Library in Centreville, MD.

Rain Gardening

Mary Ryman and Linda Reese
Centreville, MD

Mary Ryman and her daughter Linda Reese share more than just good genes—a mother-daughter rain garden straddles their backyards.

Mary's and Linda's families moved to a new development just two years ago. Their backyards are down-slope from a street of new houses, where lots are only about one-quarter acre in size. With a typical rainstorm, six inches of water would flood most of their backyards.

After regrading did not solve the flooding problem, the pair applied for a grant from the Corsica Watershed Restoration Project to install side-by-side rain gardens. At the time neither knew much about native plants or rain gardens, but both are thrilled with the two 22' x 14' rain gardens that were professionally constructed in spring 2008. The beds consist of approximately 7" of a sand/soil mix planted with native shrubs and flowers, and then mulched.

When these photographs of their rain gardens were taken, a tropical storm had blown through just a few days earlier. No standing water was present, although the rain garden soils were still damp from the storm. The rain gardens are just becoming established, flowering this year with excellent plant survival rates. Next year, the duo expect the native plants to grow and fill the gardens, perhaps enticing that hummingbird Linda had seen the day before to linger through the summer.

Mary's and Linda's rain gardens were so successful that several neighbors have signed up with the Corsica River program for their own rain gardens. (See *Resources* for contact information on the Corsica River Conservancy's grant program.)

9 Landscaping for Wildlife

All wildlife needs food, cover, and water to thrive. Critical Area landowners have the opportunity and responsibility to enhance wildlife habitat.

Native plants provide food year-round, with flowers producing nectar during the growing seasons, and berries ripening in fall and winter. Insects feeding on plants become food for birds. Groundcover plants and brush piles offer sanctuary for birds and small mammals. The diversity of birds, butterflies, frogs, turtles, and other wildlife that inhabit an uncultivated or "natural" area abound.

The Buffer should be a contiguous ribbon of forest and wetlands along tidal waterways, acting as an unbroken wildlife corridor. Residential property owners can enhance and enjoy the wildlife benefits of this landscape by allowing the shoreline to remain natural and establishing natural areas on Critical Area properties. Even a small property can be a sanctuary for a variety of interesting and essential insects, birds, and animals.

Pollinator gardens. Butterflies, bees, and hummingbirds feed on the nectar that comes from flowering plants. They also eat tiny insects on the flowers. Many insects and butterflies are plant specific and are adapted to local native species. A common example is the monarch butterfly caterpillar, which prefers native milkweeds. Learn to identify the caterpillars of common butterflies and commit to sharing your landscape with them. For example, the caterpillars of swallowtail butterflies love parsley, fennel, and dill. Savvy gardeners plant a little extra to share.

A variation on pollinator gardens—a Moon Garden—incorporates night-blooming plants for nectar-feeding moths, and white and silvery flowers and leaves that glow in the moonlight. Do not spray your pollinator gardens with pesticides! Chemicals may kill the good insects and butterflies, as well as the bad.

Spotted mint

Rain gardens. Rain gardens, described in the *Stormwater Management* section of this chapter, are planted with woody and herbaceous native plants that can tolerate being inundated with water for periods of time. By choosing plants that are beneficial to wildlife, one can create a rain garden that attracts frogs, birds, and butterflies.

Meadows and grasses. A wide variety of ground-nesting and seed-eating birds require grassland habitats. Today, these habitats are relatively scarce throughout the Chesapeake Bay region. You can encourage species such as quail, meadowlarks, and song sparrows by incorporating native grasses into your gardens and maintaining warm season grass meadows on a portion of your property. See the section on *Meadows* in this chapter for information on their establishment and maintenance.

Trees and shrubs. A property with a diversity of trees and shrubs will attract a variety of birds. Mix native evergreen and deciduous trees and shrubs for the best result. Evergreen tree cones are favored by nuthatches and many warbler species. Even small patches of forest will attract nesting hummingbirds, woodpeckers, sparrows, and wrens.

Contiguous stretches of forest are potential breeding grounds for ***Forest Interior Dwelling Species (FIDS)*** such as thrushes and warblers. Herons and egrets nest in groups or "colonies" in relatively undisturbed forested Buffer areas. Large dead trees, called snags, are important components of forests—providing insects for food and holes for bird and mammal families, as well as perching and nesting opportunities for birds of prey such as bald eagles and osprey.

