

Community Forest
Management Plan

City of Bainbridge Island
2006

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GIS analysis of forest canopy cover conducted by Karl Johansen, 2005

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Executive Summary

This is a critical time in the history of the Island. Quality stands of native forest still exist in and around the built features of the City's landscape. These forests provide innumerable benefits – economic, environmental and social – that improve the quality of life for every Island resident. However, if careful planning and management do not occur, these native forests will decline in the face of ongoing residential growth, land development and other landscape changes.

The purpose of the Community Forest Management Plan is to provide tools that ensure we maintain forests that provide all possible functions and benefits, maintaining the forest cover in residential areas and integrating trees as green infrastructure into the developing urban landscape.

An inventory of the community forest, compiled using 2004 aerial photography and GIS technology, was used to better understand the existing forest and to make informed recommendations. The 2004 inventory showed that:

- The Island is comprised of mixed deciduous and coniferous forests with the majority of trees on privately owned lands.
- Overall canopy coverage on the Island is estimated at 72%.
- Canopy coverage in Winslow is 42% and declining quickly. Tree canopy in Winslow consists mainly of trees on private property, as very few street trees currently exist.

The Community Forestry Commission worked with public and elected officials to compile the following recommendations for effective management of the community forest:

- Maintain long-term overall canopy coverage goals for the Island while retaining the native forest structure throughout the Island.
- Adopt an ecosystem-based approach to forest management, using this plan and incentives to conserve multi-functional urban greenways.
- Encourage retention of trees by creating incentives for incorporation of trees and native landscaping into new urban development.
- Develop tree preservation and replacement regulations to ensure that trees are integrated into the urban core areas.

Trees and forests define the visual character of the Bainbridge Island community. In a community values survey conducted in 2000, Islanders highlighted forested land as the main contributor to the Island's character. By establishing ambitious but attainable community forestry management goals, Bainbridge Island will distinguish itself as a leader in the region, committed to providing its residents with a quality lifestyle.

Aldo Leopold once wrote, "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." Sustainable urban forestry can lead to a community where trees are abundant, healthy, and highly valued by all. Like Leopold's vision for the biotic communities he knew, sustainable urban forestry can preserve the integrity, stability and beauty of our Island.

Introduction

The Community Forestry Commission of the City of Bainbridge Island was initiated in 2003 to steward the well-being of the Island's trees and forests. This management plan is the result of two years of work to inventory the forest resource and to develop management strategies that complement the changing patterns of land use that are occurring in the community.

Mission Statement

This plan will guide and promote sustainable forest conditions on Bainbridge Island through education, incentives, and regulation, on public and private property, in the village centers, neighborhoods and open spaces, for the environmental, social, and economic benefit of all Bainbridge Island residents.

Bainbridge Island is a distinctive urban area in that its boundaries are finite. A large portion of Bainbridge Island is forested and developed at low densities, with a significant amount of land in conservation. However, the population of the community has grown considerably in the last twenty years and it has become apparent that the community must plan for an equal amount of growth in the future. The intent of this management plan is to maintain the forest cover in the residential areas and to integrate trees as green infrastructure into the developing urban landscape.

This Community Forest Management Plan is intended to assist the City Council, City staff and citizens in implementing actions that ensure maintenance of forests that provide optimal functions and benefits. Without a comprehensive understanding of the value of our trees and forested areas, and a coordinated management plan to maintain and enhance them, we risk losing an enormously valuable resource that is at the heart of the Island's character. By adopting this plan, the City acknowledges the many contributions to our quality of life that are supplied by a healthy and vital community forest.

To fulfill the mission statement, the City of Bainbridge Island and the Community Forestry Commission are committed to providing education and technical assistance, implementing incentive programs, and revising regulations to more effectively support and reflect the goal of integrating trees and forests into the changing urban environment.

I The Community Forest

What is the Community Forest?

Community Forest:

Any individual trees, small stands of trees or forested areas, and associated understory plants, that are found growing in both natural and built environments, and which contribute important ecological, social and/or economic benefits to the community.

Bainbridge Island supports a wide variety of forest systems within one urban boundary. Large tracts of open space preserved through conservation easements such as the Hall and Close properties, and forested parks such as the Grand Forest and Fort Ward State Park make up the largest components of the native forest systems. Much of the forested land on the Island is privately owned on low-density residential land and is managed by individual homeowners or neighborhood associations. The forest in the town center is comprised of recently planted street trees; trees on private property; Waterfront Park; and the “Ravine”, which is a privately owned forested property that is protected through regulation.

This plan addresses all trees in our community, including native, naturally grown, and introduced or ornamental species. However, it is important to note that the multi-layered native forest also includes woody shrubs, ground cover, soils and root micchorizae that all function together as a living system. The inventory data used for this management plan is focused on the trees and the tree canopy. However, the management strategies included in this plan are intended to recognize that all components of the community forest contribute to the health of the environment, and that retaining the native understory plants in forested areas is essential to the health of the community forest.

History of the Community Forest

Trees and forests have played a key role in the lives of all peoples that have inhabited this unique Island environment. The Suquamish Tribe were the first known inhabitants of the Island and depended on the forests for their summer residence. The trees of the island were highly valued, providing habitat for game, bark used in woven clothing, and the wood for canoes.



When Captain Charles Wilkes first visited the Island in 1841, he found dense cedar forests, undisturbed, with the exception of a few Suquamish settlements. Within a few decades a number of lumber mills were established on the Island and by the early 1900's, much of the forest on Bainbridge Island had been removed. Strawberry farms dominated the center of the Island where land had been cleared (Swanson, 2002). What remains today is mainly second growth forest with very few old growth trees. These few trees stand testament to the history of the last two centuries and should be protected as part of our heritage.

As the Island's communities continued to expand, residential development began to dominate the area and much of the forested land was converted to residential lots. Nonetheless, substantial forest areas have been conserved in the community. Fort Ward State Park was established after the fort closed and protects a large forested tract along the south end of the Island. The Bloedel Reserve is now privately owned and managed for public use through a fee system. Other large forested properties, including Gazzam Lake Park and the Grand Forest Park, are managed by the Parks District for public use.



In 2001, the citizens of Bainbridge Island approved an eight million dollar bond measure for “acquiring or otherwise preserving forested areas, open space, wildlife habitat, farms and agricultural lands and creating new trails and passive parks....” To date, 13 properties have been acquired, including large tracts of forested land, such as the 12-acre Hall property, 6 acres of forest in the Lost Valley, 49 acres of forested land on the Peters property and 7.5 acres of forested area at the Yama property. These forests are managed by the Parks District. Specific funds have not yet been set aside for comprehensive management of these properties.

Benefits of the Community Forest

Scientific studies of the past several decades reveal that forests provide a great variety of benefits and services which indirectly provide high levels of economic return to communities.

Healthy trees and adequate forest cover provide a variety of ecological functions. Collectively, the urban forest can be viewed as a green infrastructure system, just as roads, sewers and stormwater systems comprise a city's gray infrastructure. However, trees are living entities and have basic biological requirements for survival and growth. In an urban setting, the trees must be actively managed and protected to maintain their health, function, beauty and value.

Benefits are experienced at different scales. Some benefits are realized at an individual scale. For instance, research shows that views of nature reduce stress and help people heal more quickly from both physical and emotional injuries. Some benefits impact our entire community. Forest stands enable rainwater to percolate into aquifers better than impervious surfaces do, enhancing the water supply. The following are examples of the many services and benefits that forests provide in built settings:

Trees and forests improve air quality by absorbing carbon dioxide during the process of photosynthesis and producing oxygen as a by-product. Tree leaves also intercept and remove other pollutants and particulate matter from the air.

- A large, healthy tree can produce enough oxygen each day for 18 people.
- An American Forests study of the Puget Sound area found that tree canopy cover removed 38,990 tons of air pollutants in one year (American Forests, 1998).

Trees and forests save energy by shading our homes and offices, streets, parking lots and other paved areas. Trees cool the air as their leaves transpire water.

- Trees can provide a 4% reduction in annual heating and cooling costs (McPherson 2002).
- The 200,000 leaves on a healthy 100-foot tall tree can take 11,000 gallons of water from the soil and breathe it into the air in a single growing season (Head 2001).

Trees and forests reduce stormwater runoff by intercepting rainfall and releasing it slowly. This reduces runoff and cuts peak flow rates that cause flooding and burden stormwater systems.

- The leaves and branches of trees intercept 7 to 22% of precipitation, hold it, and then release it slowly back into the atmosphere.
- The value of trees can be measured by the reduction in construction and material costs for stormwater control structures and systems. One study has shown that for every tree, 2 cents in water control costs are saved for every gallon of water intercepted during a twelve-hour storm. In a medium-sized city, this equates to a 17% reduction of 11.3 million gallons, and a savings of \$226,000 (Head 2001).

Trees and forests improve water quality and reduce soil erosion and decrease the amount of sediment that enters streams and Puget Sound.

