

City of Mercer Island Open Space Vegetation Plan

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**City of Mercer Island
Parks and Recreation Department**
2040 84th Avenue SE
Mercer Island, WA 98040
206.236.3545
www.miparks.net



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1. Summary

The City of Mercer Island's open space properties are losing trees and native vegetation from the rampant growth of invasive, non-native plants. This trend is expected to cause significant additional losses in the next twenty years. This will result in the decline of the benefits that open space properties currently provide to the public.

Voters and the Mercer Island City Council have previously rejected the levels of spending that would be necessary to restore all properties to native forest. This plan proposes several levels of spending that could achieve minimum and intermediate levels of service to preserve some of the benefits of open space. Minimum levels of service would focus on removing ivy from trees. Intermediate levels of service would also remove invasive plants from areas that are not yet heavily invaded. Levels of service have been assigned according to priorities developed with input from two public meetings in June, 2004.

This plan proposes to utilize volunteer participation and neighborhood partnerships to implement significant portions of the plan. It provides an incentive for neighborhood leaders to recruit volunteers, grants and donations by offering equivalent plan implementation from the City. Priorities may shift as a result of this approach. The potential for this approach is unproven and may be limited by the staff time required to administer it. Dependent upon the levels of service selected for the prioritized sites, an investment of between \$18,000 and \$180,000 per year over a 20 year planning horizon would be required. The Plan recommends an annual City investment of \$135,000 per year.

2. Introduction

The vegetation in the City's parks and open spaces provide multiple benefits to the public. Some of these benefits are quantifiable functions, like erosion control, storm water buffering, energy conservation and pollution abatement¹. Other benefits, such as aesthetic, design and wildlife functions are more subjective in their value. Nevertheless, we know that if the vegetation is left unmanaged, these benefits decrease. **Invasive plants crowd out native vegetation and prevent new trees from replacing those that are lost over time. The result is fewer trees and native vegetation, and more thickets of blackberry and carpets of ivy.**

At the outset, City staff could not have said, for example, that the ivy growing in trees was the biggest problem. At that point, if the City had gone ahead and paid to remove the ivy vines, it would have raise questions, such as: Did this solve the problem? If not what were the consequences of doing that rather than something else? Was work done where it was most urgently needed? Was this the best use of limited resources? Instead, Mercer Island City Council asked Parks and Recreation staff to evaluate the problem and

¹ McPherson, E. Greg, et. al. 2002. *Western Washington and Oregon Community Tree Guide: benefits, costs and strategic planning*. International Society of Arboriculture, Silverton, OR http://wcufrre.ucdavis.edu/products/5/cufr_164.pdf

formulate a strategy to address this problem. With the information presented in this plan, Council is now better equipped to apply limited resources where they will make the greatest difference for the long-term health of the City's parks and open spaces.

3. Scope of this Plan

Land area covered by this plan is 301 acres of the 467 acres of parks and open space on the island. This includes portions of parks that are forested, such as the western end of Mercerdale Park, the ravine in Island Crest Park and the southern end of Homestead Field. It also includes City-owned right-of-way that is adjacent to these properties where the landscape is not distinguished from the park.

It excludes developed park areas, because these are already planned for and maintained by the City. It excludes all I-90 properties, which are managed by terms agreed to between the Washington State Department of Transportation and City of Mercer Island.

This document will sometimes refer to open space vegetation as "forest," recognizing that most open space and undeveloped park properties are forested. There may be some instances where forest is not an applicable term and we will make that exception where necessary.

4. Problem Statement

The Problem of Invasive Plants

For the purposes of this discussion, we are using the term “invasive plant” to mean a plant species that:

- is not native to the coastal pacific northwest of the United States
- once released into the local environment, spreads readily without human assistance
- takes over native and/or developed landscapes and displaces plants found there.

The King County Noxious Weed List contains 91 species². On Mercer Island, staff has found 13 of these species. Most of these are currently limited to small areas or specific habitats. The invasive plants that are widespread and causing the most impact are Himalayan blackberry (*Rubus discolor*) and English ivy (*Hedera helix*). Other species, such as English holly (*Ilex aquifolium*) and cherry laurel (*Prunus laurocerasus*) are spreading and may become widespread.

The problem with these plants is their ability to spread and displace trees and native shrubs. Both ivy and blackberry smother ground vegetation. English ivy also kills trees that it climbs³. Over time, more diverse and complex landscapes become thickets dominated by one single species. Both plants spread by seeds dispersed by birds as well as by extending runners into neighboring landscapes.

² <http://dnr.metrokc.gov/wlr/lands/weeds/weedlist.cfm>

³ http://www.nwcb.wa.gov/weed_info/Ivy.htm

An initial field survey in November, 2003 of public property across the island showed that 82% of the open space has some level of invasive plants. Heavy invasion (over 50% coverage) occurred in 43% of the open space. A more detailed field mapping in July, 2004 confirmed that 45% of open space is heavily invaded. The problem is clearly widespread throughout the island.