Hedgerows. Adding a mix of trees and shrubs to your property borders can provide privacy, as well as essential wildlife habitat. Evergreen woody plants provide year-round cover for wildlife and privacy for your property. Plant berry-producing native trees and shrubs among the evergreens to increase food and cover for wildlife.

Water. Critical Area properties, by their definition, are located close to water. During the summer, however, brackish tidal waters are not a suitable drinking source for wildlife. You can increase the wildlife on your property by adding a small pond, or even just a fresh bowl of water each day. Pond construction is permissible in the Critical Area but not the Buffer, and may require local government approval. Refresh water daily or keep fish in the pond to control mosquito larvae.

New England aster

10 Access to Your Waterfront

Although not everyone wants to get their feet wet, many waterfront homeowners like access to their waterfront for swimming, fishing, or launching a boat.

Access from your Critical Area property, through the Buffer, to the waterfront is generally allowed with the proper local government authorization.

As part of your Buffer Management Plan, talk with county or town planning office staff about creating access to your waterfront. The preferred access through the Buffer is a maximum 6-foot-wide path of wood chips that is as direct as possible, without cutting down any trees. Stairs to the shoreline may be permitted, especially if required by the owner due to special needs or to prevent erosion.

If walkways or stairs encroach into tidal waters, tidal wetlands, or nontidal wetlands or you are conducting shoreline alterations, such as beach replenishment, shoreline protection, and boat launch or pier construction, additional permits may be required from the Maryland Department of Environment and the U.S. Army Corps of Engineers. To start this process, file a Joint Federal/State Application of the Alteration of Tidal Wetlands in Maryland, available on the MDE website at www.mde.maryland.gov/assets/document/permit/alter_sf.pdf or by calling 410-537-3762 or 800-876-0200.

Access to the waterfront is generally allowed with the proper local government authorization.

Tips for Bay-friendly access

1. Design the shortest possible path that disturbs as little woody vegetation as possible.
2. Design the narrowest possible path needed for you and, when applicable, your boats.
3. Cover the path with a natural pervious surface, such as wood chips or pine needles. Check the labels, or ask the landscaper or nursery about the source of the product.
4. Minimize tree limb pruning by seeking authorization to maintain an open path that can be safely navigated without bumping your head.
5. Maintain the minimum access needed to safely navigate through a living shoreline to a pier. Leave wetland grasses intact at the edge of your walkway.
6. If you need steps to the shoreline:
   - Secure local government authorization as part of your Buffer Management Plan and make sure you are complying with state and federal requirements as well.
   - Consult with a professional for a design that ensures your steps will not aggravate erosion and will provide safe access to the water.
   - Use slip-resistant materials.
7. Access to your Buffer, via constructed path, may affect your lot coverage. Even so, you may want to consider pervious options, such as gravel instead of a cement sidewalk, to help control runoff. See the *Stormwater Management* section in this chapter for pervious materials and whether they count as lot coverage.

Simple fencing protects newly planted living shoreline from waterfowl damage.

Important Terms

Best Management Practices (BMPs). Conservation practices and management measures that control soil loss and reduce water quality degradation caused by nutrients, toxins, sediment, and animal waste.

Buffer. A naturally vegetated area or planted area established or managed to protect aquatic, wetland, shoreline, and terrestrial environments from manmade disturbances. The Critical Area Buffer is a minimum of 100 feet from the HWW (Mean High Water) Line, the edge of tidal wetlands or tributary streams. In some circumstances, such as when wetlands or steep slopes are present, it may be expanded beyond 100 feet.

Buffer Exemption Area. Areas that have been officially designated and mapped where specific development activities may be permitted within the Buffer without a variance, in accordance with specific standards and requirements, including mitigation. (Kent County calls these Buffer Modification Areas.)

Buffer Management Plan. A landscape plan and supporting written documentation used to show and describe development activities or the alteration of land or vegetation within the Critical Area Buffer. Buffer Management Plans include existing conditions, proposed activities, and restoration or mitigation actions.

Critical Area. All waters of and land under the Chesapeake Bay and its tributaries and the Atlantic Coastal Bays and their tributaries to the head of tide, and all land and water areas within 1,000 feet of tidal waters and the edge of tidal wetlands.

Critical Area Commission. A 29-member group responsible for overseeing the effective implementation of Maryland's Chesapeake Bay Critical Area Program. The Commission was created by the Critical Area Act in 1984.

Development Activities. Human activities that result in disturbances to land in conjunction with the construction or substantial alteration of residential, commercial, industrial, institutional, or transportation facilities or structures.