- The vegetation of forested streamsides helps disperse the energy of heavy rain so that soil particles are not carried into streams.
- Riparian forests remove, hold, or transform nutrients from fertilizers, sediments, and other pollutants. Healthy root systems prevent soil compaction and retain valuable surface layers of organic soils.

Trees and forests provide wildlife food and habitat important to the survival of insects, amphibians, birds, mammals and other wildlife.

- Many species depend on trees and the forest for food and shelter. Bald eagles and osprey nest in large conifers and use other tall trees along the shoreline for roosting. Tree corridors provide shelter for deer, squirrels and other small mammals, birds and amphibians.
- Forested riparian corridors contribute to the health of aquatic ecosystems, providing shade to streams, and shelter to wildlife.
- Riparian or “streamside” forests control fluctuations in water temperature and maintain varied, but stable light levels. Light levels affect the type and amount of algae present in a stream, and water temperature affects salmonid health. Animals in streams depend on litterfall, as the decay of woody debris releases food and nutrients into the aquatic system.

Trees and forests enhance the quality of life for our residents by creating environments that benefit peoples' health and functioning.

- Physical activity is directly linked to good health. Trees and forests create a natural setting for recreational activities such as walking, jogging, bicycling, golfing, and bird watching.
- Trees contribute to higher job satisfaction and lower absenteeism when employees can view trees or landscapes from their workplace (Kaplan, 1993).
- Routine activity in parks with trees reduces Attention Deficit Hyperactivity Disorder (ADHD) symptoms in children (Taylor, 2001).
- Views of nature from hospital windows also provides a measurable acceleration of the healing process following physical or emotional injuries (Ulrich, 1991).



Trees and forests enhance community economics by contributing to increased property values and enhancing commercial districts.

- Consumers shop more often and longer and are willing to pay 9-12% more in well-landscaped business districts (Wolf, 2005).
- Having trees increases property values by adding to the visual appeal of a property. One study found that each large tree in the front yard was associated with a 1% increase in sales price (Anderson and Cordell, 1988).
- Residences adjacent to quality open space gain 10-20% in value (Crompton, 2001).
- Rental rates for landscaped commercial properties were 7% higher compared to properties with no plants (Laverne, 2003).

2 State of the Forest

One of the Island's greatest assets is that it is well forested, with large parcels of native forest protected by public ownership or conservation easements. The trees and the forests provide the Island with a sense of place and pride, giving structure and character to the community.

Islandwide Forest Cover

A vegetation inventory was conducted to provide baseline data to support the analysis and subsequent policy formulation found in this management plan. The City acquired 0.5-foot pixel resolution color orthophotography in late 2004 (aerial photography flown October 2004). Detailed analysis of the orthophotography resulted in canopy cover estimates for the various land use zones in the community. This information, as well as the preliminary data from the *City of Bainbridge Island Population Allocation Study for the Year 2025, Phase I: Research and Analysis, September 2005*, was used to determine canopy cover goals for the community.

Forest Cover

The estimated forest cover throughout the Island is 72%, based on data acquired from 2004 aerial photography. Forest cover over the various zones in 2004 was estimated as follows:

Low Density Residential (R-2, R-1, R-0.4)	75%
High Density Residential (R2.9 through R-I4)	47%
Neighborhood Service Centers	27%
Mixed Use Town Center/High School Road	42%
Winslow Core	29%

American Forests, a nonprofit forest conservation organization, notes that the potential for overall tree cover in urban areas ranges from 60-80% and recommends that cities set canopy cover goals for different land use areas of a city. Canopy coverage in all zones on Bainbridge Island currently exceeds the goals recommended by American Forests¹, as indicated in the table above. However, development is occurring rapidly in many areas of the Island and canopy coverage is declining, especially in the Winslow central core area. It is estimated that forest canopy in the Winslow core has declined by almost 2% since the 2004 data was collected.

¹ American Forests, <http://www.americanforests.org/>, recommends the following canopy cover goals for metropolitan areas in the Pacific Northwest: 50% cover in suburban residential zones, 25% in urban residential zones, and 15% cover in central business districts.

The 2025 Population Allocation Study indicates that 1,242 new residences are expected in the low and high density residential areas. If each new anticipated dwelling unit resulted in one-half to two-thirds of an acre of clearing, total forest loss in the zones is estimated between 600 and 800 acres. This plan recommends canopy cover goals of 70% for the low-density residential zones and 50% for the high-density residential zones. In order to attain these goals, less than 770 acres of forest can be lost in those areas. Therefore, this plan recommends incentives and education to encourage landowners to clear less than fifty-percent of the forested areas on their individual properties.

<u>Zone</u>	<u>Cover Goal</u>
Low Density Residential	70%
High Density Residential	50%
Neighborhood Service Centers	35%
MUTC/High School Road	35%
Winslow Core	35%

The City of Bainbridge Island Comprehensive Plan focuses much of the anticipated growth in the Mixed Use Town Center (MUTC) and Winslow Core zones. Canopy cover goals address the expected growth in these areas, anticipating the possible decline of tree cover in the MUTC through development of treed lots, but also anticipating increased canopy from newly planted street trees.

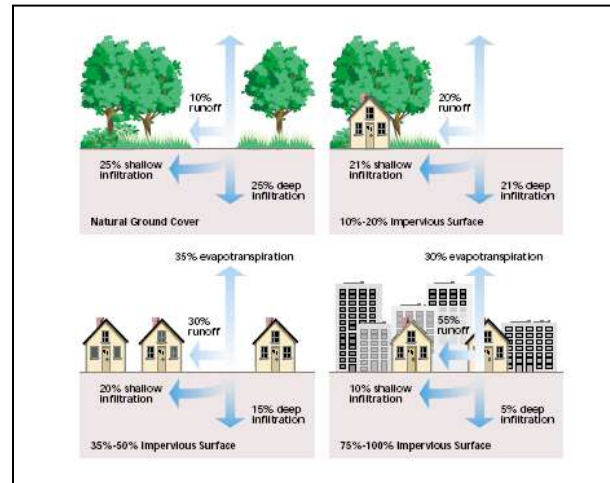
The goals show an increase in tree canopy in the Winslow Core area. This is based on the assumption that much of the available land in the Core is currently impervious surface (either buildings or pavement), and that implementation of a new street tree program may result in increased tree canopy in this district. The same is true for the Neighborhood Service Centers.

Watershed Forest Cover

Bainbridge Island is made up of twelve distinct watersheds (see map on Page 14). Watersheds are land areas that drain surface water and groundwater to a downstream water body such as Puget Sound. High ridges and peaks in the landscape determine the direction of water flow and so serve as watershed boundaries.

Our Island community is unique in that all of our watersheds lie within City boundaries, thus our community can effectively manage surface water quantity and quality. All drinking water for the Island is provided by underground aquifers, which are recharged by surface water that percolates into surface soils and then infiltrates to deeper soil and rock layers.

Forest cover in watersheds is important for two reasons. First, trees and forests cleanse surface water by filtering and extracting pollutants and sediments. Vegetation cover also prevents rainfall from moving quickly over the landscape and accumulating into destructive peak flows. Having trees in all areas of the watershed, rather than only within stream corridors, is crucial to maintaining healthy streams and shorelines and to sustaining our drinking water supply.



Impervious cover in a watershed results in increased surface runoff. As little as 10 percent impervious cover in a watershed can result in stream degradation. Source: FISRWG 2001.

