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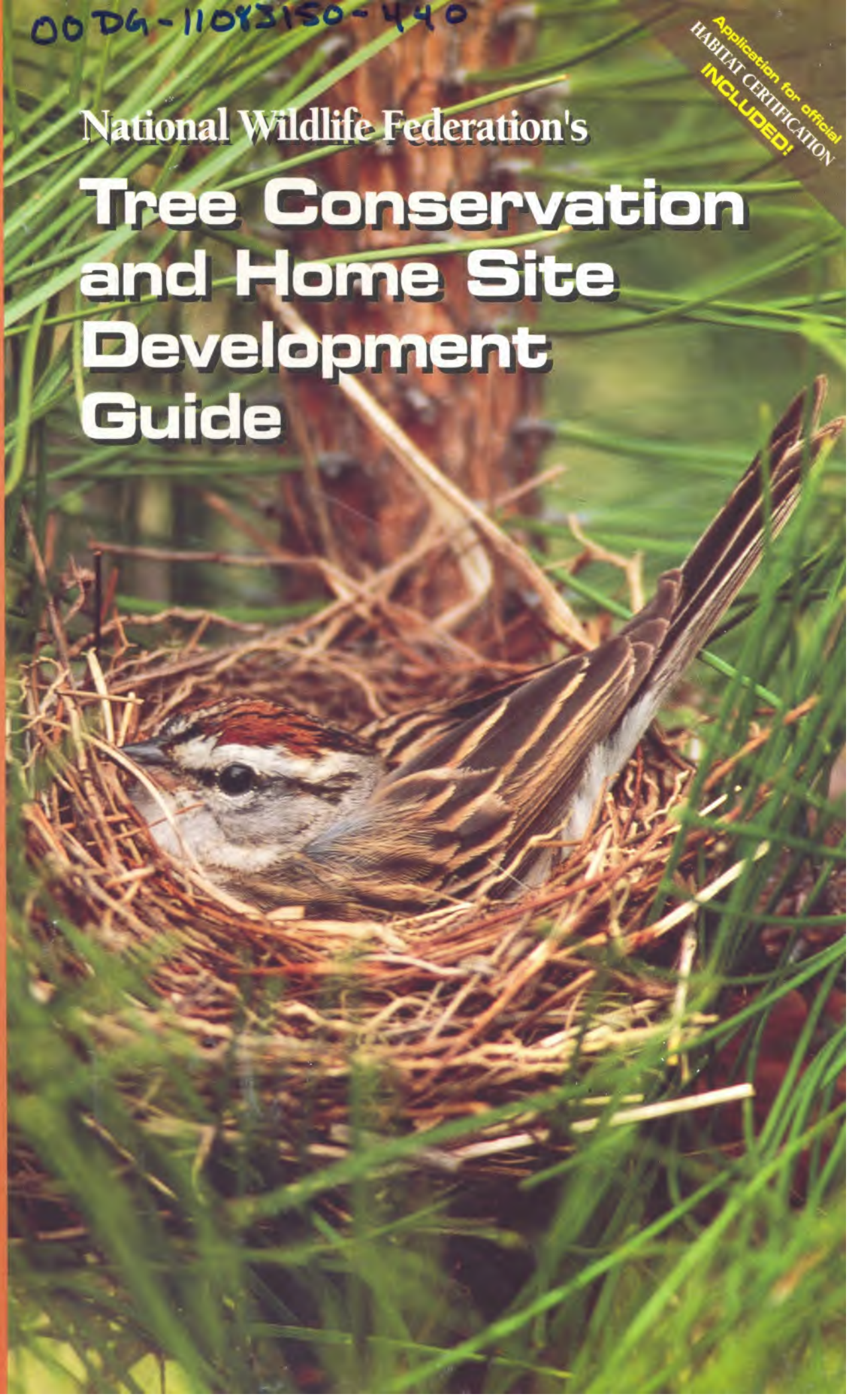
National Wildlife Federation's

Tree Conservation and Home Site Development Guide



National Wildlife Federation

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National Wildlife Federation Mission Statement

The mission of the National Wildlife Federation (NWF) is to educate, inspire, and assist individuals and organizations of diverse cultures to conserve wildlife and other natural resources and to protect the Earth's environment in order to achieve a peaceful, equitable, and sustainable future.

The design process is followed by students in design studios around the country, many of whom are interested in partnering with HFH and NWF. Professor Lolly Tai's landscape architecture studio exhibits the research and site analysis drawings for a Habitat for Humanity project at Clemson University.

Credits

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National Wildlife Federation's

Tree Conservation and Home Site Development Guide

NATIONAL WILDLIFE FEDERATION®
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Introduction

Realizing the important role nature plays in promoting a healthy sense of place and community, Habitat for Humanity International invited the National Wildlife Federation® to become its environmental stewardship partner in 1997, and the two organizations began working together with the goal of creating better habitat for both people and wildlife. The organizations are teaching new homeowners how to become environmental stewards, promoting the creation of certified Backyard Wildlife Habitat® sites at Habitat for Humanity homes, and encouraging habitat conservation in the siting of new Habitat for Humanity homes.

This manual was created in order to help Habitat for Humanity volunteers construct homes that embody the concepts of sustainable site design and development and green landscaping.

How to Use This Guide

Many of the concepts in this book reinforce one another, just as elements of a natural landscape provide complex interconnections. This guide is organized into chapters that address the steps you will take to create a landscape, but the information on any one topic—trees, for example—may appear in each chapter. Thus, for any step you are undertaking, you may find helpful information in other sections of the guide.

Chapter 1 provides an overview of all the principles that will be integral to your project. Keeping these concepts in mind during the design, construction, and planting phases will help you create a landscape that uses resources efficiently, conserves needed wildlife habitat, is environmentally sensitive, and is easy for the homeowner to maintain.

Chapters 2, 3 and 4 outline the planning and implementation of the landscape. Chapter 2 provides information on the steps that should precede construction. Chapter 3 discusses sustainable construction practices. Chapter 4 covers the actual planting of the landscape after the construction phase.

Chapters 5 and 6 address the role of homeowners in understanding and maintaining the landscape. Chapter 5 includes information created especially for the homeowner. These "Homeowner Pages" can be photocopied for distribution. Chapter 6 details how your Habitat for Humanity affiliate can incorporate conservation into homeowner education programs. These programs can be provided during and after construction and will help homeowners accumulate their required "sweat equity" hours.

The **Contacts and Resources** section at the end of this publication provides further information for anyone working to build a Habitat for Humanity home that is environmentally sensitive.

About the Organizations

National Wildlife Federation

The mission of the National Wildlife Federation (NWF) is to educate, inspire, and assist individuals and organizations of diverse cultures to conserve wildlife and other natural resources and to protect the Earth's environment in order to achieve a peaceful, equitable, and sustainable future.

For more than three generations, the National Wildlife Federation has been educating Americans of all ages and from all walks of life about conserving our common heritage of wild places and wild things. Conservation education occurs in many places: in a classroom, in a meadow, in a wetland, in a backyard, in an urban park, or in the home. It takes many different forms—from a community tree planting, to a field trip, to the study of local plant life. The National Wildlife Federation teaches all people the necessity of conserving natural resources so that they can take action to help uphold America's conservation tradition for future generations. With headquarters in northern Virginia and offices in Washington, D.C., the National Wildlife Federation provides local conservation leadership through ten regional offices across the United States and through state-based affiliate organizations.

National Wildlife Federation
11100 Wildlife Center Drive
Reston, VA 20190-5362
(800) 822-9919
http://www.nwf.org

Habitat for Humanity International

Habitat for Humanity International (HFHI) is a nonprofit, ecumenical Christian housing ministry that seeks to eliminate poverty housing and homelessness from the world and to make decent shelter a matter of conscience and action. Habitat for Humanity International invites people of all backgrounds, races, and religions to build houses together in partnership with families in need.

Habitat for Humanity International began its quest to provide housing for people in need more than 20 years ago. Habitat for Humanity International volunteers build an average of 40 homes per day, making the organization one of the largest builders of homes in the world. To further its mission, Habitat for Humanity International's environmental stewardship program focuses on materials management and the utilization of energy-efficient technology in the Habitat homes. The program promotes environmentally responsible landscape design and utilization and seeks to educate volunteers and homeowners about the need for and benefits of environmentally responsible home construction and ownership.

Habitat for Humanity International
121 Habitat Street
Americus, GA 31709
(800) 422-4828
http://www.habitat.org

Concepts of Tree Conservation & Sustainable Landscaping

Trees and other plants present on a property will provide benefits much more quickly than newly installed landscape plants. Therefore, before any work is done on your site, enlist an arborist or urban forester to assist in selecting trees that should be protected and to advise on proper protection methods. Recognizing the many functions and benefits provided by trees should encourage you to obtain the proper information and assistance to retain them as a critical element in your sustainable landscape.

The Benefits of Urban and Community Forests

Our cities and towns are, or can be, more than just a concrete and asphalt jungle. A stunning variety of trees, other plants, and wildlife coexist with humans in our communities. The "urban forest" simply refers to the trees that live in our cities and towns, in public parks and roadsides, as well as in our yards. These trees are just as important to community infrastructure as are streets, sidewalks, sewers, public buildings, and recreational facilities.

Reduction of Air Pollution

Trees help keep the air clean by filtering a number of pollutants, including carbon dioxide, sulfur dioxide, ozone, methane, nitrous oxide and chlorofluorocarbon, many of which are released into the air as a result of burning fossil fuels (oil, coal, and natural gas or their derivatives, such as gasoline). Trees actually use excess carbon dioxide emitted by cars and factories to make food for themselves. As a by-product, they then release oxygen, which humans and animals need to breathe. Particulate pollutants like dust, ash, pollen, and smoke collect on the surface of the leaves and trunks of trees and eventually wash to the ground with the rain, effectively removing them from the air.

Groups of trees create large zones of cool air.

Temperature Regulation

Trees naturally regulate temperature and help us to conserve energy. On a global scale, trees help fight the greenhouse effect, which is the unnatural rise in global temperatures that results from excess emissions of several heat-trapping gases into the atmosphere. Carbon dioxide is one of the worst of the greenhouse gases. As trees use this gas, they store the carbon in their cells and prevent it from being released back into the atmosphere. On a smaller scale, trees shade our homes in summer and buffer winds in winter, effectively allowing us to use less fossil-fuel energy to cool and heat our homes. This can also result in a significant reduction of our energy bills.

Erosion and Runoff Control

Unchecked, water and wind can cause unnatural soil erosion and the runoff of chemical pesticides and fertilizers into clean waterways. Trees and other vegetation help control runoff by holding the soil in place with their roots and by absorbing or breaking down pesticides and fertilizers before they reach the water. This serves to keep bodies of water much healthier for people and wildlife.

Wildlife Habitat

Human development continues to remove viable wildlife habitat at an alarming rate. As we remove the natural vegetation, including trees, in order to build homes, roads, and offices, many species of wildlife are pushed into ever-shrinking natural areas. A diverse array of wildlife, however, can live alongside people if provided with trees and other plants in which to live, find food, and raise their young. As development continues, the need to provide wildlife habitat through the urban forest will only increase.

Quality of Life

Trees improve our quality of life by adding beauty to our lives and neighborhoods. The flowers of many species are both visually appealing and fragrant. The birds and other wildlife that use trees bring us joy. Trees and other plants can soften the hard angles of city architecture and act as a buffer to noise pollution, both of which make our communities more livable. Evidence even suggests that sick people recover faster if they have a view of some trees and that crime rates go down and economic activity goes up in communities with a healthy urban forest.

The Benefits of Sustainable Landscaping

Sustainable landscaping helps protect the integrity of the local ecosystem by using particular plants and techniques to reduce water use, favor native plants, provide wildlife habitat, and reduce insecticide and herbicide use. Sustainable landscaping can:

- **Reduce Erosion.** Leaves and branches of plants reduce the impact of raindrops and slow water runoff. Fibrous root systems help hold the soil in place.
- **Reduce Pollution.** Plants can help purify the air and reduce sound pollution. Sustainable landscaping also involves the reduction of lawn areas and therefore reduces the need for mowing. It is estimated that using a gas-powered lawnmower for one hour can cause as much air pollution as driving a car 350 miles!
- **Reduce Energy Costs.** Plants can be seen as air conditioners, heaters, and humidifiers. Planting trees in strategic locations can help lower heating and cooling costs by blocking winter winds, channeling prevailing summer winds, and blocking the summer sun.
- **Conserve Water.** An estimated 30 to 60 percent of the potable municipal water in this country is used for maintaining lawns and other formal landscapes. Sustainable landscaping practices help conserve water.
- **Create Wildlife Habitat.** Native plants are an important part of the ecosystem. When used in the landscape, they provide food, cover, and places for wildlife to raise young. Native plants typically require less maintenance and often provide better wildlife habitat than their exotic counterparts.

Plants and trees absorb both direct and reflective radiation, reducing glare and heat buildup.

Landscaping for Energy Conservation

Studies have found that proper landscaping around a home can save as much as 30 percent on heating and cooling costs. Cutting energy use not only saves money, but also helps protect the environment, since fewer natural resources are used.

Orientation of the Home

Solar Orientation

For maximum solar gain, the house should be oriented properly on the site. This will vary depending on the geographic location.

Build your house below the crest of a hill to preserve views. Create wildlife corridors around waterways

Deciduous trees can make your home more energy efficient by providing shade during summer months and allowing sunlight to warm your house in the winter.

Shading your air conditioner is an easy way to cut cooling costs.

Evergreen materials block precious warmth from the winter sun.

Wind Orientation

Landform plays an important role in controlling and directing wind. Keep in mind the principle that cold air sinks and warm air rises. Do not locate the home on top of a hill, where wind speeds are often 30 percent higher, or in the bottom of a valley, where cold air pockets exist.

Views

Locating homes on gentle slopes in between high and low points preserves the views throughout the region.

Wildlife Corridors

If you are involved in a multi-home building project, you may have the opportunity to create a wildlife corridor by preserving natural areas along streams and other low-lying areas. These areas can provide habitat for a large number of wildlife species and can be important stopover points during seasonal migrations. Bike and/or walking trails can be added through these areas, providing recreational opportunities in the community.

