November 2001

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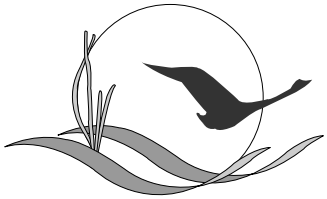
Chesapeake Bay Program
A Watershed Partnership

Better Backyard

A CITIZENS' RESOURCE GUIDE TO BENEFICIAL LANDSCAPING AND HABITAT RESTORATION IN THE CHESAPEAKE BAY WATERSHED



Chesapeake Bay Program

A Watershed Partnership

CHESAPEAKE BAY PROGRAM

The Chesapeake Bay Program is a unique regional partnership that has led and directed the restoration of the Chesapeake Bay since 1983. The Chesapeake Bay Program partners include the states of Maryland, Pennsylvania and Virginia; the District of Columbia; the Chesapeake Bay Commission, a tri-state legislative body; the U.S. Environmental Protection Agency (EPA), which represents the federal government; and participating citizen advisory groups.

Since its inception, the Chesapeake Bay Program's highest priority has been to restore the Bay's living resources—its finfish, shellfish, Bay grasses and other aquatic life and wildlife. In 2000 the Chesapeake Bay Program and its signatory partners signed the *Chesapeake 2000* agreement, in which Bay Program partners committed to achieve and maintain water quality conditions necessary to support all of the plants and animals that live in the Bay's complex ecosystem. The Chesapeake Executive Council—comprised of the governors of Maryland, Pennsylvania and Virginia; the mayor of Washington, D.C.; the EPA administrator; and the chair of the Chesapeake Bay Commission—continues to guide the restoration with directives and policies that address habitat restoration, toxic pollution prevention and point source and agricultural nonpoint source nutrient pollution reductions. Bay Program initiatives encourage the watershed's 1,650 local governments to address land use management, growth and development, stream corridor protection and infrastructure improvements.

Nutrient pollution reductions are achieved through voluntary agricultural management practices, urban nutrient management strategies and nitrogen-reducing technologies for wastewater treatment plants. Habitat restoration efforts focus on reestablishing Bay grasses, protecting and planting riparian forest buffers, opening fish passages, creating and restoring aquatic reefs and the Baywide management of fish stocks. Toxic contaminants are declining in many parts of the Bay since regional action plans have been established and a voluntary industrial pollution prevention program was implemented. Other improvements include fisheries and habitat restoration, recovery of Bay grasses, nutrient and toxics reductions and significant advances in estuarine science.

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Better Backyard

A Citizens' Resource Guide
to Beneficial Landscaping and Habitat Restoration
in the Chesapeake Bay Watershed

November 2001

Printed by the U.S. Environmental Protection Agency
for the Chesapeake Bay Program

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WHERE WE LIVE
The Chesapeake Bay Watershed

The Chesapeake Bay is our country's largest and most productive estuary. It is nearly 200 miles long, fed by 48 major rivers, 100 smaller rivers, and thousands of tiny streams and creeks in its 64,000 square mile watershed. This watershed covers all or parts of six states—Maryland, Virginia, Pennsylvania, New York, Delaware, and West Virginia—and the District of Columbia. It is home to 3,600 species of plants and animals, ranging from the lowly benthic worms living in the mud, to the majestic bald eagle. It is also home to 15.1 million people, with another 2.8 million expected by the year 2020. We have come to understand that people are the major cause of the Bay's problems, and that the challenges facing the Chesapeake Bay begin at home—in our own backyards—as well as in farm fields, cities and suburbs, and on our highways. Why? Because the Bay is part of a vast interconnected ecosystem. Everything we do on land—where we live, how far and how often we drive our cars, and the consumer choices we make—affect the Bay and the plants and animals that live there.

Special landscapes are disappearing from the Chesapeake Bay watershed, and loss of habitat is the main cause for loss of wildlife. Between 1982 and 1989, watershed wetland losses averaged about 3,000 acres a year. Despite regulatory protection, these losses and degradation continue as development pressure increases. Approximately one-third of historical forest coverage has been lost. Between 1985 and 1995 Bay watershed forests were cleared at a rate of over 100 acres every day. The health of many streams is declining, their waters transporting large quantities of sediment and pollution downstream and, eventually, into Chesapeake Bay.

Thirteen species of underwater Bay grasses once covered up to 600,000 acres of the Bay. The existing 69,000 acres fall far short of historical levels. Eastern oysters once lived on underwater shell reefs that rose to near the surface from the bottom of the Bay. Millions of oysters filtered plankton from the water, completely siphoning the Bay in under a week during summer. The human taste for tender oysters has significantly contributed to declining populations. Today, the Bay's oyster population has been reduced to a small percentage of historic levels, and it takes them one year instead of one week to filter the Bay. Destruction of aquatic reefs from centuries of dredging and tonging has greatly reduced suitable habitat for oysters and the other creatures that live on and around their reefs. In addition to harvest pressure and disease, reef acreage has been lost to the sediments and pollution that run off the land.

With so many people living in the Bay watershed, nonpoint source pollution has become a problem for living resources in the Bay ecosystem. Nonpoint source pollution includes runoff from streets, farms and construction sites and our own yards. Contaminants from every community —sediments, sewage, manure, fertilizers, pesticides, herbicides and motor oil—can be carried into the Bay from local streams and waterways.

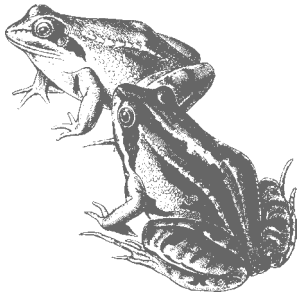
In 2000 the Chesapeake Bay Program and its signatory partners signed the *Chesapeake 2000* agreement, in which, among other things, the partners committed to achieve and maintain water quality conditions necessary to support living resources such as finfish, oysters, crabs, underwater grasses and waterfowl throughout the Bay ecosystem. By recognizing the inherent connections among the Bay watershed's vital habitats—its open waters, underwater grasses, marshes, wetlands, streams and forests—and by engaging in the landscaping and wise conservation activities proposed in *Better Backyard*, you can make an important difference and help preserve the Bay's plants and animals.

Here's how you can help. Reducing chemical use in the home landscape reduces toxins and nutrients reaching local creeks and, ultimately, the Bay. Managing erosion in your yard will help cut down on the amount of pollutants that reach nearby waterways. Special features can be used to divert water from your house, eliminating homeowner problems like flooding and wet basements. Creating rain gardens, raised beds, and permeable walkways are just some of the ways you can protect the Bay while protecting your property.

Wetlands and streamside forested buffers can also reduce runoff while adding diversity and beauty to your landscape. Trees act as natural air filters by trapping particulates and smog-related chemicals, removing carbon dioxide and producing oxygen. They can even help lower the costs of heating and cooling your home, when planted strategically around your yard. Degraded streams can be restored to provide an aesthetic focal point for your property while serving important habitat functions for fish, birds, and other animals. Natural areas like these can provide havens for local wildlife and solve problems of concern to property owners, like streambank and shoreline erosion.

What you do with your property can make a big difference for Chesapeake Bay, but it doesn't end there. Get involved and spread the word! Many organizations need volunteers for monitoring and restoration activities. The more people know about the Chesapeake Bay and what they can do to help, the better. There is strength in numbers.

Because our actions are so closely linked to the health of the Chesapeake Bay, stewardship of the land and water by ordinary citizens is our most effective tool for the Bay's restoration. There is much that we can do to help the Bay regain its historical elegance. What better place to begin than your own backyard?



BEFORE YOU BEGIN
Important Concepts

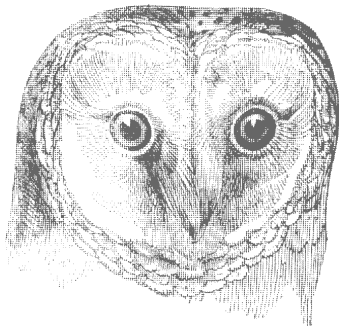
Congratulations on taking the first step toward a Better Backyard! Before you begin, there are some concepts that you should be familiar with. These concepts form the foundation for beneficial landscaping and will help you understand why your Better Backyard will be Better for the Bay!

BENEFICIAL, NATIVE AND NONNATIVE PLANTS

Beneficial plants are plants that require minimal maintenance—such as trimming, watering, and fertilizer or pesticide applications—because they are well-adapted to local climate and soil types. Native plants are always "beneficial plants," but not all plants considered beneficial are native. Although even botanical experts disagree on a formal definition of a native plant, for the purpose of this guide and the beneficial landscaping principles, we will define it as a tree, plant, shrub, vine or ground cover that would have been present in a particular area before modern humans altered the landscape.

When choosing native plants, select those that are indigenous to your locality, state or region of your state (for example, coastal plains or piedmont). In the Bay region, the primary habitats where native plants can be found include ancient forests, second-growth forests, wetlands, freshwater hardwood swamps, dunes, open meadows and mountain slopes. Native plants are well-suited to the landscape and climate, so they often require less maintenance—in the form of fertilizers, pesticides and watering. Consequently, fewer nutrients and chemicals are carried into Chesapeake Bay through runoff from our yards. Because they have been historically present in the Bay watershed, many local birds, mammals and other wildlife have come to depend upon native plants for food, breeding and nesting sites.

Nonnative plants may be invasive. Even plants native to other states can be invasive when planted out of their native range. Invasive plants displace naturally occurring vegetation and, in the process, upset nature's balance and diversity. They generally grow rapidly, taking over other native species. They are often pioneer species, quickly taking hold in disturbed areas. Invasive nonnatives may be very costly to control, and may severely limit the habitat value of the area for local wildlife. By planting native and beneficial plants at home, we can make a meaningful contribution to the restoration of local waterways and the Chesapeake Bay.



WILDLIFE HABITAT

Forests, wetlands and other natural areas are rapidly giving way to development and people in the Bay watershed. Whether converted to businesses, shopping malls or houses, the results remain the same: natural habitat is destroyed and plant and animals species diversity is lost.

Habitat refers to the food, water, cover and nesting sites all living creatures need to survive. Like humans, each animal has habitat preferences. You can help restore wildlife habitat in your own backyard. Even a small yard can be landscaped to attract birds, butterflies, beneficial insects and small animals. The plants you use for food and cover will help determine which wildlife species will be attracted to your property. Adjoining backyards can be landscaped to form greenways, safe havens in which animals can live and move. And by using a variety of native plants, you can often attract a wider range of wildlife. Natural wildlife corridors are especially important where large expanses of similar vegetation—such as a row of lawns in a subdivision—leave animals vulnerable to predators, or where exotic, invasive plants like kudzu have upset the balance of native vegetation.

RIPARIAN FOREST BUFFERS

A riparian forest buffer is an area of trees, usually accompanied by shrubs and other vegetation, that lies next to a stream or other body of water. The roots of trees and shrubs can help stabilize stream channels and shorelines. Vegetation also reduces pollution by trapping and filtering sediments, nutrients and other chemicals, keeping them from running off into local waterways. Additionally, riparian forest buffers supply food, cover, and shade for fish and other wildlife in the area.

INTEGRATED PEST MANAGEMENT (IPM)

IPM, as the name implies, is the integration of biological, cultural and chemical pest management methods into a comprehensive program of pest control for the home landscape. For the homeowner confronted with a multitude of pests throughout the year, an effective IPM program offers a wide variety of environmentally safe choices to manage pests. Approaches include plant selection to repel unwanted bugs and encourage good bugs, use of beneficial insects like lady bugs and praying mantids to reduce pest populations, or spot treatment with "safer" insecticides like insecticidal soaps. In the Bay region, IPM minimizes impacts on beneficial insects, wildlife and the waters of the Chesapeake Bay.

IPM encourages the use of alternatives to harmful or toxic chemicals as a means of controlling pests. Many natural and biological controls exist in the landscape to ward off insects, disease and other pests. Although IPM does not totally eliminate chemical pesticides as a control measure, it can help reduce the volume of pesticides used on the land.

XERISCAPING—LANDSCAPING FOR WATER CONSERVATION

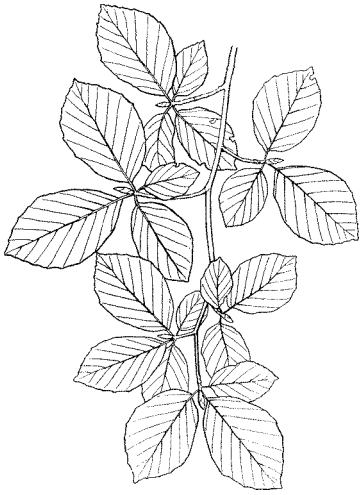
The word xeriscape comes from the Greek word *xeros*, meaning dry. Xeriscaping, literally means "dry landscaping", but is generally used to refer to landscaping that maximizes the efficient use of water in gardens and landscapes.

Water-wise landscaping includes evaluating how much water the lawn and landscape really need; learning how and when to apply water; understanding that plants thrive with well-developed, deep root systems; and using plants with lower water requirements and minimizing water waste in the garden. In some households, as much as 40 percent of the water used each month finds its way into the landscape, so future freshwater supplies depend upon wise outdoor water use.

You can reduce the amount of water used to maintain your lawn and garden with little significant expense or serious effort. For the most part, reducing water use means changing the way you have watered in the past. Key elements include: timing, thoroughness, proper equipment, mulching, plant selection and water zoning. Together, they can cut your normal water use by as much as two-thirds during summer months.

BAYSCAPING

Taken together, the concepts described above constitute "BayScaping." BayScaping is an environmentally sound way of managing lawns, gardens and other natural landscapes. By creating habitats that most closely resemble the historical, natural areas of the Chesapeake watershed, it is possible to reduce chemical and fertilizer use, improve habitat for local wildlife and create natural buffers that help protect the Bay from the impacts of pollution.



HOW TO USE THIS GUIDE

Resources for the first edition of *A Better Backyard* were gathered over a year, starting in the summer of 1997. Although we don't claim to be all-inclusive, we have done our best to scour the Chesapeake Bay watershed for information that will help you create beautiful, environmentally friendly landscapes. We looked for resources through the Internet, in libraries and through our many contacts within the Chesapeake Bay Program. More than 200 surveys were sent to government agencies and nonprofit organizations, asking for resources and leads. This document is a compilation of that year's research and our 2001 revision. If you find errors with contact information, please notify us so we can incorporate changes into future documents.

A Better Backyard is organized into chapters that go from your yard to the water's edge. Using the last chapter, we hope you will take this information beyond your backyard and into your community. This is a "resource document." We provide general information on environmentally friendly landscaping. For more technical and specific information, you will need to explore the many resources mentioned in the text and listed in the back in Resources and Contacts. Because landscapes and ecology differ dramatically from the watershed's mountains to the Bay's shorelines, we don't make plant recommendations. Numerous sources for plant lists are provided in the resources section. It is well worth your time to study the lists that are appropriate for your region and to talk with local nurseries and greenhouses. Many nursery growers know much about native plants and are just waiting for people like you to create a demand for natives.

We formatted the text to make it easy to find resources. Contacts are underlined in the text and the Resources section. *Programs and documents are italicized*. Full contact information is in Resources and Contacts at the end. Contacts are organized by federal agencies and programs, state and local government agencies and programs, government agencies outside the Chesapeake Bay watershed, nonprofit and private organizations, plant lists, and other resources. Many contacts provide Internet webpages and addresses. We take you to the front page of websites, so you may have to search the website for a particular document or program. We chose to provide front page website addresses because we found many addresses within websites changed during our year of research. If you can't find the document or program that we mention, please contact the webmaster of the site. They should be able to help you. Watch the Chesapeake Bay Program website for *A Better Backyard* online. It will be linked with the many websites listed here.

BEFORE YOU START
Evaluate Your Yard

Here are a few steps you may want to consider before you start to dig. Read the chapters of *A Better Backyard* for guidance, then explore the resources for details. This homework can help prevent disasters, save work and money, and give you the yard of your dreams. Take your time. Your plans can extend over several years. Gardening is a great experiment that can last a lifetime. Enjoy it.

STEP 1: TAKE A LOOK

Walk your property and look carefully at its features. Note size, shape, borders (and what's next to them), and contour. Do you have special habitats like wetlands, forests, or streams? If so, take a look at Chapter Three, Protecting Critical Habitats. Do you have special problems like slopes, erosion or lack of sunlight? For erosion problems, check Chapter One, Water, Water Everywhere! or Chapter Four, Guarding the Edge.

STEP 2: EVALUATE GROWING CONDITIONS

Test your soil. Is it well drained or poorly drained? What is its texture? Find out more about soil testing in Chapter One, Water, Water, Everywhere! Note your local ecology. Do you live in the mountains, on the Bay, along a stream? Waterfront residents will be interested in Chapter Four, Guarding the Edge. Those of you lucky enough to have natural streams on your property should be sure to read Chapter Three, Protecting Critical Habitats. Are natural areas in the region composed of deciduous forests, conifers or grasses? How much sun do you get and at what angle and time of day does it hit the ground? How much rain does your area receive during the growing season?

STEP 3: WHAT ARE YOUR GOALS?

Determine what you want from your landscaping. Privacy? If so, consider forested areas and read about options in Chapter Three, Protecting Critical Habitats. Wildlife enhancement? Skip to chapters two, three or four, depending on the natural features of your yard. Ease of maintenance? Stormwater runoff control? Be sure to review Chapter One, "Water, Water Everywhere!". Write down those goals and incorporate them into your landscaping ideas.

STEP 4: MAP YOUR YARD

Draw a map of your yard, to scale if possible. See "BayScaping for the Long-Term", a fact sheet included in the Alliance for the Chesapeake Bay and Fish and Wildlife Services's *BayScaping* package, for more planning guidance. Decide where you would like gardens, trees and open areas. Consider local laws and be considerate of neighbors. Remember that plants grow, so you need to leave space for growth and the shade that trees will eventually produce.