Removing invasive plants is difficult. If they simply are cut down, they grow back quickly and the invested effort is lost. Removal requires repeated cutting, digging and ultimately replacement of the invasive plants with other plants that grow well in the area. In forested settings, replacement sometimes happens when native plants re-grow where the invasives have been removed. The success of this depends on how long the invasive plants have been growing there and how much follow-up maintenance is performed. Otherwise, replanting with nursery-grown plants is necessary. Because invasive plants are widespread in the surrounding environment, ongoing monitoring and maintenance is necessary to prevent the establishment of new invasives in restored areas.

For these reasons, removing invasive plants is expensive. Volunteers can do some of the work to reduce costs. **However, the scope of the problem combined with the cost of the remedy makes complete eradication of invasives on Mercer Island an unrealistic choice.** This was also the consensus of the Mercer Island City Council at its January 5th, 2004 meeting.

Doing nothing is another choice. Left alone, open space properties will gradually lose trees and native vegetation. Blackberry and ivy will accelerate tree decline and prevent new trees from growing. The future can be seen today in open space around Seattle where ivy and blackberry have been resident for a longer time period⁴. Ivy accelerates the decline of trees. Once the trees have fallen down, blackberry takes over. The result is sparse tree cover and thickets of blackberry in many places. For example, imagine the view from Gallagher Hill Road twenty years from now. Driving by, one might see a hillside covered with blackberry and remnant trees, instead of the dense tree canopy found there today. That is a likely outcome of doing nothing.

The Loss of Benefits

How would that future scenario impact island residents? To answer this question, this plan explores several of the functional benefits that forest vegetation provides. The urban forest is not a single-function infrastructure like a water line or a roadway. Instead, it provides several functions, some of them of minor benefit.

If any individual benefit was compromised, the affect on the environment would not be catastrophic. The potential impact of losing several of these benefits together, however is significant. The following analysis describes the benefit of the current vegetation

⁴ http://www.seattle.gov/environment/green_seattle_initiative_handout.pdf This trend can also be seen on Mercer Island by comparing the levels of invasion among various open space properties. Higher levels of invasion seem to correlate with how long the surrounding neighborhood has been developed. North end sites are typically more invaded than south end sites, for example.

condition and the potential loss from predicted trends. According to a CityGREEN™ GIS analysis, the City's parks and open space currently have 70% tree cover. These properties buffer 595,736 cubic feet of storm water runoff and remove 23,734 lbs of air pollutants annually (see Appendix A). If tree cover was reduced 25%, (a probable scenario 20 years from now if no action is taken) an additional 5,982 pounds of air pollutants would be present in the air on Mercer Island every year. In addition, 22.5 tons of carbon would remain in the atmosphere each year without these trees. Storm water buffering would decrease significantly, however CityGREEN™ modeling was not able to accurately reflect this. Energy use (from the loss of summertime cooling and wintertime wind buffering) and erosion were not analyzed but would probably increase slightly as well⁵.

The predicted changes in forest composition will impact other functions. Loss of tree cover would reduce aesthetic and design functions of open space. Forests buffer neighborhoods from other land uses. For example, the forest on Mercerdale Hillside buffers the noise and light from the Town Center for residents living on First Hill. Forests along city streets create wooded landscapes for passing motorists and inform the common perception of the island as forested. Forests help provide neighborhoods with privacy by providing screening between homes. As forest vegetation is lost, these functions are reduced proportionately.

The anticipated changes in forest vegetation will also reduce recreational benefit. Forest vegetation is a significant part of the recreational experience on trails in Pioneer Park, Mercerdale Park and Hillside, Island Crest Park, as well as other properties. The predicted scenario would find park users walking trails bordered extensively by blackberry thickets, with reduced visibility into the forest⁶. Forested edges also provide the recreational backdrop to parks and beaches. On the edges of playfields at Island Crest Park, Homestead Park and South Mercer Playfield, forest vegetation provides shade and reduces glare for athletes. Also, forest habitat provides opportunities for bird watching and wildlife study. These benefits will decrease as forest vegetation declines.

Wildlife habitat for native species is another benefit of native forests on Mercer Island. Habitat on public property makes it possible for native plants and animals to coexist with development on Mercer Island. In addition to the recreational benefit that many people find in this (noted above), there are also functional benefits for the community. Native habitat inhibits the invasion of nuisance wildlife. Native wildlife (hawks, bats, forest birds, coyote) compete with or prey upon nuisance wildlife such as rats, pigeons, swallows and mosquitoes and prevent their populations from growing larger. Native forest is poor habitat for these species but is excellent for the native wildlife which depends on forest. Conversely, invaded habitat may favor nuisance wildlife. Ivy has

⁵ McPherson, *op cit.*

⁶ The questionnaires distributed at the first public meeting for this plan revealed that some citizens are concerned about how invasives impact trail maintenance. Some citizens also consider blackberry a recreational benefit for the ability to harvest fruit in the summer. It was proposed at the meeting that certain locations (South Mercer Playfield, Groveland Beach, Clarke Beach) be left for blackberry picking.

been observed to be particularly useful habitat for rat species. Loss of native habitat means greater problems with nuisance wildlife.