The Role of Plants in Energy Conservation

Plants play a significant role in climate control and help make a home more energy efficient. They can block hot sun (solar radiation), buffer cold winds, moderate temperature, and influence snowdrift depth and location. Plants are also effective at reducing direct, as well as reflected, solar radiation. Trees cool buildings not only by shading, but also by cooling the air around them through a process called evapotranspiration; this is the "air conditioner" effect.

Solar Effects

Plants influence the microclimate around homes and buildings by controlling solar radiation in both winter and summer. Energy use during warm months can be reduced by 40 percent or more by shading windows, walls, and roofs. Trees are most effective in warmer climates when they are placed so that they screen late morning, afternoon, and early evening sun. Native vines are an excellent and inexpensive way to provide quick, effective shade on walls, especially where space or other restrictions preclude using large trees.

Shading the outdoor air conditioning unit with trees and shrubs can reduce energy use to a small degree as long as the plants do not interfere with air flow around the unit. The greatest savings can be achieved by locating air condition units on the shaded north side of buildings.

Appropriately located trees, fences, and hedging can also prevent winter heat loss from buildings by providing areas of insulated air next to walls. Improper choice and placement of trees, however, can increase energy costs. For example, during the winter, coniferous trees may not allow the sun to warm the building. Instead, use deciduous trees, which drop their leaves during the winter and allow the sun's rays to filter through the branches.

Wind Effects

Wind speed can influence perceived air temperature in both summer and winter. For example, a 10-mile-an-hour northwesterly wind can make an air temperature of 44 degrees Fahrenheit feel like 32 degrees Fahrenheit. Wind can also accelerate the rate of air exchange between outdoors and indoors, changing the demand for heating or cooling in a home.

Properly placed landscape plants can influence air infiltration by slowing or increasing the speed of winds near the house. Survey the area visually and note topography that can influence wind movement. Note any ridge lines, valleys, depressions, major bodies of water, walls, fences, or masses of trees or other vegetation.

A windbreak of mixed trees planted perpendicular to prevailing winter winds can provide protection from the cold, saving as much as 10 to 17 percent on heating bills. Placing plants near the house will also create a pocket of dead air and increase insulation. (When placing new plants close to the house, make sure to consider the full height and growth habit of the plant.) Windbreaks planted along the sides of the house can reduce fuel consumption by as much as 40 percent. Make sure, however, that evergreen trees do not block winter sunlight and that plants, once fully grown, will not interfere with window views or other structural aspects of the home.

Winter winds may be as much as 30% stronger at the crest of a hill. Reduce the risk of flooding by building away from waterways.

Wind movement can be used in the summertime to cool a house when air conditioning is not used. Planting trees around the house to funnel in prevailing winds can help keep the house cooler. If air conditioning is used often during warm months, however, directing wind flow towards the house could actually increase energy costs, since warm breezes increase warm air filtration and heat the interior. Because prevailing winds typically differ depending on your region and the season, consult the local weather bureau for accurate information on prevailing wind directions.

Landscaping Surfaces

Many types of surfaces are used in the built environment, including roofs, walls, and pavement. Elements that are dark absorb heat; conversely, light surfaces reflect heat and stay cooler. Dark-colored surfaces such as retaining walls and pavements can help warm outdoor areas during chilly nights and cold seasons. Using light-colored surfaces can significantly lower temperatures and energy consumption in warm months. When using light-colored surfaces, be sure to consider glare problems. Reduce glare by texturing the surface, which will disperse the light rays in several directions. Use a balance of native plants and selected surface colors in order to obtain the most energy-efficient living environment.

Elements that are dark absorb heat. Conversely, light surfaces reflect heat and stay cooler.

Landscaping for Water Conservation

Water is one of the most abundant resources on earth, covering three-fourths of the planet's surface. However, the majority of this water is either frozen in polar ice sheets or held in the world's oceans. Only a minute percentage of the earth's water is available for human use. Droughts in recent years, even in areas where water had seemed to be abundant, have spotlighted our dependence on previously plentiful water supplies. Water is a precious resource and should not be treated as unlimited.

According to estimates, most Americans use approximately 80 gallons of water every day. Fortunately, specific steps can be taken to relieve pressures on water supplies around homes without sacrificing quality of life. Because one of the largest single uses of municipal water is landscape irrigation, it is an excellent place to begin reducing water demand.

The concept of xeriscape promotes water conservation in the landscape. Although the idea began in the western United States, where landscapes can be truly dry, the same water-saving principles can be applied throughout the country. Studies have shown water-use reductions of 30 to 60 percent or more in landscapes that employ the basic principles of xeriscape. This translates directly into financial savings for the homeowner. Xeriscapes need not be dry-looking cactus and rock gardens; they can be lush, green landscapes.

Plant Selection & Placement

When planting near areas where salt spray or salty runoff from roadways is a concern, choose plants that can tolerate these conditions.

When selecting plants, consider site conditions such as sun exposure, wind, soil conditions, drainage patterns, micro-climates, existing vegetation, and topography. Choose plants native to your locale. Check with a local native plant society or cooperative extension office to find out which plants will do best on your specific site. Your county's Master Gardener program may be able to help you connect with a qualified volunteer who can assist you in selecting plants.

In general, the greatest success is achieved when plants are placed in an environment most similar to their native habitat. However, recognize that the landscape into which they are being introduced may have been altered considerably. Building construction almost always destroys the natural soil structure, often leaving compacted clay or sandy subsoil. Amending the soil may be necessary before planting. Prepare the soil so that it closely resembles the soil where the plant would occur naturally. Always use organic fertilizers and compost for nutrients, since chemical fertilizers can destroy important soil microbes and burn the roots of plants.

To achieve the greatest water-efficiency, the landscape plan should incorporate "hydrozones"—areas within a design that receive low, moderate, or high amounts of water. Select and group plants that have similar water needs, so that all plants within a zone can be watered as a group. Protecting the existing vegetation, or digging it up and replanting it after construction is finished, is an economic way of obtaining native plants for your site.

Minimize lawn area to high use and front entry areas adjacent to house when lawns are needed. Other sunny areas can be planted as a wildflower meadow.

Lawn Reduction

Lawns are often the single largest users of water in the landscape. Reduce lawn areas where possible and use only drought-tolerant grass species. When planning a landscape, shape lawn areas to make maintenance efficient. A small area of grass can provide much of the aesthetic beauty associated with a larger lawns. As a result, water demand for the landscape will be reduced.

Shade

Shade is an important feature of a water-efficient landscape. Overhead foliage can help lower temperatures and decrease water loss by plants. Existing shade trees should be left wherever possible. Shade can also be created by hardscape features such as walls, fences, arbors, and trellises.

Plants placed directly under a shady tree face tree-root competition that may decrease the availability of water. "Dry shade" is a problem that must be considered when planting within a tree's root zone. Select native plants that would naturally grow under trees in dry shade.

Watering

By choosing plants native to your area, you will eliminate the need for supplemental watering once plants become established. If watering is needed to help plants become established, be as efficient as possible. Use a soaker hose, water in the early morning or the evening, water infrequently but deeply, and let the lawn go dormant during hot spells. You can "harvest" rainwater from the roof with a barrel under a down spout, or create a "rain garden." Chapter 5 includes more specific tips on watering.

A simple soaker hose applies water to the roots of plants inexpensively and slowly, minimizing evaporation and runoff.

Mulch

Mulch can be used to tie several groups of plants together, providing unity in the landscape. As much as 75 percent of rainfall landing on bare ground may be lost because of evaporation and runoff. Mulching increases the water-holding capacity of the soil, prevents soil erosion, and reduces the amount of water lost by runoff. One of the important qualities of mulch is that it moderates extreme soil temperature fluctuations. The mulch dissipates summer heat and insulates the soil from winter cold. A mulch barrier between the soil and plants also helps prevent splash-transmitted, soilborne diseases. Mulch also reduces weed competition.

Selection

The best mulches are fine-textured and non-matting organic materials. Ideally, mulch should decompose slowly and be free of weed seed, and it should not be easily washed away by rainfall. Avoid using light-colored gravel mulches since they reflect light into the plant's canopy and increase water loss from leaves. Bark, wood chips, shredded wood, dried grass clippings, shredded newspaper, leaf litter, aged sawdust, compost, and pine straw are examples of good mulch materials.

Application

Maintain a two- to three-inch layer of mulch around woody landscape plants. The mulched area should extend to the drip line, the area that extends outward from the trunk to the tip of the branches of the tree or shrub. Be certain that the mulch is pulled away from the trunk of the plant to keep the bark dry. When mulching near the house, make sure that the mulch remains at least six to eight inches below untreated wood siding and structural members. If such wood is kept moist by contact with mulch, it may be attacked by wood decay fungi, termites, or other pests.

A 2"-3" layer of organic mulch around trees and shrub beds will conserve moisture, reduce weed competition, and modify soil temperature while creating a visually interesting line in the landscape.

Soil Erosion

Erosion occurs when rain or moving surface water dislodges and moves soil particles. If excessive, erosion-caused soil sediment can be a major source of pollution in streams, rivers, lakes, and bays. One of the primary causes of soil erosion is lack of vegetative cover. To combat soil erosion:

- Construct driveways and walkways with water-permeable surfaces such as gravel, brick on sand, or wood.
- Seed or plant newly graded areas as soon as possible.
- Install gutters and downspouts that empty water onto the lawn or other vegetated areas instead of onto pavement.
- Use splash blocks or drainage tiles at downspout outlets to protect the soil.
- Allow grass to grow taller in order to slow runoff.
- Use mulch to cover bare soil areas.

Site Planning for Wildlife

A new home for humans does not have to mean less habitat for wildlife. National Wildlife Federation's Backyard Wildlife Habitat program gives people the knowledge to turn their backyards into valuable wildlife refuges and teaches them the rewards of connecting with nature by inviting wildlife into their lives. Through this program, people learn that habitat restoration is critical for wildlife survival in urban and suburban settings, where commercial and residential development has eliminated most natural areas. Through a Backyard Wildlife Habitat project, anyone can make a personal contribution to wildlife conservation. Creating and maintaining a habitat helps people of all ages develop a sense of place and an awareness of the natural world.

Since 1973, NWF has been rewarding people who restore habitat to their yards by certifying their properties as official Backyard Wildlife Habitat sites. To date there are more than 31,000 certified Backyard Wildlife Habitat sites. The majority of certified landscapes result from the work and commitment of individuals and families providing habitat near their homes. The program is inter-generational, with parents and grandparents teaching their children basic stewardship through the habitat project, and children often requesting materials or certification to honor their parents' efforts.

Creating a wildlife habitat contributes to the overall health of the ecosystem—a system important not only to wildlife and plants, but to humans as well. A Backyard Wildlife Habitat site can provide natural beauty and can be a relaxing place for contemplation and observation. Often program participants refer to their projects as "backyard sanctuaries" for wildlife and for themselves. Loss of wildlife habitat is the primary cause of current species decline and extinction. As urban and suburban sprawl continues to consume natural areas, homeowners providing habitat area in their backyards is becoming increasingly important.

Getting Started

A Backyard Wildlife Habitat landscape must provide the basic elements needed by any species to survive: food, water, cover or shelter, and places to raise young. The first step of any Backyard Wildlife Habitat project is to identify the habitat elements that already exist on the site. When building a new home, conduct an inventory before determining the placement of the home, driveway, and other structures. Then plan to preserve the best wildlife habitat areas. (The process of conducting a site inventory and analysis is covered in more detail in Chapter 2. Protecting wildlife habitat areas during construction is covered in Chapter 3.)

Here are some specific wildlife habitat questions to consider during your site inventory:

- Are there any native plants that provide food and cover? Native plants are the backbone of every wildlife habitat. By contrast, invasive exotics can often threaten to overwhelm everything else in a garden. Make a list of all the plants on the site, and include everything from trees to wildflowers. Determine which of these plants are native to your area and which are not.
- Which existing plants might provide food such as seeds, fruits, nuts, and nectar? Which plants might provide safe cover or nesting places?

- Are there any dead or dying trees on the site that do not pose a safety hazard? If so, don't reach for the chain saw! Dying or dead trees are excellent wildlife habitat features.
- Does the site already have a stream or wetland that provides water for wildlife?
- Are there any structures that provide cover or shelter, such as rock walls or log piles?

Providing the Four Basics

In planning a Backyard Wildlife Habitat landscape, how you provide food, water, cover, and places to raise young will determine what kind of wildlife species you can attract and sustain.

Food

Restoring native plant communities is the main emphasis of any Backyard Wildlife Habitat project. This is especially important since our native plants and wildlife have co-evolved. Select plants with fruits, seeds, nuts, and nectar that, together, will provide food for backyard wildlife throughout the year.

Water

Wildlife needs water for drinking, bathing, and in some cases, breeding. Water can be supplied in a birdbath, a small pond, or a shallow dish. If the site has a natural pond, stream, vernal pool, or other wetland, make sure to preserve this area and protect it during construction as these are excellent aquatic habitats. However you decide to provide water, make sure to do so year-round. This can easily be done by simply removing ice from the birdbath each day or with a thermostatically controlled birdbath heater to prevent icing during subfreezing weather when the need for water is critical.

Installing nesting boxes such as this wood duck box provides a safe place for cavity nesting wildlife to raise their young.

Cover

When choosing plants, try to establish or preserve at least one good clump of evergreen trees and shrubs, if they are naturally part of the plant community in your area. These will provide year-round protective cover from weather and predators. Plant choices will depend on the site location. Deciduous shrubs offer effective summer cover for nesting and escape from predators. Rock, log, and mulch piles also offer good cover. Small mammals, reptiles, amphibians, and a great variety of insects and other small animals find homes in these structures, which are easily constructed.