STEP 5: CHOOSE YOUR PLANTS

Check the plant lists noted in our resources section. Talk to local growers. Visit parks, botanical gardens, arboretums and greenhouses in your area. For the best results, choose plants suited for your region, soil type, rainfall and sunlight.

STEP 6: PLANT WITH LOVING CARE

Follow planting instructions from your nursery or greenhouse or other resources. Plant only during spring or fall. Be prepared to water plants during that first year, if it's a dry one. Fertilize only when necessary.

STEP 7: BE PATIENT

Plants take time to grow. Be patient. Enjoy the pace set by Mother Nature.

STEP 8: SPREAD THE WORD

Don't keep your new-found knowledge to yourself. Take a look at Chapter Five, "Beyond the Driveway," for tips on how to help spread the word. Talk to your neighbors, community, schools and governments about environmentally friendly landscaping.

CHAPTER 1

WATER, WATER EVERYWHERE!
Controlling Runoff

Water has a way of taking things with it—especially your topsoil. Your soil is as important as water and sunshine for growing healthy lawns and gardens. Soil erosion is a huge threat to your yard's stability and beauty; it's also a major polluter of our waterways and the Bay. Cloudy water isn't the only consequence. When sediments settle to the bottom they can cover important fish habitat, underwater Bay grasses and oyster beds. Sediment is not the only thing washing off the land. Nitrogen and phosphorus from fertilizers, and harmful chemicals from pesticides and household products, run into storm drains when it rains. They eventually end up in the Chesapeake Bay. When water rushes off the land, carrying soil and pollutants with it, this is called "runoff." Runoff can significantly affect life in the water and in the Bay.

Nitrogen and phosphorus are nutrients that fuel algal growth. Excessive algal growth, along with sediments, clouds the water and prevents the growth of underwater Bay grasses. In addition, when the algae die they decay. Decaying plants use up the oxygen that fish need to survive. Warm water holds less oxygen than cold water. So in summer, when the water is warm and algae abundant, oxygen levels in the water may drop so low that fish can't live. Chemical contaminants have a different effect. If concentrations are very high, toxic chemicals can kill fish and wildlife, as well as insects. Most of the time, however, concentrations are low enough that animals don't die. Instead, they may accumulate toxic substances in their bodies over long periods of time. These accumulations can affect fish and wildlife health and reproduction. For example, during the 1960s the pesticide DDT started accumulating in fish-eating birds like ospreys and eagles. High DDT levels in their tissues resulted in thin eggshells. Parents broke eggs when they sat on them, causing dramatic population declines in these majestic birds. A ban on DDT since 1972 has slowly resulted in population recovery. Humans, too, can accumulate toxic chemicals if they eat contaminated fish, so be sure to heed any fish consumption advisories in your area.

Although careful use of fertilizers and chemicals is essential to keeping these pollutants out of waterways, preventing water from rapidly running off the land and into local waterways is crucial. Impervious surfaces that won't allow water to seep through, like pavement and buildings, are a significant

DITCH THE DISPOSAL!

While garbage disposals are convenient, they add loads of excess nutrients into wastewater flows. Try composting! Composting makes use of bacteria to break down leaves, grasses, and vegetable food waste, speeding up the natural process of decomposition. It's a great way to recycle organic materials and nutrients back into your where your garden plants can use them. You'll reduce household waste and improve the health of your soil. Maryland Cooperative Extension Service *Leaflet #245* explains all you need to know about home composting. You can find information in virtually every gardening book and there are tons of great web-sites with "how-to" instructions.

Check out:

The Humusphere Website, www.composter.com

Backyard Magic: The Composting Handbook, www.gnb.ca/elg-egl/0372]0003/0001-e.html

Texas Natural Resource Conservation Commission, www.tnrcc.state.tx.us/admin/topdoc/gi/036.html

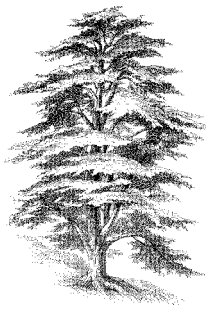
Home Composting, www.stopwaste.org/fscompost.html

cause of rapid runoff in urban and suburban areas. You can help slow runoff by reducing impervious surface cover in your yard. Best management practices (BMPs), such as proper drainage, water retention areas, buffers of grass, shrubs and trees, and raised beds can help prevent pollution and direct water to areas where it can safely filter through the soil. Additionally, these measures may prevent homeowner headaches like excess water finding its way into your basement.

BEGIN HERE: LOOK FOR EROSION IN YOUR YARD

Your first step to managing stormwater is to check your property for signs of erosion. Soils that are vulnerable to erosion are often on slopes, exposed to wind, or in the path where water tends to flow when it rains. Steep slopes and areas that lack vegetation are especially susceptible. The Maryland Cooperative Extension Service provides several factsheets on preventing erosion. To spot signs of erosion in your yard or community, check for:

- Exposed tree roots, stones and rocks
- Small gullies
- Build-up of silt and soil in low-lying areas
- Soil splashed on walls or walkways
- Widening and deepening of stream channels and drainage ditches



SOIL-SAVING TECHNIQUES FOR HOMEOWNERS

There are three basics to stopping and preventing erosion: (1) cover bare soil; (2) redirect runoff water across vegetated areas; and (3) plant trees, shrubs and ground covers best suited for your soil and region. County Cooperative Extension Services and federal Natural Resources Conservation Service offices in each state can provide you with tips for preventing erosion and excess runoff. Details are also provided in the Center for Watershed Protection's document *Erosion and Sediment Control* and the Alliance for the Chesapeake Bay's *Controlling Nonpoint Source Water Pollution: A Citizens Handbook*.

Construction projects substantially contribute to sediments in our waterways. *Clearing and Grading Strategies for Urban Watersheds*, prepared by the Metropolitan Washington Council of Governments (MWCOG) for the U.S. Environmental Protection Agency, describes how to prevent erosion during construction. Contact MWCOG for ordering information.

Cover Bare Soil

Soil exposed by construction or landscaping projects should be replanted immediately and covered with grass clippings, straw or other coverings until the new vegetation is established. Mulch will protect unplanted areas around newly planted trees, shrubs and flowers.

Cover Crops

Cover crops aren't just for farmers. Planting a cover crop during winter on your vegetable garden will prevent erosion. Grasses, clover or grains can be planted in fall, will grow throughout winter, and should be tilled into the garden in spring.

Permeable Walkways

High traffic areas are especially vulnerable to erosion. Construction techniques and materials that allow water to filter through the soil are called permeable. Permeable materials, such as vegetation, wood chips or gravel, will protect soil, allow rain to penetrate into the grounds, and prevent muddy shoes. Consider creating walkways, driveways and patios that are permeable. Special materials can be used to create environmentally friendly permeable parking lots. Large stones surrounded by gravel or ground-creeping vegetation, wooden decks, even brick with sand between the bricks allow more water penetration than blacktop or cement. Check with your local home improvement center for information on specific permeable material product lines.

Direct Water Away from Homes and Development

Unless you have landscaped your property to accommodate excess water, most of it will leave your yard as runoff into public drainage systems or nearby streams. Uncontrolled runoff can create gullies and deepened channels in your yard. Runoff carries sediments and pollutants into your local streams, eventually delivering them to Chesapeake Bay. The key to controlling runoff is to encourage water to move away from your house slowly, through vegetation in your yard and into the public drainage system or stream. During dry summer months, you may want to encourage some water to stay near your thirsty grass and gardens.

Water leaves your property in three ways: infiltration (filtering through the soil), runoff across land and evaporation. Infiltration recharges your groundwater and the water can be used by plants as it trickles through the soil. You want to encourage infiltration by planting vegetation and maintaining good soil texture. Improve soil texture by adding organic material, such as peat or compost. Clay soils may require a little extra sand. Plants also promote infiltration when water trickles along root channels in the soil and a significant amount of water is lost through their leaves as evaporation.

Wetlands and Open Space

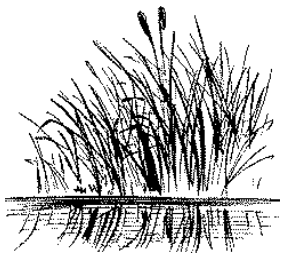
Wetland areas that are used for runoff retention and detention should be part of every stormwater management program. Wildlife is an added bonus that comes with well-designed areas. The National Institute for Urban Wildlife reports that the majority of homeowners say they enjoy the birds and wildlife associated with stormwater control basins. Their *Urban Wetlands for Stormwater Control and Wildlife Enhancement* provides a brief technical overview concerning the wildlife benefits that go with utilizing wetlands for urban runoff control. (For more information on wetland benefits, protection and restoration see Chapter Three, Protecting Critical Habitats). Natural areas of

BE A GOOD NEIGHBOR

If you plan to substantially alter your land close to a property line, inform your neighbor as a courtesy before you begin work.

almost any type become valuable for stormwater management, especially in urban and suburban areas. J. Toby Tourbrier, a Philadelphia planning consultant, provides details and diagrams for using open space in a holistic approach to stormwater management. Check the *Journal of Soil and Water Conservation* article entitled "Open Space through Stormwater Management: Helping to Structure Growth on the Urban Fringe" (J. Soil and Water Cons., Vol. 49, #1, Jan/Feb 1994, pp. 14-21), which recommends designing development around stormwater management rather than squeezing stormwater management into the development plan. Many of the questions and concerns that local organizations and landowners face when they tackle runoff control, vegetation buffers and wetland protection are addressed in *Local Ordinances: A Users's Guide*, available from the Terrene Institute.

Rain Gardens and Bioretention Areas



Rain gardens and bioretention areas are techniques used in many newer developments, but they can work under some circumstances in older communities, especially where yards are large. Rain gardens are low-lying areas, away from homes, where water can safely accumulate during heavy rain. Many homeowners have low spots in their yard already. Rain gardens placed among several yards or on community properties can provide benefits to the entire community. Bioretention areas are larger, usually require earth-moving and permits to create, and should be considered before development begins and while developing local stormwater management plans. These areas slow down water flowing into drainage systems and streams, and help prevent flooding in those flood-prone areas of the community. Rain gardens and bioretention areas are vegetated. Although rain gardens often have only grass, shrubs and trees or layered natural areas do a better job. Bioretention areas should be allowed to grow naturally and should contain native vegetation. In addition to runoff control, the plants in rain gardens and bioretention areas help suck up water, increasing infiltration and evaporation. Remember to put only water-tolerant varieties in water-prone areas. Some plant lists indicate whether the plants can tolerate periodic flooding. (Available plant lists are included in Resources and Contacts).

You can learn more about bioretention areas (and gain tips for smaller rain gardens) from *Design Manual for Use of Bioretention in Stormwater Management*, a publication prepared for the Prince George's County, Maryland Department of Environmental Resources, and available at cost from Biohabitats, Inc. The Center for Watershed Protection addresses bioretention and other infiltration techniques in *The Economics of Urban BMPs in the Mid-Atlantic Region*.

Raised Beds

You can keep water away from your house using raised flower or shrub beds beside the house. The edges of the beds should direct water onto grassy or natural low-lying areas away from your house. During a heavy or long rain, water is diverted to a vegetated area that can accommodate the runoff, such as a rain garden. From there water will either evaporate, infiltrate, or run off into your public drainage system or local stream. Grass or other vegetation will help filter out pollutants and sediments, before it hits the drainage system or nearby waterway.

Riparian Forested Buffers

In the best of worlds, water would flow away from your house and through the forested buffers that edge all local streams. Even a small forested portion of your yard will help control runoff. Numerous publications are available on establishing streamside forest buffers. (Many of these, along with the benefits and techniques for forests and streamside buffers are discussed in Chapter Three, Protecting Critical Habitats.) For easy-to-read summaries on forest buffers, erosion, rain gardens, wetlands, cover crops and more, contact the Northern Virginia Soil and Water Conservation District for *You and Your Land: a Homeowner's Guide for the Potomac River Watershed.* Its easy-to-follow diagrams and recommendations are pertinent to the entire watershed.

THE BEST BMP IS PLANNING

Ideally, stormwater runoff and land use planning should be managed regionally, in cooperation with local governments. The Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation hits at the heart of the issue in their brochure: *The Best Urban BMP is Planning*. This brochure summarizes the steps needed for effective land use planning and how stormwater management programs work. *Developing Successful Runoff Control Programs for Urbanized Areas* is a comprehensive manual describing the strategies local communities can use to implement runoff control programs. This publication is available from the Northern Virginia Soil and Water Conservation District. Support for land use strategies such as cluster development, preservation of open space and sensitive areas, and natural stormwater runoff control will help communities manage stormwater while maximizing habitat benefits for local wildlife. See *Providing Wetlands for Wildlife While Controlling Stormwater, Circular #384*, a brochure offered by the Pennsylvania Cooperative Extension Service. Additional details are included in *Beyond Sprawl: Land Management Techniques to Protect the Chesapeake Bay*, available from the Chesapeake Bay Program. Complete details for managing stormwater runoff are beyond the scope of this document. You can receive full information on regulations and guidelines from your state government. In Pennsylvania, contact the Pennsylvania Department of Environmental Protection, Bureau of Watershed Conservation, for *Stormwater Management Guidelines and Model Ordinances*. More information can be obtained on their website. (See Resources and Contacts for the web address). In Virginia contact the Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation for *Virginia Erosion and Sediment Control Law, Regulations and Certification Regulations*. In Maryland contact the Maryland Department of the Environment. District of Columbia stormwater management regulations can be obtained through the District of Columbia Environmental Health Administration's Soil Quality Division.

Planning should be comprehensive, with stormwater management as just one component. It should include zoning for particular uses, wastewater treatment, support for transportation and other infrastructure, and preservation of open space and sensitive areas such as wetlands and forests. You can help by learning about alternative and innovative planning and protection strategies and by participating in your local government. The Chesapeake Bay Program's *Local Government Toolkit Series* provides strategies and financial and

technical assistance programs that local governments and communities can use to protect their natural resources and maintain livable communities. Documents include *Protecting Wetlands: Tools for Local Governments in the Chesapeake Bay Region*, *Protecting Wetlands II: Technical and Financial Assistance Programs for Local Governments in the Chesapeake Bay Region*, *Beyond Sprawl: Land Management Techniques to Protect the Chesapeake Bay* and the *Local Government Pollution Prevention Toolkit.* Also check with the Center for Chesapeake Communities or the Chesapeake Bay Program's Local Government Advisory Committee for additional information on what local governments can do to protect the Chesapeake Bay.

Contact the Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation for *Clean Water...A Community Commitment to Protecting Virginia's Watersheds*. This brochure contains common sense watershed protection tips for homeowners, developers, farmers, local officials, boaters and businesses. The *Citizens Water Quality Handbook*, produced by the Northern Virginia Soil and Water Conservation District, is also a great source of information on ways citizens can protect water quality. The Pennsylvania Department of Environmental Protection, Bureau of Watershed Conservation produces *Local Solutions to Pennsylvania's Pollution: Pennsylvania's Nonpoint Source Management Program*. Maryland Office of Planning developed *Managing Maryland's Growth: Smart Growth Options for Maryland's Tributary Strategies*, which provides guidelines for managing development at the local level. Although they are outside the Chesapeake Bay watershed, the tips provided by Wisconsin Cooperative Extension Service factsheet *Cleaning up Stormwater Runoff* are relevant to all. *Urban Runoff and Stormwater Management Handbook* and *A Watershed Approach to Urban Runoff: Handbook for Decisionmakers* are produced by the Terrene Institute, in cooperation with U.S. Environmental Protection Agency, Region 5. Order documents from the Terrene Institute. The Center for Watershed Protection, Inc. publishes numerous documents, newsletters and a journal on innovative planning strategies and techniques, including *Site Planning for Urban Stream Protection*. The Chesapeake Bay Foundation produces a practical guide for creating communities that are more livable and better for the environment. *A Better Way to Grow* contains diagrams and photos showing stormwater management, innovative development patterns, and sensible transportation designs. The Alliance for the Chesapeake Bay offers several publications on runoff, stormwater management and pollution control. Ask for *Nonpoint Source Pollution Publications and Projects*.

VACATIONING IN MARYLAND?

Taking a trip through the state of Maryland? At toll booths, make sure kids ask for their copy of the *Maryland Bay Game* to make your trip fun and educational!

CHAPTER 2

LESS TO MOW

Alternatives to the Traditional Lawn

Less yard work? Sounds too good to be true? It is true. There are many ways to reduce the amount of time and attention your yard requires *and* help the Chesapeake Bay! The easiest way is to shrink your lawn. That's right, mow less. A healthy lawn protects soil, slows runoff, and traps pollutants, but the basic upkeep takes energy, time and money. So, you might want to rethink your landscaping. Butterfly gardens, wildflower meadows, tree and shrub groupings, groundcovers or water gardens are only a few of many alternatives to traditional grass lawns that are pleasing to look at, may require less maintenance over time and prevent erosion and runoff. The added bonus comes when your new easy landscaping attracts wildlife.

The Maryland Cooperative Extension Service Home and Garden Information Center offers a fact sheet on *Lawns and the Chesapeake Bay* that guides you with maintaining a healthy, low-impact lawn. While you have them on the phone, ask for *Help the Chesapeake Bay!*, an extra-heavy information sheet that is packed with lawn care tips, and suitable for bulletin boards or the refrigerator. They also have a series on Chesapeake Bay Preservation and the Home Landscape. Mimeo #302, *Landscapes that Help Chesapeake Bay* has a table of suitable ground covers. Publication #AM 70, also available from the Home and Garden Information Center, explains how to establish and care for a wildflower planting. The *Virginia Gardener Guide to Water-Wise Landscaping* covers everything from designing a water-wise site, to plant selection and soil management. It is available from the Virginia Cooperative Extension Service. General lawn care guidelines can be found on the United States Department of Agriculture's Natural Resources Conservation Service website. While you're there, check out *Backyard Conservation* for tips on ways to make your lawn more attractive that are good for the environment. The U.S. Environmental Protection Agency's Great Lakes National Program Office offers comprehensive information about beneficial landscaping on their website, including a link to the *Wild Ones Handbook*. The handbook provides lots of technical advice for creating natural areas, but be sure to consult local sources for plant suggestions. The U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, publishes native plant lists for the Chesapeake Bay Watershed.