Furthermore, Mercer Island as an ecosystem does not function in isolation. The condition of the island's forests affect surrounding habitats. For example, a decline in native forest vegetation may increase soil erosion and sediment loading in Lake Washington, potentially affecting salmon habitat. Regional trends to reduce invasive plants and manage urban pest species are mutually reinforcing. Conversely, decline in the forest habitat on Mercer Island will impact other habitats as well.

The cumulative benefit of these functions can be observed in the comparative value of residential properties near open space. A national survey of research on property values in proximity to parks and open space was conducted by GIS analysis. This survey found that the property value of land in proximity to urban "greenways" (equivalent to "open space") may be up to 15% higher than comparable property without this characteristic.⁷ Added value extended to properties as much as 1500 to 2600 feet from the greenways, with adjacent properties receiving the greatest added value. The more valuable greenways were accessible (by trail) and had mature trees, while the least valuable were inaccessible and covered in dense scrub vegetation. This observation provides evidence to the above assertions that forest vegetation in open space property has a positive influence on its public value. It is possible that the decline in open space conditions on Mercer Island would cause a decrease in surrounding property values.

5. Planning approach

The planning approach developed for this plan consisted of seven tasks listed below. These tasks were not strictly sequential. They progressed as necessary for the completion of the plan.

1. Problem definition- clarification of public benefits of vegetation
2. Property evaluation- assess current condition of vegetation through measurements & mapping
3. Values clarification- public discussion regarding benefits of vegetation and prioritization of various management methods
4. Benefit Analysis- estimate developed of the current and potential benefits of each property and the risks associated with no action
5. Prioritization- rank each property based on criteria developed in #2 above
6. Public review- receive public feedback and responses to results of analysis
7. Work Plan- work plan developed for high priority properties, including tasks and cost estimates

In April and May of 2004, initial site assessments were conducted. City staff surveyed all City-owned parks and open space for certain criteria such as landscape type, presence of invasives, habitat type and condition. Other criteria, such as adjacent land uses, connectivity and erosion potential were analyzed using existing data in the City's

⁷ Nicholls, Sarah. 2004. *Measuring the Impact of Parks on Property Values*. Parks and Recreation. 39:3, pp. 24-32.

geographic information system (GIS). Consultants from Marshall GIS used available LIDAR (light distance and ranging) to analyze canopy heights in parks and open space properties. They used the results of this analysis to conduct a CityGreen™ analysis of the park and open space properties to model the value of certain benefits, such as storm water buffering, air pollution removal and carbon sequestration that results from this vegetation.

This preliminary analysis was presented at two public meetings in June, 2004. At the first meeting, participants were given a questionnaire to rate six benefits of open space vegetation in their order of importance. In a separate exercise, participants placed "sticky dots" on a map to indicate which parks they believed were most important to receive funds to manage open space vegetation. This resulted in a initial ranking of open space properties.

Following the first meeting, staff analyzed each park and open space property, weighting each benefit by the average of the ratings supplied by the meeting participants (see Appendix B). A final analysis of benefit on a per acre basis was validated by the final results of the "sticky dot" exercise. (see Appendix C) Three groupings of properties emerged from this analysis (see Goals and Objectives, below).

These results were presented at a second public meeting for verification. Questions that arose from the first meeting were addressed by City staff. A prioritized list of management tasks were presented and discussed as well. See Appendix G for a summary of the two public meetings.

In July, 2004, City staff conducted a detailed inventory of selected parks and open spaces. Parks that were selected were the ones that ranked high in the previous analysis. However, Pioneer Park was omitted from further analysis because it already had an adopted Forest Management Plan. City staff mapped study areas of understory vegetation and evaluated the levels of key invasives in these areas. Levels of invasive cover were set to correspond with the appropriate treatment to control invasives. Coverage below 65% was considered appropriate for selective weeding. Coverage above 65% was considered appropriate for wholesale clearing. See Appendix F for maps of selected sites showing a summary of the inventory results.

The data generated was entered into the City's GIS database. It was processed to divide study areas into areas with slopes less than 30 percent and slopes greater than 30 percent. Area measurements of the resulting study areas were used to generate cost estimates for task priorities (see Goals and Objectives, below) on each property based on levels of invasion and the steepness of the slope. These estimates were then used to develop cost estimates.

6. Goals and Objectives

Goals

The broad goals of this plan are as follows:

1. Maintain the functional benefits of open space vegetation to the extent that available resources allow.
2. Implement work based on the value of these functional benefits, the community's priorities for the open space properties, and the condition of the vegetation found there.
3. Maximize the return on available funding through volunteers, matching grants, and donations.

Below are the explanations of these goals.

Goal 1. Maintain the functional benefits of open space vegetation to the extent that available resources allow.

While the cost of the full restoration of all open space property is not feasible because of limited funding, the total loss of native forest is unacceptable to the Mercer Island community. This plan proposes several levels of investment to establish a middle ground. The smallest investments limit the overall loss of benefit to a certain level, intermediate investments maintain the current level of benefit, and the biggest investments produce an overall gain in benefit. In each case, the forests will continue to provide some functional benefits described above.