Places to Raise Young

Every species has specific requirements for their places to raise young. Trees, shrubs, and other large plants provide nesting areas for many birds. Dead and dying trees (called "snags") provide nesting sites for many species, including owls, bluebirds, chickadees, wrens, flying squirrels, and other cavity-nesters. Rabbits, shrews, mice, snakes, and salamanders lay their eggs or raise young under the boughs of plants, as well as in rock, log, or mulch piles. Nest boxes for cavity-nesting species can be placed in the yard. Fence rows provide food and shelter for songbirds. Amphibians—such as frogs, toads and newts—as well as dragonflies and other insects deposit their eggs in ponds, vernal pools, and other wetlands. Butterflies require "host" plants that serve as food sources for butterflies during their larval (caterpillar) stage. Butterflies invariably lay their eggs on the native host plant preferred by the caterpillar, so make sure to include some host plants on your plant list.

A simple fountain in an old barrel can become an attractive focal point as well as a water source for animals.

Beyond the Basics

In order to have a truly sustainable landscape, there are some additional things that Backyard Wildlife Habitat participants can do to further enhance the site and to minimize adverse impacts on the ecosystem.

Value of Native Plants

A native or indigenous plant is one that naturally occurs in the area and is well suited to local climate and soil conditions. When correctly planted, native species require less maintenance than non-natives because they do not need special watering or ground preparation. Because they are suited to local conditions, they do not require additional fertilizer. In addition, native plants usually require less effort to control pests. The presence of native plants also ensures that the unique local plant communities, which are also in danger from human development, will continue to thrive. Native plant species provide the best overall food source for wildlife.

Most regions are fortunate to have a large number of native plant species that are naturally well-adapted to the local climate. By contrast, many of the most popular landscape plants are non-native and do not provide valuable wildlife habitat. Some even destroy wildlife habitat when they escape the garden and invade natural areas. Use native plants whenever possible.

When purchasing native plants, select plants that have been grown from seed or from cuttings at a nursery and have not been removed from the wild. Whenever possible, select the wild species and not an ornamental variety (most ornamentals have a special name in quotation marks that follows the Latin name on the tag). To get a list of plants native to your area, visit the Native Plant Guide at www.nwf.org/backyardwildlifehabitat or contact your local native plant society.

Lawns

Lawn areas are one of the most labor-intensive and expensive maintenance features in a yard. Unfortunately, lawns offer little or nothing of value to wildlife and consume large amounts of water, pesticides, and fertilizers. Lawn insecticides and herbicides can leach into groundwater and make their way into ponds and streams. Exposure to these chemicals can lead to health problems, particularly for children and pets.

When designing the lawn area in a landscape, use a grass seed mixture that is appropriate to local climate and soil conditions. This will ensure that the smallest quantity of pesticides, water, and fertilizer are used. If the yard is shady, plant shade-tolerant grasses. Also consider planting drought-tolerant species. To increase the habitat area, reduce the amount of lawn area by increasing mulched garden beds or creating a native wildflower meadow or prairie.

Wetlands

Wetlands include marshes, swamps, bogs, springs, seeps, and areas along the edges of streams, rivers, lakes, ponds, and coastlines. Wetlands can have standing or flowing water and can be dry during part of the year. Wetlands are important ecosystems because they help restore and maintain water quality in rivers, streams, and human drinking-water supplies. They serve as a filtering system that helps remove phosphorous, nitrogen, and other pollutants from the water. Wetlands help control flooding and erosion and in urban areas, are especially important in controlling surface-water runoff. Wetland areas also provide important habitat for fish, waterfowl, and many mammals.

To conserve wetlands:

- Identify wetlands on the property and avoid these areas during construction.
- Maintain vegetated buffer areas around wetlands.
- Restore wetland areas to the property.

Meeting Specific Wildlife Needs

Bird Habitat

Attracting birds can be enjoyable and rewarding. Birds enjoy different habitat areas—woodlands, wetlands, shrubby areas, lawns, and open water such as ponds. It is important to plant species that provide food sources such as seeds or berries at different times of the year and support healthy, diverse insect populations. Supplemental feeders can provide nectar for hummingbirds in the summer months and a variety of foods (sunflower, niger, suet, and millet) for other birds throughout the year. Keep in mind that bird feeders should only be used as a supplement to natural food provided by native plants.

Insect and Spider Habitat

Insects, spiders, and other invertebrates are often overlooked, but can be fascinating to observe and welcome additions to any wildlife habitat. Left to its own devices, nature has a way of keeping harmful insects in balance. Often when insecticides are used to do battle with bugs, beneficial as well as harmful insects are killed. Insects such as praying mantises, ladybird beetles, dragonflies, and wasps are beneficial insects that will prey on garden pests. Spiders, although not insects, also help control insect pests. Don't destroy spider webs, since spiders use these webs to prey on pest insects. Sunny locations with plenty of cover, open areas near water, shrubbery, and flower gardens provide habitat areas for insects, which help pollinate food crops, and spiders. Both are important parts of the ecological system.

Butterfly Gardens

Butterflies are one of the few insects that don't get overlooked. Not only are butterflies enjoyable to watch, they also serve as important pollinators. A butterfly garden can be a small plot with just a few flowers or a large flower garden with plants for both the larval and adult stages of butterflies. Start with a small, manageable project and expand the garden in later years. When designing and planting a butterfly garden, consider the following:

- Learn which butterflies are native to the area, and select the appropriate plant species to attract them.
- Plant nectar-bearing compound flowers.
- Use brightly-colored flowers. Butterflies prefer pink, lavender, orange, purple, yellow, and white.
- Locate the garden in full sun. Butterflies are cold-blooded and need sunlight to warm the muscles that they use to fly.
- If you have a vegetable garden, plant flowers that attract butterflies to help pollinate the vegetable plants.
- Select plants for the entire life cycle of butterflies, including the larval or caterpillar phase.
- Use chemical pest controls sparingly or not at all.
- Plant a variety of flowers that provide bloom from spring to fall.
- Provide a place for butterflies to puddle (a muddy place where butterflies can drink the mineral rich water without drowning), such as a shallow dish filled with wet sand or mud.
- Place the garden so that it is visible from inside the house.
- Add wind protection for the butterflies, such as a tall trellis or shrub border.

Reptile and Amphibian Habitat

Reptiles and amphibians can be fascinating to observe, and they play important roles in the ecosystem. They are welcome additions to the habitat area. Salamanders, snakes, frogs, toads, and turtles are voracious predators of pest species like flies, slugs, grubs, mosquitoes, and rodents. Venomous snakes rarely live in areas with high human populations and for the most part are not a concern for habitat areas. If you do live in an area with venomous snakes, learn which species are potentially dangerous and which are harmless.

Mammal Habitat

Squirrels, foxes, rabbits, chipmunks, groundhogs, opossum, deer, and raccoon are just a few mammals that might show up in your habitat. Some mammals, like bats and shrews, consume thousands of insects a night. The presence of other species, like raccoon, might require that you store trash and pet food securely. The entertainment and education these creatures provide make the effort well worth it.

Planning the Habitat

The first step in planning a habitat area is to inventory the site to determine what features already exist and what wildlife is already using the site. Once the site has been inventoried, draw up a rough plan of habitat features that should be added to the site. Make sure that homeowners can view the wildlife that will be attracted to the area. Keep in mind that edge areas—the places between open spaces and dense vegetation—support an abundance of wildlife. These edge areas are also easy places to observe wildlife.

Share aims, information, and skills:

- Communicate to everyone on the project the intent to save wildlife habitat and what will be expected of them.
- Include specifications in subcontractor contracts to ensure compliance with habitat-protection efforts and goals.
- Know the development plans for the neighborhood.
- Know the local regulations regarding property use, zoning, etc.
- Work with homeowners to get the home certified as a Backyard Wildlife Habitat landscape.
- Incorporate environmentally friendly yard maintenance into homeowner education classes/sweat equity hours.
- Involve children in tree planting and other gardening activities to celebrate the completion of new homes.
- Provide homeowners with site-specific information about the wildlife habitat that was conserved or enhanced.
- Make sure homeowners have a list of the plants that are in the landscape and their corresponding value to wildlife. Labeling plants with signs can help homeowners easily identify plant species.

Newly planted flowers, shrubs, and trees need watering to get them established. Since children love water, this is an enjoyable way to involve them in the landscape project.

Designing for Habitat

When designing the landscape around the home, include habitat areas for wildlife. Remember to include food, water, cover, and places to raise young. Brush piles, bat boxes, rock piles, prairie gardens, evergreen trees, and dense shrubbery can help provide this habitat. Adding a water feature such as a pond to the site is an excellent way to attract wildlife.

- Keep food supplies (seeds, berries, nuts, nectar, etc.) close to cover and water.
- Plant a diversity of native grasses, flowers, trees, vines, and shrubs and remove invasive exotic plants.
- Enhance natural areas that already exist on the site.
- Remember that gardens evolve over time and are not created in one growing season.
- Get information about what type of wildlife could be attracted to the site. (Contact a local nature center.)

When siting a home, try to keep grading and filling to a minimum. Grading destroys the ecological processes of the soil, existing vegetation, and the root systems of plants. Fill dirt can also smother roots and existing vegetation.

Designing for Communities

When planning multiple houses, consider using cluster development, which places buildings close together on the landscape and increases the amount of land available for creation and wildlife habitat. Reducing street widths and sharing driveways also helps provide more natural areas. Consider using utility installation techniques such as tunneling, common trenching, and shared easements.

Here are some recommendations for building communities:

- Build homes closer together facing inward onto a central green area such as a park.
- Consider gravel streets.
- Add a community park or playground.
- Add trails and walking paths so residents can enjoy the area.
- Make nature visible so that it can be experienced on a daily basis.

For more information on conservation design for subdivisions contact the Natural Lands Trust, Hildacy Farm, 1031 Palmers Mill Road, Media, PA 19063, (610) 353-5587.

Gardens to attract birds and butterflies should include seed, berry, and nectar producing plants which provide food for wildlife. Keep plants in the pots to layout the garden, but be sure to remove them before planting.

Elements of a Low-Maintenance Landscape

Although Habitat for Humanity homeowners have help from the surrounding community when building their homes, the task of maintaining the yard throughout the years falls to the homeowners alone. Since many homeowners are busy, it is important to design the landscape so that it is easy to maintain. Here are some ways designers can plan carefully to make maintenance more efficient. (Chapter 5 outlines maintenance practices in greater detail.)

Reduce Mowing

Reduce turf areas and replace them with ground covers, mulch, natural wooded areas, or meadows. Where grass is necessary, specify slow-growing species or cultivars. Use ground covers or mulches instead of grass around trees to reduce hand-edging and trimming and to protect trees from mechanical damage. When laying out borders between lawn areas and shrub beds, woods, or meadows, design with lines that allow mowers to negotiate the area easily.

Reduce Herbicides and Pesticides

Use native plants that have as few pest problems as possible. Native plants are better adapted to use by wildlife, including insects, and are better suited to local conditions. This will reduce the need for homeowners to use herbicides and pesticides.

Reduce Pruning

A well-designed landscape should not require much pruning. Select plants whose mature height and spread will fit the space for which they are intended. Specify plants whose natural form (e.g., columnar, rounded, vase shaped, or weeping) is appropriate for their location. Using an informal, natural design instead of a more formal one will also help reduce the need for pruning, since plants will not have to mirror one another.

Watering

Use plant species that are adapted to the moisture levels of the site and can withstand periods of drought. Native plant species, if chosen correctly, should not need additional watering once established. Be especially careful when selecting plants for south or west-facing slopes, where water runs off and solar radiation is higher.

If plants in the landscape are to be surrounded by paving materials, use porous paving or a material such as brick laid on sand. This allows water to seep through the cracks and provides plants with more moisture. Do not locate plants under roof overhangs, since these areas receive little if any rainfall. Materials such as stones or mulch are good alternatives to use under overhangs.

Other Low-Maintenance Tips

- In high-use areas where turf is difficult to maintain, use an inexpensive alternative like mulch or plant a native groundcover.
- If the budget allows, a porous paving may be used in pedestrian areas or in heavy shade, where grass is difficult to grow.
- Some trees produce fruit that provides food for wildlife and is beautiful on the tree, but creates litter problems when fruit or twigs accumulate on the lawn, sidewalk, or patio. When designing around existing plants with such litter problems, incorporate a deep ground cover that will absorb fallen fruit, twigs, etc.
- Some plants have low-growing limbs that reach the ground and cover any fruit or leaf drop. Locate these types of plants so they will hide fallen fruit, leaves, and twigs.
- When designing and implementing a new landscape, specify proper planting and installation techniques. This reduces stress on plants and encourages a vigorous, healthy landscape that requires less maintenance.

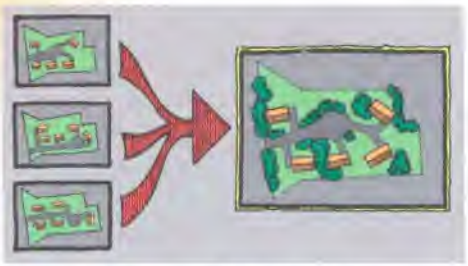
To reduce pruning, choose plants whose mature size and shape will best fit the space.

Trees that drop fruit such as these sweet gum balls should be planted in areas where falling fruit will not litter sidewalks or patios.

The Design Phase

Apply the concepts discussed in Chapter 1 as you inventory the site and begin designing.

Good site design is the arrangement of land, building, pavement, and plants for functional and aesthetic purposes, as well as for the benefit of its users and the environment.

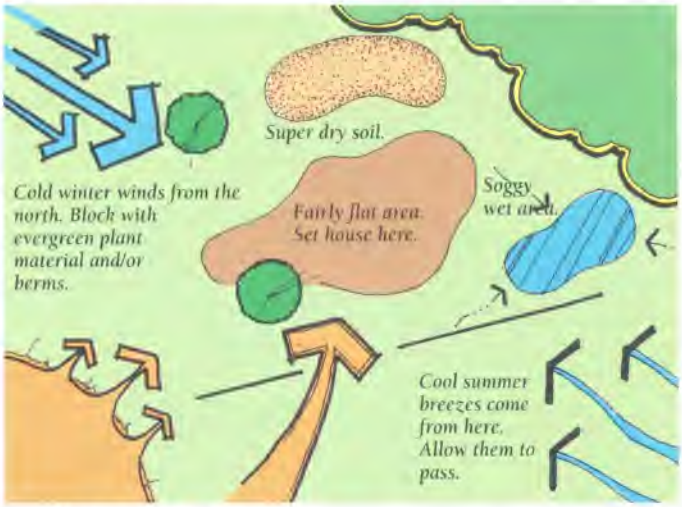


Use the strengths of several alternatives to create your final design solution.

