Cowen Park
VEGETATION MANAGEMENT PLAN
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COWEN PARK VEGETATION MANAGEMENT PLAN

Chapter 1 – Plan Overview, Goals and Objectives

Overview

This plan provides direction for the long-term care of vegetation at Cowen Park. Based on goals and objectives described below, the document lays out appropriate strategies for managing all vegetative components of the landscape. While the core focus is trees, the park's urban forest encompasses all types of plants as they interact dynamically with each other and park users.

The Cowen Park Vegetation Management Plan (VMP) is organized so that different readers can easily find and use portions of greatest relevance to them. The document's audience likely will include Seattle Parks and Recreation Department maintenance staff, tree crew and managers, Cowen area residents, stewardship volunteers, community advocates for historic preservation and habitat protection, students, urban forestry and landscape professionals, and the broader public. Each will take interest in particular aspects of the plan, if not the entire document.

The Cowen Park VMP consists of eight parts:

1. Overview, Goals and Objectives

Provides basic orientation to the vegetation management plan and describes objectives for vegetation management within context of overall, established park goals.

2. Plan Context

Summarizes relevant factors influencing vegetation management direction, besides characteristics of the natural resource itself. Covered are general site description, park history, existing plans and policies, community interests and concerns, and patterns of park usage.

3. Assessment of Existing Resource

Physical elements which constitute the existing park landscape are described and evaluated: native forest vegetation, developed landscape trees, shrubs, herbaceous plants and turf, park soils, topography, wildlife and encroachment status. Analysis of how documented resource condition should affect management approach.

4. Findings

Synthesizes key "realities" which emerge from preceding evaluation of contextual factors and physical resource condition. For each finding, suggests related vegetation management issues the VMP should address.

5. Vegetation Management Recommendations

Lays out prescriptions for vegetation management, defining WHAT needs to be done, WHEN seasonally and over time, WHERE in the landscape, and BY WHOM, whether

Parks crew or other staff, contractor or volunteers. For purposes of organizing work according to landscape type, the park is divided into six Management Areas (MA's).

6. Maintenance, Management, and Monitoring Practices
Details HOW to accomplish specific recommended tasks, sorted by activity type, closely paralleling and supplementing Seattle Parks' evolving Best Management Practices guidelines (BMPs). Also offers monitoring guidelines for long-term success of projects.

7. Implementation
Provides suggested priorities, strategies and budgets for VMP implementation.

8. Appendices
Assembles VMP maps for reference and supporting documents for further background.

Goals and Objectives
Vegetation management goals echo overall goals already established for Cowen Park and Seattle's park system. VMP-specific goals derive from evaluation of the existing park resource, contextual factors, and concerns articulated by staff and public. Key issues identified from resultant findings have been transformed into the overall statements of intent (Goals) for this plan which follow. Supporting plan objectives have been developed as well. Specific vegetation management recommendations in Chapter 5 concretely describe actions required to meet the overarching VMP goals. While abstract, the "big picture" given here provides impetus and meaning to individual activities, ensuring that when added together, they will yield positive results.

Goals for Cowen Park vegetation management are to:
- Create sustainable plant communities throughout Cowen Park.
- Ensure long-term aesthetic quality and continuity of park vegetation.
- Attract and support diverse, non-destructive park uses.
- Safeguard Cowen Park's Olmsted design and planning heritage.
- Expand and enhance quality of Park wildlife habitat.

Objectives relate to one or more of the VMP goals. They include to:
- Improve age diversity of Park trees.
- Expand species diversity of Park trees, both native and ornamental.
- Remedy identified tree hazard conditions.
- Develop and implement ongoing program to monitor tree condition.
- Eliminate invasive plants from entire park, forest as well as developed landscape.
- Improve irrigation to eliminate unnecessary labor, over- and under-watering.
- Correct turf drainage problems that impair visitor use and impede upkeep.
- Institute measures to improve soil quality and reduce compaction.
- Provide reliable establishment care to ensure vigorous plant survival.
- Select and place new plants respecting Olmsted intent, general and Park-specific.

- Expand quantity and variety of native plants used throughout the Park.
- Where consistent with user safety, increase habitat structural complexity.
- Convert ornamental plantings to minimize resource demand (labor, pesticide, water, fertilizer, etc.) without compromising aesthetic quality.
- Encourage active involvement of users in care and enjoyment of park plantings.

