



How to Manage Community Natural Areas

TREE CITY USA®
BULLETIN

No. **27**

Editor: Dr. James R. Fazio • \$3.00



Managing natural areas may sound like a contradiction of terms. But your help is needed if remnants of woodlands are to survive in the nooks and crannies of our cities and towns. These unique communities of life need protection from the inroads of development. Even more, they need active management to prevent deterioration from abuse and neglect.

Henry David Thoreau once wrote, “A town is saved, not more by the righteous men in it than by the woods and swamps that surround it. A township where one primitive forest waves above while another primitive forest rots below — such a town is fitted to raise not only corn and potatoes, but poets and philosophers for the coming ages.”

Philosophy aside, wooded areas in and around our communities offer practical benefits as well. They prevent soil erosion, cleanse the air, buffer noise, counter the heat-absorbing effect of buildings and pavement, and offer the kind of recreational opportunities that new industries and savvy home buyers look for in selecting a new location. They also provide a home for wildlife and can be a lifesaver for migrating birds. Woodlands are clearly an attribute, but as part of an urban forestry program, they also present a number of challenges.

One challenge is the need to gain broader public appreciation for these little strips and odd lots of nature among the concrete and asphalt of our busy society.

Another — and closely related to the first — is to ward off the invasion of development. Parcels of woods on public property are often the first to be eyed for building affordable housing, expanded parking lots, or other often-praiseworthy projects. “Underutilized land” is the term sometimes used by decision makers.

Finally, there is the question of keeping natural areas truly natural. All wooded areas offer educational, recreational, and environmental benefits to some degree. But to the ecology-minded, there is the beauty and value of fine art in seeing a forest of native vegetation function on its own through successive generations of trees and understory. This challenges the manager to first understand the ecology of the site, then root out weedy invaders, and finally, to provide a helping hand to restore the native system.



Arbor Day Foundation
100 Arbor Avenue • Nebraska City, NE 68410

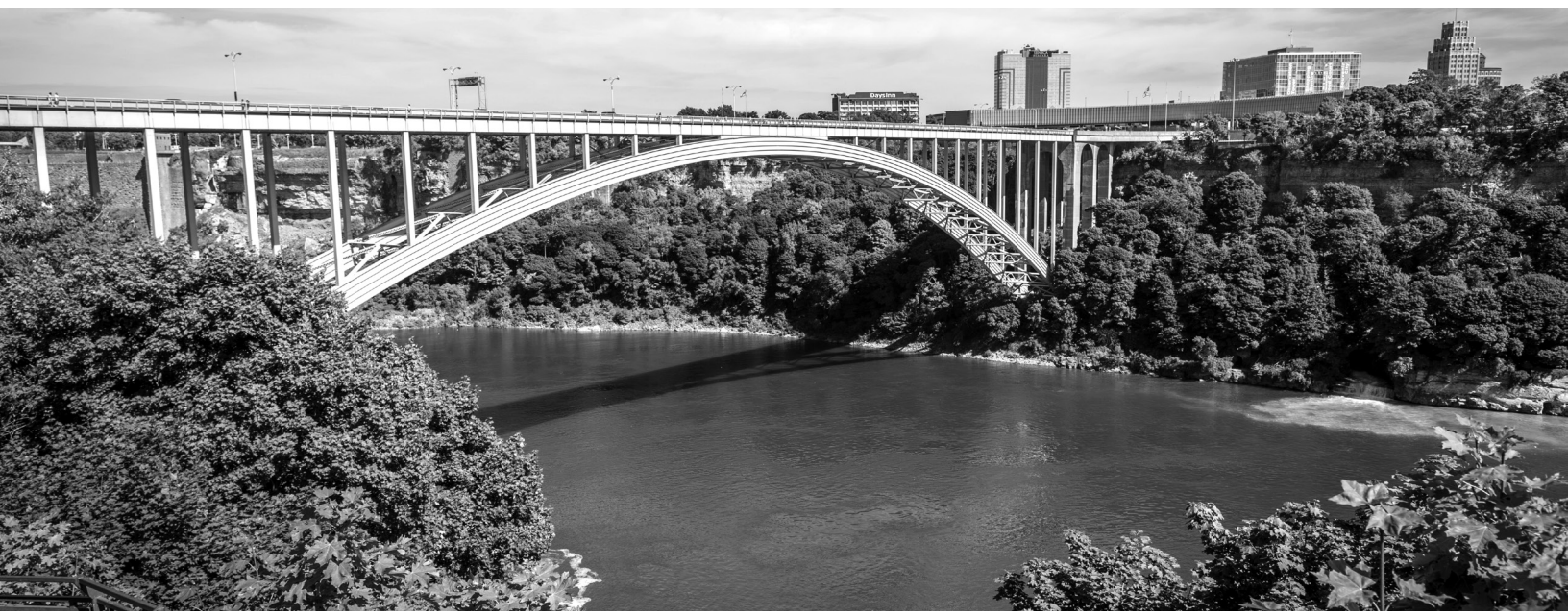
Where Are Natural Areas?