A sensitive site design will fit the house to the site and help save trees and habitat areas, reduce soil erosion, avoid moisture problems, and save money. (Chapter 1 includes more information on the features of a sustainable landscape and how to plan your habitat area. This chapter outlines the actual steps for inventory and design.)

A site design does not have to be complex. It can be simple, but it should enhance the appearance and environmental assets of the land. Proper site design can ultimately increase property values. The optimum time to begin the site design is right at the beginning of the project, before any building and site work is started. Include a landscape architect, arborist, and wildlife biologist or ecologist in the process.

The design process is a three-step process: 1)research, site inventory and analysis, 2)design, 3)construction drawings and implementation.



The most direct radiation occurs here. Use deciduous plant materials to block in the summer.

Making notes about site conditions using graphics and text enhances the analysis process.

Research, Site Inventory, and Analysis

Research

The first step is research: collecting as much relevant information about the project intent as possible. This may also help in the site selection process, before negotiation of the final purchase of the land. Research should include information about wildlife use of the land, local plant communities, energy and water conservation, and green architecture methods, as well as the historical and current use of the site.

Site Inventory

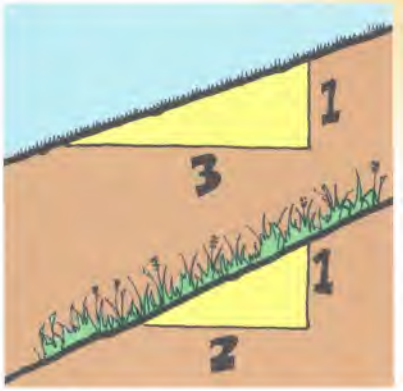
Before beginning the building project, one must know the site and note the existing features. The inventory can include the following information:

- Topography, slopes, and landforms (accessible digitally through a Geographic Information System at www.usgs.gov/research/gis/title.html),
- Geology and soils (available through the Natural Resources Conservation Service. Visit them on the web at www.nrcs.usda.gov/),
- Property lines,
- Utilities,
- Drainage (hydrology),
- Trees and other major vegetation,
- Climate: sun, wind exposure, precipitation,
- Wildlife habitat and any endangered plants or animals,
- Land use on adjacent properties,
- Traffic patterns of wildlife, people, and vehicles,
- Views,
- Special features,
- Human-made structures such as utility rights of way and sidewalks,
- Water sources, and
- Noise.

User Needs

Identifying the needs of the homeowner is also important in the design process. Determine the interests, needs, and capabilities of the future homeowner(s) at the start of the project. One homeowner may want a large vegetable garden, while another may prefer plantings to attract butterflies. Consider the types of activities that will take place outside—like cooking, entertaining, gardening, reading, sunning, and relaxing. This input is crucial to a successful project. This is also a good time to educate the homeowners on the benefits of trees and other native plants, for both people and wildlife.

If the homeowner's needs include an accessible landscape, refer to the Americans with Disabilities Act Accessibility Guidelines (ADAAG). These guidelines highlight overall accessibility ideas. For example, pathways that are a minimum of 48 inches will give a person who uses a wheelchair ample space for gardening tools and easy maneuvering while allowing others to pass by. The additional room will also allow multiple visitors with and without disabilities to enjoy the space at the same time. Please contact the United States Access Board at www.access-board.gov for the complete Americans with Disabilities Act Accessibility Guidelines (ADAAG).



A 3:1 slope is the maximum incline for safe and comfortable mowing. A 2:1 slope is the maximum stable incline for groundcover planting and erosion control. Any slope steeper than these horizontal to vertical ratios may cause problems in erosion and maintenance.

Site Analysis

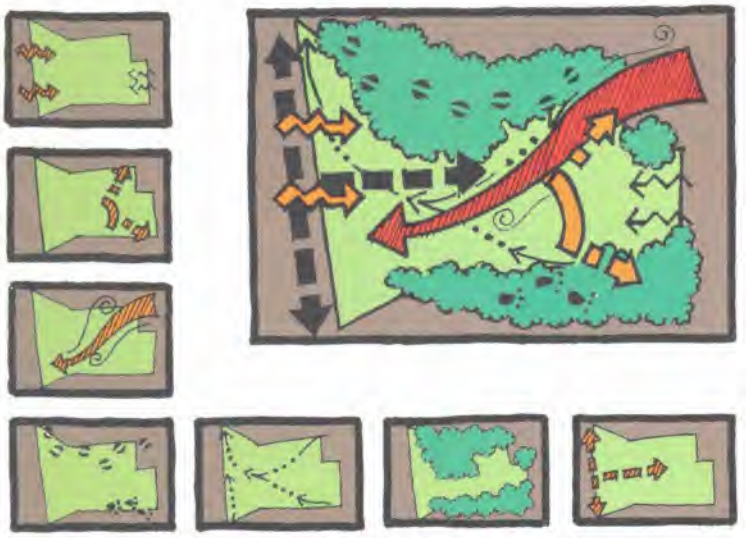
Site analysis is the evaluation and assessment of a site, after an inventory has been completed, to determine the opportunities and constraints that may affect the project design.

The Base Map

The base map is typically prepared by a licensed surveyor and will often include the property boundary lines, topographic contour lines, and the location of structures, large trees, and easements. Once the base map is complete, the information gathered during the site inventory can be documented using the map as a template.

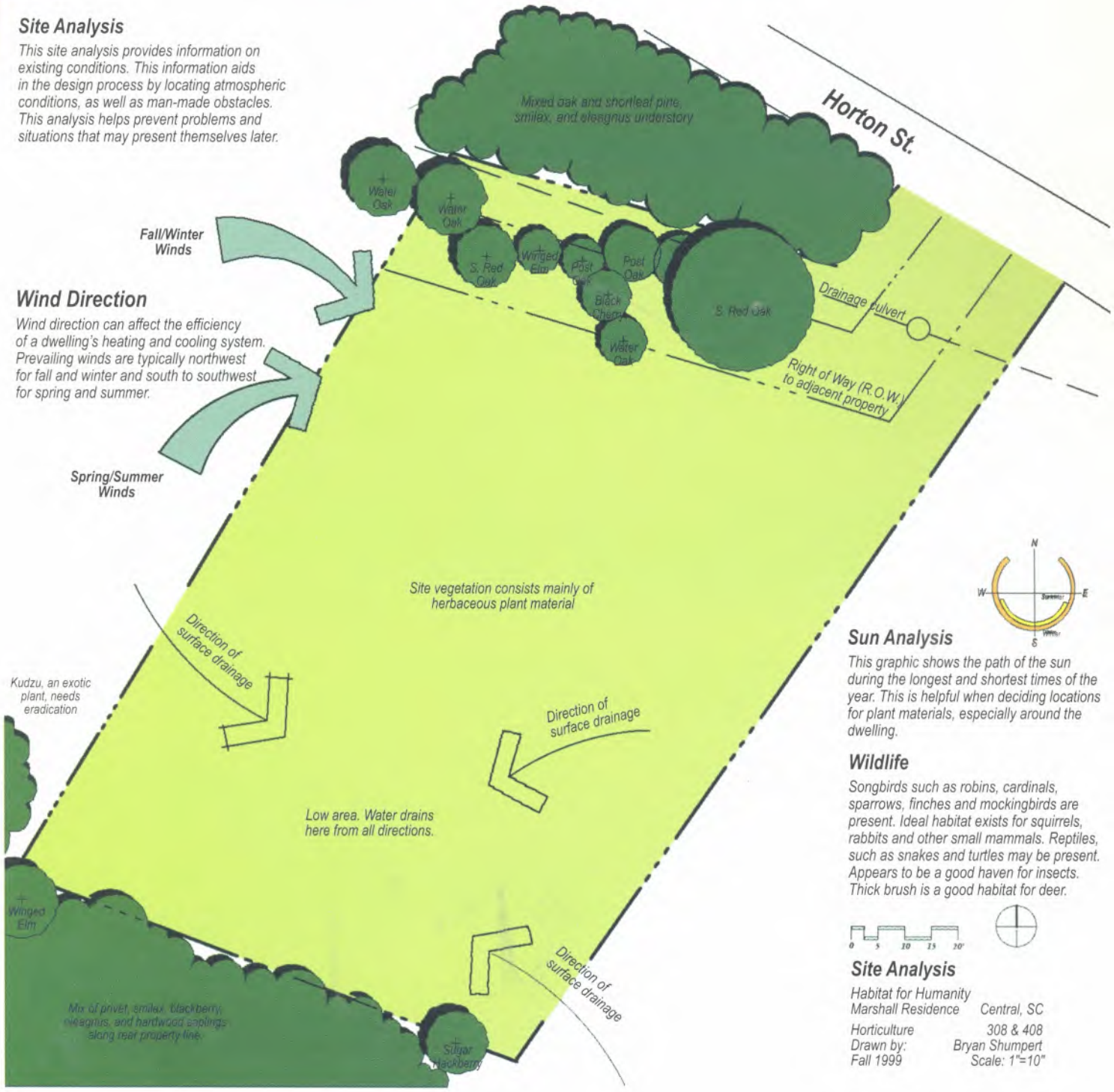
Putting It All Together

Ideally, the analysis can be thought of as a series of keyed map layers. Each layer can be studied individually or all layers can be superimposed on one another to show the overall picture. For example, a vegetation analysis map will show the location, type, size, quality, and condition of the trees. A slope analysis map will show flat, rolling, and steep areas of a site. The composite layers will clearly show the potential of the site. Your analysis may be simpler than this, but it is still helpful to think about the way different kinds of features combine to shape your site.



The site analysis is a series of keyed layers of map. Superimposed together, they provide information for the site's overall assessment.

Sample Site Analysis



Sample Conceptual Design

Design Phase

During the design phase individuals involved in the project work together to determine the best placement of specific elements in the landscape. This process ideally should involve the help of a landscape architect. The data gathered from the site inventory and analysis is used to shape the design. Design alternatives can be drawn on tracing paper and superimposed over each other in order to evaluate each one. Frequently, the best ideas from each of the alternatives can be combined to the make up the final design.

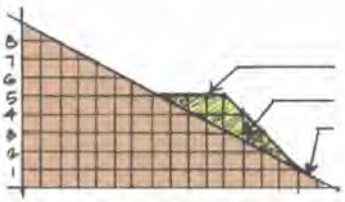
Water should drain around and away from the house. Consult a professional to design the grading plan.

Kinds of Construction Drawings

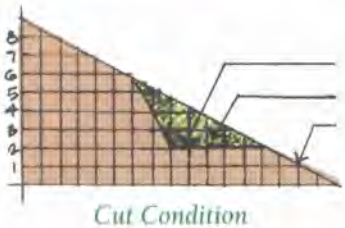
The final drawings include the construction documents that the contractor will use to bid on and build the project. This set of technical drawings is typically prepared by a landscape architect and comprises the following elements:

- **The layout plan** shows the location and dimensions of existing site features and proposed site improvements.
- **The grading plan** is a technical drawing that is designed and mathematically calculated to illustrate the manipulation of contours on the site in order to appropriately drain and shape the site.
- **The planting plan** shows proposed trees, shrubs, vines, and groundcovers that are drawn to their mature size. It also includes a plant list that describes the name of the plant, size, quantity, and spacing. The planting plan makes it possible to order the correct number of plants.
- **The planting details** include drawings that show proper planting methods for trees, shrubs, and groundcovers.
- **The site details** include drawings that show details of proper construction and installation for landscape elements such as paving, as well as specification for products. Also included in the documentation package is a set of written construction specifications, a legal document specifying standards and construction methods.

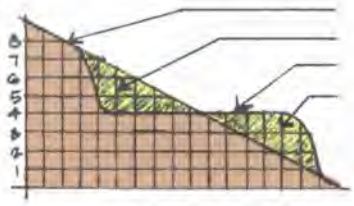
Various ways to grade a site.



Fill Condition



Cut Condition



Cut and Fill Condition

Grading Plan: Alteration of the Land

Proper grading is imperative in any design. A grading plan is a technical drawing, so it is important to retain a professional landscape architect to prepare the plan. The grading plan gives instructions about proposed shaping of the site and the method that is to be used—cut, fill, or a balance of cut and fill.

Problems Caused by Improper Grading

Proper grading and drainage can help eliminate moisture problems such as basement flooding and overly damp crawl spaces. The most important fact to remember is that water must drain away from the house to prevent flooding. Improper grading creates many problems including:

- moisture and water in basements;
- tree destruction from cutting off roots during earth removal;
- tree suffocation from filling over roots;
- added cost for tree removal; and
- need for expensive structures such as retaining walls.

Whenever possible, reduce the need for grading by situating the home in an area where drainage will not be a problem. If that is not possible, try to work with the natural topography of the land in a way that reduces the need

Overzealous grading often results in unnecessary destruction of trees and wildlife habitat around homes. Removal of existing vegetation leaves homes exposed to sun and wind and leaves soil vulnerable to erosion.

Poor grading practices which destroy existing vegetative buffers also leave homeowners exposed to noise from nearby highways. Evergreen screens will be planted, but the homeowners will have to wait many years before they grow to provide adequate privacy.

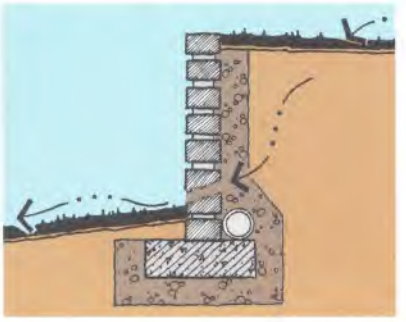
A gentle slope allows rain water to drain off of the roof and away from the house.

for heavy grading and at the same time preserves existing vegetation and wildlife habitat.