GO NATIVE!

Forget about location—the three most important things about habitat restoration are Native, Native, Native! Planting invasive or non-native species can undo an entire project and disrupt the surrounding habitat and ecosystem. BE SURE to consult your local cooperative extensive service or U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, (410) 573-4593, for a list of native plants species for your area and avoid "invasives" at all cost!

MAKING YOUR LAWN LOW MAINTENANCE AND LOW IMPACT

If you decide to maintain some grass areas in your yard, make them low maintenance for you and low impact for the environment. Here's how . . .

Test Your Soil

A soil test to determine soil pH is recommended before you start planting grass or other vegetation, and every 3 to 5 years thereafter. Maintaining proper pH is very important in low- or no-maintenance conditions. The best pH levels for healthy grass range from 6.0–6.5. Most frequently pH is too low and soil needs an application of limestone. Contact your local Cooperative Extension Service (through the blue pages of the phone book or the U.S. Department of Agriculture's Cooperative State Research Extension and Education Service website) to find out where you can get your soil tested. *Soil Management in Home Gardens and Landscapes*, available from the Pennsylvania Cooperative Extension Service provides tips on testing and improving your soil. The type and pH of your soil will determine which grasses and will grow best in your yard. For a comprehensive look at soil science and nutrient management, obtain a copy of *Chesapeake Bay Region Nutrient Management Training Manual* from the Chesapeake Bay Program.

Choose the Proper Variety of Grass

The turfgrass species you choose should perform well with low amounts of fertilizer. Many species of zoysiagrass, tall fescue, or fine fescue are adapted to Chesapeake Bay watershed climate and rainfall. If you live in Maryland, use varieties listed in Maryland Cooperative Extension Service Publication #AM 77 *Turfgrass Cultivar Recommendations for Certified Sod and Professional Seed Mixtures in Maryland*. Virginia and Pennsylvania publications listed previously can help with varieties in these areas.

Establish a Healthy Stand

For best results, seed grasses between late August and late September. Avoid seeding after mid-October or in Spring because weeds often become a problem if grass growth isn't optimum. Check the turfgrass bag label for the seeding rate, often 4 to 6 pounds of seed per 1000 square feet, depending on species. Broadleef weeds should be removed between May and early June following one fall seeding, either by hand pulling or by careful spot-treatment with herbicides. Overseeding may be necessary to maintain a dense turf if thinning occurs or if bare patches are left after weeds are removed.

Fertilize (If You Really Must)

By choosing the appropriate lawn grass, you will reduce the amount of fertilizer required to maintain your lawn. However, when you do fertilize, be sure to read the label recommendations and calibrate your spreader correctly (see box). Keep fertilizer off of paved surfaces and out of natural drainage areas. You don't want fertilizer running directly into local waterways. A starter fertilizer that contains nitrogen (N), phosphorus (P), and potassium (K) may be applied at the time of seeding or shortly after seedlings emerge, if a soil test indicates deficiencies.

HIRED LAWNCARE

Questions to ask when choosing a Pest Control or Landscape Company

- Is the company licensed/certified to apply pesticides?
- Are references available?
- Does the company test soil before making decisions?
- Do they offer nontraditional landscaping, including the use of native plants?

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ANOTHER REASON TO MOW LESS . . .

A lawnmower pollutes as much in one hour as driving an automobile for 350 miles!

Incorporate Fertilizer into Soil Prior to Seeding

This is critical for establishing a lawn that will prevent soil erosion and the encroachment of weeds. Established lawns typically need some fertilizer applied yearly in September and October to maintain dense growth, enhance pest and drought resistance, and encourage root growth. Don't apply fertilizer if rain is forecast in the next day or so. Avoid the temptation presented by the stacks of fertilizer bags outside local garden centers in Spring. Fertilize ONE TIME ONLY during Spring, and ONLY if your soil test or grass quality indicates nutrient deficiencies. The general fertilizer recommendation for most grasses is 1 pound of nitrogen per 1000 sq. ft. The easiest way to follow this recommendation is to apply 20 lbs of a 5-10-10 fertilizer on 1000 sq feet of lawn.

Not all homeowners choose to fertilize their lawns. But, if you choose to fertilize, consult the recommended fertilizer application guide in Maryland Cooperative Extension Service Fact Sheet #702 *Lawns and the Chesapeake Bay*. You may also want to ask them for *Take It from Maryland Farmers... Use Fertilizer Wisely: Protect Chesapeake Bay*. Virginia's Department of Conservation and Recreation publishes *The Virginia Gardener Year Round Guide to Nutrient Management*, with month-by-month highlights on soil maintenance and fertilizing, and *Tips on Keeping Your Lawn Green...and the Chesapeake Bay Clean*, a brochure on fertilizer application programs for specific grasses. Virginia's Cooperative Extension Service offers a factsheet called *Ecological Turf Tips.... To Protect the Chesapeake Bay: Lawn Fertilizer in Virginia*. Wisconsin's Cooperative Extension Service offers a general factsheet that is applicable to most regions of the country called *Lawn and Garden Fertilizers*.

WATCH THAT FERTILIZER!

Make sure to calibrate your spreader before you start applying fertilizer. How much you need will depend on what type of spreader you use, and the size of your yard. Contact the Virginia Cooperative Extension Service for Fact Sheet Publication #430-017, *Ecological Turf Tips . . . to Protect the Chesapeake Bay: Calibrating Your Lawn Spreader.*

Mow Properly

Keep grass fairly long to retain grass density and shade out annual weeds. Never mow lower than 2.5 inches in height and, preferably, 3.5 to 5 inches. Zoysiagrass species, however, should be mowed to a height of 0.5 - 1 inch. A rule of thumb is not to remove more than 1/3 of the grass height at any one mowing. Never mow fine leaf grasses in summer during conditions of heat or drought stress.

"Grasscycle"

After mowing, allow clippings to remain on the lawn. This practice helps recycle nutrients and will help maintain grass density on unfertilized lawns. The use of mulching mowers, which cut clippings into smaller pieces, can be beneficial for nutrient cycling. Remove clippings only when the lawn has substantially overgrown suggested cutting heights and compost those clippings. Never blow lawn clippings onto sidewalks, driveways, streets or storm drains.

Tend That Lawn

Aerate the lawn to reduce compaction and remove thatch as needed. Zoysia and fine fescues tend to accumulate thatch over time. Overseeding of areas that are bare or with low grass density may be necessary. Seed between August 15 and October 15, just as you would with first plantings. Watering isn't always necessary and may actually damage your grass if done incorrectly. It is safe to let an established lawn go dormant during dry periods. Dormancy is a

survival mechanism and your lawn will usually recover when it finally rains. However, proper irrigation can help minimize the encroachment of weeds by increasing grass density. If you irrigate, follow guidelines in the Maryland Cooperative Extension Home and Garden Information Center factsheets, *Irrigation and Water, Conservation on Home Lawns,* and *Water Tips for Drought Conditions*. The Wisconsin Cooperative Extension Service offers a practical factsheet that is applicable to most regions of the country, including Chesapeake Bay, called *Lawn Watering*. Control weeds by hand or with spot treatments of herbicides. Information on crab grass control is available in Maryland Cooperative Extension Service Publication #AM 85*, Herbicides for Crabgrass and Goosegrass Control in Turf*. AM #79 provides information on *Broadleaf Weed Control in Established Lawns*.

LANDSCAPING FOR WILDLIFE

WASTE NOT!

Pet waste is a major contaminant in many streams and rivers that can impair water quality and carry disease. Dispose of your pet's waste by burying it or flushing it, or placing it in the garbage can.

It's hard for animals to live among people. Residential landscapes aren't usually their habitat; wildlife need natural vegetation that supplies food and shelter. With careful plant selection and arrangement, even the smallest yard can become a haven for wild creatures. Increasing the plant diversity will attract the most types of animals, but careful plant selection will help attract specific creatures.

Planting trees, shrubs, and perennial plants provides habitat for migrating birds and monarch butterflies. It also provides homes for resident birds, amphibians and reptiles, butterflies, moths and other beneficial insects. You can put up houses for bats, birds, squirrels and even insects. Urban dwellers, with little or no yard, can help create wildlife-enticing community areas or parks. Apartment dwellers might try container gardens on rooftops or balconies. Birds and even butterflies also benefit from these tiny urban sanctuaries.

Plant the Essentials: Food, Water and Cover

Wildlife require the basics: food, water and cover. Birds eat seeds, buds and fruit produced on trees, shrubs and grasses. Trees and shrubs shelter birds from sun, inclement weather and predators. Nesting and singing birds especially need trees and shrubs. Most birds need a little water, which can easily be supplied with a bird bath, but you can add frogs to your yard's wildlife community with the addition of a small pond.

BIRD FEEDING TIP!

Place shrubs near bird feeders for cover and perching.

Birds. Migratory bird populations have been declining over the last few decades. Habitat loss, especially forest fragmentation, is to blame. You can help by planting trees and shrubs. Larger forested areas are best, so think about planting your trees near your neighbors' trees or natural areas close to your property. Better yet, work with your community association or neighborhood to create natural areas that span portions of several yards or fill community properties.

When choosing plants, mix up the species. If you have a big yard or are landscaping a community area or park, combine different species, sizes and shapes in clusters. Group trees and shrubs to create sanctuaries throughout the area; a smaller yard may support just one cluster. Choose plants that provide the greatest overlap of flowering and fruiting times, so there is fruit on trees year-round. Berry bushes and fruit-bearing trees and shrubs will be appreciated by orioles, cardinals, mockingbirds, house and purple finches,

white-throated sparrows, and grosbeaks. Plant choices will depend on where you live.

Evergreens and shrubs provide the best cover and offer potential nesting sites for birds. Evergreens, which don't lose their needles, provide excellent winter protection. Shrubs with thorns or prickles also heighten protection from predators. Many birds, like blue birds and flickers, nest in cavities, so consider saving older trees or stone walls that may have holes. Older, dying and dead trees harbor insects essential for many birds. Maryland Department of Natural Resources *Wild Acres Program* produces a factsheet on *Snags* (dead standing trees) *and Logs for Wildlife Food and Shelter*.

Other elements essential for attracting birds to your backyard include food and water. Many birds benefit from seeds and fruits placed at bird-feeding stations and nest boxes. The website at Wild Birds Forever provides a list of foods preferred by various types of birds. Suggestions for providing the appropriate birdhouse or shelter are available, as are tips for identifying backyard visitors. A bird bath or water tray gives birds a place to drink and bathe.

BayScapes, a homeowner's guide to environmentally sound landscaping for Chesapeake Bay produced by the Alliance for the Chesapeake Bay and U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, provides plant suggestions and details on landscaping for wildlife. In Howard County, Maryland, you can visit sites in the Maryland Cooperative Extension Service's *Bay-Wise Landscape Management Demonstration Site Program*. For details, contact the Maryland Cooperative Extension Service's Master Gardener Program office in Howard County. The Maryland Department of Natural Resources *Wild Acres Program* offers factsheets with advice on landscaping for wildlife and how to attract specific birds. The Elizabeth River Project in Virginia established the Citizens for a Cleaner River Program to assist citizens interested in enhancing habitats. For a fee, you can order the *Project Habitat Enhancement Packet* with tips on creating backhard habitat. The Pennsylvania Game Commission invites schools and youth organizations to join their *Wild Habitats Program*, which offers technical and resource support to schools, nonprofit organizations and community groups who wish to improve wildlife habitat on their grounds. The National Wildlife Federation also offers a *Schoolyard Habitats Program*. (See Chapter Five, Beyond the Driveway for more information on school programs). The U.S. Fish and Wildlife Service Office of Migratory Bird Management offers pamphlets on backyard bird feeding and nest boxes. The pamphlets are only available on the Internet, but you can request a copy of *For the Birds,* a comprehensive brochure that covers everything included in the birding pamphlets and more, from feeder selection and placement to plants for wild birds.

Nectar-eaters: Butterflies and Hummingbirds. Over 700 species of butterflies are found in North America and most consume nectar from flowers. Only one species of hummingbird, the ruby throat, lives in the Chesapeake Bay watershed. In spring and fall, migrating hummingbirds and monarch butterflies need flowers to fuel their long journey. Numerous bees and other insects that help pollinate plants will also benefit from your butterfly garden. If you plant night-blooming flowers, your garden will attract nighttime, nectar-eating moths.

The key to a hummingbird and butterfly garden is diversity. You need to have flowers blooming throughout the growing season, even into mid-fall

BUTTERFLY GARDENING TIP!

Place tallest flowers so they block the wind for light-weight flyers.

when late-migrating hummingbirds pass through the watershed. Add a shallow puddle, with rocks strategically placed, so drinking butterflies and tiny hummingbirds can perch. An essential and often forgotten element of every butterfly garden should be food for caterpillars. Caterpillars are a little fussier about their food and many will only dine on specific plants. Plant extra herbs, like parsley and fennel, and add native asters and milkweeds for the caterpillars.

Adult butterflies and hummingbirds favor red flowers, but yellow, orange, pink or purple blossoms will also do. Trumpet vine, morning glory, bee balm, coral bells, red clover, zinnias and lavender all make excellent fare. Although it is always best to use native plants, many ornamental species, like zinnias and cosmos, are blooming when most perennials have died and are worth adding to your butterfly garden.

The Backyard Habitat Program, run by Chesapeake Wildlife Heritage, and another program from National Wildlife Federation, called *Backyard Wildlife Habitat*, can provide you with details, plant suggestions and garden plans for starting a butterfly and hummingbird garden. *BayScapes, Wild Acres* and *Wild Habitat* programs, mentioned above, also have butterfly gardening information. The Smithsonian Institution's *Butterfly Garden Website* not only provides tips on how to start your own garden, but also lists places to visit gardens in action. For a nominal fee, the American Horticultural Society offers tons of factsheets like *Wildflower Meadow Gardening*, *Butterfly Gardening*, *Gardening for Wildlife*, and *It's for the Birds*.

Bring on the Bats. Most of us think of bats as those horrid creatures that live in attics and abandoned buildings. But bats can be good; a single bat may eat ½ or more of its body weight in insects each night, especially those nasty mosquitoes. Common bats seen in the Chesapeake Bay watershed include the little brown bat, big brown bat, Eastern pipistrelle and red bat. All, except the red bat, roost in colonies in buildings, tree hollows or caves. The red bat prefers to roost under leaves or loose tree bark.

You can encourage bats to eat night-time insects by putting a bat box in your yard. Exclude them from your house and prevent them from becoming a nuisance by plugging any holes in your attic before you put up the box. The U.S. Fish and Wildlife Service produces a beautiful color booklet entitled *Bats of the Eastern United States*, that describes the various species and includes information on exclusion and attraction.

Good Bugs. With careful plant selection and arrangement, you can encourage the beneficial insects that are integral to your integrated pest management (IPM) program. Honey bees, lacewings, praying mantids and lady bugs will utilize your plants as hunting grounds and surfaces for placing eggs. IPM will reduce your need for pesticides that may harm other wildlife in your yard. Plants that attract insects also attract the animals that eat insects, such as birds, toads and bats.

Fragrant herbs, like lavender and mint, often attract egg-laying praying mantids. Lady bugs will use many plants for egg laying as long as you don't use pesticides on those plants. For landscaping techniques that enhance your IPM program check out the Alliance for the Chesapeake Bay's and U.S. Fish and Wildlife Service's *BayScapes* or *You and Your Land: A Homeowner's Guide for the Potomac River Watershed* produced by the Northern Virginia Soil and Water Conservation District.

THROW OUT THE BUG SPRAY AND BRING IN THE BATS!

Did you know that bats can consume 500 insects in an hour, including MOSQUITOS? They are important for pollination, and bat numbers are decreasing rapidly, due to loss of habitat. You can attract bats to your garden with a bat box and plants that attract the insects they like to eat. A bat box must be built to certain specifications for temperature, location, etc. You can get plans for building a bat house from Maryland's Wild Acres packet, and Bat Conservation International. Good "Bat Garden" plants attract insects at night, and include: salvia, silene, phlox, stock, cornflower, spearmint, four o'clocks, moonflowers, and nicotiana.

Water Gardens

A small water garden attracts birds, frogs, dragonflies and salamanders. Adding plants around your water garden increases the diversity and provides food and protection for these animals, giving them cover as they approach the water. Rocks placed near the edge of your garden or pond tempt small amphibians looking for a sunny spot. A gentle slope to the water gives local wildlife an easy way to access the pond. If you choose to add fish to your water garden, submerged plants will supply food and keep the water oxygenated. "Floaters" or plants with broad, floating leaves, help regulate pond temperature and limit the growth of algae because the leaves provide shade.

Check your local library for *The Natural Water Garden*: *Pools, Ponds, Marshes and Bogs for Backyards Everywhere*, a book in the Brooklyn Botanic Garden 21st Century Gardening Series, which gives a complete how-to for developing a natural pond. If you live in Pennsylvania, Aquascapes Unlimited, Inc. can supply native wetland plants for your garden. Located in St. Michaels, Maryland, Environmental Concern, Inc. also has a wetland plant nursery. They can help you choose what plants will work best with your water garden plans. The Maryland Cooperative Extension Service Home and Garden Information Center offers publications on aquatic gardening, including Publication HG 17, *Aquatic Gardening: Construction and Maintenance*, and HG 17a, *Basics of Planting Aquatic Plants*. The Virginia Cooperative Extension Service also offers water gardening factsheets, including: *Cleaning a Water Garden and Preparing for Winter*; *Controlling Algae in Your Water Garden*; *Natural, Wild Water Plants of Virginia*; *Planning and Installing a Water Garden*; and *Planting a Water Garden.*

CAREFUL!