Expanded Buffer. An area where the Critical Area Buffer is extended to include contiguous sensitive areas such as steep slopes or highly erodible soils.

Forest Interior Dwelling Species (FIDS). Bird species that require relatively large, undeveloped, forested tracts for successful breeding. Examples include flycatchers, warblers, vireos, and woodpeckers.

Habitat Protection Areas. Those areas, including the 100-foot Buffer, nontidal wetlands, habitats of threatened or endangered species and species in need of conservation, certain plant and wildlife habitats, and fish propagation waters that are designated for protection and generally require specific conservation measures under the Critical Area Law and Criteria.

Habitat Protection Area Plan. A plan to conserve certain special habitat types developed in cooperation with Maryland Department of Natural Resources.

Lot Coverage. The percentage of a total lot or parcel that is occupied by a structure, accessory structure, parking area, driveway, walkway, or roadway; or that is covered with gravel, stone, shell, impermeable decking, a paver, permeable pavement, or any manmade material. Lot coverage does not include a fence or wall that is less than one foot in width that has not been constructed with a footer; a walkway in the Buffer or expanded Buffer, including a stairway, that provides direct access to a community or private pier; a wood mulch pathway; or a deck with gaps to allow water to pass freely.

Mean High Water (MHW) Line. The average level of high tides at a given location.

Mitigation. An action or activity performed to compensate for, or offset, adverse impacts to water quality, habitat, or other natural resources associated with development activities, changes in land use, or other land alterations or disturbances.

Native Plants. Plants that have evolved in a region over hundreds of thousands of years without direct or indirect human actions. These species are adapted to local soils, climate, and hydrologic conditions.

Natural Vegetation. Plants that grow in the absence of human activities.

Site Plan. A graphic depiction of the existing or proposed development of a property that may include structures, setbacks, parking, utilities, environmental features, and landscaping. A site plan is normally required by local governments for all development activities or redevelopment activities.

Soil Erosion and Sediment Control Plan. A written plan that describes how erosion and transportation of sediment are to be managed and controlled on a development site or a site undergoing an alteration or disturbance.

Timber Harvest Plan. A plan required for the removal of one acre or more of forest in the Critical Area within any one-year period. The plan must be prepared by a registered professional forester and in the Critical Area must be reviewed and approved by the District Forestry Board.

Variance. An administrative exception to a land use or zoning regulation to compensate for a deficiency on a property that would prevent the property from complying with a specific regulation.

Wetland Delineation. The process that is used to determine if a wetland is present and to identify its boundaries. Wetland delineations include information about soils, hydrology, and vegetation and must be conducted by an environmental professional.

Resources

First Stop for the Bay
www.firststopforthebay.org

COUNTY PLANNING OFFICES

Caroline County Department of Planning, Codes and Engineering
Health & Public Services Building
403 South 7th Street, Suite 210
Denton, MD 21629-1335
(410) 479-8100
www.carolineplancode.org
Caroline County's Critical Area Program

Kent County Department of Planning, Housing and Zoning
400 High Street
Chestertown, MD 21620
(410) 778-7475
www.kentcounty.com/gov/planzone/
From My Backyard to Our Bay—A Guide to Improving Our Environment and Drinking Water.

Queen Anne's County Land Use, Growth Management and Environment
160 Coursevall Drive
Centreville, MD 21617
(410) 758-1255
www.qac.org
From My Backyard to Our Bay—A Guide to Improving Our Environment and Drinking Water.

Talbot County Office of Planning and Zoning
28712 Glebe Road, Ste. 2
Easton, MD 21601
(410) 770-8030
www.talbotcountymd.gov

STATE AND COUNTY GOVERNMENT AGENCIES

Natural Resources Conservation Service
Maryland State Office
John Hanson Business Center, Suite 301
339 Busch's Frontage Road
Annapolis, MD 21401-5534
(410) 757-0861
www.nrcs.usda.gov/

Queen Anne's County Office
211 East Water Street
Centreville, MD 21617-1101
(410) 758-1671

Kent County Office
122 Speer Road
Chestertown, MD 21620-1037
(410) 778-5353

Talbot County Office
28577 Mary's Court
Easton, MD 21601
(410) 822-1577

Caroline County Office
640 Legion Road
Denton, MD 21629-2040
(410) 479-1202

Maryland Cooperative Extension Divisions
http://extension.umd.edu/

Home and Garden Information Center
12005 Homewood Road
Ellicott City, MD 21042
(800) 342-2507
www.hgic.umd.edu
Many publications, factsheets, and diagnostic tools are available.