A wetland garden planted with the proper native plants can help contain excess water on a soggy site. Rainwater can be collected at the down-spout in barrels rather than dumping out around the foundation. This water can then be used to water plants in the garden.

If grading is necessary, the site should be altered so that the land slopes away from the foundation of the home. When this is not possible, trench drains or PVC piping may be used to take water away from the house through underground channels. Minimize impervious surfaces to allow the land to naturally absorb rainfall.

Conserving existing topsoil during grading is also important. Topsoil should be safely stockpiled (in a designated area away from any trees that are to remain) during the earth-moving operation and re-applied over appropriate areas on the site once grading is complete.



Retaining walls take less space than slopes, and can be used to save vegetation when grading a site. Provide drainage and weep holes in retaining walls to relieve water pressure behind the wall.

Planting Plan

The planting plan shows existing and proposed plants. The planting plan should create an attractive environment with seasonal interest that will also provide habitat for wildlife and incorporate principles of water and energy conservation, using plants native to the region.

Involve the homeowner in the design process by discussing their wishes and needs. Make notes to include in the user needs analysis.

If sidewalks or driveways are placed too close to mature trees, there is a good chance that the roots will crack the paving.

Tips for Good Design

- **Strive for balance in the planting plan.** For example, if the house has a gable facing the front on one side of the roof, use a larger mass of planting on the other side.
- **Maintain a sense of scale.** Keep in mind that larger plants are appropriate for large houses and smaller plants for small houses.
- **Select a variety of plants.** Choose plants that provide blooms and colors at various times throughout the year. This ensures that there is always color in the landscape and creates biodiversity.
- **Complement the home.** Remember that areas around the home have various functions. The front is usually the public area of welcome while the back is the private area for family recreation.
- **Use foundation plantings.** Plants placed around the house will soften hard lines and corners, create balance where it is needed, accent certain features of the house, and help to blend the house with its surroundings. Be sure to select plants that will not outgrow the foundation space and block windows or entrance ways.
- **Avoid overplanting.** Landscaping is more successful if kept simple.
- **Take into account the eventual size of a plant.** One of the biggest mistakes made by homeowners is selecting plants that grow to become too big for the intended space. Know how tall and wide a plant will become with age. Place plants so that they do not spill over into the doorway or grow over the windows, blocking views.

Drawing the Planting Plan

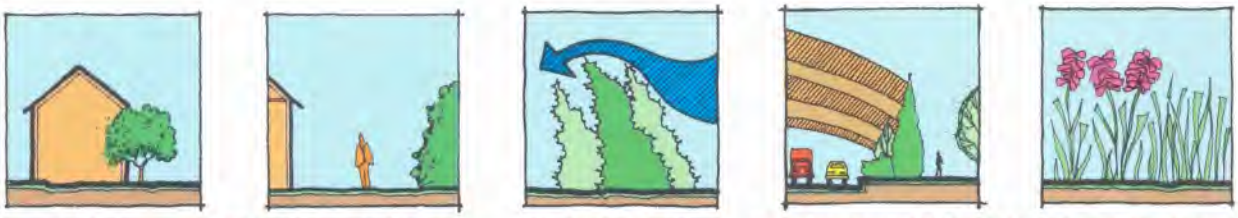
Draw a detailed planting plan so that the landscape will be properly installed. Trees, shrubs, vines, groundcovers, grasses, perennials, and annuals should be drawn with different symbols. Make sure that these symbols are designated in a key. A plant list or plant schedule should be on the drawing. The plan should show, for each of the plants: its botanical name; common name; quantity; height or size; ball and burlap (B&B), container, or bare root; and other comments. Notes should also be incorporated on the planting plan to indicate specific instructions about the treatment of topsoil, mulch, existing underground utilities, and any other concerns.

Drawing the Planting Details

Plant materials also come in different types and sizes, which should be properly detailed. Instructions must be provided regarding soil mixture, mulching, fine-grading practices, pruning, or other special considerations, so that plants are correctly installed.

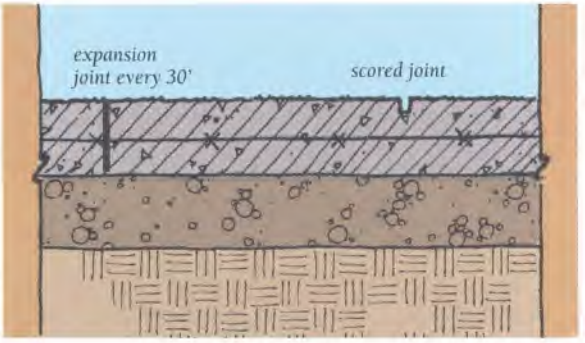
There are many uses of plants in the landcape.

They provide:



SHADE *SPATIAL DEFINITION* *WINDSCREEN* *SOUND ATTENUATION* *AESTHETICS*

Details of landscape elements such as this concrete sidewalk allow contractors or volunteers to construct them according to acceptable design and construction standards.



Mulch can be used to tie several groups of plants together, providing unity in the landscape.

Drawing the Site Details

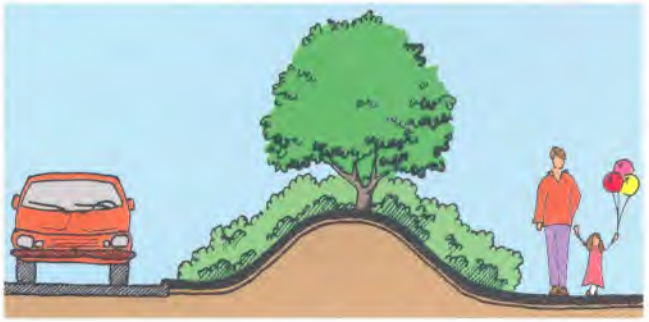
Site elements such as walkways, roads, retaining walls, and decks come in different materials, sizes, shapes and colors. Details of landscape elements allow contractors or volunteers to construct them according to acceptable design and construction standards. An example of an appropriate specification for a concrete sidewalk is shown above.

Cost Estimate

During the design phase, generate preliminary cost estimates with a breakdown for each item. These can be adjusted as the drawings are completed, and a final cost estimate can be generated. The final cost estimate is important to keep a project on budget. During construction, the general contractor or equivalent person is responsible for coordinating and scheduling the various volunteers involved in the project. However, someone should be responsible for overseeing the implementation of the site design. It is important to conduct a final check of the project to ensure that everything is completed as shown on the plans.

Avoid placing new sidewalks and driveways close to existing trees. Root damage during construction will lead to branch dieback and often to the eventual death of the tree.

Consider the mature height and spread of plants before planting them in the front of your house.

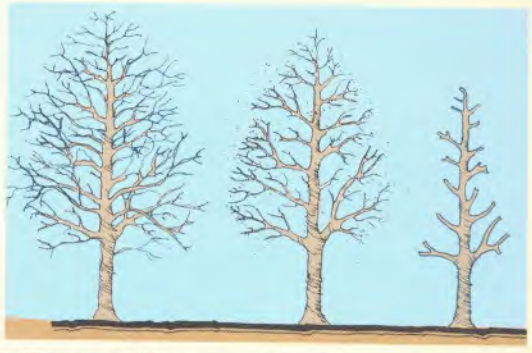


A berm, or man made mound of earth, can add a sculptural, rhythmic form to the landscape while screening unattractive views or noise. They can also direct pedestrian or vehicular traffic, block winter winds, and direct water flow.

The Construction Phase

Traditional building methods usually do not focus on preserving the natural beauty of the area. Bulldozers remove indigenous tree species, and those that are not removed may die in subsequent years from damage inflicted during construction. New practices can help you minimize these problems.

When pruning, make proper cuts at lateral branches. Do not top or head back. When pruning is needed or appropriate, remove branches at lateral branching points. Do not cut branches in a way that leaves stubs (heading or topping), as seen at far right.



Unpruned Tree *Properly Pruned Tree* *Improperly Pruned Tree*

Building Envelopes

Using a building envelope is an ideal way to minimize the environmental impact of construction. Building envelopes preserve as much of the natural area as possible by limiting the spaces in which construction can be done. When built, the home looks as if it has been placed amid natural surroundings. To use a building envelope, project planners survey the site and divide it into three zones: the private zone, the transition zone, and natural areas.

- **The private zone** is the actual site of home and driveway.
- **The transition zone** extends 10 to 25 feet from the walls of the house. Construction is allowed in this area, and all materials and equipment are stored here.
- **The natural area** is undisturbed during construction and left intact. All major plants within this zone should be tagged and marked according to their market value. The building contract should include a clause for protecting plants within the natural area.

Broken limbs and scarred trunks often result from mechanical damage associated with vehicles and equipment moving around unprotected trees during the construction process.

Preserving Trees

Benefits of Trees

Conserving trees during construction saves on clearing, grading, and landscaping expenses. The National Association of Home Builders reports that 43 percent of home buyers would pay more for a wooded lot. Homeowner satisfaction is also increased when the landscape is already in place. In addition, a carefully planned landscape can make the new home more energy efficient, improve the view, buffer noise, and shield windows from headlights (see Chapter 1).

Saving trees during construction requires not only the right attitude, but also the right actions. Everyone on the construction team must understand the techniques that can save existing trees.

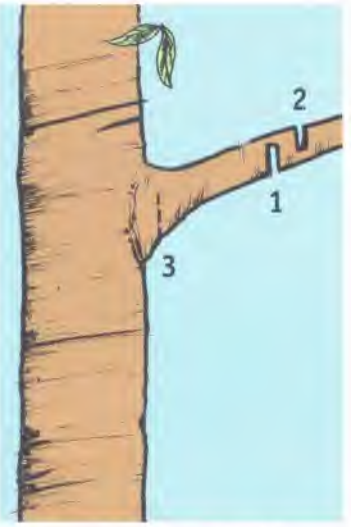
Evaluation and Treatment

The process of saving trees ideally begins with a thorough site inventory and analysis at least one growing season before site development begins. Invite a professional arborist, landscape architect, horticulturist, or other natural resource expert to be part of the team. When studying the condition of each tree on site, be sure to evaluate all parts of the tree, including the crown, the trunk, and the roots. Trees already in decline are less likely to survive the trauma of construction. Seek the advice of an arborist to determine if any trees should be removed before construction begins. If there are a large number of trees already on the site, consider preserving the forest-like setting as a very low-maintenance alternative to open lawn. If many trees are removed from a forested site, the remaining trees are often more susceptible to damage from winds, pests, storm, and ice.

Before Construction Begins

Before construction begins, these actions should be taken to help avoid damage to existing trees:

- Designate areas for utility and equipment access.
- Prune for necessary vehicle clearance.
- Designate the area for the building envelope (extending no more than 25 feet from the house).



When pruning large limbs on trees, use the 1-2-3 method to prevent stripping the bark down the tree as the limb falls.

- Construct tree-protection barriers of sturdy fencing material to protect the critical root zone, as well as the trunk and tree canopy.
- Mulch protected trees with three to four inches of organic mulch.
- Set up and maintain a watering program.
- Conduct educational/training sessions for contractors, volunteers, and homeowners.

Minimum Distance (Radius) from Trunk for Tree protection Barriers

Trunk Diameter	Radial Distance from Trunk
Less than 6 inches	10 feet
6 to 12 inches	15 feet
12 to 24 inches	30 feet
24-36 inches	35 feet
Greater than 36 inches	40 feet

The above chart provides a guideline to estimate a safe distance for a tree protection barrier.

Plastic fencing is often inadequate and can be easily damaged by large equipment.

Trees and their root systems need to be protected on construction sites. A 6' chain link or wooden fence should be placed at or beyond the edge of the tree canopy.

Construction

Get to the site before construction begins. Make sure that every person working on the project knows exactly where the trunk, crown, roots, and associated soil areas inhabited by the roots are located for every tree being preserved. Ensure that individuals working on the site are educated and rewarded for their actions to preserve trees.

Tree Protection Zone

Healthy trees that are located inside the building envelope but are marked for preservation need special protection from construction practices. Make sure that each tree or group of trees is mulched and fenced, leaving as much soil surface as possible around the trees(s). Determine if low-hanging branches should be pruned to prevent accidental breakage by equipment. Additionally, consulting arborists can design and install various tree-protection systems or techniques to accommodate specific construction approaches.

A guideline for estimating the minimum distance to place protective fencing from a tree is to multiply the trunk diameter in inches by 1.2. That number (in feet) is as close to the tree as the protective barrier or any activity should be. For example, the protective fence for a ten-inch tree should be at least 12 feet from the trunk. Always limit construction machine access, vehicle parking, material storage, and chemical or cement rinsing to areas without trees, since these activities can damage the soil structure and root zone.

Protection from Grading

Cut and fill practices are very damaging to trees. Cutting soil away from a site can destroy root systems and cause water tables to drop, leaving existing tree roots unable to survive in the resulting dry soils. Fill can also change water flow patterns and smother roots. When stockpiling topsoil from the house site, be careful not to create such problems.

Soil Compaction

Soils can easily be compacted by vehicle traffic or stockpiled materials on the site. Soil compaction can limit a tree's root and shoot growth. Construction sites, which often have soil compaction that is worse than the native soil by 50 percent or more, do not support vigorous tree growth.

Utility Lines

Locate utility trenches in non-tree areas beside driveways and sidewalks. Work with utility companies to design serpentine corridors or to tunnel under trees when necessary. Underground and overhead utility corridors should be shared when possible. Local codes vary, but two or three trenches should accommodate all utilities. Designate two access points (in and out), so that large utility trucks have room to maneuver.

The Planting Phase

At this stage of the project, the plans created from the research and the site inventory and analysis can be implemented.