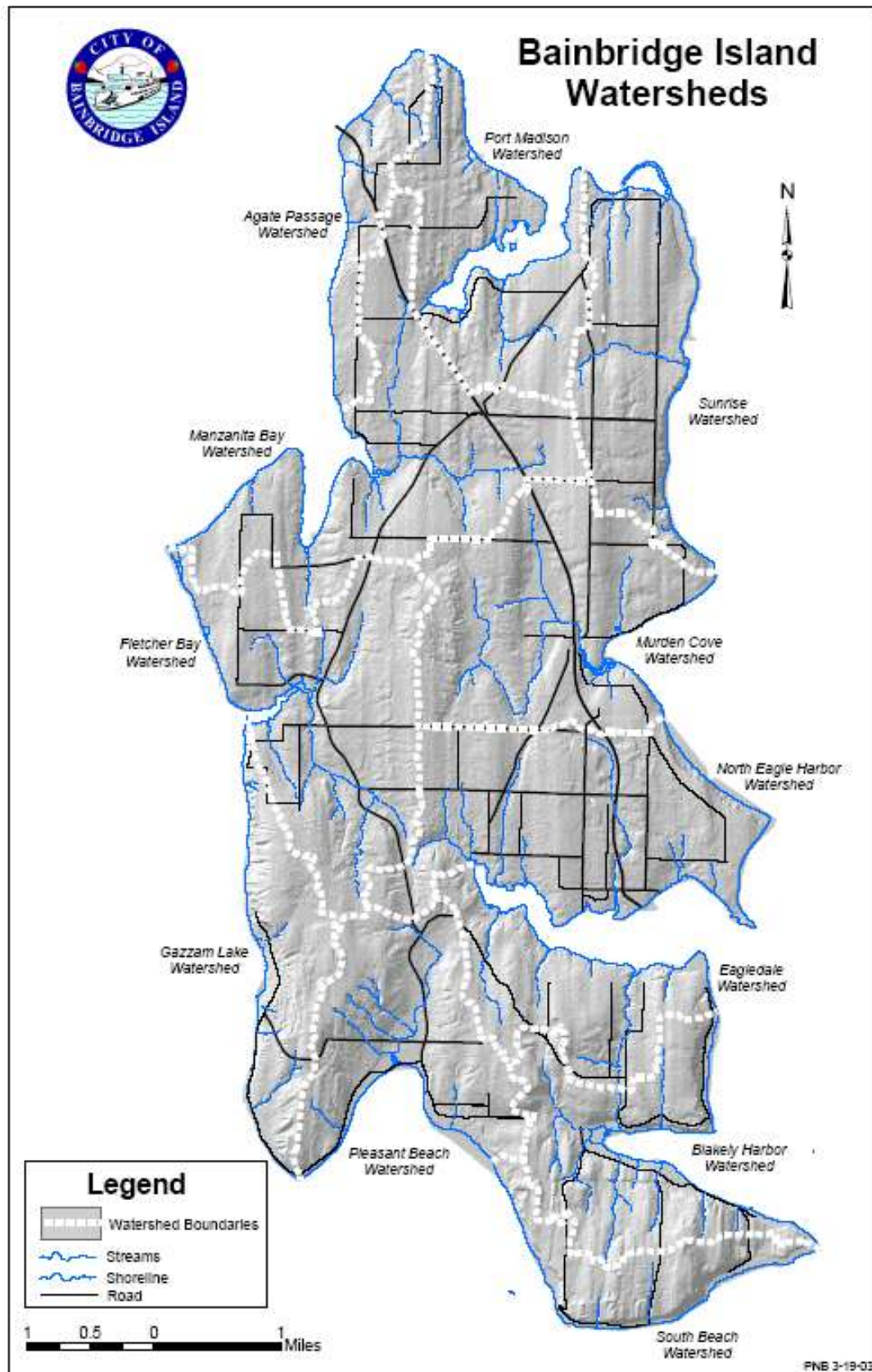
As development occurs in the community, much vegetation is typically removed and replaced by impervious surfaces. The combination of forest canopy loss and increased impervious surfaces results in additional runoff, higher stream temperatures and more pollutants in streams and on the shore. The degree of water loss to runoff and increased evapotranspiration can be seen in the above diagram that illustrates the effects of increases in the quantity of impervious surface in the landscape.

Watershed forestry information can be used during the planning process, to monitor impervious surface cover within watersheds and create programs to maintain adequate levels of forest cover that will help protect and retain the watershed systems of the Island.

The 2004 forest canopy cover data was used to calculate forest canopy for each watershed. Canopy cover rates vary from 57% to 84%. The North Eagle Harbor watershed, where Winslow is located, contains the lowest cover rate, reflecting its more urbanized condition.

Watershed Forest Cover	
The 2004 forest canopy inventory data shows canopy coverage for each watershed on the Island as follows (The figure on the following page illustrates watershed boundaries):	
Agate Passage Watershed:	75%
Port Madison Watershed:	80%
Manzanita Bay Watershed:	71%
Sunrise Watershed:	76%
Fletcher Bay Watershed:	77%
Murden Cove Watershed:	69%
North Eagle Harbor Watershed:	57%
Gazzam Lake Watershed:	84%
Eagledale Watershed:	69%
Pleasant Beach Watershed:	73%
Blakely Harbor Watershed:	84%
South Beach Watershed:	72%

This data provides important baseline information for future policy and actions. Retention of existing forest that has mature trees and native soils is the best way to achieve water quality and other environmental benefits. During site development large trees may be replaced by small trees that will take decades to reach a size sufficient to generate comparable benefits. In addition, earth moving associated with development can cause erosion or removal of topsoils, compaction of the subsoils where water infiltration occurs, and elimination of the small depressions and water storage areas that aid natural water quality processes. This plan proposes policies and actions for maintaining water quality through forest retention.



Street Tree Canopy Cover/Diversity

Trees in public spaces are an important element of the urban forest. Street trees:

- provide shade and cover from the weather;
- act as a barrier between traffic and sidewalks;
- have traffic calming effects;
- encourage pedestrian activity; and
- enhance the visual appeal of residential and commercial districts.

Trees in civic spaces, such as those adjacent to civic buildings (such as the library or city hall), on school grounds, in plazas and in more formal park spaces, are often planted to commemorate significant events or people and may serve as memorials in times of loss. Aesthetically, public trees are a mark of the identity and character of the community. Symbolically, they represent the cultural and natural heritage of a place.

Individual street and civic trees within the Winslow core area were inventoried to prepare this plan. Two goals guided the assessment.

First, an evaluation of individual trees and species distribution was needed. Knowledge about the age of components of the urban forest guides management strategies, as young trees have different maintenance needs than mature ones. Species diversity is also important because a prevalence of any single species places the forest at risk for disease (a lesson learned from Dutch elm disease).

The second goal of the assessment was to determine health and condition of the trees. Trees that are well-maintained and healthy generate the greatest level of benefit for both the environment and aesthetics. Numerous studies have demonstrated that costs applied to tree maintenance are a net gain for community investment.

On Bainbridge Island, street tree canopy within the Mixed Use Town Center area is minimal, with a total of 222 small to medium-sized street trees located in street rights-of-way (See Appendix A). The existing street trees are young and most have been planted since 2000. Several large trees are located along Winslow Way. These trees are planted in bulb-outs and most of the trees have outgrown their limited root space.

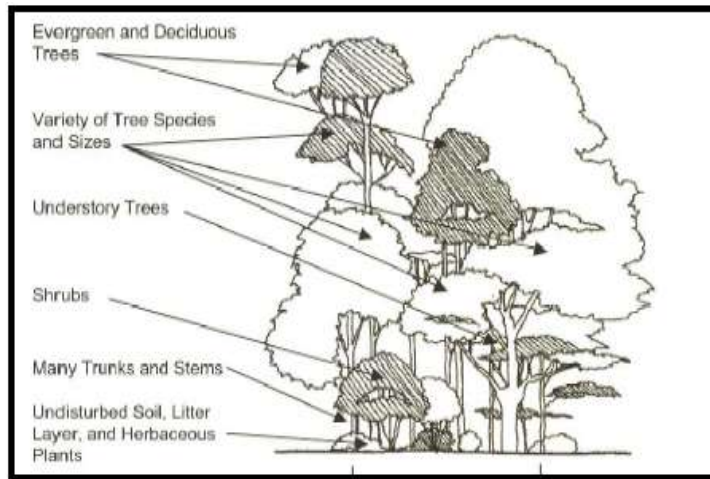
The City does not currently have a comprehensive street tree planting or maintenance plan and there are currently no requirements for planting street trees. Many of the street trees have been planted by private property owners, and the care of these trees depends on the property owners. Trees are also planted by the City during road or infrastructure installation. Tree pruning and maintenance is currently carried out as needed by the Operations and Maintenance Division of

the City's Public Works Department. Utilities occupying the public right-of-way are required to maintain vegetation clearances for existing power lines according to state and federal requirements. Tree pruning and maintenance is often performed by these utilities.

Civic trees are a combination of planted ornamental species, and retained native species. Data collection about this urban forest component, including significant trees, needs to be completed. There is currently no plan for adding to or managing this important community asset.

Forest Structure

The structure of the forest influences the integrity and function of the forest. A forest typically becomes more complex in structure as it matures. Early successional forests typically have lower canopy, fewer canopy layers, and large patches of single species of plants. Over time, pioneer plants grow taller, but are more diversified in height. As trees die, more sunlight reaches the forest floor, encouraging the growth of new saplings of a different group of species. Fallen trees provide essential nutrients to the forest floor. Dead trees left standing may become snags, providing essential habitat to many species. Eventually, tree stands become mixed in species composition and the understory becomes more diverse as well.



Soils. Soils are the foundation of the community forest. Soils on Bainbridge Island are typically glacial till, with shallow bedrock evident on the south end of the Island, especially in the Fort Ward area. The native soil types of the Island, including Alderwood, Harstine, Kapowsin, and others are well suited to supporting Douglas fir, Western hemlock, Western red cedar and red alder (SCS, 1980).

Soils in the urban environment are generally highly disturbed as development can result in erosion or removal of topsoil, compaction of subsoils and alteration of wetlands or natural stormwater storage areas. The resulting quality of urban soils for forest and tree growth is poor. Compacted soils limit root growth and poor drainage can cause tree roots to drown. Special attention should be paid to improving or preparing soils for tree planting in the built environment.

Overstory. The overstory of the community forest was surveyed using a combination of digital aerial imagery obtained in October 2004 and ground observation. Based on this analysis, the Island's overall tree canopy is estimated at 72%. Predominant tree species outside the town center are alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*), Douglas fir (*Pseudotsuga menziesii*), Western red cedar (*Thuja plicata*), Western hemlock (*Tsuga heterophylla*), and Madrona (*Arbutus menziesii*).