Natural woodlands are found in communities of all sizes. Just across the Potomac from our nation's teeming capitol, 43 acres of verdant forest can be found in Alexandria, Virginia. In little Nebraska City, Nebraska, ancient oaks and tenacious berry bushes grace the edges of Table Creek, much as they did when Arbor Day Founder J. Sterling Morton lived at nearby Arbor Lodge. Tracts of woods can be found almost everywhere, occupying the land so unobtrusively they are too often virtually ignored and taken for granted.

In your community, look for natural areas in places like these:

- **MUNICIPAL, COUNTY, AND REGIONAL PARKS.** These are the most common locations of community natural areas.
- **RAVINES AND STEEP SLOPES.** Trees and understory vegetation on these sites are often protected by virtue of difficult terrain. In turn, they hold soil in place and protect waterways from siltation.
- **BUFFERS.** These are usually found around zoos, industrial sites, and other large public or private facilities.
- **ARBORETUMS.** Managers who value native vegetation as well as exotic trees will make an effort to grow both.
- **PAPER STREETS.** These are publicly owned easements marked out on maps for possible use as streets in the future.
- **EDGES OF RIVERS AND CREEKS.** A plant community here is called riparian habitat and often contains a unique assemblage of life.
- **WETLANDS.** These include lake shores and swamps.
- **ABANDONED INDUSTRIAL SITES.** Vegetation quickly reclaims the site, particularly along rivers.
- **RESIDENTIAL PROPERTY.** Old estates slated for subdivision and new areas planned on former farmland are particularly rich in woods.
- **GOLF COURSES.** Older courses are often fringed or divided with woodlands. In Ocean City, Maryland, when a new golf course was developed, the owners saved 90 acres of woods and wetlands on a 200-acre site. Their goal was to demonstrate environmental responsibility, and their reward has been booming business from golfers who appreciate the beauty and serenity of the natural scene.
- **SCHOOL PROPERTY.** In some cases, innovative teachers convert the woodlands on their own grounds into marvelous outdoor laboratories.
- **GREENWAYS.** Flood plains, old railroad beds, and utility rights-of-way offer recreational pathways, often adjacent to natural strips of vegetation. In China, "bamboo beltways" are planned to link panda preserves; in the United States, greenways could just as easily link communities.
- **LANDFILLS.** With the passage of time, the waste piles of humanity can support rich areas of vegetation. Near Toronto, excavated materials dumped at the edge of Lake Ontario became so natural-looking that there was an outcry from citizens when development was suggested for waterfront recreation.

Small parcels of the wild can be found in most communities. Some, like the famous river banks of Niagara, are an integral part of the community's visual identity. Others are more easily overlooked but are just as important.