Preparing the Soil

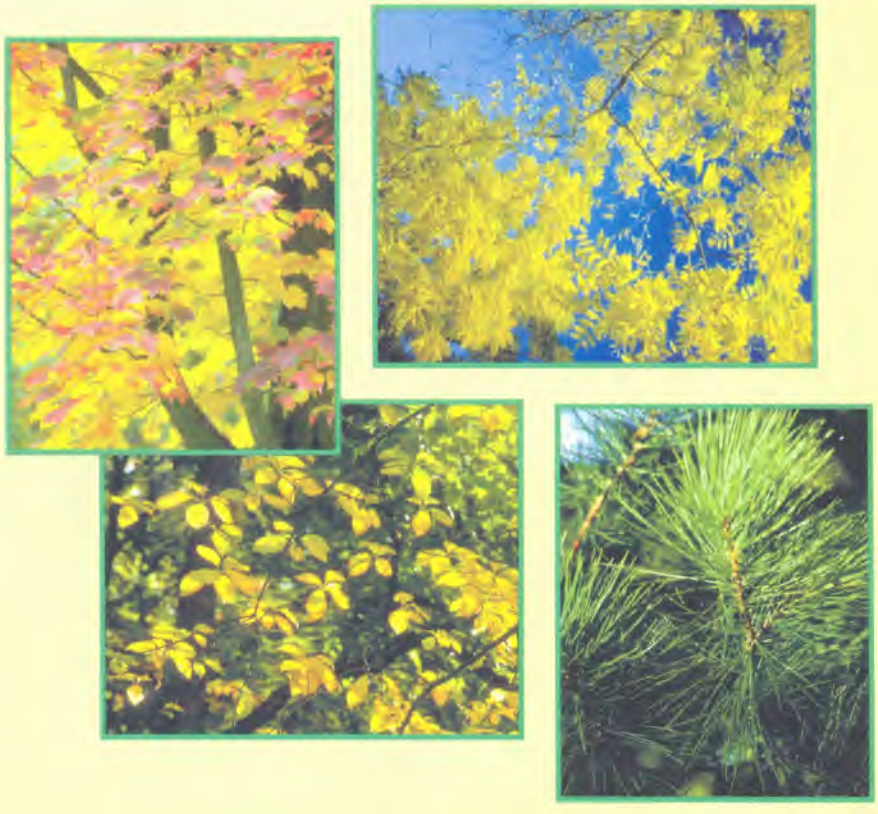
Proper Soil Preparation

Soil is a living ecosystem and the basic life-support system of the landscape. It is a medium for root growth and a reservoir for water and nutrients. Good soil will enable plants to become established more rapidly and to maintain greater disease and drought resistance. Ideally, soil should be porous and drain freely, yet retain water and nutrients in a form available to plants.

Amending the Soil

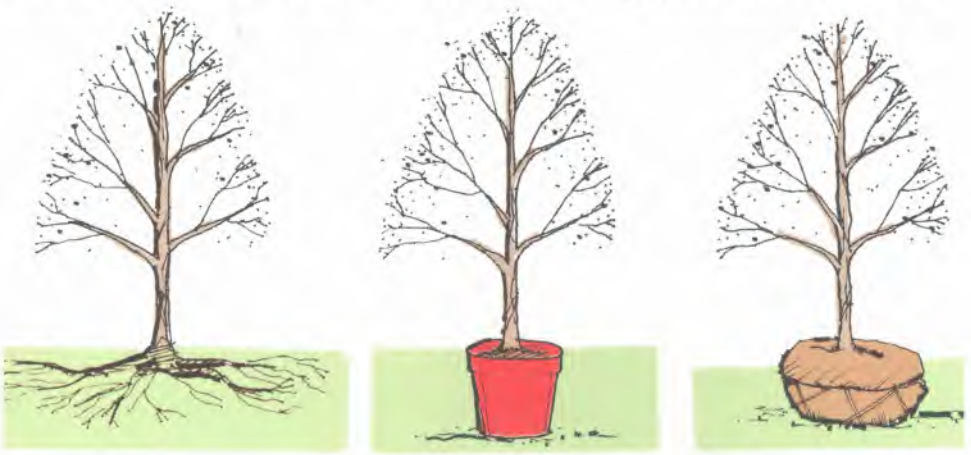
Organic matter increases water and nutrient-holding capacity, aeration, and drainage. Types of organic matter for soil amendment include decomposed wood chips, rotted worm castings, sawdust or manure, shredded leaves, and compost. It is important to add organic matter to the entire shrub or flower bed, not just the individual planting hole, so that plants form extensive root systems and achieve greater drought tolerance. One of the most common mistakes in amending the soil is failure to incorporate sufficient organic matter. As a rule of thumb, one inch of organic matter should be incorporated into planting beds every year.

Organic matter can also be added to lawn areas and around trees. Know the cultural preferences of the trees you are planting before investing in extensive soil improvement, however. It is important to note that not all soils need amending and not all plants do well in soils rich in organic matter. Many soils are already suitable for planting. When unsure about the soils in a landscape, contact a local county extension agent or have the soil tested.



Selecting Trees

Always plant high-quality trees that are suited to the site's climate and soil conditions. Species native to a given region do this best, particularly if the natural site was disturbed as little as possible during construction. Use good



Bare Root *Container* *Ball and Burlap*

planting procedures and follow up with regular maintenance to minimize stress to trees. This will help minimize the threats of insect pests and diseases. (See Chapter 1 for the other roles trees can serve in a landscape.)

Trees may be obtained in three forms: bare root, container-grown, and balled and burlapped. Generally, bare-root plants are small, deciduous plants that should be planted while dormant in the early spring or late fall. Bare-root evergreen plants may be planted as seedlings or very young plants. Avoid planting large bare-root evergreens. Container-grown and balled and burlapped plants can be planted throughout the year. When planting during dry summer periods, water frequently and liberally until well established to reduce the chances of plant mortality.

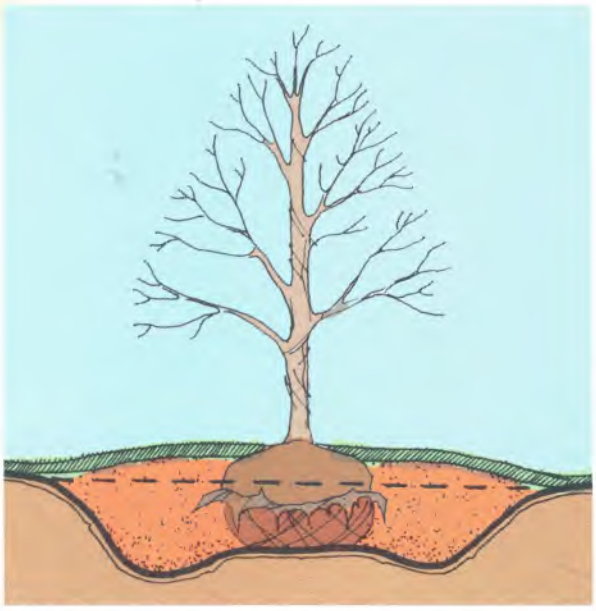
Planting Trees and Shrubs

Storage

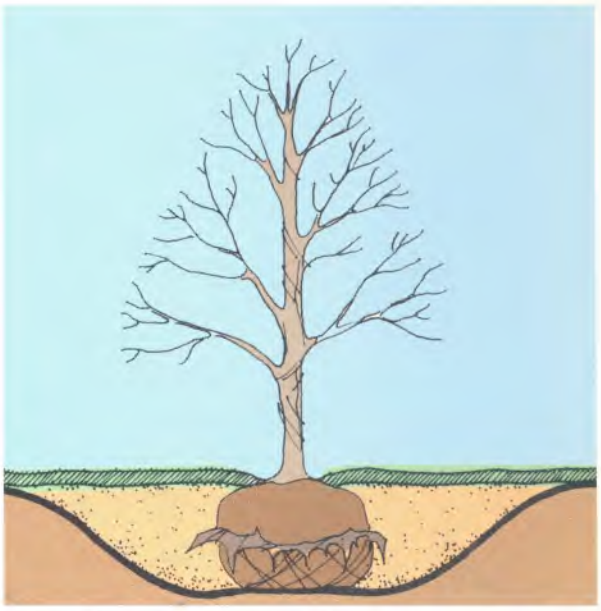
Trees should be stored outside in a cool, sheltered, shaded area to protect them from the drying effects of sun and wind. Keep the roots of bare-root plants moist by temporarily covering them with damp sand, sawdust, peat moss, or soil. Container-grown and balled and burlapped plants must also be kept watered until they are planted.

Planting

Dig a shallow, broad planting hole. Make the hole wide—as much as three times the diameter of the root ball, but only as deep as the root ball or root mass (see illustration on page 36). With bare root trees, trim off all damaged or diseased roots prior to planting. Trees should always be planted so that the basal trunk flare, where the roots spread at the base of the tree, is at or slightly above the soil grade. If the trunk flare is not visible, remove some soil from the top of the root ball. Remove the container or, with balled and burlapped plants, cut and roll down the burlap from the top one-third of the ball. Make sure that no burlap remains above ground to wick moisture away from the



When planting trees in poorly drained soils, plant the tree "high", with 1/3 of the root ball above the exiting grade. Place the ball on undisturbed soil to prevent settling, and allow water to drain away from the root ball. Mulch with a 2" to 3" layer of organic mulch, and pull the mulch away from the base of the trunk to avoid decay.



When planting a tree in well drained soils, place base of trunk flare at ground level and mulch with a 2-3" layer of organic mulch.

roots. If the plant is contained in synthetic material, remove it completely. Remove any twine from the trunk of balled and burlapped trees to avoid girdling.

Add enough water to settle the soil around the root ball or root mass in order to eliminate air pockets and to improve root-soil contact. Fill the hole with the soil originally removed when the hole was dug, and add water again to settle the soil. Finally, build a ridge or dike of soil four inches high around the perimeter of the hole. It is important to keep the tree or shrub well watered while the root system establishes itself. To help conserve water, mulch around newly planted trees and shrubs. Pruning transplanted trees to compensate for root loss is not recommended. Only broken and damaged branches should be removed.

Tree Staking

If trees are grown and dug properly at the nursery, staking for support is not necessary. However, protective staking may be required on sites where lawn-mower damage, vandalism, or windy conditions are concerns. If staking is needed, use two stakes with a wide flexible tie material to hold the tree upright, provide flexibility, and minimize injury to the trunk. Remove support staking and ties after the first year of growth. See Chapter 5 for maintenance of newly planted trees.

Maintaining Your Sustainable Landscape and Home

Building the project is only part of the effort; the other part rests in upkeep and maintenance. An ongoing education and follow-up program is recommended for Habitat for Humanity homeowners, since land ownership and grounds maintenance may be unfamiliar to them.

Chapter 5, the Homeowner Pages, may be photocopied and distributed to Habitat for Humanity homeowners.

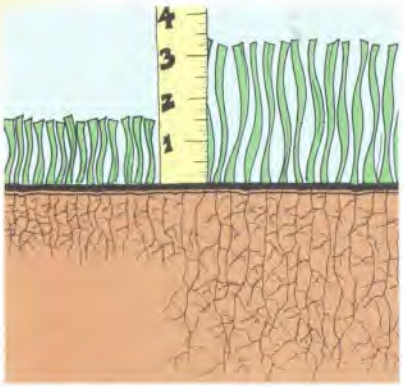
Homeowner Pages

Lawn and Garden Maintenance

Mowing

Lawns, although standard features across American landscapes, are both resource- and labor-intensive. Whenever possible, lawn areas should be limited to those parts of the property that will be used by people for recreation and open space. The rest of the property can be naturally landscaped—which requires less watering, less fertilizer, little or no chemicals, and minimal work for the homeowner.

For areas that are kept as lawn, mow the grass to the proper height to improve its drought tolerance. Cool-season grass should be kept at a height of approximately three inches. Warm-season grasses, such as bermuda grass and centipede grass, should be kept at a height of approximately one to one and one-half inches. Use a mulching lawn mower so that lawn clippings are left on the lawn to add nutrients to the soil. Keep mower blades sharp.



Cutting grass at taller heights encourages deeper root growth, promoting greater drought tolerance.

Watering

There are no exact rules for watering most plants, although there are some guidelines for watering lawns. For other plants, check the soil for moisture and the plants for signs of drying out. Once established, well-chosen plants will grow in most yards and gardens without additional water, except during periods of drought. Mulching will greatly reduce the need for and the cost of watering.

Children might also enjoy putting your grass to "the footprint test", a technique that helps determine the need for lawn irrigation. If footprints appear and remain when you walk across a lawn (that is not covered with dew), then you may need to water. Footprints appear when the grass plants have low moisture in the leaves, which prevents them from springing back.

Watering Lawns

It is difficult to determine exactly when a lawn needs watering. One technique that helps determine the need is the "footprint" method. Walk across a lawn (not covered with dew) and examine the area to see if any footprints are left behind. If the footprints remain for an extended time, the lawn area should be watered thoroughly.

Watering Tips

When watering, keep these points in mind:

- Plan to water new trees for the first three years, until they become established.
- Apply water slowly so it can soak into the soil. A drip or soaker hose system is an ideal way to water trees and shrubs.
- Water soil thoroughly to a depth of eight to ten inches. Never water by spraying only the surface, since light watering encourages shallow root development.
- Avoid watering the foliage, since this increases the spread of diseases and does the plant little good.
- Avoid too much water, since this will leach nutrients from the soil and may drown roots.
- Water early in the morning to minimize the water's evaporation.
- Allow lawns to go dormant in the heat of summer; they will become green again in the fall.
- If using sprinklers to water the lawn, make sure that the nozzle is not set on mist spray, or most of the moisture will be lost to evaporation.

Fertilizing

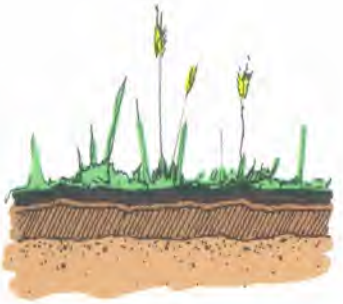
Most homeowners over-fertilize their landscape plants. Excess fertilizer can leach into groundwater or run off the yard into nearby waterways. Use fertilizer in the right amount, at the right time, and in the right place. Adding too much fertilizer also produces excessive growth in plants. This growth is weak, breaks easily, and is more susceptible to injury from cold, drought, and pests. Native plants rarely require any additional fertilizer once established.