Understory. The understory vegetation of the forest provides habitat for wildlife and contributes to the overall functions of a healthy forest. Common native understory species in Bainbridge’s forests include vine maple (*Acer circinatum*), salmonberry (*Rubus spectabilis*), Indian plum (*Omelaria cerasiformis*), elderberry (*Sambucus racemosa*), oceanspray (*Holodiscus discolor*), huckleberry (*Vaccinium ovatum*), sword fern (*Polystichum munitum*), salal (*Gaultheris shallon*), Oregon grape (*Mahonia aquifolium*) and trailing blackberry (*Rubus ursinus*).

A common practice in forested open space or green belts is underbrushing. Trees are retained, but landowners wish to tidy up the forest or enhance views. The understory is typically made up of multiple layers of varied height vegetation. Removing all but the tallest trees severely compromises forest health and reduces the benefits that are associated with forests. Minor vegetation removal does little damage, but removal of all “brushy” vegetation down to bare soil endangers the health of remaining trees.

Managing our forests for better forest structure will assure that, long-term, they will be sustainable and provide the highest level of benefit. Focusing on managing urban soils, incorporating species diversity in tree planting and encouraging the planting of native understory plants will result in a healthier urban forest.

Forest Health

The community forest on Bainbridge Island is a mosaic of highly altered landscapes and fragments of remaining native ecosystems. The condition of the trees in the forest is an indicator of the health of our urban ecosystem. When the forest is healthy, the Island’s ecological systems, including the soil, air and water, are also healthier.

Many factors negatively affect the health of the community forest, including fragmentation, reduced forest structure, invasive species, insects and disease, pollutants, increasing impervious surfaces and construction damage. The strategies outlined later in this management plan are intended to reduce the effects of these threats and to produce a healthier and more functional community forest.

Forest Fragmentation

As land is developed, contiguous forest areas are divided into smaller fragments. Fragmentation increases the proportion of edge to interior habitat. Habitat for interior dwelling species is diminished and invasion of non-native plants is more likely.

Remaining forest fragments are generally located in areas that are difficult to develop, such as wetlands, stream ravines or steep slopes. These fragments are stressed by nearby development and land use activities. Construction compacts root zones and alters drainage patterns. Air pollutants damage tree foliage and impair photosynthesis, making trees more susceptible to pest outbreaks, disease and drought. Forest fragments are also stressed by deer overbrowsing, dumping of trash and compaction from foot traffic (Cappiella, 2005).

The Bainbridge Island Wildlife Corridor Network Study (December 2000) designates upland and riparian wildlife corridors throughout the community. The study proposes to counter the increasing fragmentation of the Island's forests by incorporating existing large patches into the proposed wildlife corridor network, providing smaller habitat areas within the corridor network and maintaining or enhancing the quality of wildlife habitat in the designated corridors. Preservation of the wildlife corridors may not be required depending on how developments are configured. Therefore, incentives are needed to encourage private landowners to protect, expand and enhance the existing corridors.

Increased Impervious Surface and Construction Damage

Development and construction can result in increased impervious surface near remaining forest fragments, compromising root systems and elevating soil pH. Tree damage is often sustained as construction vehicles cut into tree roots or trunks. Additionally, tree roots often conflict with utilities that are installed during construction, causing a long-term decline in tree health.

Insects and Tree Disease

Trees are more susceptible to pests and disease when trees are stressed by crowding, construction damage, or weather conditions, such as drought. Examples include laminated root rot (a fungus that infects conifers) and insect pests such as gypsy moths, longhorn beetles and pine beetles that can invade large areas of forest land.

Invasive Species.

Another major threat to the health of the Island's forests is the introduction of non-native, invasive species. The most widespread is English ivy (*Hedera helix*). Ivy smothers the ground layer vegetation and ultimately carpets the forest floor. Ivy grows up tree trunks, and the heavy weight of the plant can cause breakup of tree trunks and branches. English holly (*Ilex aquifolium*), Himalayan blackberry (*Rubus discolor*), Scot's broom (*Cytisus scoparius*) and Japanese knotweed (*Fallopia japonica*) are other invasive and problematic species threatening the health of the Island's forests and other ecosystems.

Invasives Control. Ivy is the most prevalent invasive plant presenting a serious threat to the forests all over the island. Ivy control is labor intensive and can be accomplished with repeated and consistent efforts.

Knotweed is another non-native, invasive plant that has emerged as a concern on Bainbridge Island in recent years. Knotweed is a rhizomatous perennial introduced from Asia to Europe, and from Europe to the United States in the mid-nineteenth century as an ornamental and fodder plant. Knotweed grows to a height of 2-5 meters, with bamboo-like stems, arching branches and clusters of creamy white flowers appearing late in the season. The plant grows in moist areas and is becoming a serious threat as it forms a monoculture and chokes streams and wetland habitats. This invasive plant has just begun to establish itself on Bainbridge Island and has been targeted as a priority for removal and control before it becomes too prevalent.



Large Knotweed Patch

Invasive species removal efforts are labor intensive. Herbicides are effective to a limited extent, and must be applied carefully and repeatedly to be effective. Other methods include repeated stem removal at the ground, mowing, and/or smothering with heavy plastic and organic mulch materials. In many communities invasives removal is achieved using volunteer groups and frequent work parties.

3 Current Policies/Practices

Existing Policies and Resources

Community forest management in the City of Bainbridge Island is currently achieved through the use of state and local policies and regulations. Very few established City educational programs, incentives or defined standards for management of public or private trees and forests currently exist. This section describes the management tools now available to the City and the following Section 4 recommends policies and actions that will form a comprehensive management approach.

The City of Bainbridge Island Comprehensive Plan, adopted in 2004, outlines City policies on trees and the community forest. The Community Values Survey, conducted in 2000, indicates that Island residents feel forested land contributes greatly to the character of the Island. In response to these survey results, the City developed the Environment Element of the Comprehensive Plan to include Urban Forestry policies.

This Community Forest Management Plan is intended to serve as a supporting document to the Environment Element of the Comprehensive Plan, providing a comprehensive and more detailed set of goals, policies and actions for managing and enhancing the Island's trees and forests.

The Bainbridge Island Municipal Code establishes the regulations that implement the policies of the Comprehensive Plan. The recommendations in this Management Plan for new or revised regulations are intended to be incorporated into the municipal code. The following sections of code are currently in use by the Planning and Public Works Departments:

Landscape Requirements. Chapter 18.85 of the Bainbridge Island Municipal Code outlines requirements for tree retention and landscaping for new development. Generally, new developments must retain 15 percent of the significant trees or 30 percent of the existing tree canopy. This regulation often results in the preservation of inappropriate and potentially hazardous perimeter trees or small stands of trees subject to windthrow. New development in the Core District and Ferry Terminal Overlay District is not required to preserve existing trees.

Flexible Lot Subdivision Design. Title 17 of the Bainbridge Island Municipal Code requires that short plats and subdivisions cluster homesites or retain 25 percent of the original parcel in open space, giving priority to contiguous forested areas. Vegetated buffers along roadways are also required to be retained during division of land. This has resulted in the preservation of much privately owned and maintained forest land. The Wildlife Corridor Network Plan (City of Bainbridge Island, 2000) encourages voluntary preservation of riparian and upland wildlife corridors during subdivision of land.

Land Clearing. Chapter 15.18 of the Bainbridge Island Municipal Code requires that a property owner obtain a permit to clear more than six significant trees or 2,500 square feet of land. A land owner can clear up to 5,000 board feet of timber under this permit.

Vegetation Management. Chapter 16.22 of the Bainbridge Island Municipal Code regulates managed forest lands as well as conversion of forest lands to residential use. This chapter requires that landowners clearing more than 5,000 board feet of marketable timber obtain a Vegetation Management Permit from the City, as well as a Forest Practices Permit from Washington State Department of Natural Resources. Through the City permit process, the landowner is restricted to cutting a percentage of the trees on the property and is required to provide perimeter buffers.

Critical Areas. Chapter 16.20 requires retention of trees and native plants in all wetlands, as well as in all stream and wetland buffers. Significant amounts of tree canopy are preserved through implementation of the regulations in this chapter.

Analysis of Gaps in Current Policies and Resources

This plan recommends that the Department of Planning and Community Development, in cooperation with other City departments, embark on a program to implement forestry management strategies, new education and outreach projects, and innovative community forestry incentive programs. The Community Forestry Commission recommends that existing policies and regulation pertaining to tree planting and preservation be revised. This section briefly discusses the gaps in current programs and policies.

- Regulations pertaining to preservation and removal of trees are scattered throughout several chapters of the Bainbridge Island Municipal Code. In order to facilitate review of tree-related projects, the tree-related regulations should be incorporated into one separate chapter of the code, and cross-referenced where appropriate.