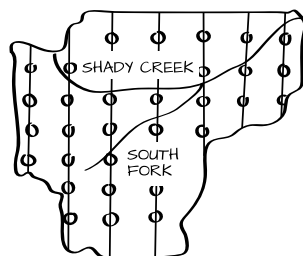
Conducting an Inventory

In natural areas, as along streets, the best management decisions about trees are based on factual information. This information can be obtained from a casual walk through the woods by someone well-schooled in forest ecology. A more precise way to obtain a record of the current situation is to conduct an inventory.

Unlike in a street tree inventory (*Bulletin No. 23*), it is usually not practical to measure every tree in a natural area. Instead, a profile of the stand can be created by using a number of plots of known size, measuring the trees in those plots, then expanding the data to the whole area. More details can be found in any forestry text or by consulting a local forester.

STEP 1: DESIGN THE SAMPLING PROCEDURE

On a map of your natural areas, draw parallel cruise lines so they reasonably cover the tract. They should be perpendicular to drainage patterns so you pick up vegetation differences caused by elevation and soil moisture conditions. On the map, measure the total length of your cruise lines. Then:

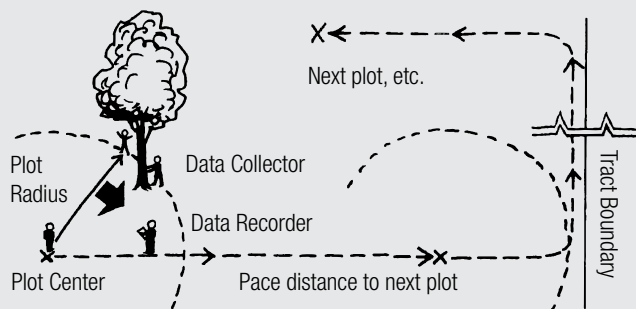


$$\begin{aligned} \text{(A) } & \frac{\text{Total area of woodland}}{\text{Size of sample plots (e.g., .10 acre)}} \times \frac{\text{Percent of total area to be sampled (e.g., 15 percent)}}{\text{Number of plots}} = \text{Number of sample plots needed} \\ & \frac{\text{Total length of cruise lines}}{\text{Number of plots}} = \text{Distance between plot centers} \end{aligned}$$

STEP 2: COLLECT DATA

A one-tenth-acre circular plot has a radius of 37.24 feet. Using a tape measure or pre-measured rope, move clockwise around the plot, recording information about each tree as you come to it. This usually includes species, diameter at 4.5 feet

FOUR-PERSON DATA COLLECTION TEAM



above ground, and estimated height (if interested in wood volume for product sale or other reasons). For each plot, you may also want to note the composition of understory vegetation and estimated number of stems.

A simple form that makes recording and summarizing data fast and easy should be designed for the information you need to collect for future decision making. An example at the right:

Plot _____

Diam.	Usable Height			
< 2"	N/A			
2-6"	8'			
	16'			
6-10"	8'			
	16'			
	20'			

STEP 3: SUMMARIZE THE DATA

Total the trees in all plots by species and size class. Calculate a correction factor for expanding the samples to the whole tract.

$$\frac{\text{Total Woodland Area}}{\text{Total Area in Plots}} = \text{Correction Factor}$$

Multiply your totals by the correction factor and you will arrive at a reasonable profile of the trees in your entire woodland.

STEP 4: PUT THE DATA TO WORK

To help present a clear picture of existing conditions, you may want to convert your totals to percentages and display them in bar graph form. The information can be used to help determine:

- How much the current forest differs from what could be expected under truly natural conditions. Experts and sites outside the city can help with the comparison.
- Whether adequate native species exist to take over if released from non-native competition.
- What species should be removed and how much work it would take to convert the stand to a more desirable profile.
- How much timber or firewood might be available for sale from thinning or removals.

When in the field, notes on your map can also show such things as extraordinary trees and the boundaries of vegetative types. Overlaying a soil map (available from your county office of the USDA Natural Resources Conservation Service), trail plans, viewpoints, and potential interpretive sites can also expand the usefulness of an inventory.