Creating a water garden may require special insurance! Some ponds may be deemed an "attractive nuisance" to curious neighborhood children!

On the Roof

Many species of plants will grow in containers, making small-scale urban landscaping portable and flexible. An advantage urban gardeners have over others is that cities create heat islands which extend the gardening season. Window boxes, wall containers, and various sizes of pots can be filled with herbs, flowers, and vegetables, even small fruits. Your wildlife will be limited to creatures that live in the city or are passing through, so look for insects, dragonflies, monarch butterflies, and an assortment of birds. You may even get hummingbirds now and then.

The Alliance for the Chesapeake Bay's and U.S. Fish and Wildlife Service's *BayScapes* produces a fact sheet for creating landscape diversity, which can get you started with your urban garden. Of course, rooftop gardening requires special considerations relating to access and roof structure. Check out the *Rooftop Gardens* article on the City Farmer's *Urban Agriculture Notes* website. This site gives a good overview of the why and how of gardening on the roof, and provides ordering information for a Rooftop Gardening factsheet series.

Living Fences: Hedgerows

Hedgerows are living fences comprised of small trees, shrubs and ground cover. These living fences used to divide farm fields, but in the last few decades, miles of natural hedgerows have been removed. It's a shame. They diversified landscapes, provided wind breaks, helped prevent the erosion, and

sheltered wildlife. Hedgerows also have a place in residential landscaping. Carefully maintained hedgerows will add diversity to the plant and animal life in your yard, and give you and your family privacy.

To create a hedgerow, start with a variety of small trees, tall and short shrubs, and ground covers. Include some fruit-bearing trees and shrubs, with overlapping fruiting times. You can enhance wildlife value by choosing native plants with prickles or thorns for added cover. Evergreens will enhance winter cover. If you have a natural area that needs to be tamed into a hedgerow, get a copy of *Habitat Management Guidelines for the Benefit of Land Birds in Maryland,* with guidelines on what plants to selectively eliminate and which to keep, from the Maryland Department of Natural Resources Critical Areas Commission.

Hedgerows require maintenance. You'll need to prune trees and shrubs to keep them attractive and at a manageable size. Many fruiting varieties also require pruning for best fruit production. Don't forget to add ground covers underneath the trees and shrubs. You don't want to be mowing around these low-growing obstacles.

If your community has natural areas, or you own a large lot and live in the type of neighborhood that might tolerate a brush pile, consider creating one with the branches removed from your shrubs and trees. Brush piles shelter wildlife from predators, especially during the winter when trees don't have leaves. Throw your discarded Christmas tree on the pile, and place it along your hedgerow, a forest edge, in the corner of the field, or near a stream or pond. Keep brush piles away from your home, because they may attract creatures you don't want near the house, such as woodchucks, skunks and snakes. If you have a large piece of property, create several piles —three or four brush piles per acre, placed 200–300 feet apart.

The Maryland Department of Natural Resources *Wild Acres Program* has factsheets on planting shrubs for wildlife and creating brush piles. The Alliance for the Chesapeake Bay and U.S. Fish and Wildlife Service's *BayScapes* can provide general guidelines on shrubs for wildlife. The Pennsylvania Department of Environmental Protection has produced a useful document, *We All Live Downstream: A Homeowner's Guide, Improve Your Property—Improve the Environment*, that offers suggestions for Pennsylvania residents interested in attracting wildlife. Chesapeake Wildlife Heritage has much experience with creating both agricultural and residential hedgerows and can provide guidance. Although they are outside the Chesapeake Bay region, the Northeastern Illinois Planning Commission created a useful document called *Natural Landscaping for Public Officials* that provides tips on being a good neighbor when creating some of these natural landscapes.

KEEP NEIGHBORS HAPPY!

Set back natural areas several feet from the edge and maintain them for aesthetic as well as wildlife benefits. Hedgerows should be planted at least 6 feet from your property line.

CHECK LOCAL LAWS!

County nuisance laws may forbid unmowed grass or unmaintained natural hedges. However, most communities will allow planted or restored natural areas. Contact your local government for local laws and regulations.

Unwanted Visitors

Along with the pleasures of adding wildlife to your yard, there are some hazards. Rabbits, squirrels, snakes and deer may be attracted to your new habitat. Many people enjoy these additions to their yards, but others may not appreciate bunny dens in the garden, squirrels raiding the bird feeders, or deer consuming expensive shrubs.

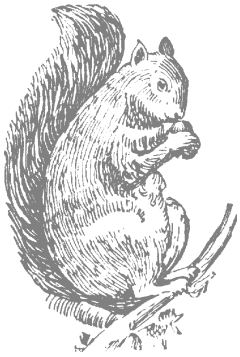
Tolerance and understanding are one strategy for dealing with this situation. For instance, snakes can be good additions to your yard. Many eat small rodents, like moles and voles, whose tunnels can destroy shrubs and flower

beds. Snakes and rodents often consume insects living in your yard. You can adapt your yard to accommodate some of these unwanted visitors. Plant extra beans in the garden for the rabbits or place inexpensive shrubs along the edge for deer to browse.

Some people fear that a more natural landscape will attract rats or allow mosquitoes to breed. Rats rarely live in natural landscapes; they are usually associated with human-constructed structures and their trash. So, your more natural areas will tend to exclude rats. Mosquitoes may breed in your water garden, if you create one. However, frogs and fish in the pond will probably eat the larvae before they can mature and fly from the pond. In addition, natural landscapes tend to absorb more water than a conventional lawn or landscaping. This will reduce the amount of standing water, preventing mosquitoes from breeding in the first place.

The Maryland Department of Natural Resources *Wild Acres Program* offers a factsheet on dealing with squirrels. You can accommodate them by building a squirrel nest box and feeding squirrels far away from bird feeders. You can exclude them via a number of techniques including spreading blood meal or dried red peppers in your garden and placing metal collars at the base of bird feeders. There are some disadvantages to attracting birds to your yard. Woodpeckers may drum on your house, causing structural damage and making an awful lot of noise. Fish-eating birds, like herons and egrets, may raid your water garden eating the goldfish you carefully placed there. Nesting birds may choose sites on your home or other buildings, making a mess in the process. The U.S. Fish and Wildlife Service offers a brochure describing how to handle backyard bird problems.

Deer can be a significant problem, especially in residential neighborhoods surrounded by forests or fields where development is occurring. Maryland's Department of Natural Resources recommends deer IPM. This involves population management on the part of wildlife agencies, fencing to exclude deer, repellents to discourage deer, and vegetation management in your yard. Landowners should consider plant species not favored by deer. A booklet called *Resistance of Woody Ornamentals to Deer Damage* is available from the Maryland Department of Natural Resources. A webpage created by Jeff Chorba Landscape Design in Pennsylvania provides plant suggestions and landscaping techniques that will discourage deer from munching on your yard.



FIGHTING MOSQUITOS WITH BASIL?!

Companion planting is a method of using specific plants to attract or repel certain insects. Problems with aphids? Plant garlic, an aphid repellent, nearby. Or plant some Alfalfa to attract ladybugs. Aphids are one of their favorite snacks! While this may take some experimenting, it's an interesting and chemical-free way to keep pesky pests away from your plants. Rodale Press' *Illustrated Encyclopedia of Herbs* contains some companion plant charts. Or check out the *Winnipeg Bugline* website for a list of planting tips.

CHAPTER 3

PROTECTING CRITICAL HABITATS

Wetlands, Forests, and Streams

Take a look around your property. Does it have special features or unique habitats like streams, wooded areas or wetlands? Habitat loss is the primary cause of plant and animal species extinction, and areas like these are critical as sources of food, water and cover for wildlife. Special habitats may provide recreational and aesthetic values—a relaxing walk through the woods on a summer day or the peaceful quiet of observing wildlife in your yard. Forested areas, riparian buffers and wetlands provide valuable ecological services such as filtering runoff, flood buffering and sediment and erosion control. Enhancing your wetlands or woodlands or stabilizing your streambanks can help to improve local water quality by limiting the amount of sediment, nutrients and pollution entering nearby waterways.

Wetlands provide year-round habitat for various wading, marsh and songbirds. Shellfish and finfish use wetlands as spawning grounds and nurseries. Wooded areas can support many species. Each layer of a forested ecosystem—from the grasses, ferns and flowers that make up the ground cover, to the understory and the leafy canopy—fills different ecological requirements for a diversity of animals. Forested areas act as greenways or wildlife corridors that provide living space and protection for animals as they move from one area to another. As development increases, these corridors are becoming more and more important in offsetting the impacts of widespread forest fragmentation on wildlife. Streams and forested riparian zones are critical habitats as well, supporting many species of fish and amphibians, as well as terrestrial wildlife that relies on the stream environment as a food and water supply.

These important landscapes are disappearing from the Chesapeake Bay watershed. Watershed wetland losses averaged about 3,000 acres a year between 1982 and 1989. Despite regulatory protection, wetland losses and degradation continue. For more details, see the Chesapeake Bay Program report titled *Wetlands: The Vital Link Between the Watershed and the Bay*. Approximately one-third of historical forest coverage has been lost, sometimes as quickly as 100 acres per day. In the last few decades, many streams have become degraded, transporting large quantities of sediment and pollution. Although water quality has improved with help from the National Clean Water Act, rapid development threatens to overtake these improvements.

GO SEE . . .

Before you begin your project, visit a natural area in a park or refuge near you. Notice the variety of plant and animal species and the way plants are grouped together. Check the Internet, maps, and your local phone directory for parks, nature centers, and wildlife management areas. If you live in or are visiting D.C., get a copy of *DC Naturally*, available from the Rock Creek Nature Center. This guide includes an extensive list of parks and natural areas in the metropolitan Washington area.

There are a lot of ways you can help protect and restore the Bay's critical habitats. Enhancing a wetland on your property with native wetland plants will increase the type and number of wildlife visiting this area. Expanding or enhancing wooded areas on your property provides habitat for animals and decreases the amount of nutrients and pollution that may run into nearby streams. Shrubs or trees along your streambank shade stream waters offering cool, dark habitat for fish. The leaves that fall from your trees provide a food for insects and bottom-dwelling creatures that fish like to eat. Runoff is perhaps one of the most serious problems affecting Chesapeake Bay. So, the steps you take on your property to enhance habitat and improve water quality will result in benefits both in your backyard and far downstream.

WETLANDS

Wetland areas are characterized by saturated or flooded soils. There are several different types of wetlands, grouped by the vegetation found in the area. Emergent wetlands are dominated by herbaceous water-loving plants. Scrub/shrub and forested wetlands, as their names imply, are dominated by higher layers of woody vegetation. Tidal wetlands include wetlands where the water level is influenced by oceanic tides. They may be salt, brackish or freshwater. Water levels in nontidal wetlands are not influenced by tides, but are driven by wind, surface water runoff, or groundwater discharge.

Wetlands are protected by federal and state laws because of the values they provide, not only to local wildlife, but to humans as well. These areas help protect water quality by filtering pollutants that would otherwise end up in nearby streams. Wetlands act like natural sponges, protecting adjacent land from flooding by trapping and storing water. They help to buffer shorelines from erosion and are extremely important as fish and wildlife habitat. For more information, call the U.S. Environmental Protection Agency's *Wetlands Hotline* for a copy of *America's Wetlands: Our Vital Link Between Land and Water*.

Wetlands provide so many benefits to society that steps are being taken to restore this important resource throughout the Chesapeake Bay watershed. In 1997, Maryland announced a goal of restoring 60,000 acres of wetlands throughout the state. For information on what you can do to help Maryland reach this goal, contact the Maryland Department of the Environment. Pennsylvania and Virginia are also working to develop goals for wetlands restoration. For information on Pennsylvania's efforts to help restore wetlands, contact the Pennsylvania Department of the Environment. In Virginia, contact the Virginia Marine Resources Commission for information on tidal wetlands and the Virginia Department of Environmental Quality for efforts relating to nontidal wetlands. The District of Columbia has developed the *Wetlands Conservation Plan* to guide its wetlands protection, enhancement, and restoration efforts. More information is available through the District of Columbia Environmental Health Administration, Division of Water Quality.

Before you begin, it is important to identify which kind of wetland exists on your property so you can plan the most appropriate type of restoration. Is your wetland salty or freshwater? Does the water level in your wetland fluctuate with the tide? How deep is it? Is the area shaded or in full sun? Answering these questions will help you to choose plants that are best suited for

DON'T BE AN OUTLAW!

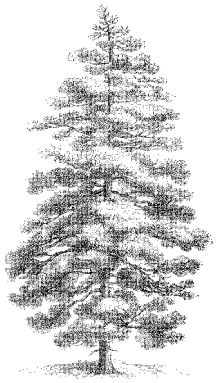
Wetlands are regulated under Section 404 of the Clean Water Act. Before you plan changes to wetlands on your property, check with appropriate federal and state regulatory agencies to obtain any necessary permits. Check the Resources Section for agency listings, and call the Chesapeake Bay Program for a copy of *Protecting Wetlands: Technical and Financial Assistance Programs for Local Governments in the Chesapeake Bay Watershed.*

conditions on your property. Ask your local nursery about obtaining native wetland plants. Avoid plants that are not specifically adapted to moist or wet soils. They may not survive in a wet area and have far less value to wetland wildlife. If you are planting to enhance wildlife values, mix native sedges to provide food and cover, or add shrubs and trees for cover and protection. Choose flowering plants with different blooming periods to add year-round color to a wetland meadow. Using wetland plants may also be appropriate for those wet areas on your property where nothing seems to grow. (See Chapter Two, "Water, Water, Everywhere!") A useful fact sheet on *Gardening in Wet Places* is available from the U.S. Environmental Protection Agency Region 3 Office in Philadelphia.

Lists of wetland plants are available from Environmental Concern, Inc. Environmental Concern also has a nursery where you can buy native Maryland wetland plants. If you live in Pennsylvania, check out Aquascapes Unlimited, Inc.'s nursery for native wetlands plants. Your state's Native Plant Society or Landscape and Nursery Association may also have information on nurseries that specialize in wetland plants. You may wish to add nesting boxes or platforms to supplement the natural areas. Instructions for building for wildlife are included in the Maryland Department of Natural Resources *Wild Acres* information packages, and the Pennsylvania Cooperative Extension Service circular *Providing Wetlands for Wildlife while Controlling Stormwater* contains an appendix with plans for building nest boxes and platforms.

FORESTED AREAS

Wooded habitats are an essential part of life for many of the watershed's animal, bird and plant life. Extensive scientific findings show clearly that acre for acre, forests are the best land use for protecting water quality. As living filters, forests capture rainfall, regulate stormwater and streamflow, filter nutrients, sediment and other pollutants, and stabilize soils. Maintaining or creating a naturalized forested area can add value to your property and save a month's worth of Sundays in mowing. Trees can be planted strategically for privacy and insulation, providing economic benefits when placed appropriately. For instance, they can help shade you from the summer sun, increasing air conditioner efficiency as much as 10 percent. Evergreens and deciduous trees can be planted to shield the house from winter winds to lower heating costs. To learn more about how to plant trees on your property for energy conservation, contact the National Arbor Day Foundation for a copy of *How Trees Can Save Energy*. Trees will also provide recreational and aesthetic values and food and cover for wildlife. Choose several native species to plan for blooms and fruit through the spring, summer and fall. Before planting, consider all your objectives. Do your goals include habitat enhancement? Water quality improvement? A source of firewood? Wooded areas can be easily managed for multiple uses. The Pennsylvania Bay Education Office's *We All Live Downstream*, contains a chapter on "Managing a Wooded Home Site" and includes tips on how to get started. Information about forest management can be obtained from the Pennsylvania Cooperative Extension Service. Their *Forest Stewardship Series* contains guidelines for planning and managing your forest area, and includes a list of services offered to woodland owners by public and private organizations in the state. *You and Your Land*, published by the



Northern Virginia Soil and Water Conservation District, includes technical information on planting, pruning, and protecting trees and shrubs.

STREAMS AND RIPARIAN FOREST BUFFERS

There is something soothing about the gurgle of a meandering stream. But perhaps your stream has lost its gurgle. Perhaps it is instead, a straight-as-an-arrow stream that rushes through muddy banks without so much as a pause. What was once valuable habitat for fish, amphibians and beneficial insects may now be a watery highway for sediment, nutrients and other pollution—an expressway to local rivers, and ultimately, the Chesapeake Bay. There are 50 major rivers that lead to the Bay and the health of each has an impact on the health of the Chesapeake.

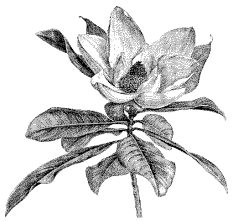
When many people think about water pollution, they envision smoke-stacks and factories. This perception of industry as the source of most water-related pollution is misleading. Runoff from agricultural lands and communities is the major cause. Homeowners in the U.S. use more than 100 million tons of fertilizer and 80 million pounds of pesticides on their lawns each year. With every episode of rain or melting snow, excess nutrients and toxic chemicals are washed into adjacent streams, imperiling the plants and animals that live there. Sediment that is washed into a stream may clog the gills of fish and limit the light available to underwater plants, making the aquatic environment inhospitable.