This plan will not be evenly applied across all open space. Some open space may be restored gradually, some will be maintained at current levels of function, and some will be allowed to decline to a lower level of function. The extent of these outcomes will depend, again, on available resource levels. The locations for these outcomes will be determined by where the resources can produce the greatest overall benefit.

Goal 2. Implement work based on the value of these functional benefits, the community's priorities for the open space properties, and the condition of the vegetation found there.

In order to maximize the overall benefit achieved with this plan (Goal 1), staff conducted an analysis of six functional benefits of forest vegetation: storm water buffering, air pollution removal, erosion control, urban design functions, recreational functions and habitat functions. See Appendix D for details of this analysis. At two community meetings in June, 2004, citizens were asked to rate these benefits in two separate exercises. The result was the following weighted value of benefits:

Benefit	Weighting from questionnaire
Habitat	1.0
Erosion control	1.0
Storm water buffering	0.9
Air pollution removal	0.9
Urban design	0.9
Recreation	0.8

Table 1: Weighting of the Values of Open Space Benefits

These weights were applied to the previous analysis of benefits on a per acre basis. The resulting ranking of sites was divided into three categories, representing where the greatest benefits of forest vegetation are found. This prioritization was validated by a sticky dot exercise where participants "spent" ten dots on a map to indicate where they thought vegetation management was most needed.

The final prioritization (below) represents the results of that analysis with two modifications. Ellis Pond, a storm water detention facility, was advanced into the 2nd priority because it represents a unique open water habitat on the island. For a modest investment, this habitat can be conserved. Tract A was removed from 3rd priority because of its status as a utility property. There is potential that it could be developed at some point in the future to support the City's utility system. Therefore, investing substantial resources in the property's vegetation is not prudent. However, work on vegetation management in Tract A may proceed under the provision in the Resource Objectives (below) for neighborhood stewardship.

1st Priority

Pioneer Park

2nd Priority

Mercerdale Park & Hillside

Upper Luther Burbank Park

Ellis Pond

Island Crest Park

SE 53rd Open Space

3rd Priority

Clarke Beach

Clise Park

Gallagher Hill OS

Groveland Beach

Hollerbach OS

Luther Burbank Park

N. Mercerdale Hillside

Parkwood Ridge OS

Secret Park

Table 2: Prioritization of City Properties for Vegetation Management

Goal 3. Maximize the return on available funding through volunteers, matching grants, and donations.

With limited funding available, it is necessary for this plan to develop additional resources for implementation. It is a goal of this plan to thoroughly explore the potential for volunteers, grants and donations, as well as partnerships with neighborhood groups, government agencies, businesses, service groups and non-profit organizations. Objectives for these resources are explored below. The uncertainty of these resources requires conservative planning with flexibility for more accelerated action as resources become available.

Objectives

Level of Service Objectives

Level of Service Objectives describe three classes of results that this plan will attempt to achieve. Level C is the minimum level of service that properties listed in Table 1 should receive. It would result in decreasing benefits over time, but would limit the loss. Level B is a level of service that maintains the current levels of benefits. Level A would produce optimal function of forest vegetation and result in increasing benefit over time.

In Cost Estimating (below), the plan will discuss which properties receive each level of service.

Stewardship	Level C	Level B	Level A
vegetative cover	maintain vegetative cover to conserve soil and prevent erosion	plant new trees to maintain tree canopy while maintaining the ground layer vegetation.	plant a diversity of native vegetation to provide multiple layers of vegetation cover
tree health	cut ivy vines in trees to reduce tree loss	clear all invasive plants from the base of trees to reduce competition	remove invasives from the ground layer in forested areas
ecosystem health	remove Class A noxious weeds as required by law	identify and prevent invasion of intact or functional native plant communities	remove invasive plants from all areas and prevent their re-growth

Table 3: Level of Service Objectives

Management Objectives

Management Objectives provide a priority order in which to allocate resources on a given site. These represent good stewardship choices and are as follows:

1. revegetate bare (eroded) areas on slopes
2. remove ivy vines growing up trees
3. maintain existing restoration project areas
4. foster trees and woody debris in riparian and shoreline habitats
5. plant native trees (especially conifers) where needed
6. selectively weed invasives from native understory
7. clear invasive dominated areas and foster native regeneration on slopes <30%
8. control invasives and replant natives on slopes >30%

Revegetating bare slopes prevents loss of soil. Soil loss is very expensive to remedy and also damages downstream habitat. The cost of revegetation is far less than the alternative. Removing ivy vines saves existing trees which generates far more return than planting new trees. Maintaining existing project areas in restoration prevents the loss of public investment in existing projects as new project areas are begun. Often this requires only a small routine effort.

Keeping canopy and woody debris in riparian shoreline habitats preserves critical aquatic habitat with minimal effort. Planting new trees provides for canopy trees over the long term. In this plan, canopy is being prioritized to some degree over understory management for two reasons. First is that canopy is the more significant component of functional benefit. Second, native understory condition can be improved by increasing tree canopy, which results in shady conditions that favor native vegetation.