Caroline County Office
207 South Third Street
Denton, MD 21629
(410) 479-4030

Kent County Office
Kent County Public Works Complex
709 Morgnec Road, Suite 202
Chestertown, MD 21620
(410) 778-1661

Queen Anne's County Office
505 Railroad Avenue, Suite 4
Centreville, MD 21617
(410) 758-0166
Call for a free Baywise site visit from Master Gardeners.

Talbot County Office
Talbot Agriculture Service Center
28577 Mary's Court
P.O. Box 519
Easton, MD 21601
(410) 822-1244
Call for a free Baywise site visit from Master Gardeners.

Maryland Department of Agriculture
50 Harry S. Truman Parkway
Annapolis, MD 21401
(410) 841-5871
www.mda.state.md.us
Maryland Noxious Weed I.D.
Information on invasive plants, pest control in forests, erosion

Maryland Department of Natural Resources
580 Taylor Avenue
Tawes State Office Building
Annapolis, MD 21401
(877) 620-8DNR
www.dnr.state.md.us/
Shore Erosion Control documents

Watershed Restoration Action Strategies
www.dnr.state.md.us/watersheds/wras/index.html

Maryland's Coastal Zone Management Program
(410) 260-8732
www.dnr.state.md.us/bay/czm
Funding available for local governments and nonprofits

Critical Area Commission for the Chesapeake and Atlantic Coastal Bays
1804 West Street, Suite 100
Annapolis, MD 21401
(410) 260-3460
www.dnr.state.md.us/criticalarea/
Bay Smart: A Citizen's Guide to MD's Critical Area Program

Critical Area Buffer management guidance

Overview of 2008 Critical Area Legislation

Forest Service—Caroline and Talbot counties
Upper Shore Project
Martinak State Park
105 Deep Shore Road
Denton, MD 21629
(410) 479-1623
Riparian forest buffer design and maintenance

Forest Service—Kent and Queen Anne's counties
120 Broadway
Centreville, MD 21617
(410) 778-4439
(410) 819-4120
www.dnr.state.md.us/forests/

Wildlife and Heritage Service
(410) 260-8540

Wildlife and Heritage Service—Eastern Region
Eastern Regional Office
Wye Mills Field Office
P.O. Box 68
Wye Mills, MD 21679
(410) 827-8612
www.dnr.state.md.us/wildlife/
Backyard Habitat for Wildlife

Invasive and Exotic Species

Wildlife & Heritage Service—Project Wild
3740 Gwynnbrook Avenue
Owings Mills, MD 21117
(410) 356-0941
www.dnr.state.md.us

Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230
(410) 537-3000 or toll free at
(800) 633-6101
www.mde.state.md.us/

Joint Federal/State Application of the Alteration of Tidal Wetlands in Maryland
(410) 537-3762 or (800) 876-0200
www.mde.state.md.us/assets/document/permit/alter_sf.pdf

Septic Upgrade Grant Program
(410) 537-4195 or toll free at
(800) 633-6101
www.mde.state.md.us/assets/document/water/MDE-WMA-FIN020.pdf

FEDERAL AGENCIES

U.S. Army Corps of Engineers
Baltimore District
P.O. Box 1715
Baltimore, MD 21203-1715
(410) 962-7608 General Information
www.usace.army.mil/

U.S. Department of Agriculture
http://plants.usda.gov/
Plants database

U.S. Environmental Protection Agency, Region 3
1650 Arch Street
Philadelphia, PA 19103-2029
(215) 814-5000
www.epa.gov/region03

Chesapeake Bay Program Office
U.S. Environmental Protection Agency
410 Severn Avenue, Suite 109
Annapolis, MD 21403
(800) YOUR-BAY
www.chesapeakebay.net

Chesapeake Bay Field Office
U.S. Fish and Wildlife Service
177 Admiral Cochrane Drive
Annapolis, MD 21401
(410) 573-4500
www.fws.gov/chesapeakebay/
Partners for Wildlife Program has funding for private landowners.

Native Plants for Wildlife Habitat and Conservation Landscaping

Bayscapes Program and information

U.S. Forest Service
U.S. Department of Agriculture
Sidney R. Yates Federal Building
201 14th Street, SW
Washington, DC 20024
(202) 205-8528
www.fs.fed.us/r9/
Caring for your Forest with a Forest Stewardship Program

NONPROFITS

Adkins Arboretum
12610 Eveland Road
P.O. Box 100
Ridgely, MD 21660
(410) 634-2847
www.adkinsarboretum.org
First Stop for the Bay *information*

400-acre native garden and preserve; adult and children's programs; native plant sales, gift shop, art exhibits

Alliance for the Chesapeake Bay
6600 York Road, Suite 100
Baltimore, MD 21212
(410) 377-6270
www.acb-online.org
Many guidebooks available.