- The tree retention requirements found in Chapter 18.85 (Landscape Requirements) do not apply to the urban center of the Island. Preservation of trees within new developments in the Core District and the Ferry Terminal District is voluntary only and little guidance is provided for appropriate construction activities adjacent to retained trees. An education and incentive-based policy should be drafted to encourage land owners to preserve significant or distinctive trees. Best construction practices should be required to ensure that trees are preserved in appropriate locations and protected from damage during construction.
- The Vegetation Management chapter (BIMC 16.22) was written with the intent of regulating forest lands that are managed for harvest yields or other productive uses. Although a few vegetation management permits are issued each year for forest management, most applications reviewed through this chapter involve conversion of forest lands to residential uses. The Vegetation Management chapter is confusing with regard to these types of applications and should be clarified.
- The preservation of forested open space required through the Flexible Lot Design process is effective in maintaining canopy cover in the residential areas. However, in order to obtain the canopy cover goal for low density residential areas, incentives should be provided for landowners to plant or preserve trees on individual lots and to use low impact development (LID) techniques.
- Code enforcement on illegal tree clearing incidents requires replanting of trees based on the Significant Trees and Tree Stand Replacement section of the Landscape Requirements chapter (BIMC 18.85.050(C)). This section requires replacement at a ratio of 1.5 inches diameter for every one-inch diameter of removed tree. Failure to replace the trees results in a fine of up to three times the value of the trees removed.

The fine for illegal clearing under the Vegetation Management chapter is \$20,000 for each acre of forest cut. This fine has rarely been enforced. Alternate penalty provisions should be created. For example, lesser fines, or fines more closely tied to the number and size of trees removed, might serve as more effective and more enforceable deterrents to nonpermitted clearing.

- The City does not have a street tree plan or guidelines for planting or managing street trees. A requirement for planting street trees with new development in the Mixed Use Town Center and for all newly created streets in the City should be developed. A voluntary program can be developed to encourage street tree planting in established neighborhoods. A street tree plan that includes appropriate tree species selection, practices, and maintenance techniques is needed.

- A Best Management Practices Manual is needed to provide guidelines for maintaining healthy trees and tree stands. Best Management Practices can then be applied by City crews when work on public lands occurs near trees or forests. The manual will also be useful for City employees when they review or inspect private construction or development projects.

4 Forests in the Future: Policies, Standards & Actions

Policies

The Community Forestry Commission developed forestry policies for the City of Bainbridge Island Comprehensive Plan. Those policies are reflected in the policies defined in this plan. The following pages detail standards and actions for each of the six policies that will provide a plan for better management of the community forest through education, incentives, and regulation.

Policy 1: Protect, restore and improve existing vegetation that has environmental, wildlife habitat and aesthetic qualities to include tree groves, significant tree stands, and forested hillsides and vegetation associated with wetlands, stream corridors and riparian areas.

Policy 2: Initiate and promote urban tree management practices in high density, mixed use areas in order to improve quality of life for all district users and create more livable conditions, to include visual amenities, environmental services and economic development.

Policy 3: Develop a community-wide program to enhance the community's awareness of the value of trees and the urban forest.

Policy 4: Encourage the use of Best Management Practices to protect and enhance community trees and forests.

Policy 5: Control and prevent establishment of invasive species that are destructive to forest health.

Policy 6: Periodically review Island-wide forest conditions and revise policies and actions to address changing or emerging circumstances and needs.

Policies, Standards and Actions

Policy I: Protect, restore and improve existing vegetation that has environmental, wildlife habitat and aesthetic qualities to include tree groves, significant tree stands, and forested hillsides and vegetation associated with wetlands, stream corridors and riparian areas.

Standard I.I Maintain or achieve optimum tree canopy cover levels in all zones of the Island.

In order to ensure that forest canopy in our community is maintained or increased, the Forestry Commission recommends the following minimum canopy coverage limits/goals:

<u>Zone</u>	<u>Existing Cover</u>	<u>Cover Goals</u>
Low Density Residential (R-2, R-1, R-0.4)	75%	70%
High Density Residential (R2.9 through R-14)	47%	50%
Neighborhood Service Centers	27%	35%
Mixed Use Town Center/High School Road	42%	35%
Winslow Core	29%	35%

Actions

- a. Identify priority areas for preservation of forest lands through conservation easements or purchase.
- b. Use this information for comprehensive planning and rezoning.
- c. Promote retention of native tree canopy in all project development review, and during construction.
- d. Develop policies, incentives or regulations that result in native forest retention on individual residential building lots.
- e. Require planting of street trees that are compatible with existing infrastructure to replace tree canopy lost during development.
- f. Develop educational materials to inform landowners about the benefits of tree canopy and management approaches that can be applied to private property.
- g. Promote restoration of native forests on sites that have been cleared or harvested.
- h. Monitor the forest canopy every five years using the 2004 survey as baseline data.

Standard I.2 Effectively manage publicly owned forest lands.

Much of the forest land on the Island is publicly owned or maintained by the Washington State Parks Department, the City of Bainbridge Island and the Bainbridge Island Parks and Recreation District. The Bainbridge Island Parks District has recently been given responsibility for maintenance of lands purchased through the Open Space Commission. Management plans have not been developed for these properties and funds for long-term maintenance of the newly acquired properties have not yet been specifically allocated.

Actions

- a. Develop site-based management plans for properties purchased by the Open Space Commission.
- b. Identify costs for long-term management of Open Space properties and allocate appropriate funds.
- c. Develop a long-term tree management plan for Waterfront Park.
- d. Work with the Parks and Recreation District to implement Best Management Practices for trees and forests on forest lands managed by the Parks District.
- e. Prevent unnecessary forest loss on all public lands from any private or public activities, including public works and utilities projects.

Standard I.3 Restore forested areas along scenic roadways, wetlands, stream or riparian corridors, and along ridges and hillsides.

Actions

- a. Conduct a scenic corridor analysis to identify and promote vistas that are enhanced by forests and vegetation.
- b. Develop incentives for private landowners to plant trees and restore native vegetation on private property, especially along scenic roadways, on ridges and hillsides and in critical areas.
- c. Work with the Washington State Department of Transportation to maintain high quality forest stands along SR-305.

Standard I.4 Maintain adequate forest canopy cover in all areas of the Island's watersheds, with particular attention to wetlands and riparian corridors.

Actions

- a. Integrate watershed forest canopy and impervious surface data into future planning efforts. For instance, plan for higher densities in watersheds that are not threatened by high impervious surface levels.
- b. Continue to update data on forest canopy and impervious surface.

Policy 2: Initiate and promote urban tree management practices in high density, mixed use areas in order to improve quality of life for all district users and create more livable conditions, to include visual amenities, environmental services and economic development.

Standard 2.I Create and maintain a healthy and diverse street tree canopy, including tree canopy on all civic properties.

The City does not have a street tree plan or a requirement for planting of street trees. The City should adopt a policy requiring planting of street trees during development of subdivisions and for all properties in the urban environment. A comprehensive street tree maintenance program should then be developed to ensure that the street trees and trees on civic properties are properly pruned and cared for.

Actions

- a. Develop a street tree plan that identifies a long-term strategy for street tree selection, siting, replacement and maintenance.
- b. Provide funds for successful implementation of the Street Tree Plan.
- c. Require street tree planting during development of properties in the urban area and for subdivisions.
- d. Develop street profiles that include trees and create more opportunities for tree planting in the public right-of-way. Include innovative standards for adequate tree planting facilities so that root systems neither fail nor interfere with utilities in the right-of-way.

Potential Incentive Programs

Heritage Tree Program

A Heritage Tree Program is being developed to recognize and assist in preserving historic, culturally significant or otherwise unique trees in the community.

Exceptional Trees

Exceptional trees are trees of significant size that should be preserved on private property. Whether a tree can be considered exceptional depends on its species and its size.

Transfer of Development Rights (TDRs)

A Transfer of Development Rights program is recommended to allow density to be transferred from forested properties to other areas on the Island, thereby creating an incentive to preserve forests on private property.

Standard 2.2 Encourage property owners to maximize the preservation of native forest communities and to maintain and enhance the connectivity of tree groves. This should be accomplished using appropriate site design and construction methods as well as open space dedication of open space.

Incentives and education should be provided in order to encourage property owners to preserve trees and native forest communities during design of new developments in the urban core. Incentives are already available in the code to encourage provision of public amenities or affordable housing in the mixed use zones. The Community Forestry Commission recommends the implementation of an incentive option for property owners to obtain additional density by preserving Heritage trees, exceptional trees and significant tree groves in the Mixed Use Town Center and the Urban Multi-family Zones.

Practical design options using a density bonus obtained through tree retention might include an increased height allowance of one story to accommodate the added density and/or a reduction of required parking spaces. This approach would not only preserve individual trees or tree stands, but would serve to decrease the amount of impervious surface created in the urban area.