However, it is not the intention of this plan to ignore understory condition. Rather, it prioritizes understory work that is most cost effective. **Weeding invasive plants from**

predominantly native understory has been shown to be more cost-effective than restoring native vegetation to heavily invaded areas.⁸ Therefore, this is prioritized over clearing invasive-dominated areas (#7) and replanting heavily invaded steep slopes (#8).

Resource Objectives

City Funding

This plan is based on funding from City budgets. This funding provides a core operational resource from which other resources can be developed and leveraged. The City creates its budgets on a biennial basis. The next biennium for which these activities could be included is 2005-2006. Level and source of funding is determined by City Council during the budgeting process.

Volunteers

Volunteers are central to the implementation of this plan. This plan assumes volunteers accomplish half the work on slopes less than 30% grade and also contribute significantly on slopes greater than 30% as physical ability allows. Tasks on these slopes will be led by professionals and will be accomplished by professionals where volunteer resources are insufficient. On slopes greater than 30%, most work will be accomplished by professionals or experienced volunteers.

Because volunteers represent a significant potential resource for this plan, a small portion of available funding will be utilized to develop volunteer participation. This will include recruitment, training, outreach materials, refreshments and recognition. Specifically, a training that was initiated in 2004 to develop project leaders within the volunteer base will be expanded to achieve greater participation.

Neighborhood Stewardship

People living close to a park or open space represent the greatest potential for ongoing volunteerism. Therefore, this plan provides incentive for neighborhood groups to come together to help implement this plan for a specific park. It allows them to leverage their volunteer efforts with implementation dollars as follows. A park in any priority may be accelerated in plan implementation and/or moved to a higher level of service with volunteer-based projects organized by the neighborhood group. The City will fund support resources (tools, materials, contracted services, project management) for these projects up to the value of the "match" provided by community volunteers. Neighborhood groups can match using their time, by making cash donations, or by securing grants from non-City sources. Donated goods and contracted services are not eligible match, except as approved by the Director of Parks and Recreation.

Neighborhood groups may propose projects for work outlined in this plan through the current volunteer project planning system. Parks and Recreation staff will sit down with submitted proposals in August and November each year and look at what is being

⁸ Moody, Michael E and Richard N. Mack. 1988. *Controlling the Spread of Plant Invasions: the importance of nascent foci*. Journal of Applied Ecology, 25, 1009-1021.

requested. Projects that are mostly self-supporting and being run by trained forest stewards are likely to get approved and scheduled. Projects that require higher levels of support from the City will be selected and scheduled based on the available resources and the level of community support they demonstrate in their proposal. Project proposals may be submitted any time of the year and are considered in August and November of each year. Projects are then scheduled based on timing and resources available to support the project. See Appendix E and www.miparks.net for more information on this system.

Grants and Donations

Grants for open space vegetation management are available through government agencies, corporations and foundations. Donations of money, goods or services may be made to the City of Mercer Island or its non-profit partners. Grants and donations will leverage City funding and neighborhood participation. This is an important way to accelerate plan implementation. The City will seek grants and donations for implementation of this plan and coordinate the applications of neighborhood groups to insure that they are not unnecessarily competing against each other or the City for grant funding.

Partnerships

There are potential partnerships with government agencies, businesses, service groups and non-profit organizations that can be developed to accelerate plan implementation and reduce costs. The USDA Forest Service Natural Resource Stewardship Network is a resource for technical assistance as well as grant funding. Businesses such as Starbucks and Windermere Real Estate have previously expressed interest in their employees providing volunteer service to Mercer Island Parks and Recreation. Service groups such as Kiwanis have performed invasive removal in Mercer Island parks as well.

In 2004, Mercer Island Parks and Recreation contracted with three non-profit environmental service organizations to provide volunteer recruitment, training and coordination for invasive removal at Pioneer Park and Upper Luther Burbank park. This approach was very effective at achieving the objectives for those parks within budget constraints. This approach may be a preferred option for future invasive control work for this plan.

Landscape Contractors

The region's landscape industry is highly developed and very cost-competitive for traditional landscape maintenance. One landscape contractor has performed invasive removal in Pioneer Park in previous years. However, City staff have had difficulty identifying contractors who are qualified to provide this service. The service of selective invasive removal is not a recognized specialty within the industry currently. City staff have approached Washington State Nursery and Landscape Association and Washington Association of Landscape Professionals about ways to engage and train contractors for this work.

Property Owners

This plan only covers public property, but levels of invasives are probably similar on forested private property. Controlling invasives on public property reinforces efforts by private property owners to control invasives on their properties and *vice versa*. Owners of forested property in proximity to open space properties can be allies in the effort to control invasives. Outreach to these owners would include information on the problems with invasive plants and strategies for controlling the plants. These efforts would lower levels of bird-borne and windborne seeds being dispersed in open space properties.