Natural Fertilizers

Natural fertilizers, like composted kitchen scraps or cow manure, provide nitrogen and other nutrients slowly. One advantage is that they provide minor nutrients—nutrients required in small amounts, such as iron or manganese—not usually found in synthetic fertilizers. Natural fertilizers also improve the condition of the soil and help recycle solid waste, but they contain lower concentration of all nutrients, particularly nitrogen, phosphorus, and potassium. Therefore, a larger quantity of natural fertilizer must be applied to provide the same amount of nutrients that can be obtained with a smaller quantity synthetic fertilizer.

Synthetic Fertilizers

If natural fertilizers cannot be used, consider using a slow-release synthetic fertilizer. Since the nutrients are released over time, the potential for water contamination is lower. Slow-release nitrogen fertilizers usually cost more initially, but fewer applications are required. Those few extra dollars up front can go a long way to protecting streams, lakes, and bays. Avoid using fertilizers that contain weed killer or insecticide. Use environmentally friendly pest-control options instead.



Filter fabrics help reduce weed growth but also allow moisture and air to penetrate into the soil.

Weeding

Develop a stronger tolerance for weeds. A lawn does not have to be perfect. Elsewhere in the landscape, use mulch to shade out weeds and to discourage their germination. A layer of two to three inches of mulch should be maintained in planting beds and around trees. Spunbond fabrics or layers of old newspaper or cardboard will smother weeds and still allow water and air to penetrate; these can be used under mulches to discourage weeds in particularly difficult areas. Make sure to select plant species that are aggressive enough to compete with the weeds.

Pest and Disease Control

Making sure plants receive appropriate water, sun, and nutrients will reduce the need for pest and disease control, since healthy plants are naturally resistant to pests and diseases. If pests or diseases do occur, use natural pest and disease controls to minimize the impact on the environment. Organic pest control options include dormant oil, sprays of soapy water, diatomaceous earth, predatory insects, or hand-picking to remove pests. A landscape that is chemical-free is also safer for people and pets.

Maintenance for Newly Planted Trees

Young trees require special care and training during their early years. Without it, they may die, be unhealthy, require costly care, or create future problems. Strong, healthy trees are valuable landscape and community assets.

Mulch helps control erosion, conserves soil moisture, modifies soil temperature, and decomposes to build soil structure. Many cities offer free mulch, and volunteers can help mulch shared community space as well as individual yards.

Mulching Trees

Mulch acts as a blanket to hold moisture, protect against harsh soil temperatures and mechanical injury, and reduce competition from grass and weeds. Good mulch choices include wood chips, shredded bark, or shredded leaf litter. Maintain a two- to three-inch layer of mulch around trees and shrubs. The mulched area should extend to the drip line, the area that extends outward from the trunk to the tip of the branches. Make sure that the mulch is not placed against the trunk.

Watering Trees

It is important to keep the soil around newly planted trees moist for at least the first three years after planting. During dry periods, water trees at least once a week during the growing season and more frequently during hot weather. Continue watering newly planted trees until mid-fall and then taper off when lower temperatures reduce the need for additional water. (See the section on watering earlier in this chapter for more tips.)

Pruning Newly Planted Trees

Pruning helps train young trees to establish strong trunks with sturdy, well-spaced branches. Initial pruning should begin one or two years after planting and be repeated every two or three years for ten or 12 years. Leave branches along the entire length of the trunk during the early years. The lower branches help develop a strong, tapered trunk. Remove a few lower branches at each pruning time until you reach the desired height for the lowest permanent branch. Remove any branches attached to the trunk at very narrow angles and those nearly equal in diameter to the trunk itself. For large maturing trees, permanent branches should be vertically spaced 12 to 18 inches apart along the trunk. For small maturing trees, permanent branches should be vertically spaced eight to 12 inches apart along the trunk. A tree professional or county extension agent can advise you about proper pruning techniques and the quantity of leaves and branches that should be removed at any one time. Properly pruning your trees regularly will ensure good growth patterns and a long life. This will greatly reduce the chances of need for expensive tree removals and the risk of tree related damage to homes.

"Volcano" mulching is improper. Mulch should be pulled away from the trunk of the tree and spread in wide layer two to three inches deep around newly planted trees.

Fertilizing Trees

While fertilization can often increase the rate of growth of young trees, it seldom has any visible affect on mature trees. Physical soil characteristics, such as soil compaction, usually affect tree growth much more than nutrients. Ideally, mulches and compost will provide needed nutrients. For fertilization advice, seek assistance from a tree care professional or a county extension agent.

Green Home Information

The earlier sections of this chapter explain the steps you can take outside your home to maintain a sustainable landscape. But the way you use natural resources inside your home also has an impact on local, regional, and even worldwide habitats. Polluted air and water can affect not only wildlife and ecosystem health but human health, as well. The good news is that because our simple, daily actions affect the environment, there are simple, daily steps you can take to decrease air and water pollution. Here are some guidelines for making a Habitat for Humanity home a "green" home. Try one or two suggested actions first and then add more until you are doing something from each area.

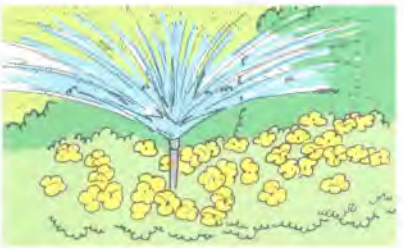
Water Conservation in the Home

By wasting less water, we leave more water for other uses, like recreation and fishing, and we reduce the risk of pollution. In addition, more water is left for wildlife habitat. Conserving water also reduces health risks by decreasing bacterial contamination in slow-moving water. One in five Americans drink water contaminated by toxic chemicals, so keeping toxic chemicals out of our water supply is important. Wise water use can help improve the health of both people and the environment.

WHAT YOU CAN DO

Don't Waste Water.

Install low-flow shower heads and faucet aerators. (Aerators improve water pressure, enabling you to use less water.) Fix leaky faucets and toilets. Water the lawn and garden with timers and drip hoses early in the day and note the other watering tips earlier in this chapter. Use only full loads when running dishwashers or washing machines. Don't keep the water running while brushing teeth or shaving.



Overhead spray systems are less efficient than drip systems because water lost is lost through evaporation and drift on windy days.

Keep Water Clean.

Properly dispose of paints, motor oil, and pesticides by recycling them or sending them to a hazardous-waste collection site. Never pour these materials down storm drains, which usually empty into the nearest local stream and not to the waste-water treatment plant, as is commonly assumed. Use low-impact gardening techniques that avoid pesticides and chemical fertilizers. Buy organic produce, which is grown with fewer pesticides.

THE GOAL

- Keep your water bills, and check to see how much you've used each time. Aim to cut your water use by ten percent within six months. (If you live in a hot or dry climate, your summer bills may be the highest ones. Compare spring bills with fall ones to see how much you've saved in six months, and compare bills from the same season to see how much you've cut back in a year.)
- Devise a family plan to keep toxics out of the water.
- Use fewer toxic chemicals and dispose of them safely.

Energy Conservation in the Home

Producing energy consumes valuable resources and creates pollution. For example, the generation of electricity is a major contributor to acid rain

(through the sulfur-dioxide emissions of coal-fired power plants) and global warming (through the burning of fossil fuels such as coal, oil, and natural gas). Generating electricity can also be harmful to human health. Studies have linked power-plant pollution with worsening asthma in children and other respiratory problems in adults. Pollution from power generation also harms fish and can affect drinking water by allowing toxic materials to leach into the water supply.

WHAT YOU CAN DO

Don't Waste Energy.

Lower the thermostat in the winter and raise it in the summer; you can install a programmable thermostat to do this for you automatically. Have the furnace and air conditioner serviced and cleaned regularly. Turn the hot water heater down to 120 to 140 degrees Farenheit. Check the refrigerator for leaky gaskets around the doors. Caulk, weather-strip, and insulate walls, attics, basements, windows, doors, and pipes.

Buy Energy Savers.

Install compact fluorescent light bulbs wherever practical. They cost more, but because they use much less energy and last longer, they save you money in the long run. Add dimmers to light switches where your light needs vary, and add timers to light switches where you only need light for limited times. Purchase energy-saving appliances.

GOAL

- Reduce energy use ten percent within two months.
- Reduce energy use 25 percent within six months.
  (Note that energy use varies with the seasons. Although it's realistic to expect higher bills during periods when you use heat or air-conditioning, those higher bills provide a greater opportunity for savings.)

Compost bins can be created by wiring together recycled pallets. Your goal should be to compost or recycle 100 percent of lawn clippings and yard waste.

Decreasing Household Waste

America generates more trash per person than any other country. On the average, only about 25 percent of that waste is recycled. The remainder goes to landfills or incinerators. Where to dump our trash is only one problem. A more serious problem is posed by the hazardous substances in our trash—including household items such as batteries, motor oil, cleaning products, and paints. The chemicals in these products can pollute the air, soil, and water.

WHAT YOU CAN DO

Reduce Trash.

Avoid wasteful packaging and single-use products that can't easily be recycled. Buy reusable, repairable, rechargeable, or refillable products or those made from or packaged in recycled material.

Eliminate Toxics.

Seek alternatives to caustic household cleaners, pesticides, paint removers, and other products containing toxic chemicals. Carefully dispose of unused chemicals at a waste disposal facility in the community.

Reuse and Recycle.

Try to reuse material before recycling it. Start a compost pile. Mulch or compost yard waste. Sell or donate used clothing, furnishings, books, appliances, etc. Borrow or rent rather than buying seldom-used appliances.

GOAL

- Reduce household trash by 25 percent within three months and 50 percent within six months.

Home Improvement

Keeping your home in good shape is one of the greenest things you can do. Keeping things tuned, painted, repaired, and refurbished will lengthen their useful lives and make items more efficient. However, not every home-improvement product is good for the environment. Some paints, cleaners, glues, and solvents can pollute the inside and outside air and harm human health. Check any product before purchasing it. Another concern is the wood used for building projects. Improper harvesting and processing of some forest tree species threatens the rain forests and old-growth forests that are home to endangered plant and animal species.

Remember that it is not just what we buy, it is how we use and dispose of it. Make sure that hazardous wastes are disposed of properly.

WHAT YOU CAN DO

Clean Green.

Buy nontoxic cleaners and other products and use them properly. Follow directions when storing or disposing of these products.

Fix It Up.

Use low-impact products and materials. Use woods from sustainably grown forests (look for certification labels).

GOAL

- Evaluate green options for cleaning, fix up, or construction.
- Aim for 100 percent proper handling of materials and waste.

Lawn and Garden

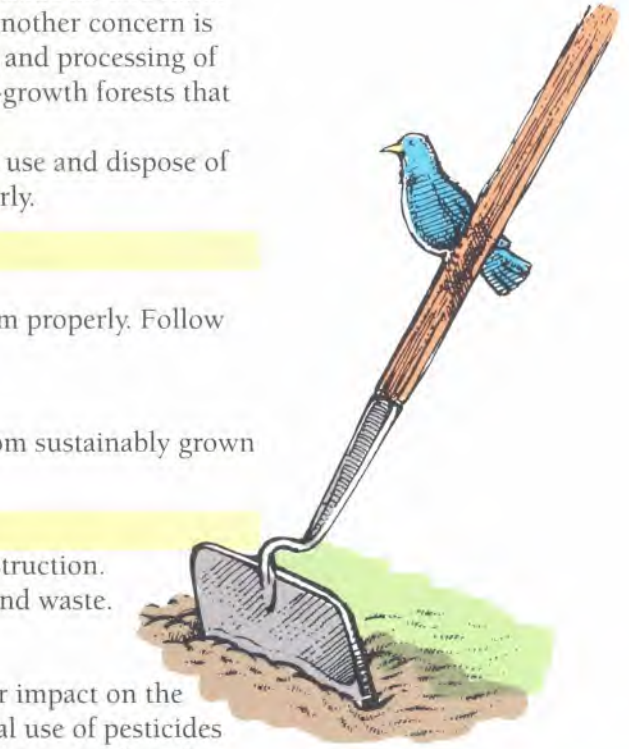
The actions that are taken in the yard can have a major impact on the environment and human health. For example, the habitual use of pesticides and fertilizers has many drawbacks—to the lawn and garden, as well as the overall environment. Repeated chemical applications can actually diminish the health of the garden by making the soil uninhabitable for beneficial insects and microorganisms.

Pesticides and herbicides can also harm people. The symptoms of pesticide poisoning can be deceptively similar to other illnesses—chest tightness, asthma-like wheezing, coughing, muscle pain, headaches, cramps, and diarrhea.

WHAT YOU CAN DO

Reduce Lawn Cover.

Create a low-maintenance Backyard Wildlife Habitat landscape. Aim to reduce the lawn to 50 percent or less of the total area. Replace lawn with trees, shrubs, flower beds, and ground covers.



Deck areas provide an extension of the house as well as help to reduce amount of lawn area

Let It Grow Naturally.

Use organic or low-impact gardening and watering techniques. When the yard is fertilized, use a slow-release fertilizer, compost, or composted sewage sludge. Use a mulching mower. Compost yard waste. Conserve water by mulching.

GOAL

- Reduce chemical use by 50 percent within six months.
- Compost or recycle all your lawn clippings and yard waste.

Backyard Certification

Getting your yard certified as an official Backyard Wildlife Habitat site rewards you for the dedication that you have shown to making a place for our fellow creatures. Once the habitat area is complete, you can apply for certification by completing an application form and sending it to the National Wildlife Federation with the application fee.

The application will be reviewed to make sure that the four basic habitat elements—food, water, cover, and a place to raise young—are provided. When the habitat is certified, you will receive a personalized Certificate of Achievement from the National Wildlife Federation. Since the program began in 1973, more than 30,000 Backyard Wildlife Habitat sites have been certified by the National Wildlife Federation.