American Forests
734 15th Street NW, Suite 800
Washington, DC 20005
(202) 737-1944
www.amfor.org

Center for Watershed Protection, Inc.
8390 Main Street, Second Floor
Ellicott City, MD 21043-4605
(410) 461-8323
www.cwp.org
Many guidance documents on stormwater management

Chesapeake Bay Environmental Center
P.O. Box 519
600 Discovery Lane
Grasonville, MD 21638
(410) 827-6694
info@BayRestoration.org

Chesapeake Bay Foundation
Philip Merrill Environmental Center
6 Herndon Avenue
Annapolis, MD 21403
(410) 268-8816
Many documents available

Salisbury, MD Office
212 West Main Street, Suite 204B
Salisbury, MD 21801
(410) 543-1999
www.cbf.org

Chesapeake Bay Trust
60 West Street, Suite 405
Annapolis, MD 21401
(410) 974-2941
www.cbtrust.org
Funding for nonprofits and local governments

Chesapeake Conservation Landscaping Council
www.chesapeakelandscape.org
Conservation Landscaping Guidelines

Chesapeake Ecology Center
Adams Academy (middle school)
245 Clay Street
Annapolis, MD 21401
www.chesapeakeecologycenter.org
Ecoscaping Back to the Future…Restoring Chesapeake Landscapes

Rainscaping with Rain Gardens

Chesapeake Bay Maritime Museum
Navy Point, P.O. Box 636
St. Michaels, MD 21663
(410) 745-2916
www.CBMM.org

Chesapeake Wildlife Heritage
P.O Box 1745
46 Pennsylvania Avenue
Easton, MD 21601
(410) 822-5100
www.cheswildlife.org
Assists private and public landowners in design, building and management of wildlife habitat projects

Ducks Unlimited
Mid-Atlantic Field Office
34 Defense Street, Suite 200
Annapolis, MD 21401
www.ducks.org

Environmental Concern, Inc.
P.O. Box P
210 Boundary Lane
St.Michaels, MD 21663
www.wetland.org
Living shoreline design and installation, wholesale nursery catalog, native wetland plants

Maryland Nursery and Landscape Associations
P.O. Box 726
Brooklandville, MD 21022
(410) 823-8684
www.mnlaonline.org

Maryland Oyster Recovery Partnership
P.O. Box 6775
Annapolis, MD 21401
(410) 990-4970
www.oysterrecovery.org

Maryland Native Plant Society
P.O. Box 4877
Silver Spring, MD 20914
www.mdflora.org
Maryland's Native Plants: A Master Checklist

Control of Invasive Nonnative Plants

Native Plants for Wildlife Habitat and Conservation Landscaping

Maryland Eastern Shore Resource Conservation and Development Council, Inc.
28577 Mary's Court, Suite 6
Easton, MD 21601-7131
(410) 822-9300
www.md-esrcd.org
Shore Erosion Control—The Natural Approach

National Wildlife Federation Chesapeake Bay Mid-Atlantic Regional Center
11100 Wildlife Center Drive
Reston, VA 20190
www.nwf.org
Certify your Backyard Wildlife Habitat

Pickering Creek Audubon Center
11450 Audubon Lane
Easton, MD 21601
(410) 822-4903
www.pickeringcreek.org

Wilmer Park
Chestertown, MD 21620
www.wilmerparkrestoration.org

WATERSHED ASSOCIATIONS

Chester River Association
100 North Cross Street, Suite 1
Chestertown, MD 21620
(410) 810-7556
www.chesterriverassociation.org

Choptank River Eastern Bay Conservancy
P.O. Box 1276
St. Michaels, MD 21663
(410) 745-8341
tdjunkin@comcast.net
www.crebconservancy.org

Corsica River Conservancy
P.O. Box 235
Centreville, MD 21617
corsicariverconservancy@verizon.net
www.corsicariverconservancy.org
Funding for rain gardens

Sassafras River Association
P.O. Box 333
Georgetown, MD 21930
(410) 275-1400
www.sassafrasriver.org

Talbot River Protection Association
P.O. Box 2234
Easton, MD 21601
info@talbotrivers.org

Notes

BUFFER MANAGEMENT PLAN
Please attach site plan.