7. Cost Estimating

If cost were not a factor, all properties would be maintained at their highest level of function. However, this plan has estimated that providing Level of Service A to all second and third priority sites would cost almost \$15 million dollars over twenty years. This level of funding has been previously rejected by voters and City Council. Therefore a more modest level of expenditure must be reconciled with the goals of this plan.

The minimal investment recommended by this plan is a Level of Service C. Every priority open space property should receive at least Level C service. This is feasible with a modest investment, estimated at \$363,000 over twenty years (\$18,150/yr). This will result in a loss of trees and native vegetation over time and the loss of benefit that results. However, it would slow the rate of tree loss significantly. **In addition to this Level of Service, some properties should be selected to receive Level of Service B.** This would maintain current function by replanting trees where needed and keeping invasive plants out of areas that are in relatively good condition. Selection of these sites should be based on the functional benefit of the sites and the site priorities in Goals above. **This means that second priority sites as listed in Table 2 are the best candidates for Level of Service B. Thus, this recommended combined approach equates to \$2.7 million over twenty years (\$135,000/yr)**

Ideally, Pioneer Park would receive Level of Service A since it is a first priority site and provides the greatest functional benefit according to the analysis conducted for this plan. The Pioneer Park Forest Management Plan, however, will not achieve that result. Instead, the Pioneer plan could be considered equivalent to an enhanced Level of Service B, where invasives are controlled park-wide, but these activities are restricted by limited resources. This plan assumes that the Pioneer plan remains the guiding document for that property and it is funded accordingly. Therefore, Pioneer Park has not been considered in the discussion here.

This plan requires that priorities be somewhat flexible, influenced by the generosity of the community. Volunteerism and community participation are great potential resources that must be developed for this plan to succeed. Therefore, a cornerstone of this plan is an incentive to neighborhood leaders to recruit volunteers, grants and donations for their local park. All properties, including unprioritized properties could receive accelerated plan implementation and/or a higher level of service commensurate with the level of neighborhood participation. (see Resource Objective above).

Cost estimates are based on site inventories conducted by City staff in July, 2004. Costs were estimated from the level of invasive cover, the percentage of trees covered in ivy, the extent of the ivy cover in the trees and the steepness of the slope in each vegetation map unit. The area of the map unit was multiplied by an area unit cost for each non-overlapping work task. Unit costs were based on similar work done at Pioneer Park, Upper Luther Burbank Park, as well as Seattle Parks and Recreation sites restored by Earthcorps, Inc. Costs assume uncompensated volunteers accomplish at least half the work on slopes less than 30%. Crew costs are calculated at a rate of \$1,125 per six person crew per day, which includes overhead and tax, if applicable.

Tables 4-8 below identify the Level of Service costs for individual parks. Each level of service includes all applicable services for that level, with the exception of staff time. These are planning estimates only. Since this is a relatively new field of operation for the City and the region in general, there are not well-developed unit costs for this type of work.

Priority	Site	Level C	Level B	Level A
2	Mercerdale Hillside Park	\$36,015	\$567,346	\$2,408,208
2	Upper Luther Burbank	\$43,369	\$319,625	\$740,247
2	Ellis Pond	\$923	\$43,239	\$122,119
2	Island Crest Park	\$58,011	\$742,607	\$1,986,072
2	SE 53rd PI OS	\$77,859	\$866,214	\$2,746,784
	Subtotal	\$216,177	\$2,539,031	\$8,003,430
3	Clise Park	\$1,052	\$21,944	\$38,665
3	N Mercerdale Hillside	\$16,665	\$142,990	\$772,338
3	Parkwood Ridge OS	\$8,370	\$148,883	\$365,323
3	Gallagher Hill	\$43,376	\$175,188	\$1,389,308
3	Groveland Park	\$22,404	\$55,271	\$147,487
3	Luther Burbank	\$20,334	\$314,447	\$2,380,786
3	Hollerbach OS	\$16,898	\$163,031	\$600,710
3	Clarke Beach Park	\$16,900	\$11,628	\$1,050,151
3	First Hill Park	\$453	\$3,306	\$17,829
	Subtotal	\$146,452	\$1,036,688	\$6,762,597
	TOTAL	\$362,630	\$3,575,718	\$14,766,028

Table 4: Level of Service Costs for Second and Third Priority Open Space Properties with a twenty year implementation window (in 2004 dollars)

Investment Options

The recommended investment by this plan is a combination of Level of Service B for priority 2 properties and a Level of Service C for priority 3 properties, as identified in Option 1 below:

Option 1- Level of Service B on second priority and Level of Service C on third priority properties

- Estimated cost to implement- \$2.7 million over 20 years (\$135,000 per year).