As a property owner, there are two important actions you can take to enhance local water quality. First and foremost, limit your use of fertilizers and pesticides! Native plant species require fewer inputs as they are already well-adapted to local conditions. Selective planting can deter certain insects and help attract beneficial wildlife, like frogs and toads, that will snack on the others and reduce the need for pesticides. (For more information on low-impact lawns, see Chapter Two, "Less to Mow".)

The second important action you can take to help restore your stream is planting riparian forest buffers along stream banks. Riparian forest buffers are naturalized areas of trees, usually accompanied by shrubs and other vegetation, adjacent to a body of water. These areas are increasingly recognized as an important way to protect stream health. Woody vegetation creates a "root mat" that holds soils in place and limits erosion. Trees take up nutrients through their roots, reducing the amount of nutrients entering waterways. Overhanging streamside vegetation provides important habitat for frogs, toads and salamanders and helps regulate stream temperature for fish. Visit the Chesapeake Bay Program's *Riparian Forest Buffer website* for more information on the importance of riparian forest buffers.

The Chesapeake Bay Program Partners have agreed to a goal of restoring 2,010 acres of riparian forest buffers by the year 2010. Each jurisdiction has developed a *Riparian Forest Buffer Implementation Plan* to help achieve this goal. For information about the District of Columbia's plan, contact the District of Columbia Environmental Health Administration, Water Quality Division. In Virginia, contact the Virginia Department of Forestry. As part of their plans to reach the riparian forest buffer goal, Maryland and Pennsylvania have joined up with American Forests' *Stream Releaf* campaign. Contact the Maryland Department of Natural Resources Forest Service for a copy of

Maryland Stream Releaf. Copies of *Pennsylvania Stream Releaf* are available from the Pennsylvania Department of Environmental Protection and the Pennsylvania Department of Conservation and Natural Resources Bureau of Forestry. The U.S. Department of Agriculture's *Conservation Reserve Program*, a voluntary program that offers incentive payments and cost-share assistance for conservation practices on agricultural lands, includes an emphasis on riparian forest buffers. The Alliance for the Chesapeake Bay, a nonprofit organization, is developing a permanent trust fund to provide resources for planting riparian forests in Pennsylvania. The Alliance for the Chesapeake Bay's *Pennsylvania Streamside Forest Fund*, which is still in the formative stages, seeks private donations to provide small grants for conservation and community groups to use for restoring forests along streams and rivers. Maryland's Chesapeake Bay Trust also offers financial assistance for some restoration projects.



Plants selected for riparian areas should be able to withstand periodic flooding or inundation. For maximum wildlife value, create or enhance ecosystem layers. Take a look at *Chesapeake Riparian Handbook: A Guide for Establishing and Maintaining Riparian Forest Buffers* and *Restoring a Bay Resource: Riparian Forest Buffer Demonstration Sites,* available from the Chesapeake Bay Program. For information about approaches to stream corridor restoration, you can download a copy of *Stream Corridor Restoration*, from the U.S. Department of Agriculture website. Call your local Extension Service or state Native Plant Society for a list of natives for your area. The Virginia Department of Conservation and Recreation offers a list of native plants specifically for use in riparian forest buffers in Virginia. (See "Where to Get Help" at the end of this chapter for additional sources of assistance).

Besides planting riparian forest buffers along your streambank, you may also want to enhance the in-stream habitat. DO NOT DO THIS ON YOUR OWN! Careful placement of logs or rocks in the stream bed may slow water velocity and create riffles that help oxygenate the water. This creates microhabitats, providing resting and hiding places for fish and for soon-to-be fish food. Depending upon the condition of your stream, restoration may be a technical process requiring consideration of such factors as soil type, bank slope and flow velocity. Consult your state's Natural Resources Conservation Service or U.S. Fish and Wildlife Service, Chesapeake Bay Field Office for additional advice on how to enhance your stream. The Izaak Walton League *Save Our Streams Program* offers books and videos on stream ecology and restoration. Your local chapter of Trout Unlimited is another good place to check for advice. *Landowner's Guide to Managing Streams in the Eastern United States,* publication #420-141, is available from the Virginia Cooperative Extension Service.

FISH PASSAGES: OPENING BARRIERS FOR MIGRATING FISH

Anadromous fish, including several species of shad and herring, must migrate from saltwater environments to spawn in freshwater tributaries. Many streams and rivers in the Chesapeake Bay watershed are blocked by dams, culverts, and other structures. More than 2,500 blockages in the watershed keep anadromous and other migratory fish from reaching historic spawning grounds. As a result, natural reproduction of American shad, in particular, remains low.

Stream blockages, in conjunction with in-stream habitat degradation and the pressure of over-fishing, have caused a serious decline in anadromous fish populations. Although stocking programs and fishing regulations are helping restore migratory fish populations, their numbers will continue to decline unless these fish can return to their natural spawning grounds. The Chesapeake Bay Program is committed to opening blockages in the tributaries so anadromous fish can reach freshwater spawning grounds. Fish passage goals established in 1993 direct Bay Program signatories to open 731 stream miles by 1998 and over 1,356 miles by 2003. See the Chesapeake Bay Program annual reports, *Removing Impediments to Migratory Fishes in the Chesapeake Bay Watershed*, for an update on progress. Encourage your local government to support fish passage restoration efforts and help anadromous fish buck the tide of population decline! Call the Chesapeake Bay Program for additional information, or check out their webpage for lists and maps of fish passage projects and viewing sites. An overview of *Fish Restoration and Passage on the Susquehanna River* is available from the Pennsylvania Fish and Boat Commission, the U.S. Fish and Wildlife Service's Pennsylvania Field Office, or the Susquehanna River Basin Commission. The Alliance for Chesapeake Bay, the Chesapeake Bay Foundation and the Alliance for the Chesapeake Bay's Chesapeake Regional Information Service (CRIS) are other good sources of information. For general information on sport fisheries restoration, the U.S. Fish and Wildlife Service offers a brochure called *Restoring America's Sport Fisheries: The Federal Aid in Sport Fish Restoration Program*. Maps of public access areas to the Bay are available from the Chesapeake Bay Program.

THE UNDESIRABLES . . .

Enhancing or restoring unique habitats on your property may bring some guests who are less desirable than others. Snakes, rabbits and other animals may be attracted to the new habitat you have created. Make an effort to understand their role and importance in the context of your backyard ecosystem. If you still have trouble tolerating these visitors, consider the resources and natural control approaches mentioned in Chapter Two, "Less to Mow," or use physical barriers, such as fences, to restrict wildlife from certain areas.

CITY LIFE

Many resources and programs available give special consideration to urban restoration scenarios. The Center for Watershed Protection publishes a bulletin that features innovative watershed restoration and protection techniques; *Site Planning for Urban Stream Protection* provides guidance on buffer establishment. The Chesapeake Bay Program offers a factsheet called *Urban Riparian Forest Buffers* that outlines the benefits of buffers and what they should look like.

BEFORE YOU PLANT!

Be sure to give some thought in advance to the scale of your efforts. Knowing whether your project will consist of planting a few trees or shrubs or will require more complex landscaping is necessary to help you to identify the level of technical knowledge you will need. Restoration training workshops offer opportunities to learn more about the technical and ecological aspects of your restoration/enhancement project. You may save yourself valuable time, money and effort by talking with professionals who know the dos and don'ts of beneficial landscaping. Environmental Concern, Inc. hosts wetlands workshops that cover such topics as Native Wetland Plants and Backyard Habitat Design. Stream restoration workshops are available through the Izaak Walton League of America's *Save Our Streams* Program. The Maryland Cooperative Extension Service conducted two courses on riparian buffer systems in May 1997 that focused on ecology and structure of riparian forests and how to establish and maintain forested buffers. Similar courses are planned in Pennsylvania and Virginia. State agencies also offer occasional workshops on stream and riparian restoration. The Virginia Department of Conservation and Recreation offered several such training sessions in 1997. The Alliance for Chesapeake Bay also offers *Riparian Reforestation Field Days* to train potential recipients of grants from their *Pennsylvania Streamside Forest Fund* on the basics of riparian forest restoration.

WHERE TO GET HELP?

You may also need to target potential sources of financial assistance. Fortunately, because of the importance of special habitats like wetlands, streams, riparian zones and wooded areas, federal and state agencies and nonprofit organizations have made technical and financial assistance available to landowners interested in making landscape improvements on their property. The U.S. Department of Agriculture's Natural Resource Conservation Service offers several programs geared toward wetlands protection. The *Wetlands Reserve Program (WRP)* and the *Conservation Reserve Program (CRP)* provide financial incentives to enhance wetlands to qualifying landowners in exchange for taking certain agricultural lands out of production. The *Wildlife Habitat Incentives Program (WHIP)* was designed to provide financial and technical assistance to landowners wishing to undertake habitat improvements on their property for upland and wetlands wildlife, endangered species and fisheries. Programs like these are administered by state agencies within the Bay watershed. Check with your state Department of Agriculture for more information.

Programs of the U.S. Forest Service provide technical and financial assistance in return for the protection and management of private forest lands and associated wetlands. Such programs are administered by state forestry agencies, and include the *Stewardship Incentive Program (SIP)* and the *Forestry Incentives Program (FIP).* Cost-shares may be available for enhancement projects such as riparian forest buffer planting, wetlands protection, and streambank stabilization. Contact the U.S. Forest Service for the details of these programs. The U.S. Fish and Wildlife Service also houses several programs relevant to wetland, woodland or riparian restoration and enhancement. Programs include: *BayScapes, Partners for Fish and Wildlife, Partners in Flight, The North American Wetland Management Plan (NAWMP)* and the *North*

American Wetland Conservation Act (NAWCA). The *Rivers, Trails, and Conservation Assistance Program* of the National Park Service can provide resources for creating and enhancing rivers, streams, greenways and other natural areas in your community. *Protecting Wetlands II: Financial and Technical Assistance Programs for Local Governments in the Chesapeake Bay Region*, published by the Chesapeake Bay Program, provides additional information on federal, state and nonprofit assistance programs for wetlands protection and enhancement. Many of these programs are relevant to stream, riparian or woodland enhancement efforts as well.

State programs are also available to help you protect and enhance critical areas on your property. Maryland, Pennsylvania, Virginia and the District of Columbia have wetlands programs that provide technical assistance and/or cost-shares for wetlands management and protection. (Check Resources and Contacts for agency listings). The Maryland Department of Natural Resources offers several incentive programs geared toward riparian and woodland enhancement, including the *Maryland Buffer Incentives Program*, *Maryland Woodland Incentives Program*, *and Wild Acres*. Their *Greenways* program is designed to facilitate the creation, maintenance, or enhancement of wildlife corridors. The Maryland Department of Natural Resources *Landowner Stewardship Referral Service* was established for individuals interested in habitat restoration on their land. A Pennsylvania *Greenways* program is under development, and will be administered by the Pennsylvania Department of Conservation and Natural Resources. The Pennsylvania Department of Environmental Protection *Adopt-a-Stream* and *Stream Fencing* programs may be a source of support for landowners interested in restoring streams on their property. The Department also maintains a *Wetlands Restoration/Creation Site Registry* to link landowners with potential restoration sites on their property with individuals who are required to undertake restoration efforts as mitigation for regulated activities. In Virginia, financial assistance may be available through the *Urban and Community Forestry Assistance Grants Program* and the Virginia Department of Forestry website includes a list of available conservation incentive programs. Additional information on these and other programs may be available from your state forestry agency. The University of Maryland Environmental Finance Center offers a list of available funding mechanisms for establishing riparian forest buffers.

Publications that list voluntary options for stewardship may also be available from your state environmental agency. Maryland's Department of Natural Resources offers the *Private Landowner's Assistance Guide: Voluntary Options for Wetlands Stewardship in Maryland. Wetland and Riparian Stewardship in Pennsylvania: A Guide to Voluntary Options for Landowners, Local Governments and Organizations* is available from the Pennsylvania Department of Environmental Protection.

In addition to federal and state programs, nonprofit organizations can be a valuable source of financial and technical assistance. Ducks Unlimited is an international nonprofit organization that works to protect, restore and enhance wetlands and associated upland areas. Trout Unlimited, The Nature Conservancy, the Chesapeake Bay Foundation and Chesapeake Wildlife Heritage, are other good sources of information on conservation and restoration efforts.

CHAPTER 4

WATERFRONT PROPERTY
Guarding the Edge

At long last, your dream home. The perfect retreat—the property slopes right down to the Bay and offers you a beautiful waterfront view and a place to dock your boat. As a waterfront property owner, you are the first line of defense against shoreline erosion and water quality protection. More than anyone, you should be aware that how you landscape your lawn and manage your waterfront amenities will have an impact on the Chesapeake Bay.

THE CULPRIT: SHORELINE EROSION

Erosion occurs when natural wind, wave and current forces wear away the land by transporting sediment from one location to another. On high banks, groundwater seepage may contribute to erosion and cause undercutting and bank slumping. Although erosion is essentially caused by natural processes, its rate and severity can be intensified by heavy recreational use and development. Docks, jetties and other structures interrupt the natural movement of water and redirect erosive forces in unexpected and possibly undesirable directions. Erosion control should begin with protection of the natural shoreline defenses wherever possible. Beaches or marshes should be preserved as shallow areas that reduce erosion by limiting wave action and force. The U.S. Army Corps of Engineers offers lots of information about shoreline erosion on their website.

Loss of natural buffers are a huge problem along the edges of Chesapeake Bay. In their quest for a view of the water, many property owners inadvertently destroy the Bay's greatest protector—vegetation. The result is increased shoreline erosion that can lead to the loss of valuable waterfront property. Homeowners take note! The roots of trees, shrubs and grasses will help stabilize the soil and prevent erosion. At the same time, they help limit the amount of fertilizer running off those lawns and provide habitat for local wildlife. Bulkheads and other hard structures may be costly and unnecessary. Not only are these structural controls expensive, but they provide little habitat for wildlife in the critical zone of the water's edge. In some cases, these structures may actually block wildlife access to the water or cover important habitat areas. For instance, diamondback terrapins following their instincts to nest

LEAD BY EXAMPLE

Talk to your waterfront neighbors about shoreline stabilization. The more shoreline you protect, the safer everyone's property will be. Community projects that span several properties are far more effective than one. Bulkheads may actually be reflecting wave energy and increasing erosion of your shoreline!

at the water's edge may lay eggs on the shelf of a bulkhead, only to find the eggs washed away by the next high tide. Posing yet another threat to local wildlife, these structures may be treated with preservatives that are toxic to marine plants and animals. The construction of these structures can also be harmful to aquatic plants and underwater Bay grasses by clouding the water with increased sedimentation. Underwater Bay grasses, or submerged aquatic vegetation (SAV), provide important habitat for many species, including the crabs that have helped make Chesapeake Bay famous around the world. Underwater Bay grasses help enhance water quality by capturing sediments and reducing wave action. (See more on underwater Bay grasses below).

You can help protect your property from erosion and maintain a waterfront view at the same time. In low energy areas with limited wave and wind action, nonstructural methods of erosion controls may be sufficient. Carefully placed natural areas can provide privacy, cooling and insulation, and attract wildlife to your waterfront retreat without blocking your access to the Bay. There are a range of options you can choose from, depending upon the specific characteristics of your property and your waterfront needs. Planting marsh grasses may provide a low-cost solution to shoreline erosion, while adding interest and beauty to your landscape. Even better, most planting projects will not require a permit or the services of a engineer with a high hourly rate! They provide important fish spawning and waterfowl habitat, and can actually help reverse the erosion process by trapping sediment. Consulting with local experts, like U.S. Fish and Wildlife Service representatives, will help you choose the best areas and proper plants for "marsh restoration."

Before You Bulk Up . . .

Always check with the appropriate federal and state authorities (see Resources and Contacts) and consult a professional before beginning any shoreline stabilization or construction project. Permits are required prior to the construction of any work in, under, across or on the banks of navigable waters of the United States. Contact the U.S. Army Corps of Engineers for details on permit requirements. Your local U.S. Department of Agriculture Natural Resources Conservation Service office can provide valuable information on sources of technical and financial assistance. Many factors must be considered in evaluating an approach to erosion control. Prevailing winds, currents, tidal ranges and boat traffic should be professionally assessed before you start to move any soil. The *Shore Erosion Program* in the Maryland Department of Natural Resources Forest Service offers a useful publication titled *Shoreline Erosion Control Guidelines for Waterfront Property Owners*. This detailed book will help you determine what type of erosion control will work best for your property, the environment and your wallet! A similar brochure is available from the Shoreline Erosion Advisory Service at the Virginia Department of Conservation and Recreation. Another good source of information is *Local Ordinances: A User's Guide*. Available from the Terrene Institute, it includes comprehensive chapters on "Stabilizing Shoreline Protection" and "Planning Docks and Other Water Dependent Structures." The Maryland Cooperative Extension Service offers a brochure on *Plants for Maryland Shore Landscapes*. Plants on this list are uniquely adapted to growing conditions at the shore, including high winds, blowing sand, and tide fluctuation. Contact the Alliance for the Chesapeake Bay to inquire about salt marsh restoration workshops.

PARKING THE YACHT: DOCKS, PIERS AND OTHER STRUCTURES

So what good is a house on the water without a place to dock your boat? Think you need a dock or pier? Build with care. These structures, like bulkheads, impact shallow water areas adjacent to your property. Because light can penetrate to the bottom of shallow water, these areas are highly productive, and provide essential habitat for many aquatic plants and animals. The shade of a dock or other structure can inhibit the growth of beneficial underwater Bay grasses and shoreline vegetation.

If possible, build your dock in an area that is already shaded, or try to elevate it enough so sunlight can shine underneath (usually about five feet above mean high water). Chemicals used to treat wood and other materials may affect water quality in the nearshore area. Use caution when designing and selecting materials for your dock, pier, or boardwalk—especially those that will have direct and long-term contact with the water. Make sure your contractor presents all your options. In areas with fluctuating water levels or strong currents, a floating dock may be more practical. Again, however, check the materials. Styrofoam, once used widely to provide buoyancy for floating docks, is now discouraged. Not only does it tend to break up and disperse easily in water, but visiting birds and other wildlife may mistake the pieces for food!