Six Basic Management Needs

1. INTERPRETATION

"We can't respect what we don't understand."

— William A. McLean, Metropolitan Toronto
and Regional Conservation Authority

Conservation education is often the first requirement of natural area management. It is essential if we are to help both children and adults retain their link with the natural environment. Schools, youth groups, churches, and park interpretive programs all play an important, ongoing role. But traditional nature programs are up against stiff competition from computers, Hollywood glitz, and the other daily fare of modern lifestyles. They are also usually the first programs to suffer from budget cuts. But conservation education is not a frill. It needs support, expert planning, and revitalization using modern communication methods. The result will be our best hope for creating the kind of understanding that will place value on local natural areas. This, in turn, can be a springboard to the knowledge necessary for citizens to make rational decisions about the environment nationally and globally. For some urban children, the small, local woods may be their only exposure to nature.

2. PROTECTION FROM COMPACTION

Without planning and management, public use at attractive points in the natural landscape will destroy the very thing that is attractive. Soil compaction usually does the deed. To help prevent compaction:

- Design high-use facilities and roads or trails to avoid fragile sites. Dense plantings can also help direct pedestrian travel.
- Move picnic facilities away from shorelines.
- Aerate and mulch around trees near heavy-use sites.
- Close sites on a rotating basis for rest and restoration. Use an interpretive sign to explain the closed area.
- Prohibit vehicles, including bicycles, when necessary.

3. EROSION CONTROL

Closely related to compaction is the control of erosion. Sheet erosion removes entire layers of topsoil over a broad area. This occurs when soil-anchoring vegetation is removed and the sponge-like layer of decaying leaves disappears. As the velocity and volume of rain runoff increases or where paths ascend slopes, gullies begin to form. These channel and speed runoff even more, washing away huge volumes of soil, polluting waterways, and leaving a deep trench that can be dangerous to children.

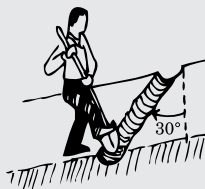
To control erosion:

- Restore vegetation.
- Plug gullies with brush or old Christmas trees. In cases of severe erosion, engineered structures may be needed.
- Place water bars across trails and woodland roads to divert runoff before it builds to damaging levels.
- Restrict bicycles, motor bikes, and even pedestrian or horse traffic, if necessary, to stabilized or erosion-proof trails.

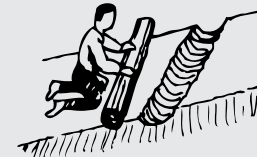
HOW TO INSTALL WATER BARS

Water bars are devices that divert rain runoff from trails before the water can gain enough volume and speed to cause erosion. Here is a way to install effective water bars that stay in place.

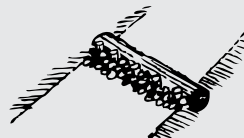
1. **DIG TRENCH** across path at 30-degree angle.



2. **PLACE LOG** or waste lumber in trench, extending it beyond the path in both directions.



3. **PLACE ROCKS** and/or stakes on downhill side.



4. **FILL IN ANY SPACE** in trench so finished cross section looks like this.



4. SOIL RESTORATION

Good soil is the key to a healthy, natural woodland. Where it has been degraded by erosion or compaction, both the nutrient value and water-holding capacity of soil are reduced. Trees suffer stress as a result, opening them to a host of insect and disease problems. In extreme cases, so much soil is lost that roots lose their anchoring ability and trees topple over.

To restore soil:

- Map areas of erosion and implement control measures.
- Loosen compacted areas.
- Add topsoil in areas of extreme erosion.
- Add about 12 inches of well-rotted leaf compost.
- Plant ground cover using native herbaceous vegetation, shrubs, and trees. Native species are more likely to reproduce themselves, a major goal for a maintenance-free area following restoration.