Application for Certification

HFHI

Take heart, you needn't be a zoologist or botanist to fill out this application. The National Wildlife Federation looks forward to acknowledging your efforts in providing habitat for wildlife where you live or work. Do your best to fill out this application, and if there are problems, we'll get back to you with some suggestions. Within 6-8 weeks of receiving your application, we'll send you a beautiful personalized certificate suitable for framing and you have the option of purchasing a yard sign to educate others about your project.

BACKYARD WILDLIFE HABITAT™
NATIONAL WILDLIFE FEDERATION®

CONTACT INFORMATION *(Please TYPE or PRINT legibly)*

Applicant Name _____

Organization Name (if applicable) _____

Name(s) to Appear on Certificate _____

Address of Habitat _____

City _____ County _____

State/Province _____ Country _____ Zip/Postal Code _____

Telephone _____ E-mail Address _____

Mailing Address (if different from above) _____

Office Use:

Habitat # _____

Fee Rcvd. _____

Certified _____

Cert. Sent _____

BWH Type _____

If you are applying for someone else, please provide your contact information:

Contact Name _____

Telephone _____ E-mail Address _____

PROPERTY INFORMATION

Property Size (approx. acres) _____

Have you ever applied for certification before? ☐ Yes ☐ No If yes, list Habitat # _____

If yes, is this application for ☐ New Property ($15 fee waived if you are certifying a new property) ☐ Second Property

Is your property ☐ Urban ☐ Suburban ☐ Rural

How long have you been gardening for wildlife at this property? _____

Did a Habitat Steward or Host assist you? ☐ No ☐ Yes - Name of Steward or Host _____

PROCESSING INFORMATION *(Allow 6-8 Weeks for Processing)*

☐ $15 Application Fee enclosed

This fee covers our processing and handling costs and is non-refundable. Make checks out to:

National Wildlife Federation
Backyard Wildlife Habitat Applications
11100 Wildlife Center Drive
Reston, VA 20190-5362
(703) 438-6434

NATIONAL WILDLIFE FEDERATION®
www.nwf.org™

☐ I want an additional certificate. I've included an additional $5 for each extra copy of the certificate.

Please keep a copy of this application for your records.

For Habitat Hints and Projects visit our website at **www.nwf.org/backyardwildlifehabitat**
or call (716) 461-3092 to purchase your Backyard Wildlife Habitat Planning Packet.

HABITAT INFORMATION

1. Plant List: Plant communities form the foundation of habitat for all wildlife. Plants that are native to your region are best. Please try to list the trees, shrubs, grasses, perennials, annuals, ferns, cacti, etc. that grow in your habitat. Also indicate an approximate quantity of each species. (Attachments welcome – see #8.)

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

2. Food: Plants are the best food source for wildlife. Feeders can be used as a supplemental source of food. Remember some creatures will become food for others in a balanced habitat. Be sure to encourage a diversity of wildlife in your yard to ensure a healthy ecosystem. Tell us how you provide food:

Plant Foods: ☐ Seeds ☐ Nuts ☐ Berries ☐ Fruits ☐ Nectar ☐ Foliage/Twigs ☐ Sap ☐ Pollen

Feeder Type: ☐ Tube ☐ Platform ☐ Suet ☐ Hummingbird ☐ Other _____

3. Water: Wildlife needs a clean water source for drinking and bathing. Tell us how you provide water:

☐ Birdbath ☐ Water Garden/Pond ☐ Lakefront ☐ Riverfront ☐ Stream ☐ Wetland ☐ Vernal Pool

☐ Puddling Area ☐ Coastal ☐ Spring/Seep ☐ Other _____

4. Cover: Wildlife needs places to find shelter from the weather and predators. Tell us how you provide cover:

☐ Wooded Area ☐ Dense Shrubs/Thicket ☐ Bramble Patch ☐ Evergreens ☐ Ground Cover ☐ Brush Pile

☐ Log Pile ☐ Rock Pile/Wall ☐ Meadow/Scrub/Prairie ☐ Other _____

5. Places to Raise Young: In order to provide complete habitat, you must provide places for wildlife to raise young. Tell us how you provide a place to raise young for nesting birds, denning mammals, egg-laying amphibians, reptiles, fish, butterflies, and other insects and invertebrates:

☐ Mature Trees ☐ Dense Shrubs/Thicket ☐ Meadow/Scrub/Prairie ☐ Water Garden/Wetland

☐ Trees with Cavities ☐ Dens in the Ground ☐ Plants for Caterpillars to Eat ☐ Other _____

6. Resource Conservation: Tell us how you are conserving resources for people and wildlife:

☐ Establishing a rain garden or buffer to filter storm water ☐ Capturing roof rain water ☐ Mulching

☐ Xeriscape ☐ Using drip soaker hose instead of sprinkler ☐ Removing invasive exotics ☐ Composting

☐ Planting native plants suited to the area ☐ Reducing or eliminating pesticide and chemical fertilizer use

☐ Reducing or eliminating lawn areas ☐ Keeping your cat indoors

7. Wildlife: Please list the wildlife that your habitat supports.

☐ Insects/invertebrates ☐ Fish ☐ Amphibians ☐ Reptiles ☐ Birds ☐ Mammals

Share specific species: _____

_____

8. Attachments: Along with this application, please send us a simple sketch and/or photos of your habitat since we cannot visit it in person. Good quality photos and sketches may be selected for our website, but cannot be returned. Feel free to include other attachments to share additions to your plant and wildlife list or wildlife stories. All attachments must be no larger than 11" x 17." **Be sure to include your name and address on the back of all attachments, including each photo.**

☐ Photos enclosed (no more than five, please)

☐ Sketch enclosed

For Habitat Hints and Projects visit our website at **www.nwf.org/backyardwildlifehabitat** or call (716) 461-3092 to purchase your Backyard Wildlife Habitat Planning Packet.

Homeowner and Family Education

Sweat equity activities can help new homeowners understand, value, and care for the landscape around them.

By offering "sweat equity" activities that focus on landscaping and learning about the natural environment, you give Habitat for Humanity homeowners and family members the opportunity to create beautiful, healthy, and sustainable homes.

These fun family projects can be as simple as planting flower boxes to attract butterflies or putting up a bird feeder, or as extensive as creating a Backyard Wildlife Habitat area in the yard. Given that young family members are not allowed to actually help build their Habitat for Humanity houses, these activities give them a way to help create their homes.

Depending on families' interests, sweat equity activities can include:

- **Sustainable Landscaping:** Activities that focus on landscape design; caring for and maintaining a yard; planting flowers, trees, and shrubs; watering methods; mulching; native plants; and appropriate fertilization can teach families how to create a yard that is cost-effective, low-maintenance, and natural.
- **Nature Education:** Activities such as nature walks, plant and animal identification, and watershed information introduce families to their community environment. These activities tap into their curiosity about the nature in their neighborhood, and can help them make connections between their homes and their environment.
- **Gardening:** Designing, planting, and caring for a garden are cost-effective ways for families to grow their own food and help to create a sustainable environment.
- **Providing a Place for Wildlife:** Activities such as planting native plants and putting up bird feeders and bat boxes teach families how to attract butterflies, birds, and other animals and provide a place for wildlife in their community.
- **Sustainable Living:** By combining the activities included above, families can learn to live and interact positively with their environment.

Planning Sweat Equity Activities

With proper planning, sweat equity activities that engage families in hands-on learning about sustainable landscaping and their environment can be relatively easy to organize. Case studies of actual programs are summarized at the end of this chapter. The following steps will help you plan these activities:

1. Survey Habitat for Humanity homeowners and families to find out what aspects of sustainable landscaping and their environment they are interested in learning.

2. Based on their interests, choose an activity or activities from the list above.

3. Plan the logistics of the activity. Use the following questions as a guide to planning the activity:

LOGISTICS QUESTIONS:

- Where and when will the activity take place?
- Is transportation needed?
- Is permission to use the site needed?
- What type of registration is needed?
- Are food and drinks needed?

ACTIVITY QUESTIONS:

- What are the specific goals of the activity?
- How many people can participate effectively in the activity?
- How many volunteers are needed?
- What type of instruction is needed, and who can teach the activity?
- What type of equipment and materials will be needed for the activity?
- What are the safety issues to consider?

Colleges and universities are excellent resources for help with Habitat for Humanity projects. These landscape architecture and horticulture students from Clemson University partnered with homeowners, NWF, HFH, and others to design and implement the landscape plans for "Red Hills" subdivision in Clemson, South Carolina.

Finding Instructors

Different activities will naturally require different types of expertise. Each instructor should be briefed about the goals of each specific activity and be reminded that the activities are to be presented at the basic, introductory level. Places to begin searching for instructors include: local landscaping firms and nurseries that support sustainable landscaping practices, soil conservation districts, National Wildlife Federation affiliates, local environmental organizations, nature centers and parks, birding clubs, gardening clubs, and cooperative extension agencies. See the resources section for other potential contacts.

Gathering Equipment and Materials

If the activity requires equipment such as water buckets, garden hoses, trowels, rakes, and shovels, ask Habitat for Humanity staff and homeowners to lend their equipment. For more complicated activities, ask local nurseries, gardeners, landscapers, farmers, and gardening clubs to donate their labor and equipment to perform such tasks as tilling the soil ahead of time. This minimizes safety issues. Approach local nurseries, stores, gardening clubs, and local conservation and environmental groups for donations of materials such as mulch, plants, small trees, soil, watering cans, planters, and gloves.

Providing Role Models and Mentors

Consider recruiting several volunteers who actively practice sustainable landscaping, gardening, or other related activities to serve as role models and mentors for the Habitat for Humanity families. These volunteers can share their own experiences with these families and serve as contacts if the families have questions about sustainable landscaping techniques.

Considering Safety

Safety is of the utmost importance for children and adults who engage in any sweat equity education activity. To protect the participants, have emergency procedures in place: a first aid kit, an emergency station, and information about participants, including a release and waiver and medical and emergency contact information. If a program is planned at or around the construction site, check with site supervisors to make sure that the site is safe for families. If small children will be attending, consider having a separate area for them, childcare volunteers to attend to them, and age-appropriate activities (e.g., stories, crafts, games). For liability reasons, check with Habitat for Humanity affiliates and other program sponsors to ensure that they have appropriate insurance coverage.

Case Studies: Sweat Equity Education Programs at Work

The following case studies provide details about actual programs that were held with Habitat for Humanity families in Americus, Georgia. Both programs involved Habitat for Humanity families who were building homes in the Easter Morning Subdivision. Family members earned sweat equity hours for participating in the activities.

Family Fun Gardening Day

The goals of this program were (1) to educate families about the basics of flower gardening, trees and shrubs, and water use, and (2) to help them put these ideas to work in their own backyards. The program was held at a church in Americus, Georgia. Instructors donated their time, and local nurseries and stores donated equipment and materials. Below is a review of the day's schedule and activities:

9:00-9:15 REGISTRATION: Each family member made a name tag. Parents took children under five to a childcare area. The materials needed were a family checklist, name tags, markers, crayons, and release and photo-consent forms.

9:15-9:45 WELCOME, INTRODUCTION, AND ICE-BREAKER: As an introduction to the program, families were asked: What do you think about flowers? Would you want flowers in your backyard? Why? Who would take care of them? How? Families introduced themselves and were divided into three groups.

9:45-11:40 ACTIVITY STATIONS: Each group of families rotated through three activity stations for 35 minutes. Materials needed for the stations included flowers, soil, access to water, water buckets, pruning sheers, informational handouts (for flowers, trees, water use), shovels, and mulch.

a) Flower Gardening: Concepts covered included common flowers, planting and caring for flowers, environmentally friendly fertilization, and the benefits of flowers to wildlife.

b) Trees & Shrubs: Concepts covered included benefits of shade, cost reduction, planting and care concepts, and hands-on planting.

c) Wise Water Use and Mulching: Concepts covered included water facts, indoor/outdoor water use, non-point pollution reduction, and mulching benefits.

11:45-12:10 FAMILY ACTIVITY: Creating Your Backyard: Families were each given a piece of butcher-block paper shaped like their yard. Together they drew pictures of how they envisioned their backyard. Materials used included the paper, as well as markers or crayons, a subdivision site map, and scissors. Volunteer mentors assisted each family with this activity and asked guiding questions about how the families would care for their yards.

12:10-12:45 COMMUNITY SHARING—CREATING YOUR NEIGHBORHOOD: Families took turns sharing the drawings of their yards, and explained what they would like to have in them, what they would do first when they have their yards, and what else they would like to learn about the outdoors. Every picture was placed onto a huge site map of the Habitat for Humanity's Easter Morning Subdivision.

Family Fun Planting Day

The goals of the Family Fun Planting Day were: (1) to engage families in planting trees and flowers and caring for them, and (2) to prompt families to explore the nature in their neighborhood. The program was held at the Easter Morning Subdivision in Americus, Georgia. Instructors donated their time, and local nurseries and stores donated equipment and materials. Materials and equipment used for the activities included dogwood trees, soil, mulch, shovels, trowels, flowers, flower boxes, water buckets, water, paper, and markers.

1:00 - 1:30 REGISTRATION: Each family member made a name tag. Parents took children under five to a childcare area. Materials needed were a family checklist, name tags, markers, crayons, and photo consent forms.

1:30-2:30 TREE PLANTING: After a tree-planting demonstration, children were divided into groups of four or five and paired with one or two adults. Each group planted one or two dogwood trees in each of the families' yards. After planting and watering the dogwoods, each child created instructions that described how to care for the dogwood trees.

2:30-3:00 NATURE WALK: Families went on a neighborhood walk to identify basic plants and animals in their neighborhood. Other themes that can be used during the walk include using your senses in the outdoors and exploring wildlife habitats.

3:00-3:30 SNACK: Participants were provided with water, fruit, and other snacks.

3:30-4:30 FLOWER PLANTING: After a flower-planting demonstration, children were divided into groups of two or three and paired with one or two adults. Each group planted flowers in flower boxes. After planting and watering the flowers, each child created instructions that described how to care for the flowers.

Appendix: Contacts and Resources

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CERTIFY YOUR BACKYARD

See "Homeowner Pages" for "Application for Certification."

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- ❑ About half
- ❑ More than half

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