Consider the long-term impacts of your project before construction begins. Increased boat traffic, leaking oils or fuels, marine paints and anti-fouling treatments, and prop scour can decimate underwater grass beds and harm local wildlife. A single spill may not seem like much, but imagine a little drip or leak at every dock or pier in the Bay watershed! Like a snowflake that becomes part of an avalanche, the cumulative effect of thousands of small-scale environmental "uh-ohs" can be disastrous. Be careful to tread lightly on the Bay and its rivers, and you will be rewarded by the beautiful sights, sounds and smells of life near the water.

UNDERWATER BAY GRASS IN YOUR PROPELLER? GREAT!

Underwater Bay grasses, or SAV, grow in shallow water and are critical to the Bay's living resources. In addition to improving water quality, they provide food for waterfowl and homes for fish, crabs and invertebrates. Growth is dependent on sufficient levels of light reaching the underwater leaves. Sediment and algae can cloud the water, making it more difficult for light to penetrate the water and reach underwater plants. Over-fertilizing your lawn can force excess nutrients into local waterways, contributing to SAV decline. Changing the vegetation or structures along your shoreline may also affect underwater Bay grasses. The Chesapeake Bay Program's *Guidance for Protecting SAV in Chesapeake Bay from Physical Disruption* offers recommendations worth following if you are considering construction on the edge.

Chesapeake Bay Program Partners are working to restore underwater Bay grasses to historical levels of acreage and we need your help. You can help by avoiding beds when boating or when planning dredging or pier construction. Environmentally friendly landscaping techniques that use less fertilizer, prevent erosion, and utilize native plants can help prevent sediments and nutrients from reaching Bay waters. Call for a copy of *Underwater Bay Grasses are*

A NOTE ON RESPONSIBLE BOATING

As a boat owner or passenger, you know the importance of a healthy Bay. You should also know the importance of boating responsibly in order to keep it that way!

Make sure to:

1. *Keep Sewage on Board*—use marina pump out facilities!
2. *Stash the Trash*— and dispose of it properly on shore!
3. *Fish Responsibly*—don't take more than the limit, or more than you need!
4. *Maintain your engine* and prevent fuel spills!
5. *Obey posted speed limits* and watch your wake! Speeding boats and personal watercraft can cause sedimentation that clouds shallow waters and harms aquatic animals and plants.
6. *Tell your friends!* No one wants to see a polluted bay. Tell other boaters what they can do to help keep the Bay clean and enjoyable.

Good for Wildlife and People, available from the Chesapeake Bay Program. The Virginia Institute of Marine Science has tons of information on underwater Bay grasses. Check out their web page for special reports, information on underwater Bay grass distribution, and links to other sites that relate to underwater grasses in Chesapeake Bay. Maryland Department of Natural Resources also has a *Bay Grasses* web page that's loaded with information. Volunteers are always needed to verify Bay grass coverage and species, monitor water quality near grass beds, and help plant underwater Bay grasses. NEVER PLANT THEM ON YOUR OWN! For tips on what homeowners can do to help underwater Bay grasses, or if you're interested in volunteering to monitor or plant grasses, contact the Alliance for the Chesapeake Bay. The U.S. Fish and Wildlife Service and Chesapeake Bay Foundation co-sponsor an annual *SAV Hunt*, an opportunity for citizens to help collect information about underwater grass beds around the Bay. The Chesapeake Bay Foundation has a *Bay Grasses in Classes* program as part of their Chesapeake Bay curriculum package.

AQUATIC REEFS AND OYSTERS: NATURE'S WATER FILTERS

Aquatic reefs have an important ecological role in Chesapeake Bay. They provide essential habitat for the Bay's oysters, as well as finfish and crabs. Historically, reefs of densely packed individual oysters grew upward and outward, creating hard surfaces over many acres of Bay bottom and three-dimensional habitat for Bay creatures. Millions of oysters once filtered plankton from Bay waters. Eastern oysters can attach to many hard surfaces, but grow best when they live on oyster shell reefs. These reefs provide hard structure where barnacles, clams and other filter feeders also attach. Crabs and finfish take advantage of the three-dimensional oyster reefs, hiding among the shells and dining on each other.

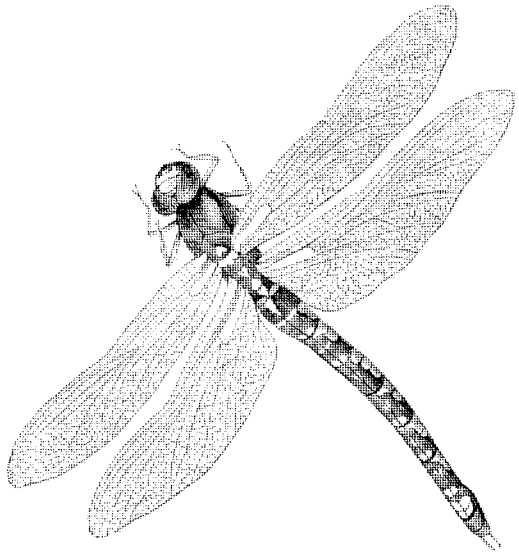
FIELD TRIP!

Have some free time? Visit the National Aquarium in Baltimore to see some Chesapeake Bay habitats in action!

Today, the Bay's oyster population has been reduced to a small percentage of historic levels. Disease is by far the greatest natural threat to oysters. Two diseases introduced to Chesapeake Bay over 40 years ago, MSX and Dermo, kill many adult oysters before they are big enough to reproduce or harvest. Destruction of aquatic reefs from centuries of dredging and tonging has greatly reduced suitable habitat for oysters and the other creatures that live on and around their reefs. In addition to harvest pressure and disease, reef acreage has been lost to silting and pollution. Scientists have begun reconstructing oyster reefs by placing oyster shell on the hard bottom where oyster reefs used to exist. Constructed reefs get oysters off the bottom, where they could be smothered by sediments. More than a dozen reefs have been created in tidal Chesapeake Bay.

Despite their tolerance to changes in salinity, without enough salt in the water oysters may stop feeding, growing and reproducing. Freshwater flooding that occurs over a few of weeks is particularly threatening to oysters. It lowers water salinity and carries heavy loads of sediments, so restore and maintain those riparian forest buffers and wetlands to help minimize flooding and flows to the Bay! (See Chapter Three, "Protecting Critical Habitats," for more information on wetlands and buffers).

You can help grow oysters for these reefs by participating in the Chesapeake Bay Foundation's *Oyster Gardening* program. Oyster gardeners build a float and receive "seed oysters" to grow until they are about two inches in length. Then the oysters are off to a new home on a reef where they can get to the job of filtering the Bay and providing habitat for other plants and animals! Call the Foundation for additional information. Projects are also sponsored by the Maryland Oyster Recovery Partnership, a cooperative venture among watermen, environmentalists, the University of Maryland Center for Environmental and Estuarine Studies, and the Maryland Department of Natural Resources, created to help recover Maryland's oyster population. The Virginia Marine Resources Commission is actively working to restore oyster populations in Virginia. Additional information on these efforts can be obtained from the Commission's Conservation Replenishment Division, or from the Virginia Institute of Marine Science. Virginia's Tidewater Oyster Gardening Association sponsors gardening workshops and a master oyster gardening class, and information on oyster gardening is included in the Elizabeth River Project *Habitat Enhancement Packet*.



CHAPTER 5

BEYOND THE DRIVEWAY

Getting Involved in Community Efforts

Whether you have acres of lawn or you live in an apartment or condominium with minimal green space, there's still plenty that you can do! Once you've conquered the concepts to a Better Backyard, take them beyond your driveway into the local community.

COMMUNITY DEVELOPMENTS

If you live in a development, there are probably opportunities everywhere. Many developments have common areas of grass. These areas may be maintained by fertilizers and pesticides. Those little flags that say "Pesticides: Keep Off" mark danger zones for children and pets. Find out what management's policy is on maintaining these common areas by attending a tenant association or homeowner's meeting. Have they considered using integrated pest management (IPM) or adopting a more natural approach to landscaping? (See *Before You Begin: Important Concepts* for a description of IPM). Beneficial alternatives to traditional lawn care may be a good way to reduce those maintenance fees!

Of course, all common areas may not be appropriate for naturalization. Kids need large grassy areas to play. Work with the management and/or other residents to choose a good location for natural areas or restoration activities. Creating a butterfly garden around a gazebo, or a wildflower meadow or wetland near a retention pond, are just two of many options. (See Chapter Two, "Less to Mow" for additional information on creating these types of landscapes). Enhancements like these will increase the aesthetic benefits for residents and can provide educational and recreational opportunities for neighborhood children. Common vegetable gardens that are subdivided into plots for participating residents are another option. By creating a place where neighbors work together, they can bring a stronger sense of community into the area.

If your development or community includes a golf course, the possibilities are almost endless! Despite their reputation as environmentally disastrous, golf courses offer lots of open space to create new landscapes and habitats. *Golf & the Environment: Environmental Principles for Golf Courses in the United States* is a handbook offered by the Center for Resource

CAUTION!

Besides pesticides, be aware of other harmful or toxic materials often used for maintenance purposes in community complexes:

- Chemical de-icers
- Cleaning solutions
- Paints and solvents

The Bay Book, available from the Alliance for the Chesapeake Bay and *Home*A*Syst*, developed by Farm*A*Syst/Home*A*Syst, are good sources of information on managing these types of hazardous products.

Management with tips on designing environmentally friendly golf courses. *Golf and the Environment: What Partners!* is a companion poster published by the Terrene Institute and the U.S. Environmental Protection Agency Region 5 Office, that illustrates these concepts.

SCHOOL GARDENS

Local schools are wonderful places to experiment with beneficial landscaping. Many schools have lots of open space—a blank canvas ready for creative landscape development! Children will enjoy the sight of butterfly and wildflower gardens, and can learn from the visitors these gardens will bring to their school. Lessons can be structured around the maintenance of these areas—math lessons on measuring plant growth and science lessons on water quality. Outdoor learning can be a welcome change from long days in the classroom and kids make perfect volunteers.

There are numerous resources available for teachers or groups interested in creating a schoolyard habitat. The Pennsylvania Game Commission offers a helpful brochure that lists *Resources on Creating Backyard & Schoolyard Habitat in Pennsylvania*. Project WILD is a national program, with coordinators in every state, designed to emphasize wildlife education. Contact your state Project Wild office for a copy of *Wild School Sites: A Guide to Preparing for Habitat Improvement Projects on School Grounds*. The Pennsylvania *WILD Habitats* program, established by the Pennsylvania Game Commission, supports and encourages habitat improvement projects for wildlife on school and community grounds. *APATH (Audubon Protecting Animals Through Habitat*, sponsored by the Audubon Council of Pennsylvania, offers *Native Plants in the Creation of Backyard, Schoolyard and Park Habitat Areas*. The National Wildlife Federation's *Schoolyard Habitats Program* complements its *Backyard Wildlife Program*. *Schoolyard Habitats*, the Federation's schoolyard planning guide, offers tips on setting goals, involving the community and incorporating the habitat into cross-curriculum learning. The Evergreen Foundation, dedicated to the enhancement of natural areas on school grounds and in communities in Canada, has a useful website with essential resources for community and school naturalization and environmental education projects. The site also has a link to *School Yard Environmental Projects: A Planning Primer*. Prepared by North Carolina State University Forestry Extension, it contains lists of resources and funding sources in the U.S. The U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, offers a schoolyard habitat guide to help teachers and students create wildlife habitats on school grounds.

NEED INSPIRATION?

Take a look at Logan Circle Urban Meadow—a native wildflower and butterfly sanctuary in Washington, D.C., or take a peek through the *Garden Cam* at Clinton Community Garden. You'll never believe it's located in Hell's Kitchen, NYC!

COMMUNITY PARKS AND GARDENS

Is there a vacant lot in your community that's in need of rejuvenation? Get together with some friends and neighbors and spruce it up! Small pockets of green can do wonders for community morale! Whether you live in a suburban area that needs a "community gathering place," or in a city that needs a little green in the streetscape, there are resources available to help you get your community garden started. The American Community Gardening Association provides information on everything from choosing a site to setting up bylaws for a gardening association. The Association's *From the Roots*

Up Program offers technical assistance and training to organizations interested in helping neighborhood groups establish community and school gardens. The National Park Service's *Rivers, Trails and Conservation Assistance Program* provides assistance to communities for revitalizing natural areas. The Pennsylvania Cooperative Extension Service has an urban gardening program that provides advice on organizing and starting a garden. Call their Vegetable and Fruit Garden Hotline with questions. Their website includes a list of demonstration gardens where you can see examples of community work in action. Although the Pennsylvania Cooperative Extension program is geared toward Philadelphians, their resources will be useful for anyone interested in setting up a community garden or park. *Philadelphia Green* is part of the Pennsylvania Horticultural Society that works with neighborhood groups, corporations and government organizations in the Philadelphia area. The Neighborhood Gardens Association/A Philadelphia Land Trust, works with community gardeners to acquire garden land and prevent it from being developed for other uses. Garden Resources of Washington (GROW) provides technical assistance and advice to groups considering community gardening projects, and has lists of great gardens to see in Washington, D.C.

Other good resources to check include *Urban Agriculture Notes*, published by City Farmer, Canada's Office of Urban Agriculture, and *Aggie Horticulture*, the Texas A&M University Horticulture Program website, which even includes a section on *KinderGardens!* Urban Harvest, a Texas community gardening association, offers publications and brochures on various topics such as funding opportunities for community gardens, and how to increase community participation.

VOLUNTEER, VOLUNTEER!

Citizen Monitoring Programs . . .

Be a scientist for a day . . . or more! Many programs in the Chesapeake Bay watershed need your help with monitoring natural resources. Depending upon your preference, you could get involved with water quality, underwater Bay grasses, and living resources monitoring efforts! Check with the Alliance for the Chesapeake Bay to find out what volunteer monitoring programs are currently underway in the Bay watershed. The Pennsylvania Department of Environmental Protection offers a *Statewide Directory of Citizens' Volunteer Monitoring Programs*, an overview of programs throughout Pennsylvania, as well as *Water Quality Monitoring of Pennsylvania Streams by Citizen's Groups: A Primer in Quality Assurance and Quality Control.*

. . . And Everything Else!

There are never too many volunteers for the Chesapeake Bay! Almost every environmental organization needs volunteers or can direct you to an organization that does. You can help plant trees, pick up litter, pass out literature at conferences or workshops, write articles for organization newsletters, talk to school groups and lead tours. If you have the enthusiasm to lead an effort in your community, get a copy of the *Chesapeake Bay Community Action Guide* published by the Metropolitan Washington Council of Governments. It's a step-by-step guide to improving the environment in your neighborhood! The Global Action Plan for the Earth offers an *EcoTeam Workbook* to help you get your community on the road to sustainability. The bottom line is that "where there's a will, there's a way," so get busy for the Bay!

WANT TO LEARN MORE?

If you're the type that loves to learn, check out nearby nature centers, arboretums and botanical gardens. They frequently sponsor educational workshops, lectures, seminars and other programs on a variety of topics.

GLOSSARY

Bioretention Areas	Larger, often community-owned areas, created and planted to provide stormwater runoff control and retention of excess water during storm events.
Cover Crops	A legume or nonlegume plant that is seeded in fall and grows during fall and winter to protect soils and provide nutrients. Cover crops are plowed under or killed in spring before garden planting.
Erosion	The disruption and movement of soil particles by wind, water, or ice.
Hedgerows	"Living fences" comprised of small trees, shrubs, and ground covers.
Impervious Surface	Surfaces, such as pavement and buildings, that do not allow water to penetrate into the ground.
Land Use Planning	Local zoning for particular land uses, such as wastewater treatment, transportation, open space, and sensitive areas like wetlands and forest.
Native Plants*	Plants that originally grew in a region before humans began introducing species for agriculture and ornamental purposes.
Nutrients	Nitrogen and phosphorous are the major nutrients causing problems in the Bay and rivers. While nutrients are essential to all plant life, nutrient overload, caused by things like excess use of fertilizer, sewage disposal, and driving, is harmful.
Rain Gardens	Low-lying areas, away from houses, created and planted with vegetation to retain water during storm events.
Riparian Forest Buffers*	Natural forested areas along waterbodies and wetlands.
Soil pH	The acidity or alkalinity of the soil.
Stormwater Runoff	Water that rushes off the land and other surfaces during rain events. Stormwater runoff often carries sediments and pollutants with it.

*More information about these terms is included in the Introduction section, *Before You Begin: Important Concepts.*

RESOURCES AND CONTACTS

KEY: T=Technical
I = Informational
$ = Funding
NOTE: Programs and documents are listed after contact.