Priority	Site	Level C	Level B	Level A
2	Mercerdale Hillside Park	\$36,015	\$567,346	\$2,408,208
2	Upper Luther Burbank	\$43,369	\$319,625	\$740,247
2	Ellis Pond	\$923	\$43,239	\$122,119
2	Island Crest Park	\$58,011	\$742,607	\$1,986,072
2	SE 53rd PI OS	\$77,859	\$866,214	\$2,746,784
Subtotal			\$2,539,031	
3	Clise Park	\$1,052	\$21,944	\$38,665
3	N Mercerdale Hillside	\$16,665	\$142,990	\$772,338
3	Parkwood Ridge OS	\$8,370	\$148,883	\$365,323
3	Gallagher Hill	\$43,376	\$175,188	\$1,389,308
3	Groveland Park	\$22,404	\$55,271	\$147,487
3	Luther Burbank	\$20,334	\$314,447	\$2,380,786
3	Hollerbach OS	\$16,898	\$163,031	\$600,710
3	Clarke Beach Park	\$16,900	\$11,628	\$1,050,151
3	First Hill Park	\$453	\$3,306	\$17,829
Subtotal		\$146,452		

Total \$2,685,483

Table 5: Option 1 - Level of Service B on 2nd Priority properties (Recommended) (in 2004 dollars)

The Mercer Island City Council may wish to consider different levels of investment for this plan as outlined below:

Option 2- Level of Service B on all second and third priority properties

- Estimated cost to implement- \$3.6 million over 20 years (\$180,000 per year)

Priority	Site	Level C	Level B	Level A
2	Mercerdale Hillside Park	\$36,015	\$567,346	\$2,408,208
2	Upper Luther Burbank	\$43,369	\$319,625	\$740,247
2	Ellis Pond	\$923	\$43,239	\$122,119
2	Island Crest Park	\$58,011	\$742,607	\$1,986,072
2	SE 53rd PI OS	\$77,859	\$866,214	\$2,746,784
Subtotal			\$2,539,031	
3	Clise Park	\$1,052	\$21,944	\$38,665
3	N Mercerdale Hillside	\$16,665	\$142,990	\$772,338
3	Parkwood Ridge OS	\$8,370	\$148,883	\$365,323
3	Gallagher Hill	\$43,376	\$175,188	\$1,389,308
3	Groveland Park	\$22,404	\$55,271	\$147,487
3	Luther Burbank	\$20,334	\$314,447	\$2,380,786
3	Hollerbach OS	\$16,898	\$163,031	\$600,710
3	Clarke Beach Park	\$16,900	\$11,628	\$1,050,151
3	First Hill Park	\$453	\$3,306	\$17,829
Subtotal			\$1,036,688	
Total			\$3,575,718	

Table 6: Option 2 - Level of Service B on 2nd and 3rd Priority properties (in 2004 dollars)

Option 3- Level of Service B on the two highest ranking second priority properties and Level of Service C on all remaining priority 2 and 3 properties. This option reflects the ranking of properties found in Appendix B.

- Estimated cost to implement- \$1.58 million over 20 years (\$79,000 per year).

Priority	Site	Level C	Level B	Level A
2	Mercerdale Hillside Park	\$36,015	\$567,346	\$2,408,208
2	Upper Luther Burbank	\$43,369	\$319,625	\$740,247
2	Ellis Pond	\$923	\$43,239	\$122,119
2	Island Crest Park	\$58,011	\$742,607	\$1,986,072
2	SE 53rd PI OS	\$77,859	\$866,214	\$2,746,784
Subtotal		\$122,151	\$1,309,953	
3	Clise Park	\$1,052	\$21,944	\$38,665
3	N Mercerdale Hillside	\$16,665	\$142,990	\$772,338
3	Parkwood Ridge OS	\$8,370	\$148,883	\$365,323
3	Gallagher Hill	\$43,376	\$175,188	\$1,389,308
3	Groveland Park	\$22,404	\$55,271	\$147,487
3	Luther Burbank	\$20,334	\$314,447	\$2,380,786
3	Hollerbach OS	\$16,898	\$163,031	\$600,710
3	Clarke Beach Park	\$16,900	\$11,628	\$1,050,151
3	First Hill Park	\$453	\$3,306	\$17,829
Subtotal		\$146,452		

Total \$1,578,556

Table 7: Option 3 - Level of Service B on the two ranking 2nd Priority properties (in 2004 dollars) and Level of Service C on all 3rd Priority properties.

Option 4- Level of Service B on some second priority properties only and Level of Service C on remaining second and all third priority properties. This option reflects 2nd priority sites that have existing neighborhood partnerships.

- Estimated cost to implement- \$1.2 million over 20 years (\$60,000 per year).
[Does not include \$15,000 per year Luther Burbank Maintenance and Operations levy funds for Upper Luther Burbank Park expiring in 2009]

Priority	Site	Level C	Level B	Level A
2	Mercerdale Hillside Park	\$36,015	\$567,346	\$2,408,208
2	Upper Luther Burbank	\$43,369	\$319,625	\$740,247
2	Ellis Pond	\$923	\$43,239	\$122,119
2	Island Crest Park	\$58,011	\$742,607	\$1,986,072
2	SE 53rd Pl OS	\$77,859	\$866,214	\$2,746,784
Subtotal		\$135,870	\$930,210	
3	Clise Park	\$1,052	\$21,944	\$38,665
3	N Mercerdale Hillside	\$16,665	\$142,990	\$772,338
3	Parkwood Ridge OS	\$8,370	\$148,883	\$365,323
3	Gallagher Hill	\$43,376	\$175,188	\$1,389,308
3	Groveland Park	\$22,404	\$55,271	\$147,487
3	Luther Burbank	\$20,334	\$314,447	\$2,380,786
3	Hollerbach OS	\$16,898	\$163,031	\$600,710
3	Clarke Beach Park	\$16,900	\$11,628	\$1,050,151
3	First Hill Park	\$453	\$3,306	\$17,829
Subtotal		\$146,452		

Total **\$1,212,532**

Table 8: Option 4 - Level of Service B on the 2nd Priority properties with existing neighborhood partnerships (in 2004 dollars) and Level of C on remaining 2nd and all 3rd priority properties.