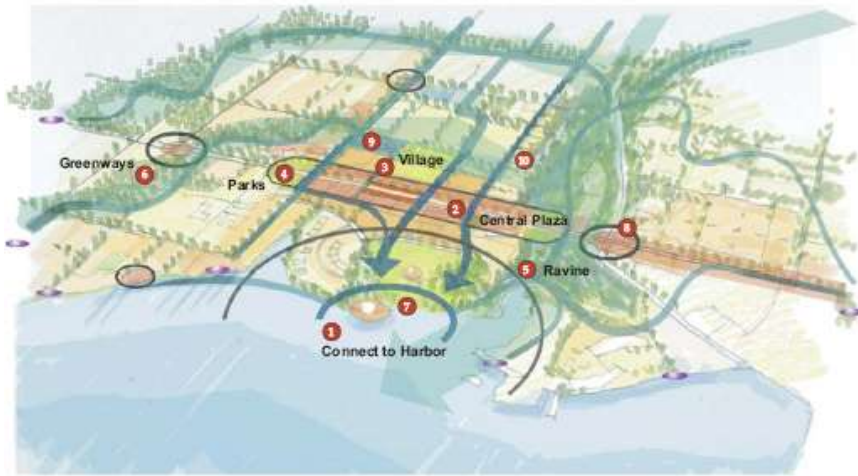
The Community Forestry Commission has defined and is in the process of mapping “Exceptional” trees in Winslow. It is recommended that incentives be provided for retention of exceptional trees during development.

Actions

- a. Promote tree retention as a goal for all new development using incentives, education and regulations.
- b. Encourage retention of groves of trees with native understory rather than scattered, individual trees, as stands of native vegetation generate more benefits than isolated trees.
- c. Develop incentives to preserve existing trees and native vegetation in site design of new development in the urban area.
- d. Allow an increase in allowed density as an incentive for preserving Heritage trees, exceptional trees or tree stands.
- e. Allow increased height to accommodate increased density resulting from tree preservation.
- f. Allow a reduction in parking requirements to encourage tree preservation.
- g. Implement a Heritage Tree program to identify, protect and promote historically or culturally significant trees or tree stands.
- h. Provide for Transfer of Development Rights to encourage preservation of forested properties on the Island and especially in the more densely developed areas of the community.
- i. Periodically identify and map exceptional trees in the urban area and make the information available to the community and to planners for use during site plan reviews.

Standard 2.3 Expand and Implement the Urban Greenways Plan

In order to preserve or enhance forests in the more densely developed section of the Island, an urban greenways plan for the urban area should be formalized. This plan will expand on the policies listed in the Greenways section of the Comprehensive Plan. Potential multi-functional green corridors or greenways were identified using existing aerial photographs and property information to identify green corridors through the urban mixed use town center, from Sportsman's Club Road to SR-305 and from Eagle Harbor to New Brooklyn Road. The figure below is a conceptual illustration of the potential green corridors.



The green corridors would connect watershed streams with Eagle Harbor and connect parks with open spaces and with schools. The green corridors act as “green” infrastructure, providing tree canopy in the highly urbanized area of the City, and reducing the need for stormwater or “gray” infrastructure. In addition, low-impact trails through the corridors could be developed to enhance non-motorized transportation options through the urban area, connecting people with green space.

Actions 2.3

- a. Finalize a Multi-Functional Green Corridor Map and Plan.
- b. Develop incentives for private land owners to preserve designated green corridors in the urban center. Incentives could include bonus density, stormwater fee reductions, additional building height, or reduced parking requirements.
- c. Establish a fund to purchase and maintain greenways.
- d. Prioritize undeveloped properties along the corridors for acquisition or conservation easements.
- e. Work with the Non-motorized Transportation Committee and the Watershed Council to plan for multi-modal trails through the corridors.
- f. Promote a public outreach program to educate citizens about the green infrastructure corridors to promote preservation and use of the corridors.

Policy 3: Develop a community-wide program to enhance the community's awareness of the value of trees and the urban forest.

Standard 3.I Assist stewards of the community forest in providing accessible and on-going education opportunities.

The Community Forestry Commission was formed to develop a long-term management strategy for the urban forest and to promote education and outreach programs to educate the community about trees and forest. The Commission has sponsored an invasive species educational effort, a tree protection workshop and coordinates an annual native plant sale. These efforts should continue to focus on best management practices and provide opportunities for landowners to understand new incentive programs for tree preservation.

Many cities sponsor a NeighborWoods Tree Steward program. The program involves creating teams of neighborhood-based, well-trained volunteer tree stewards to plant and maintain street trees and contribute to the ongoing health of our community's trees. The program contributes to the improvement of the quality of life in neighborhoods, strengthens neighborhood identities, broadens an awareness of community forest needs and builds neighborhood pride as citizens work together to care for neighborhood trees.

Actions

- a. Observe City-wide Arbor Day. Partner with other agencies and the school district to provide Arbor Day education and activities.
- b. Apply for and maintain Tree City, USA status.
- c. Develop a City-sponsored quarterly community education workshop on forest and tree management topics. Target architects, development and construction firms, real estate professionals, City employees and private landowners.
- d. Continue the annual Native Plant Sale to provide native plants to residents.
- e. Facilitate a greenwaste recycling program.
- f. Promote the "wildlife tree" concept by encouraging landowners to retain topped or diseased trees that do not present a hazard and by providing wildlife tree signs to landowners.
- g. Develop a Community Forest Stewardship program such as NeighborWoods that provides training and recognition to citizens who assist in planting and maintaining street trees in the urban core.

Policy 4: Encourage the use of Best Management Practices to protect and enhance community trees and forests.

Standard 4.1 The use of Best Management Practices for forests and trees encourages appropriate species selection, planting techniques, protection during construction, and maintenance.

Actions

- a. Create a Best Practices Manual for forests and trees that recognizes the unique conditions of the community and is subject to periodic review and update.
- b. Adopt Best Management Practices as standard City operating procedures.
- c. Encourage public entities such as the Parks Department and the School District to adopt the Best Management Practices.
- d. Promote awareness of policies in the Community Forest Management Plan and Best Management Practices for trees by providing materials, website links and technical assistance.

As more development occurs in our community, native forests are being replaced with lawns and gardens, comprised primarily of non-native species. This 'urbanization' of the forest is occurring with significant costs to the ecosystem. Non-native plants are "high maintenance" and usually require substantial support systems to keep them alive. These support systems, in the form of fertilizers, pesticides and large additions of water, place considerable strain on the environment.

Standard 4.2 Protect and enhance native plant communities.

Native plant communities are made up of groundcover plants, understory or shrub-like plants and small trees, in combination with large native trees such as Douglas fir, Western Hemlock, and Bigleaf Maple. These plant communities have evolved over many thousands of years to form compatible plant associations. They have adapted to the climate, geography and animal populations of the region. Native plants provide habitat and food for animals, such as birds, butterflies and mammals.

In protecting the forests and trees of Bainbridge Island, it is important to focus on preserving a healthy native forest plant community. The Community Forestry Commission recommends that Best Management Practices that facilitate the long-term health of native plant communities be given the utmost priority.

Actions

- a. Promote Best Management Practices that enable preservation and restoration of native forest communities.
- b. Develop Best Management Practices that encourage the greatest degree of compatibility between development and native plant materials.
- c. Use Best Management Practices to actively protect and restore native plant communities on all public lands.

Standard 4.3 Develop Best Management Practices that protect existing mature trees in the urban area.

Existing, mature trees are a valuable and vital element of the urban environment. Mature trees provide the canopy cover that generates many of the beneficial functions discussed elsewhere in this document, including stormwater attenuation, carbon uptake, and temperature stabilization. They contribute to a healthy urban forest structure and provide shade and visual relief in the city.

In addition, stands of large native trees are a visual reminder of the beauty and cultural heritage of the Pacific Northwest. Retention of large trees creates a community image and a sense of place that Island residents cherish. Large native trees provide numerous utilitarian benefits, but they are also part of our emotional connection to this island home.

Many mature trees in the urban environment are damaged by incorrect pruning or maintenance techniques, caused, for example, by installation of utilities or infrastructure in their root zones or by nearby construction activities. In order to preserve existing mature trees, Best Management Practices for tree maintenance and for tree preservation during construction must be widely accepted and implemented.

Actions

- a. Require land owners to implement Best Management Practices for tree protection during construction.
- b. Dedicate staff time for education about Best Management Practices.
- c. Educate City staff, Parks Department staff and other tree maintenance workers on Best Management Practices for tree protection.
- d. Provide workshops for construction firms to promote a shared understanding within the industry about the purpose and strategies for tree retention.
- e. Develop disincentives for damaging mature trees that are required to be preserved during construction.

Policy 5: Control and prevent establishment of invasive species that are destructive to forest health.

Standard 5.I Invasive plant species are widespread and pose a serious threat to the health of the Island's forest.

As discussed in Section 2 of this report, invasive species are one of the greatest threats to the health of our forests. The City should provide funds and coordinate efforts to address the impacts and facilitate eradication of invasive plant species in our forests.

Actions

- a. Develop partnerships to initiate an invasive species educational program that encourages citizens to avoid planting invasive species and to educate residents about invasive species removal techniques.
- b. Work with the Kitsap County Weed Board and volunteer groups to provide opportunities for invasive species removal, especially ivy and knotweed, on public lands.
- c. Promote a cooperative effort among local businesses to inform the public about invasive species and provide appropriate products.
- d. Seek funding to develop special programs to promote appropriate disposal of invasive species.
- e. Develop regulations that prevent acceptance of landscape plans that include invasive species.