FEDERAL AGENCIES AND PROGRAMS

➤ National Park Service
www.ncre.nps.gov/rtca

Philadelphia Office
200 Chestnut Street, Third Floor
Philadelphia, PA 19106
(215) 597-7995
www.nps.gov/chal/rtca

Chesapeake Bay Office
410 Severn Avenue, Suite 109
Annapolis, MD 21403
(410) 267-5787

Rivers, Trails and Conservation Assistance Program (T)

➤ Natural Resources Conservation Service
P.O. Box 2890
Washington, DC 20013
(202) 720-3210
www.nrcs.usda.gov/

Maryland State Office
John Hanson Business Center, Suite 301
339 Busch's Frontage Road
Annapolis, MD 21401-5534
(410) 757-0861

Pennsylvania State Office
One Credit Union Place, Suite 340
Harrisburg, PA 17110-2993
(717) 237-2202

Virginia State Office
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014
(804) 287-1691

Backyard Conservation (Call 1-888-LANDCARE) (I)

*Conservation Reserve Program (*T, $)

*Wetlands Reserve Program (*T, $)

*Wildlife Habitat Incentives Program (*T, $)

NRCS Earth Team Volunteer Opportunities Website (I)
www.nhq.nrcs.usda.gov/CCS/aboutEG.html

➤ Project Wild
5430 Grosvenor Lane, Suite 230
Bethesda, MD 20814-2142
(301) 493-5447
eelink.umich.edu/wild/

District of Columbia Coordinator
Environmental Regulation Administration
Fisheries Management Branch
2100 Martin Luther King Jr. Avenue, SE
Washington, DC 20020

Maryland Coordinator
Maryland Department of Natural Resources
Wildlife & Heritage Division
Tawes State Office Building
580 Taylor Avenue
Annapolis, MD 21401
(301) 478-2146

Pennsylvania Coordinator
Pennsylvania Game Commission
Division of Information & Education
2001 Elmerton Avenue
Harrisburg, PA 17110-9797
(717) 783-4872

Virginia Coordinator
Virginia Department of Game & Inland Fisheries
4010 West Broad
P.O. Box 11104
Richmond, VA 23230
(804) 367-0188

Wild School Sites: A Guide to Preparing for Habitat Improvement Projects on School Grounds (I, T, $)

➤ Smithsonian Institution
web3.si.edu/resource/tours/gardens/butterfly/

Butterfly Habitat Garden Website

➤ U.S. Army Corps of Engineers
www.usace.army.mil/

Baltimore District
P.O. Box 1715
Baltimore, MD 21203
Shoreline Protection Information
(410) 962-4713
www. nab.usace.army.mil/
Wetland Regulations
(410) 962-3670

Norfolk District
803 Front Street
Norfolk, VA 23510
Shoreline Protection Information
(757) 441-77655
Wetland Regulations
(757) 441-7068

Philadelphia District
100 Penn Square East
2nd and Chestnut Street
Philadelphia, PA 19107-3396
Wetland Regulations
(215) 656-6725

➤ U.S. Department of Agriculture
14th & Independence Avenue, SW
Washington, D.C. 20250
(202) 720-2791
www.usda.gov/
(See State Listings for Cooperative Extension Service Contacts)

Or find your local Cooperative Extension Service Office here:
Cooperative State Research Education and Extension Service Website
www.reeusda.gov/

Stream Corridor Restoration (T)
(available online at www.usda.gov/stream_restoration/)

➤ U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
www.epa.gov/
(800) 832-7828

America's Wetlands: Our Vital Link Between Land & Water (I)

Wetlands Information Hotline (I)

Chesapeake Bay Program Office
410 Severn Avenue, Suite 109
Annapolis, MD 21403
(800) YOUR BAY
www.chesapeakebay.net/

Beyond Sprawl: Land Management Techniques to Protect the Chesapeake Bay (T)

Boating Responsibly on the Bay and its Rivers (I)

Chesapeake Bay Map of Public Access Sites (I)

Chesapeake Bay Region Nutrient Management Training Manual (T)

Chesapeake Riparian Handbook: A Guide for Establishing and Maintaining Riparian Forest Buffers (T)

Guidance for Protecting Submerged Aquatic Vegetation in Chesapeake Bay from Physical Disruption (I)

Local Government Pollution Prevention Toolkit (I, T)

Protecting Wetlands I: Tools for Local Governments in the Chesapeake Bay Region (T)

Protecting Wetlands II: Technical and Financial Assistance Programs for Local Governments in the Chesapeake Bay Region (T, $)

Removing Impediments to Migratory Fishes in the Chesapeake Bay Watershed (I)

Restoring a Bay Resource: Riparian Forest Buffer Demonstration Sites (I)

Riparian Forest Buffer Website (www.chesapeakebay.net/bayprogram/facts/forests/intro.htm) (I)

Underwater Bay Grasses are Good for Wildlife and People (brochure) (I)

Urban Riparian Forest Buffers Fact Sheet (I)

Wetlands: The Vital Link Between the Watershed and the Bay (I)

Local Government Advisory Committee
777 N. Capitol St., N.E.
Suite 500
Washington, D.C. 20002-4201
(202) 962-3589
www.icma.org

Region 3 Office
U.S. Environmental Protection Agency
Public Environmental Education Center
1650 Arch Street
Philadelphia, PA 19103
(215) 814-5663
www.epa.gov/region3/

Gardener's Guide to a Healthy Environment (T)

Gardening in Wet Places (T)

Plants for Wildlife: Native Trees & Shrubs of the Delaware Valley with High Wildlife Value (T)

Some Garden Resources for the Middle Atlantic States (T)

Region 5/Office/Air and Radiation Division
U.S. Environmental Protection Agency
77 W Jackson Boulevard
Chicago, IL 60604
(312) 886-7901
www.epa.gov/glnpo/greenacres/

Wild Ones Handbook (T)

Green Landscaping with Native Plants (T)

➤ U.S. Fish and Wildlife Service
1849 C Street, NW, Room 3012
Washington, D.C. 20240
(202) 208-4131
Publications: (304) 876-7203
www.fws.gov/

Bats of the Eastern United States (I)

North American Wetland Conservation Act

North American Wetland Management Plan

Partners for Fish and Wildlife Program

Partners in Flight Program

Restoring America's Sport Fisheries: The Federal Aid in Sport Fish Restoration Program (I)

Wetland Restoration Fact Sheet (I)

➤ U.S. Fish and Wildlife Service *(continued)*

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401
(410) 573-4500
www.fws.gov/r5cbfo/

BayScapes Factsheets (I)

Field Guide to the Submerged Aquatic Vegetation of the Chesapeake Bay (I)

A Guide to Conservation Landscaping for Federal Facilities (T)

Native Plant Guides (I)

*Native Plants for Wildlife Habitat (*T)

Nursery Lists (I)

Schoolyard Habitat Guide (IT)

BayScapes Program (T)

Partners for Fish and Wildlife Program (T)

Schoolyard Habitat Program (T)

SAV Hunt (I)

Pennsylvania Field Office
315 South Allen Street, Suite 322
State College, PA 16801
(814) 234-4090

Virginia Field Office
P.O. Box 99
6669 Short Lane
Gloucester, VA 23061
(804) 693-6694

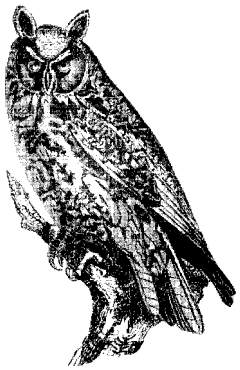
Office of Migratory Bird Management
Room 634 Arlington Square
4401 North Fairfax Drive
Arlington, VA 22203
www.fws.gov/r9mbmo/homepg.html

Backyard Birding Pamphlets (I)

For the Birds (T)

➤ U.S. Forest Service
201 14th Street, SW
P.O. Box 96090
Washington, DC 20090-6090
(202) 205-1760
www.fs.fed.us/
Stewardship Incentive Program (T, $)
Forestry Incentive Program (T, $)

Northeast Area State and Private Forestry
11 Campus Blvd., Suite 200
Newtown Square, PA 19073
(610) 557-4111



LOCAL AGENCIES AND PROGRAMS WITHIN THE WATERSHED

DISTRICT OF COLUMBIA

➤ District of Columbia Environmental Health Administration
51 N Street, NE
Washington, DC 20002
(202) 535-2500
www.environ.state.dc.us

Soil Quality Division
Stormwater Management Branch
(202) 535-1600

Stormwater Management Information (T, I)

Water Quality Division
(202) 535-2190

Riparian Forest Buffer Information

Wetlands Information

➤ Metropolitan Washington Council of Governments
777 North Capitol Street, NE, Suite 300
Washington, DC 20002-4226
(202) 962-3200
www.mwcog.org/

Clearing and Grading Strategies for Urban Watersheds (T)

Chesapeake Bay Community Action Guide (I,T)

MARYLAND

➤ Maryland Cooperative Extension Service
Publications Office
0109 Symons Hall
College park, MD 20742
(301) 405-4579
www.agnr.umd.edu/CES/

Broadleaf Weed Control in Established Lawns (T)

Herbicides for Crabgrass and Goosegrass Control in Turf (T)

Plants for Maryland Shore Landscapes, Fact Sheet #586 (T)

Take it From Maryland Farmers. . .Use Fertilizer Wisely: Protect Chesapeake Bay (I)

Turfgrass Cultivar Recommendations for Certified Sod and Professional Seed Mixtures in Maryland (T)

Home and Garden Information Center
12005 Homewood Road
Ellicott City, MD 21042
(800) 342-2507 (Maryland only)
www.agnr.umd.edu/users/hgic/

Aquatic Gardening: Construction and Maintenance (T)

Basics of Planting Aquatic Plants (T)

Conservation on Home Lawns (T)

Irrigation and Water (T)

Help the Chesapeake Bay! (I)

Landscapes that Help Chesapeake Bay (T)

Lawns and the Chesapeake Bay (T)

Water Tips for Drought Conditions (T)

Howard County Master Gardener Program Office
3525-L Ellicot Mills Drive
Ellicott City, MD 21043
(410) 313-2707

Bay-Wise Landscape Management Demonstration Site Program

➤ Maryland Department of Agriculture
Office of Resource Conservation
50 Harry S. Truman Parkway
Annapolis, MD 21401
(410) 841-5864

➤ Maryland Department of the Environment
Water Management Administration
2500 Broening Highway
Baltimore, MD 21224
(410) 631-3000 or (800) 633-6101
www.mde.state.md.us/

Wetland Regulations

Stormwater Management Information

➤ Maryland Department of Natural Resources
Tawes State Office Building
580 Taylor Avenue
Annapolis, MD 21401
(410) 260-8367
www.dnr.state.md.us/

Resistance of Woody Ornamentals to Deer Damage (T)

Watershed Restoration Division

(800) 989-8852

Private Landowner's Wetlands Assistance Guide:

Voluntary Options for Wetlands Stewardship in Maryland (I, T, $)

Landowner Stewardship Referral Service (I, T, $)

Wildlife and Heritage Service
(410) 260-8555

Wild Acres Program (T, I)

Forest Service
(410) 260-8531

Greenways Program (I, T)

*Maryland Buffer Incentives Program (*I, T)

*Maryland Stream ReLeaf (*I, T, $)

*Maryland Woodland Incentives Program (*T, $)

Shore Erosion Control Guidelines for Waterfront Property Owners (I, T)

Chesapeake Bay Critical Areas Commission
45 Calvert Street, 2nd floor
Annapolis, MD 21401
(410) 260-7516

Habitat Management Guidelines for the Benefit of Land Birds in Maryland (T)

Maryland Partners in Flight (I)

➤ Maryland Office of Planning
301 West Preston Street, Room 1101
Baltimore, MD 21201
(410) 225-4500
www.wp.state.md.us/

Managing Maryland's Growth: Smart Growth Options for Maryland's Tributary Strategies (I)

➤ University of Maryland Environmental Finance Center
0112 Skinner Hall
College Park, MD 20742
(301) 405-6383
www.mdsg.umd.edu/MDSG/EFC/index.html

Riparian Forest Buffer Funding Matrices ($)

PENNSYLVANIA

➤ Pennsylvania Bay Education Office
225 Pine Street
Harrisburg, PA 17101
(717) 236-1006

We All Live Downstream: A Homeowner's Guide, Improve Your Property— Improve the Environment (I,T)
(Online at www.dep.state.pa.us/dep/deputate/enved/Can_Do/cover.htm)

➤ Pennsylvania Cooperative Extension Service
Publications Distribution Center
112 Agricultural Administration Building
University Park, PA 16802
(814) 865-6713
www.cas.psu.edu/docs/COEXT/COOPEXT.HTML

Providing Wetlands for Wildlife While Controlling Stormwater, Circular #384 (T, I)

Publications Slide/Tape and Video Programs Catalog (Lots of good publications on Wildlife!) (I)

Soil Management in Home Gardens and Landscapes (T)

Forest Stewardship Series (T)

Urban Gardening Program I, T
4601 Market Street, 3rd floor
Philadelphia, PA 19139
(215) 471-2224

Vegetable and Fruit Garden Hotline (I, T)
(215) 471-2224

➤ Pennsylvania Department of Agriculture
2301 North Cameron Street
Harrisburg, PA 17110-9408
(717) 787-4737
www.pda.state.pa.us

➤ Pennsylvania Department of Environmental Protection
Bureau of Watershed Management
P.O. Box 8555
Rachel Carson State Office Building
Harrisburg, PA 17105
(717) 787-5267
www.dep.state.pa.us/

Adopt-A-Stream Program (I)

Greenways Program (I)

Local Solutions to Pennsylvania's Pollution: Pennsylvania's Nonpoint Source Management Program (I)

*Pennsylvania Stream ReLeaf (*I, T)

Statewide Directory of Citizen's Volunteer Monitoring Programs (I)

Stormwater Management Guidelines and Model Ordinances (I, T)

Streambank Fencing Program (I, T)

Streambank Stabilization Information (T)

We All Live Downstream: A Homeowner's Guide, Improve Your Property— Improve the Environment (T) (Online at www.dep.state.pa.us/dep/deputate/enved/Can_Do/cover.htm)

Wetland and Riparian Stewardship in Pennsylvania: A Guide to Voluntary Options for Landowners, Local Governments and Organizations (I, T)

Water Quality Monitoring of Pennsylvania Streams by Citizen's Groups: A Primer in Quality Assurance and Quality Control (T)

Wetlands Program

➤ Pennsylvania Department of Conservation and Natural Resources
Bureau of Forestry
P.O. Box 8552
Harrisburg, PA 17105-8552
(717) 787-2106
www.dcnr.state.pa.us/forestry/index.htm

Forest Stewardship Series (I, $)

Pennsylvania Stream ReLeaf (I, T)

➤ Pennsylvania Fish and Boat Commission
Habitat Management Section
450 Robinson Lane
Bellefonte, PA 16823
(814) 359-5185
www.fish.state.pa.us

Adopt-A-Stream Program (I, T, $)

Fish Restoration and Passage on the Susquehanna River (I)

➤ Pennsylvania Game Commission
2001 Elmerton Avenue
Harrisburg, PA 17110
(717) 787-4250
www.pgc.state.pa.us/

Resources on Creating Backyard & Schoolyard Habitat in Pennsylvania (T, I, $)

Wild Habitats Program (T, $)

VIRGINIA

➤ Northern Virginia Soil and Water Conservation District
12055 Government Center Parkway, Suite 905
Fairfax, VA 22035-5512
(703) 324-1460

Developing Successful Runoff Control Programs for Urbanized Areas (T)

Citizens Water Quality Handbook (I)

You and Your Land: A Homeowner's Guide for the Potomac River Watershed (T)

➤ Virginia Cooperative Extension Service
Virginia State University
P.O. Box 9081
Petersburg, VA 23806
(804) 524-5848
www.ext.vt.edu

Lawn and Garden Fertilizers (T)

Landowner's Guide to Managing Streams in the Eastern United States (T)

Virginia Gardener's Guide to Water-Wise Landscaping (T)

Water Gardening Fact Sheets (T)

➤ Virginia Department of Agriculture
P.O. Box 1163
Richmond, VA 23209
(804) 786-3501

➤ Virginia Department of Conservation and Recreation
203 Governor Street
Richmond, VA 23219
(804) 786-1712
www.state.va.us/~dcr/

Native Plants for Conservation, Restoration, and Landscaping: Riparian Forest Buffers (T)

The Virginia Gardener Year Round Guide to Nutrient Management (T)

Tips on Keeping Your Lawn Green and the Chesapeake Bay Clean (T)

➤ Virginia Department of Conservation and Recreation *(continued)*

Division of Soil and Water Conservation
(804) 786-2064

The Best Urban BMP is Planning (I)

Stormwater Management Regulations, Virginia Erosion and Sediment control Law, Regulations, and Certification Regulations (I, T)
Clean Water...A Community Commitment to Protecting Virginia's Watersheds (I)

Division of Natural Heritage
217 Governor Street, Third Floor
Richmond, VA 23219
(804) 786-7951
www.dcr.state.va.us/dnh/index.html

Native Plants for Conservation, Restoration, and Landscaping (T)

Natural Resources Fact Sheets (I)

Shoreline Erosion Advisory Service (SEAS)
York Watershed Office
P.O. Box 1425
Tappahanock, VA 22560
(804) 443-6752

Albemarle, Chowan and Coastal Watersheds
1548-A Holland Road
Suffolk, VA 23434
(757) 925-2468

➤ Virginia Department of Forestry
P.O. Box 3758
900 Natural Resources Drive, Suite 800
Charlottesville, VA 22903
(804) 977-6555
www.dof.state.va.us

Riparian Buffer Implementation Plan

Urban and Community Forestry Assistance Grants

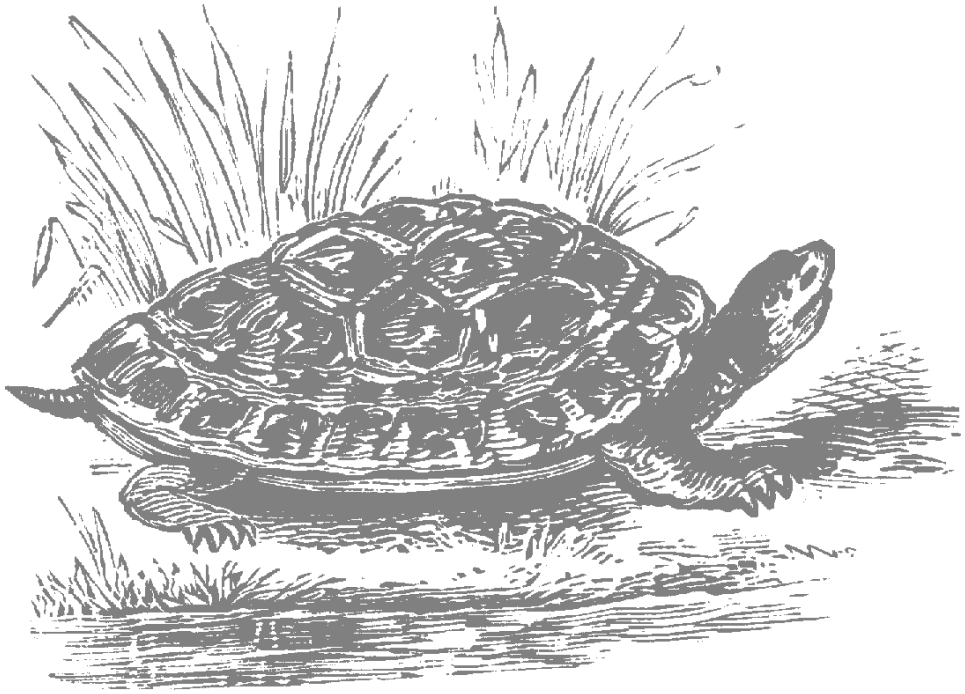
➤ Virginia Institute of Marine Science
P.O. Box 1346
Gloucester Point, VA 23062
(804) 684-7000
www.vims.edu/

➤ Virginia Marine Resources Commission
Habitat Management Division
2600 Washington Avenue
P.O. Box 756
Newport News, VA 23607-0756
(757) 247-2200
www.state.va.us/mrc/homepage.htm

Wetlands Guidelines (T, I)

Tidal Wetlands Program

Conservation Replenishment Division
(757) 247-2121
Aquatic Reefs and Oyster Gardening Information



STATE AND LOCAL GOVERNMENT AGENCIES OUTSIDE THE WATERSHED

➤ Canada Office of Urban Agriculture
801-318 Homer Street
Vancouver, BC V6B 2V3
(604) 685-5832
www.cityfarmer.org/urbagnotes1.html#notes

Urban Agriculture Notes (I)
City Farmer

➤ Georgia Soil and Water Conservation Commission
P.O. Box 8024
Athens, GA 30603
(706) 542-3065
www.gaswcc.org

Guidelines for Streambank Restoration (T)
(Be sure to use native plants from your area!)