5. REMOVAL OF INVASIVE SPECIES

Eroded areas and openings are ripe for the invasion of non-native weed species. These trees and herbaceous species often thrive on degraded soil and can colonize the area so densely that seedlings of native species cannot compete. To break the gridlock where non-native vegetation dominates:

- Eliminate the non-native species. Where possible and when it creates no fire hazard, allow the felled

vegetation to remain in place to rot naturally and help restore soil. Stump treatment with safe chemicals may be necessary to prevent resprouting.

- Plant native species that will form a self-perpetuating overstory canopy. Local foresters can prescribe suitable species in your area.

HOW NATIVE AND NON-NATIVE SPECIES FILL OPEN SPACES

NATIVE COLONIZERS

First Generation

Example: Wild cherries and black locust

- Sun-loving, shade-intolerant
- Short-lived
- Allow a diverse mix of other native species

Next Generation

Shade-tolerant natives, such as oaks or sugar maple



INVASIVE WEED* SPECIES

First Generation

Example: Norway maple

- Sun-loving and shade-tolerant
- Longer-lived
- High numbers of seeds with high rate of germination; a dense monoculture is formed

Next Generation

More Norway maples



* A weed is any plant in the wrong place.

6. PROTECTION

Whether the natural area retains its original complexity of native vegetation or has been restored through removals and planting, protection from undue human disturbances is necessary. This does not usually mean precluding visitors. But it may mean restricting travel to trails, temporarily fencing specific areas, closing roads and trails to vehicles, and stopping illegal cutting and dumping. Protection also means the prevention and control of wildfires, particularly during restoration, and it means keeping deer or other herbivore populations in balance with a sustainable food supply. This is often a sensitive issue, usually resolved through the use of hunting seasons in surrounding areas.

THE RESULT OF NATURAL AREA MANAGEMENT

Proper management, based on ecological principles, can lead to safer, healthier natural areas that are virtually maintenance-free. Edward Toth, former director of landscape management at Prospect Park in New York, said it this way, "Working with, rather than against, processes that occur in nature will allow park managers to restore and maintain woodlands with less manpower, materials, and money than are required by horticulture and turf systems." But to become or remain a healthy, low-maintenance, self-renewing area, a little help is needed from human friends.

THE PUBLIC SAFETY FACTOR

In some parks, natural areas have been purposely destroyed because of the fear of crime. While this is a judgment that can only be made locally, alternatives often exist. At the very least, the clearing of a wooded area or its understory should not be a unilateral decision by authorities. Local citizens should be involved in the decision and a search for alternatives. Where crime is a problem, some possible solutions include:



- Fencing
- Increased horse, bicycle, and foot patrols by enforcement personnel
- Volunteer patrols
- Signs warning against jogging or visiting alone
- Dusk to dawn closures

Crime problems in natural areas can be reduced through the use of limited access points and day-use-only regulations.

Tales of Three Cities

The management of natural areas varies widely from place to place. In some communities, woodlands are treasured, managed, and undoubtedly help produce the poets and philosophers that Thoreau had in mind. At the other extreme are communities that have no regard for their little plots of wilderness and may view them as little more than wastelands. Somewhere in between are the many cities with leaders who recognize the value and potential of natural areas, but who basically rely on management by benign neglect.

Of the following three categories of management, which most closely matches the situation in your community? How might your community forestry program more actively include natural areas in its management responsibilities?

CITY A — A RESOURCE UNAPPRECIATED

City A is an attractive little village with a population of about 6,000. Although it is well-endowed with natural areas, there is little local vision that ensures the best use or protection of these attributes.

One of City A's natural features is a deep ravine that winds its way through the town's largest park. Some of the same species of trees grow there that were noted appreciatively by the first pioneers who visited the area. But today, the emphasis is on ball diamonds and swimming pools. The ravine has no hiking trail and certainly no interpretive signs. Instead, city crews use the area to dump leaves, grass clippings, and old fence posts. More recently, youngsters who received no nature lessons there have discovered the place anyway, using it instead to test their skills on mountain bikes. In short, the quality of City A's little natural area is slowly being degraded while its very presence is barely acknowledged.