Policy 6: Periodically review Island-wide forest conditions and revise policies and actions to address changing or emerging circumstances and needs.

Standard 6.I Periodic inventories of the forest resources are necessary to assess change over time. The canopy cover study and street tree inventory that were prepared for this plan provide baseline data. Future data comparisons can be used to assess changes in forest canopy and forest health over time. Depending on the future rate of development in the community, it will be important to update this information at least every decade.

Actions

- a. Conduct a canopy cover inventory every ten years to monitor change over time.
- b. Maintain an inventory of City street trees, civic trees and “Exceptional” trees in the urban area. The inventory should be updated periodically.

Standard 6.2 Programs and policies should be revised as necessary over time to ensure forest health and achieve canopy cover goals. Using updated data every 5-10 years, the Community Forestry Commission and City staff should update this plan to ensure that the goal of maintaining a healthy and functioning community forest is achieved.

Actions

- a. Develop a process to respond to significant changes in the forest canopy through revisions to this management plan.
- b. Review and revise Comprehensive Plan policies related to forestry to respond to changes in forest canopy cover.

Standard 6.3. Employ or retain qualified, professional assistance to implement all standards and actions recommended by this plan. In recent decades a unique professional segment of forestry has emerged – municipal and urban forestry. While many urban forestry practices are premised on traditional forestry, the specific conditions of cities and towns demand specialized skills and knowledge. Certified urban and municipal foresters are able to address issues of tree growth, forest planning, and administrative and regulatory implementation.

Actions

- c. Develop a full or part-time urban forestry position within either the Department of Planning and Community Development or the Department of Public Works.

5 Management Plan Implementation

Proposed Priorities and Budget for FY 2006-2010

Implementation of the actions recommended by this plan must be prioritized and budgeted on a long-term basis (a five-year master plan) as well as annually:

- development of an administrative program focused on urban forestry, including establishment of a City arborist/urban forester position;
- consolidation of all tree-related codes into one chapter of the Bainbridge Island Municipal Code; and
- development of a Best Management Practices manual and a Street Tree Management Plan to set the framework for a successful, long-term management strategy.

Administrative Program Development 2006

Create a Job Description for a City Arborist or Urban Forester

In order to effectively implement many of the programs recommended by this management plan, a qualified professional urban forester or city arborist will be essential. At this time a half-time position may be appropriate, depending on the extent of work that develops from this program.

Budget Impact: Cost of salary for one half-time position, depending on qualifications (\$20,000-\$30,000)

Revise and Consolidate all Tree-Related Codes

Regulations pertaining to tree preservation, hazard trees, trees in critical areas, etc. are located in different chapters of the Bainbridge Island Municipal Code. In order to more effectively communicate the tree-related regulations and to simplify the accessibility of these regulations, it is recommended that all tree-related regulations be consolidated into one separate chapter of the code, with cross-referencing as needed. The revised regulations should address the issues and recommendations set forth in this plan. This item should be added to the Department of Planning and Community Development 2006 Workplan.

Budget Impact: No additional cost to the City.

Develop a Best Management Practices Manual

A Best Management Practices Manual for trees should be developed as a resource for City staff and for private property owners. The use of Best Management Practices should be required by ordinance for all construction projects. The contract for development of this manual will be issued in 2005. Publication and distribution of the manual is planned for 2006.

Budget Impact: \$10,000 for consultant contract to develop manual.

Develop a Master Street and Civic Tree and Management Program

The Street Tree inventory conducted as part of this management plan effort will support development of a Street Tree Management Program. Development and implementation of a street tree program will involve comprehensive management of the city maintained street trees, planting of additional trees to enhance species and structural diversity, appropriate and regularly scheduled pruning, and disease management. This effort can be undertaken by the City arborist or urban forester, in cooperation with the Department of Public Works.

Budget Impact: No additional cost if completed by City staff. Approximately \$8,000 to contract with a consultant for plan development.

Potential Funding Sources for Urban Forest

Diversifying the funding sources for Community Forestry may make it possible to increase the number of projects accomplished and reduce reliance on limited municipal funds. Potential sources of additional revenue are identified as follows:

Grants. Community Forestry Assistance Grants are available through the Washington State Department of Natural Resources. These grants are awarded on a matching basis, for program development, education and tree planting. Up to \$120,000 in grant money was available in 2005 and could be used for ordinance development, tree inventory efforts, or development of a street tree management plan.

Other grant monies are available through organizations such as the National Tree Trust (NTT), a national urban and community forestry nonprofit organization, which recently awarded \$498,000 to 31 nonprofit organizations across the country for projects that improve the health of urban and community forests.

City Funding for Urban Forestry. The Community Forestry Commission has an annual budget to fund education and outreach activities and to fund development of this management plan. Continued funding of the Community Forestry Commission's activities is crucial to implementation and monitoring of this plan.

Volunteer Contributions. Many of the projects listed in the workplan can be accomplished with volunteer time and assistance. Programs such as Neighborwoods encourage volunteer stewardship that results in planting and maintenance of street trees. However, City-funded staff time is often necessary to initiate and coordinate volunteer efforts. Establishment of a City Arborist position having an emphasis on outreach and stewardship coordination will result in the most effective use of all available resources.

Stewardship

This section identifies the key agencies and individuals responsible for stewardship of our forests and encourages alliances and cooperation among these groups to promote the protection and management of the community forest.

The stewardship of the community forest as part of the urban ecosystem is the responsibility of many groups and individuals in the City of Bainbridge Island. First and foremost, the residents and property owners of Bainbridge Island are stewards of the trees and forests on private property, as well as many street trees and trees within public property areas, open space, parks and easements. Along with these individuals, the following groups have an interest in and responsibilities for protecting and managing the community forest:

Bainbridge Island City Council. The City Council, working with the Mayor and staff, establishes policy and makes budget decisions based on provisions of the Comprehensive Plan. A number of committees, including the Land Use Committee and the Public Works and Transportation Committee make decisions relating to management of the urban forest.

Bainbridge Island Planning Commission. The Planning Commission works in an advisory capacity to the City Council or the Planning Director, and reviews applications for projects. The Planning Commission can recommend project conditions to preserve or plant trees on development sites.

Community Forestry Commission. Members of the Community Forestry Commission are appointed by the Mayor and act in an advisory capacity to the City on tree-related programs. The Commission is responsible for developing this management plan and for implementing educational and outreach programs to promote urban forestry in the City of Bainbridge Island.

Bainbridge Island Parks and Recreation District. The Bainbridge Island Parks and Recreation District is a separate agency from the City of Bainbridge Island. The Parks District manages the majority of public parks on the Island, some of which contain large forested areas. The Parks District is also charged with long-term management of lands purchased by the Open Space Commission. The Parks District has a maintenance program, but individual property management plans have not been developed for the various properties under the purview of this agency.

Bainbridge Island Open Space Commission. The Open Space Commission is an advisory group charged with recommending purchase of properties with the eight million dollar public bond funds approved by Island citizens in 2003. To date, 238 acres of property have been purchased, including many valuable forested areas.

Planning and Community Development Department. The planning department has a significant influence on tree-related issues in the City of Bainbridge Island. This department is the key reviewing agency for new construction in the City. Therefore, it is the first department to identify issues relating to tree preservation, removal or modification to landscaping. The planning department also drafts tree-related ordinances and implements tree-related programs. Planning department staff provides staff support to the Community Forestry Commission. The Director and staff in this department coordinate urban forest issues with the Commission, City Council, other City departments and other partners.



Public Works Department. This department manages municipal improvement projects that may impact trees, including sidewalk repairs, street improvements, street lighting and signage and other projects that involve infrastructure. The Public Works Department also reviews development plans for civil engineering, utilities, and drainage issues. This department coordinates with the planning department and other agencies on project review.

City Operations and Maintenance Division. This division of the Public Works Department is responsible for implementation of many municipal improvement projects. In addition, the Operations and Maintenance division staff is responsible for maintenance of the streets and rights-of-way and of stormwater facilities.

Bainbridge Island Land Trust. The Bainbridge Island Land Trust (BILT) seeks to preserve land having significant conservation values such as scenic vistas, wetlands, open spaces, tidelands, forests, unique plant and animal habitats, and stream and wildlife corridors, and to help landowners minimize the environmental impacts of development. Many acres of forest land on the Island have been preserved through conservation easements facilitated by the BILT.

Other Stewardship Efforts. Many volunteers and organizations on Bainbridge Island assist in preserving and restoring natural forest lands. Weed Warriors, a relatively new group, focuses on eradication of invasive species, especially ivy. Their efforts, in cooperation with IslandWood environmental learning center, have resulted in large areas of forests cleared of ivy. The Watershed Council, the Association for Bainbridge Communities and other environmental groups on the Island advocate for preservation of open space and forests in the community.