➤ North Carolina State University Forestry Extension
P.O. Box 8003
Raleigh, NC 27695-8003
(919) 515-5636
School Yard Environmental Projects:
A Planning Primer (T, I)

➤ Northeast Regional Agricultural Engineering Service Cooperative Extension
152 Riley-Robb Hall
Ithaca, NY 14853-5701
(607) 255-7654

Enhancing Wildlife Habitats:
A Practical Guide for Forest Landowners (I)

➤ Farm*A*Syst/Home*A*Syst
B142 Steenbock Library
550 Babcock Drive
Madison, WI 53706-1293
(608) 262-0024
(farm) www.uwex.edu/farmasyst/
(home) www.uwex.edu/homeasyst/

*Home*A*Syst*

➤ Northeastern Illinois Planning Commission
222 South Riverside Plaza, Suite 1800
Chicago, IL 60606
(312) 454-0400
www.nipc.cog.il.us/

Natural Landscaping for Public Officials (T)

➤ Texas A&M Horticulture Program (I, T)
Horticulture/Forest Science Building
College Station, TX 77843-2133
(979) 845-5341
aggie-horticulture.tamu.edu/

Aggie Horticulture Website

➤ Wisconsin Cooperative Extension Service
Cooperative Extension Publications
Room 170, 630 W. Mifflin Street
Madison, WI 53703
(608) 262-3346
www.uwex.edu/ces/
Cleaning up Stormwater Runoff (I)
Lawn and Garden Fertilizers (T)
Lawn Watering (T)

NONPROFIT AND PRIVATE ORGANIZATIONS

➤ Alliance for the Chesapeake Bay
www.acb-online.org/

6600 York Road, Suite 100
Baltimore, MD 21212
(410) 377-6270

P.O. Box 1981
Richmond, VA 23218
(804) 775-0951

600 N. Second Street, Suite 300B
Harrisburg, PA 17101
(717) 236-8825

Chesapeake Regional Information Service (CRIS)
1-800-662-CRIS

Bayscapes (T)

Baybook: A Guide to Reducing Water Pollution at Home (T)

Bay Journal Newspaper (I)

Controlling Nonpoint Source Water Pollution: A Citizens Handbook (T)

Nonpoint Source Pollution Publications and Projects (I)

Pennsylvania Streamside Forest Fund ($)

➤ American Community Gardening Association
100 N. 20th Street, 5th Floor
Philadelphia, PA 19103-1495
(215) 988-8785
communitygarden.org/

From the Roots Up Program (T, I)

➤ American Forests
P.O. Box 20000
Washington, DC 20013
910 17th Street, #600
Washington, DC 20006
(202) 667-3300
www.amfor.org

Stream Releaf (I, T)

➤ American Horticultural Society
7931 East Boulevard Drive
Alexandria, VA 22308
(703) 768-5700
https://www.ahs.org

Tons of great factsheets for a nominal cost!

➤ Aquascapes Unlimited Inc.
P.O. Box 364
Pipersville, PA 18947
(215) 766-8151

➤ Pennsylvania Audubon Society
100 Wildwood Way
Harrisburg, PA 17110
(717) 213-6880
www.audubon.org/chapter/pa/pa/

Native Plants in the Creation of Backyard, Schoolyard and Park Habitat Areas (I, T)

APATH (Audubon Protecting Animals Through Habitat) (I, T)

➤ Bat Conservation International
500 N. Capital of Texas Highway
Building 1
P.O. Box 162603
Austin, TX 78716
(512) 327-9721
www.batcon.org

➤ Biohabitats, Inc.
15 West Aylesbury Road
Timonium, MD 21093
(410) 337-3659
www.biohabitats.com

Design Manual for Use of Bioretention in Stormwater Management (T)

➤ Canada Office of Urban Agriculture
www.cityfarmer.org

Urban Agriculture Notes Website (I)

City Farmer

➤ Center for Chesapeake Communities (I)
209 West Street, Suite 201
Annapolis, MD 21401
(410) 267-8595

➤ Center for Resource Management
1104 East Ashton Avenue, #210
Salt Lake City, UT 84106
(801) 466-3600
F (801) 466-6800

Golf and the Environment: Environmental Principles for Golf Courses in the United States (T, I)

➤ Center for Watershed Protection Inc.
8391 Main Street
Ellicott City, Maryland 21403
(410) 461-8323
www.cwp.org

Site Planning for Urban Stream Protection (T)

Erosion and Sediment Control (T)

The Economics of Urban BMPs in the Mid-Atlantic Region (I)

➤ Chesapeake Bay Foundation
www.cbf.org/

6 Herndon Avenue
Annapolis, MD 21403
(410) 268-8816

614 N. Front Street, Suite G
Harrisburg, PA 17101
(717) 234-5550

1108 East Main Street, Suite 1600
Richmond, VA 23219
(804) 780-1392

A Better Way to Grow (I)

Grasses in Classes (T)
Oyster Gardening Program (T)

➤ Chesapeake Bay Trust ($)
60 West Street, Suite 200A
Annapolis, Maryland 21401
(410) 974-2941
www.chesapeakebaytrust.org

➤ Chesapeake Wildlife Heritage
P.O. Box 1745
Easton, MD 21601
(410) 822-5100
www.cheswildlife.org

Backyard Habitat Program (T, $)

➤ Ducks Unlimited
Mid-Atlantic Field Office
203 Romancoke Road, Suite 90
Stevensville, MD 21666
(410) 643-5300
www.ducks.org/

➤ The Elizabeth River Project
801 Boush Street, Suite 204
Norfolk, VA 23510
(757) 625-3648
www.elizabethriver.org

Habitat Enhancement Packet (T, I, $)

➤ Environmental Concern, Inc. (T, I)
P.O. Box P
St. Michaels, MD 21663
(410) 745-9620
www.wetland.org

➤ The Evergreen Foundation
355 Adelaide Street, Suite 500
Toronto, Ontario M5V 1S2 Canada
(416) 596-1495
www.evergreen.ca/home.html

Schoolyard Naturalization and Enhancement Information (I, T)

➤ Garden Resources of Washington (GROW) (T, I)
1419 V Street, NW
Washington, DC 20009
(202) 234-0591

➤ Global Action Plan for the Earth
Sustainable Lifestyle Campaign
P.O. Box 428
Woodstock, NY 12498
(845) 679-4830
www.globalactionplan.org/

EcoTeam Workbook (I)

➤ Izaak Walton League of America
707 Conservation Lane
Gaithersburg, MD 20878-2983
(800) BUG-IWLA
www.iwla.org
Save Our Streams Program (T, I)
Catalog of Books, Videos, Equipment and Workshops

➤ Jeff Chorba Landscape Design Website
home.ptd.net/~jchorba/

Designing for Deer Resistance (T)

➤ Landscape and Nursery Associations
Maryland Nursery and Landscape Association
P.O. Box 18989
Baltimore, MD 21206
(410) 882-5300
www.mdnurserymen.org

Virginia Nursery & Landscape Association
383 Coal Hollow Road
Christiansburg, VA 24073-6721
(800) 476-0055
www.vnla.org

Pennsylvania Landscape and Nursery Association
1707 S. Cameron Street
Harrisburg, PA 17104
(717) 238-1673
www.plna.com

➤ Maryland Ornithological Society
Cylburn Mansion
4915 Greenspring Avenue
Baltimore, MD 21209
(410) 244-0032

➤ Maryland Oyster Recovery Partnership
P.O. Box 6775
Annapolis, MD 21403
(410) 269-5570

➤ National Aquarium in Baltimore
Pier 3/501 East Pratt Street
Baltimore, MD 21202-3194
(410) 576-3800
www.aqua.org/

➤ National Institute for Urban Wildlife
10921 Trotting Ridge Way
Columbia, MD 21044

Urban Wetlands for Stormwater Control and Wildlife Enhancement (T)

➤ National Arbor Day Foundation
211 North 12th Street
Lincoln, NE 68508
(402) 474-5655
www.arborday.org

How Trees Can Save Energy (I)

➤ National Wildlife Federation
11100 Wildlife Center Drive
Reston, VA 20190-5362
(703) 438-6000
www.nwf.org/

Backyard Wildlife Habitat Program (T)

Schoolyard Habitats Program (T)

➤ Native Plant Societies

Maryland Native Plant Society
P.O. Box 4877
Silver Spring, MD 20914
www.mdflora.org
List of Nurseries for Native Plants

Virginia Native Plant Society (T, I)
400 Blandy Farm Lane
Boyce, VA 22620
(540) 837-1758
www.vnps.org
List of Nurseries for Native Plants

➤ Natural Landscapers, Ltd.
P.O. Box 23576
Milwaukee, WI 53223-0576
www.epa.gov/glnpo/greenacres/wildones/

Wild Ones (T)

➤ The Nature Conservancy
4245 North Fairfax Drive, Suite 100
Arlington, VA 22203
(703) 841-5300
www.nature.org

➤ Neighborhood Gardens Association/
A Philadelphia Land Trust (T, I)
325 Chestnut Street, Suite 800
Philadelphia, PA 19106
(215) 988-8797

➤ Pennsylvania Horticultural Society
100 North 20th Street, 5th floor
Philadelphia, PA 19103-1495
(215) 988-8800
www.libertynet.org/phs/

Philadelphia Green (T,I)

➤ Rock Creek Nature Center
5200 Glover Road, NW
Washington, DC 20015
(202) 426-6828
www.nps.gov/rocr/home.htm

DC Naturally: A Guide to Metropolitan Washington's Environmental Education Resources

➤ Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391
(717) 238-0423
www.srbc.net/

➤ The Terrene Institute
4 Herbert Street
Alexandria, VA 22305
(703) 548-5473
www.terene.org

*Urban Runoff and Stormwater Management Handbook(*I, T)

*A Watershed Approach to Urban Runoff: Handbook for Decisionmakers (*I, T)

Local Ordinances: A User's Guide (I)

Golf and the Environment: What Partners! (I, T)

➤ Tidewater Oyster Gardeners Association
8218 Hellneck Road
Gloucester, VA 23061
(804) 694-4407
www.oystergardener.org

➤ Trout Unlimited
1500 Wilson Boulevard, Suite 310
Arlington, VA 22209-2404
(703) 522-0200
www.tu.org/

➤ Urban Harvest (I)
P.O. Box 980460
Houston, Texas 77098-0460
(713) 880-5540
www.jumpnet.com/~arjun/UrbanHarvest/

➤ Wild Birds Forever (T)
27212 Highway 89
P.O. Box 4904
Blue Jay, California 92317-4909
(800) 459-2473
www.birdsforever.com

PLANT LISTS

➤ Alliance for the Chesapeake Bay
www.acb-online.org/

6600 York Road, Suite 100
Baltimore, MD 21212
(410) 377-6270

P.O. Box 1981
Richmond, VA 23218
(804) 775-0951

600 N. Second Street, Suite 30013
Harrisburg, PA 17101
(717) 236-8825

Bayscapes

➤ Aquascapes Unlimited, Inc. (T, I)
P.O. Box 364
Pipersville, PA 18947
(215) 766-8151

➤ Pennsylvania Audubon Society
100 Wildwood Way
Harrisburg, PA 17110
(717) 213-6880
www.audubon.org/chapter/pa/pa/

Native Plants in the Creation of Backyard, Schoolyard and Park Habitat Areas (T, I)

APATH (Audubon Protecting Animals Through Habitat)

➤ The Elizabeth River Project
801 Boush Street, Suite 204
Norfolk, VA 23510
(757) 625-3648
www.elizabethriver.org

Habitat Enhancement Packet (T, I, $)

➤ Environmental Concern, Inc. (T, I)
P.O. Box P
St. Michaels, MD 21663
(410) 745-9620
www.wetland.org

➤ Jeff Chorba Landscape Design Website
home.ptd.net/~jchorba/

Designing for Deer Resistance T

➤ Maryland National Capital Park & Planning Commission
Natural Resources Division
14741 Governor Oden Bowie Drive
Upper Marlboro, MD 20772
(301) 952-3650
www.clark.net/pub/mncppc/montgom/home.htm

Native Plants of Prince George's County, Maryland

➤ Metropolitan Washington Council of Governments
777 North Capitol Street, NE, Suite 300
Washington, DC 20002-4226
(202) 962-3256
www.mwcog.org/

Chesapeake Bay Community Action Guide

➤ Native Plant Societies

Maryland Native Plant Society (I, T)
P.O. Box 4877
Silver Spring, MD 20914
www.mdflora.org
List of Nurseries for Native Plants

Virginia Native Plant Society (I, T)
400 Blandy Farm Lane
Boyce, VA 22620
(540) 837-1758
www.vnps.org
List of Nurseries for Native Plants

➤ U.S. Department of Agriculture
Plants Database
tons of information about plants with photos!
plants.usda.gov/plants/

➤ U.S. Environmental Protection Agency, Region 3
Public Environmental Education Center
1650 Arch Street
Philadelphia, PA 19103
(215) 814-5663
www.epa.gov/region3/

Gardener's Guide to a Healthy Environment (T, I)

Gardening in Wet Places

Plants for Wildlife: Native Trees & Shrubs of the Delaware Valley with High Wildlife Value

Some Garden Resources for the Middle Atlantic States

➤ U.S. Fish and Wildlife Service, Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401
(410) 573-4500
www.fws.gov/r5cbfo

➤ Virginia Department of Conservation and Recreation
Division of Natural Heritage
217 Governor Street, Third Floor
Richmond, VA 23219
(804) 786-7951
www.state.va.us/dnh

Native Plants for Conservation, Restoration, and Landscaping (T)

(5 brochures: Coastal Plain, Piedmont, Mountains, Riparian Forest Buffers, Grasslands)

Natural Resources Fact Sheets (I)

OTHER RESOURCES

➤ District of Columbia Environmental Regulation Administration
Water Resources Management Division
Fisheries Management Branch
2100 Martin Luther King, Jr. Avenue, Suite 203
Washington, DC 20020
(202) 645-6068
www.p2.org/locgovt/district.htm

Aquatic Resources Education Center

➤ Fairfax ReLeaf
12055 Government Center Parkway
Suite 703
Fairfax, VA 22035
(703) 324-1409
www.geocities.com/RainForest/5663

➤ Federal Native Plant Conservation Committee (I, $)
1849 C Street, NW, Room 3223
Washington, D.C. 20240-000
(202) 219-8933
www.aqd.nps.gov/npci/

➤ Maryland Department of Natural Resources
Wildlife and Heritage Division
P.O. Box 68
Wye Mills, MD 21679
(410) 827-8612

1996 Maryland Habitat Partners Directory ($)

➤ Maryland Eastern Shore Resource Conservation and Development Council, Inc.
8133 Elliott Road, Suite 201
Easton, MD 21601
(410) 822-9300

➤ National Association of Conservation Districts Website
www.nacdnet.org/

(To find your local county soil conservation district office)

➤ Pennsylvania Department of Environmental Protection
P.O. Box 8454
Harrisburg, PA 17105-8454
(717) 772-1828
www.dep.state.pa.us (School Zone/Stuff for Teachers)

Environmental Education Grants Program ($)

➤ U.S. Environmental Protection Agency
Office of Wetlands, Oceans and Watersheds
Assessment and Watershed Protection Division
401 M Street, SW
Washington, DC 20460
To order: (800) 490-9198
www.epa.gov/OWOW/watershed/wacademy/

Catalog of Federal Sources for Watershed Protection

National Environmental Publications Information System
(EPA publications database)
www.epa.gov/ncepihom/nepishom