Deferring implementation of service at any site means that future service costs will be greater. As invasive plants continue to take over these properties, it will become more expensive to accomplish the same Level of Service goal in the future.

In addition to these costs, there could be added costs for staff time depending upon the pace and breadth of implementation. The volunteer and partnership objectives of this plan make plan implementation highly demanding of management resources. At the lowest levels of investment and with some limitation on the number of project sites undergoing work in any one year, it would not result in additional staffing needs.

However, if neighborhood partnerships are to be encouraged (unrestricted) and increased levels of investment are pursued at numerous project sites, then additional staff time would be required to coordinate the significantly higher volume of projects, including volunteers, grants and donations. It's extremely difficult to forecast what level of staff

oversight may be required given the various investment options and variability and predictability in community involvement and grant obtainment. Should substantial neighborhood support for seeking major grant and partnership opportunities be realized, then the requisite additional staff time would be funded from the allocated City funds for that specific open space project site.

8. Initial Implementation Steps

Based on approved funding levels, plan implementation would be sequenced similar to the following:

- 1) Cutting ivy out of trees at all second and third priority sites over the first three years of the program. This cutting would be repeated every five years to prevent regrowth of vines in the trees.
- 2) Removing invasive plants as part of Level of Service B work using remaining budget from the first three years. Work on these properties would progress from the least invaded areas to more invaded areas, performing selective clearing of invasives to maintain functional populations of native plants.

Temporary project signs would be installed in high visibility locations to inform the public about the work and recruit volunteers from park users and neighborhood residents.

Work on slopes that are less than 30 percent would be reserved initially for unskilled volunteers to accomplish. If volunteer participation cannot complete this work, contractors would be hired to finish it. Work on steeper slopes would be accomplished by contractors and/or experience volunteers working in conjunction with professionals. Areas identified for non-selective removal would not be cleared unless additional resources allow Level of Service A for that site for the following five years to insure that eradication and replanting are achieved. (See Appendix F for maps indicating these work areas on second priority sites). The number of sites in process in any year will depend upon levels of funding, staff resources and neighborhood partnerships.

9. Performance Measures

Measuring the outcomes of this plan will be essential to achieving project goals. All work under this plan will be measured by the criteria listed in the table below. Some of these data will be compiled annually to demonstrate progress. Other criteria, such as tree canopy and invasive coverage will be measured on a ten year interval. Trees grow slowly and the twenty year span of plan implementation reflects this. The outcomes listed below cannot not be measured with certainty until at least ten years have elapsed.

KEY PERFORMANCE MEASURES				
<i>Trees and Open Space Vegetation</i>				
DESCRIPTION	Manage trees and invasive plants on approximately 300 acres of forested park and open space property.			
CITY PRIORITIES	The community will support attractive, high quality neighborhood and business environments. The community will support reliable public infrastructure and protect its considerable public investments.			
GOAL	Maintain the functional benefits of open space vegetation to the extent that available resources allow. Maximize the use of available resources through volunteers, matching grants, and donations.			
OBJECTIVE	Perform invasive removal and tree planting in priority parks and open space properties.			
<i>Type of Measure</i>	<i>Description</i>	<i>2004 Estimate</i>	<i>2005 Estimate</i>	<i>2006 Estimate</i>
<i>Input</i>	Value of grants and donations	0		
	Number of volunteer hours	3000		
<i>Output</i>	Number of trees freed of ivy	100		
	Number of trees planted	500		
	Acres of invasive plants removed	10		
<i>Outcome</i>	canopy coverage in parks and open space	(measured on a 10 year cycle)		
	invasive plant coverage	(measured on a 10 year cycle)		

Table 9: Key Performance Measures for Open Space Trees and Vegetation

10. Plan Revisions

This plan should be revised at ten year intervals to report on the program's performance and to develop any needed revisions to the plan. At that time, another ground survey should be conducted and compared to the data from 2004 to measure plan progress. If available, LIDAR data should be collected to analyze canopy coverage for comparison with the year 2001 data used in this study. The cost of this plan revision is estimated to be \$25,000 in 2004 dollars.

11. Appendices

Appendix A: City Green Analysis

Appendix B: Weighted Ranking of Benefits by Property

Appendix C: "Sticky Dot" exercise results

Appendix D: Property Analysis

Appendix E: Volunteer Project Level of Service Matrix

Appendix F: Maps of Second Priority Properties

Appendix G: Public Meeting Documentation