Property Owner **SAMPLE**

Address of property **123 Waterfront Lane, Anytown, MD 21000**

Election District **7** Map **52** Grid **4E** Parcel **500** Lot _____

Size of property **2** acres

Total disturbed area **250** square feet

The buffer is a naturally vegetated area 100 feet or more from mean high tide or a tidal wetland. There are a limited number of reasons why vegetation may be removed from the buffer. Please list the reasons you are removing vegetation in the buffer.

There is dying locust tree leaning over the shoreline and into the creek. The tree has not produced leaves in its last growing season, is dropping branches, and is in danger of falling onto the proposed pier, taking a large section of bank with it into the creek.

Please list types of plants to be removed and types to be planted (include size of replacement trees and whether balled and burlap or container grown). See the Buffer Mitigation Requirements on the back of this sheet to calculate replacement requirements.

Understory to be removed.

NA

Understory to be replanted (See the Forest Mitigation Requirements on the back of this sheet to calculate replacement requirements).

2 Flowering Dogwoods, 3 Red Chokeberry, 3 Inkberry, & 2 Pink Azaleas

Canopy trees to be removed.

1 Dying Locust tree

Canopy trees to be replanted (See the Forest Mitigation Requirements on the back of this sheet to calculate replacement requirements).

1 Hackberry and 2 Willow Oaks

Proposed Maintenance Plan. **All plantings to be completed within 2 growing seasons of project completion and maintained for the health of the species.**

Signature_____ Printed Name_____

Mailing Address_____

City, State, ZIP_____ Daytime Phone_____

My Documents/Critical Area/Critical Area Clearing Plans/Revised 10-04/agm

BUFFER MANAGEMENT PLAN: FOREST MITIGATION REQUIREMENTS

The calculations below are based on replacement of tree canopy and understory. Tree replacement is calculated by plant spacing on 8-foot centers (8X10) and based on trees that have either 1½-2 inch calipers or are 5-8 feet tall. Understory replacement is calculated by plant spacing on 5-foot centers (5X5) and based on understory plantings that are a minimum of 1 gallon in size. In the buffer, canopy and understory replacement is figured at 2 times the square footage of proposed removal (i.e.: if 200 square feet of canopy are proposed for removal, then 400 square feet of potential canopy must be replaced).

Figure the square feet of the proposed disturbed area and divide that figure by 43,560 square feet (one acre). Multiply that number by 544 for tree removal (trees per acre based on tree spacing on 8-foot centers) or 1,742 for understory removal (understory plantings per acre based on spacing on 5-foot centers). The resulting number will be multiplied by two and will equal the replanting plan. This replanting plan may include a mixture of trees and understory plantings and will be decided on a case-by-case basis according to existing lot conditions.

Enter the square footage of canopy or understory proposed for removal into the equation below to calculate the appropriate mitigation requirement to produce a potential replacement canopy or replacement understory plantings. Always round up when a calculation results in a half number 5 (0.5) or greater (i.e.: 1.5=2 trees).

Canopy Mitigation Calculation: Deciduous/hardwood trees must be replaced by deciduous/hardwood trees, and coniferous/evergreen trees must be replaced by coniferous/evergreen trees. Native cultivars are recommended.

250 /43,560 X 544 = **3** trees X 2 = **6** trees to be replanted
square footage of disturbed area

~SEE MITIGATION OPTIONS OUTLINED BELOW~

Understory Mitigation Calculation: Understory plantings must be replaced by understory plantings. Native species are recommended.

250 /43,560 X 1742 = **10** understory plantings X 2 = **20** understory to be replanted
square footage of disturbed area

***Replanting Options**

Option One: ***3 trees and 10 understory plantings***

Option Two: 4 trees and 7 understory plantings

Option Three: 2 trees and 13 understory plantings

Please submit a site plan showing the following (this site plan does not have to be to scale; just for illustrative of your lot configuration):

- Lot dimensions
- Location of dwelling and any buildings onsite
- Location of existing vegetation
- Location of trees to be removed
- Location of replacement plantings (option 1 seems most appropriate to your site)

First Stop for the Bay
www.firststopforthebay.org or call

Adkins Arboretum	**410-634-2847**
Caroline County	**410-479-8100**
Kent County	**410-778-7475**
Queen Anne's County	**410-758-1255**
Talbot County	**410-770-8030**

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