"It used to be that people in my position even had to know the botanical names of trees. Now it doesn't matter a bit."

— Ed Kranick, former senior park foreman
Riverview Park, Pittsburgh, Pennsylvania

In this view of Arbor Lodge from a guest room at Lied Lodge & Conference Center at Arbor Day Farm, woodlands grace the banks of South Table Creek. This fringe of natural vegetation is carefully protected and managed by the Arbor Day Foundation to ensure that its beauty and many other benefits will always be available to visitors.

CITY B — BENIGN NEGLECT

Most American cities fall into this category. Their parks and ribbons of green on steep slopes have been a part of the environment for generations. These resources are probably appreciated by most residents, but the need for management or the possibility that the areas could be cleared for other uses rarely enters the public conscience. Few would view the forests in these areas as candidates for spending public funds.

Pittsburgh, Pennsylvania's 500-acre Riverview Park is a good example. This wooded haven in the midst of a busy city has served harried residents for more than 100 years. Rustic Wissahickon Nature Center is known to have transformed the lives of juvenile delinquents, and the park's trees and trails live in the hearts and memories of generations of scouts and schoolchildren. But when the nature center burned to the ground, it was not rebuilt. The park's dedicated police force has been replaced with general patrols by the citywide force, and the park naturalist position was eliminated. Summing it up, former Senior Park Foreman Ed Kranick once lamented, "It used to be that people in my position even had to know the botanical names of trees. Now it doesn't matter a bit."

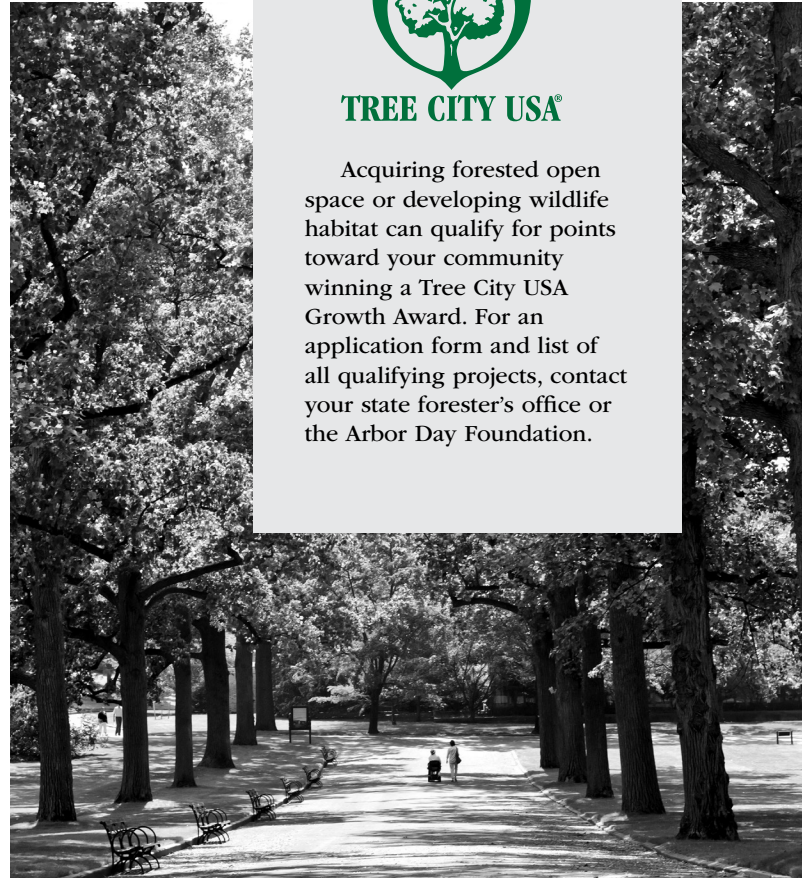
Management of the park's aging forest was minimal for many years. Grapevines and exotic species invaded, stolen cars were dumped in the woods, visitors often felt unsafe, and children were sometimes endangered by hazardous, unpruned trees. Fortunately, there is now a professionally developed plan for the park and a core group of dedicated champions to implement it. Almost like voices from the wilderness, these people — both inside city government and in several nonprofit groups — are trying to bring attention to Riverview's management needs. Their success is essential if the park is to serve the people of Pittsburgh for the next hundred years.