Table : Community Forest 2005-2010 Workplan

Action	Lead Staff/ Department	Partner Departments/ Agencies	Timeframe	Budget	Evaluation Tools
Policy I: Protect, restore and improve existing vegetation that has environmental, wildlife habitat and aesthetic qualities, including tree groves, significant tree stands, and forested hillsides and vegetation associated with wetlands, stream corridors and riparian areas.					
Identify priority areas for forest preservation	CFC	Open Space Commission, BI Land Trust	2005-2010		
Develop educational materials to inform landowners about the benefits of tree canopy and management approaches that can be applied to private property.	Staff Forester/ CFC		2006	\$5,000	
Develop site-based management plans for properties purchased by the Open Space Commission.	Staff Forester	Open Space Commission or BI Land Trust	2006-2007		
Develop a long-term tree management plan for Waterfront Park.	Staff Forester				
Policy 2: Initiate and promote urban tree management practices in high density, mixed use areas in order to improve quality of life for all district users and create more livable conditions, to include visual amenities, environmental services and economic development.					
Develop a Green Corridor Plan. Create incentives for preservation of the green corridors.	Dept. of Planning and Community Development	Winslow Tomorrow, Non-motorized Transportation Committee	2006		
Develop street profiles that include trees and create more opportunities for tree planting in the public right-of-way. Include innovative standards for adequate tree planting facilities.	Staff Forester / Dept. of Public Works		2006-2007		
Develop incentives to preserve existing trees and native vegetation in site design of new development in the urban area.	Dept. of Planning and Community Development		2006		
Develop a Transfer of Development Rights program to encourage preservation of forested properties on the Island and especially in the more densely developed areas of the community.	Dept. of Planning and Community Development		2006-2007		
Periodically identify and map exceptional trees in the urban area and make the information available to planners for use during site plan reviews.	Staff Forester		2010	\$3,000	
Policy 3: Develop a community-wide program to enhance the community's awareness of the value of trees and the urban forest.					
Observe City-wide Arbor Day. Partner with other agencies to provide Arbor Day education and activities.	CFC		2005-2010	\$1,000/year	

Implement a Heritage Tree Program	CFC/ Staff Forester		2005-2010	\$1000 first year \$500/year thereafter	
Develop a City-sponsored quarterly community education workshop on forest and tree management topics. Target architects, development and construction firms, real estate professionals and private landowners.	CFC		2006	\$2,000/year	
Facilitate a greenwaste recycling program.	Staff Forester		2007-2010		
Promote the "wildlife tree" concept by encouraging landowners to retain topped or diseased trees that do not present a hazard and by providing wildlife tree signs to landowners.	Staff Forester / Dept. of Planning and Community Development		2007		
Initiate a NeighborWoods Program	Staff Forester		2007-2010		
Policy 4: Encourage the use of Best Management Practices to protect and enhance community trees and forests.					
Adopt Best Management Practices as standard City operating procedures.	All City Departments		2005-2006		
Publish and Distribute BMP manual	Dept. of Planning and Community Development				
Policy 5: Control and prevent establishment of invasive species that are destructive to forest health.					
Initiate an invasive species educational program to encourage citizens to avoid planting invasive species and to educate residents about invasive species removal techniques.	CFC/Weed Warriors		2007	\$500/year	
Compile data on invasive species to assess priority areas for removal programs.	CFC	Weed Warriors, Kitsap County Weed Board		\$3,000	
Policy 6: Periodically review Island-wide forest conditions and revise policies and actions to address changing or emerging circumstances and needs.					
Develop Watershed Canopy Cover Targets and Coordinate Future Zoning to Accommodate Targets	Dept. of Planning and Community Development	Watershed Council	2006		
Conduct regular Street Tree and Exceptional Tree Inventories	Staff Forester		2007-2010	\$3,000	

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- Cover Photo by Kimball Andrew Schmidt pbase.com/kaschmidt

A Appendix A

Forest Canopy Cover Inventory

The City acquired 0.5-foot pixel resolution color orthophotography in late 2004 (aerial photography flown October 7, 2004). The project consultant, Port Madison GIS, Inc., utilized “heads-up” (screen) digitizing techniques to delineate forest canopy polygons at a display scale of approximately one inch to 80 feet for the entire Island. This yielded detailed canopy data that can be intersected with other map layers utilizing geographic information system (GIS) software; for example, percent forest cover by zoning, drainage basin, public land ownership, neighborhood, or other category of interest. Such analysis provides reasonably accurate area statistics that can be re-calculated periodically as development occurs. Along with demographic projections, this can be a useful predictive tool to enhance city land use policy and improve staff decision making.

Table I. Canopy Cover Inventory Data Results

Zone Area	Total Acreage in Zone Area	Total Forest Canopy	Percent Canopy Cover
Low Density Residential (R-2, R-1, R-0.4)	15,867.78 acres	11,908.09 acres	75.04 %
High Density Residential (R2.9 through R-14)	1043.57 acres	490.99 acres	47.05%
Neighborhood Service Centers	36.24 acres	9.7 acres	26.77%
Mixed Use Town Center/High School Road Districts	214.71 acres	89.27 acres	41.58%
Winslow Core	87.1 acres	25.57 acres	29.36%
Other	180.71 acres	105.25 acres	58.24%
All Island	17,430.11	12,628.87	72.45%

Several technical limitations to the forest canopy data should be noted:

- Given the date of the photography, some deciduous trees appear leaf-free and may not have been discernible.
- Canopy polygon edges are generalized somewhat, especially where displacement of tall tree crowns is present. It is assumed that these generalizations compensate each other in area calculations and do not greatly affect the final statistics.
- Mapping in obscured areas such as shadows or tall buildings cannot be easily validated without extensive field checking.
- Transition areas, including such vegetation categories as blackberries and wetland shrubs, are sometimes difficult to differentiate from low forest canopy.
- Ornamental plantings and other tree cover in residential areas were mapped as consistently as possible, although many ambiguous situations were encountered.
- The final canopy data is suitable for analysis and display at scales of one inch to 100 feet (1:1200) and smaller. The data should be used for detailed site analysis only when augmented by field observation.

B Appendix B

Street Tree Inventory

An inventory of street trees was conducted in July and August, 2005. For the purposes of this study, street trees were defined as those trees within the right-of-way that are located between the sidewalk and the roadway, i.e., in planter strips, or in planters in the center of roadways. The boundaries of this study generally followed the boundaries of the Mixed Use Town Center/High School Road I zones: Grow Avenue to the west, Ericksen Avenue to the east, High School Road to the North. Data was collected and tree locations were recorded using an ArcPad program. Tree locations were then downloaded into the City's ArcGIS mapping program.

For each street tree, information on tree species, diameter at breast height (dbh), root condition, trunk condition, and condition of the scaffold branches, twigs and foliage was recorded.

Table 2. Street Trees

Scientific name	Common Name	Number of Trees
<i>Acer griseum</i>	paperbark maple	3
<i>Liquidambar styraciflua</i>	American sweetgum	16
<i>Acer macrophyllum</i>	bigleaf maple	8
<i>Malus floribunda</i>	flowering crabapple	1
<i>Malus sylvestris</i>	edible apple	2
<i>Metasequoia glyptostroboides</i>	dawn redwood	1
<i>Morus sibirica</i>	fruitless mulberry	1
<i>Acer palmatum</i>	Japanese maple	12
<i>Pinus nigra</i>	Austrian black pine	7
<i>Acer platanoides</i>	Norway maple	1
<i>Prunus cerasifera</i>	purple-leaf plum	11
<i>Prunus domestica</i>	fruit plum	3
<i>Prunus serrulata</i>	flowering cherry	5
<i>Prunus sp.</i>	cherry	3
<i>Pseudotsuga menziesii</i>	Douglas fir	7
<i>Pyrus calleryana</i>	ornamental pear	9
<i>Pyrus communis</i>	fruiting pear	1
<i>Acer rubrum</i>	red maple	26
<i>Acer saccharinum</i>	silver maple	2
<i>Salix matsudana 'tortuosa'</i>	corkscrew willow	1
<i>Thuja plicata</i>	Western red cedar	1
<i>Tilia cordata</i>	littleleaf linden	6
<i>Acer sp.</i>	maple	4
<i>Zelkova serrata</i>	Japanese zelkova	10
<i>Araucaria araucana</i>	monkey puzzle tree	1
<i>Arbutus unedo</i>	strawberry tree	1

Scientific name	Common Name	Number of Trees
<i>Betula jacquemontii</i>	Jacquemonti birch	7
<i>Carpinus betulus</i>	pyramidal hornbeam	12
<i>Cercidiphyllum japonicum</i>	katsura	13
<i>Acer campestre</i>	hedge maple	3
<i>Cornus sp.</i>	dogwood	3
<i>Cotinus coggygria</i>	smoke tree	1
<i>Acer circinatum</i>	vine maple	2
<i>Fraxinus americana</i>	white ash	2
<i>Fraxinus oxycarpa</i> 'raywood'	Raywood ash	14
<i>Fraxinus pennsylvanica</i>	green ash	14
Unknown		8