TREE CITY USA®

Acquiring forested open space or developing wildlife habitat can qualify for points toward your community winning a Tree City USA Growth Award. For an application form and list of all qualifying projects, contact your state forester's office or the Arbor Day Foundation.



Caption about the above general picture...Bronx Park from istock.

CITY C — APPRECIATION AND ACTION

City C could be many places. It could be Bronx, New York, where the natural areas of Van Cortlandt and Pelham Bay Parks are valued parts of the environment. Here, nature activities are so abundant that a newsletter is printed to help residents keep track of them all. Urban park rangers provide protection and guide nature walks; volunteers heal erosion scars and restore native habitat; and the parks are actively managed for the future.

City C could be Vancouver, Washington, heart of Metropolitan Greenspace, a cooperative regional system of natural areas, open space, and greenways. The citizens of Vancouver have wrestled with community values and put their thoughts in print for public distribution. They have declared, "Natural areas bring us powerful experiences. But if these places, these greenspaces, are to survive as we become more urban, now is the time to act."

City C could also be Bellevue, Washington, where the need to act has been translated into a specific component of the Comprehensive Plan. A layman's version is contained in a 21-page guide to the city's natural resource enhancement program and a host of informational leaflets.

The expressed goals of Bellevue's program are to:

- Protect the health, safety, and welfare of citizens.
- Enhance and conserve natural resource features.
- Protect and enhance plant and wildlife habitats.
- Buffer land uses and provide relief to the urban environment.
- Minimize the impact of urban runoff, erosion, and sedimentation.
- Provide places for environmental education.
- Improve the value of city property.

Bellevue is implementing its aggressive program by delineating the city's 1,200 acres of forests, wetlands, and open space into specific tracts. Each tract is then inventoried, analyzed, and given management prescription alternatives to meet program goals. Plans are then presented to neighbors for comment and adjustment as needed, then implemented by city and contracted crews. Some of the management methods used include marking and signing boundaries; protecting the boundaries from the intrusions of dumping, tree cutting, and other unacceptable uses; providing recreation trails and interpretive facilities; pruning or removing hazard trees; thinning; removing weed species; and reforestation with native species.

The management of Bellevue's urban forest reflects the progressive spirit of the community. The city's natural areas are viewed as an important part of a high-quality environment, and the management program is designed to protect this asset for future generations.



The City of Bellevue, Washington, produces a variety of literature to help citizens understand, enjoy, and protect local natural areas.

Champions of Nature in Parks

Frederick Law Olmsted was America's pioneer of park design embracing nature as a central theme. Olmsted, a landscape architect, is best known for creating Central Park around the time of the Civil War. Over the course of 125 years, his firm was responsible for more than 6,000 landscapes in the United States and Canada. Olmsted's visionary concept of designing with nature has given American parks a heritage that is not always fully appreciated.

In 1980, the National Association for Olmsted Parks was formed in response to the risks that these parks face — risks not only from the intrusions of buildings, streets, and parking lots, but also from neglect. The association does its work through conferences, a newsletter, books, advisory services, and technical publications. For a list of publications, contact:

National Association for Olmsted Parks
1111 16th St. NW, Suite 310
Washington, DC 20036
(www.olmsted.org)



A mixture of native and invasive trees grows on the steep slopes of Mount Washington overlooking Pittsburgh's Golden Triangle. Retaining the vegetation anchors the soil, provides wildlife habitat, softens the built landscape, and offers recreational opportunities.

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