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Chapter 2 - Plan Context

Site Character

Cowen Park occupies a well-defined site, which lies at or below the grade of four surrounding streets and an adjacent bridge. At its eastern boundary, Cowen merges indistinguishably into Ravenna Park, marked only by the 15th Avenue NE bridge directly overhead. Before development profoundly changed Cowen's topography, the two parks shared a common ravine and creek draining from Green Lake to the west. The watershed remains today, in significantly altered form.

What once was ravine has become level and gently sloping lawn, meeting steep residual slopes along portions of the park perimeter. In these unaltered areas are vestiges of native forest vegetation. The largest woodland block occupies the northeast portion of the park, where the grade descends to merge into the intact Ravenna ravine. A flat area graded as part of original park development occupies the adjacent southeast corner of the park. The playground here has mature conifers and shade trees defining its periphery, few of them native. A recently created Sundial Garden marks the play area's north end.

Large sweeps of lawn bordered by scattered specimen trees and small groves define the westerly half of the park, including both native and exotic species. The majority of these trees were presumably planted after placement of 100,000 cubic yards of fill in 1962, which obliterated the existing stream and ravine. Much native vegetation was either felled or buried. The south end of the lawn has a backstop defining a ballfield but little used as such. The turf is not maintained to athletic standards, and is seasonally too wet for even informal play.

A narrow wetland at the north end of the park parallels the lawn edge along the base of a steep, forested slope. Recently, a considerable colony of herbaceous weeds was removed and wetland restoration begun, including the planting of some native shrubs and emergent vegetation. A small, robust cottonwood grove lies further east, and beyond, a few additional, planted trees bordering an expanse of bog overgrown with weedy understory species (notably buttercup, bindweed, and blackberry). As wetland restoration continues, it is expected that most of these weedy species will be removed and suppressed.

Formal landscape elements are limited to ornamental planting beds at the University Way and southeast (15th & Cowen) entries, and the mostly herbaceous Sundial Garden. Limited mixed shrubberies remain along the Park's southeast and western edges, most in process of conversion back to native understory. In general, the south and southwest portions of Cowen Park have the most developed landscape character. Perimeter street trees add formal definition to park edges on three sides, with mature lindens along Cowen Place and Ravenna Boulevard and mature to post-mature bigleaf maples along Brooklyn Avenue and NE 62nd Street. Several bigleaf maples were recently removed as hazard trees, and planting of replacement trees will take place as early as January 2004.

Park History

Cowen Park today only slightly resembles its original, undisturbed character. The Park's landscape has changed dramatically as a result of both urban development a century ago and major alterations undertaken just forty years ago. Vestiges of Cowen Park's pre-settlement landscape remain in its native wooded slopes and scattered conifer offspring from the primordial forest for which adjacent Ravenna was once renowned. Otherwise, humans have substantially transformed both its terrain and plant communities.

Short, steep hillsides mark the upper reaches of sinuous ravine walls that deepened from the Park's southwest to its northeast corner. A creek originally emanated from Green Lake, carving its course diagonally through the park, then flowing on through Ravenna to Lake Washington at Union Bay. Lake Washington itself formed at the end of the last glacial era 10,000 years ago, the remains of ice melt in a low, scoured depression. The outlet creek ceased to function when Green Lake was intentionally lowered in 1911 to create additional shore land for park development. Water volume decreased dramatically but not completely, and a modest stream continued to flow through Cowen ravine fed by runoff and springs, some mineral. Green Lake's water was discharged directly into the municipal sewer system. The ravine westward from Cowen Park was filled to make level grade on which to build Ravenna Boulevard.

In 1906, developer Charles Cowen donated to the City 12 acres of undeveloped property that abutted a residential subdivision he recently had platted, to be used "for park and parkway purposes". This gift followed closely on the heels of the Olmsted Brothers Landscape Architects' report to the Board of Park Commissioners detailing A Comprehensive System of Parks and Parkways, officially adopted in Fall 1903. The plan recommended construction of a continuous series of parkways linking existing and proposed new parks along a twenty mile route between what are today Seward and Discovery Parks. Ravenna Boulevard is part of this resulting system. Ravenna, Cowen and Green Lake are among numerous private tracts identified by John Olmsted for park acquisition, either by purchase or by gift. Charles Cowen committed himself to this vision as an early benefactor, noting that "Man cannot live by bread alone".

Under pressure to complete park improvements quickly for the Alaska-Yukon-Pacific Exposition of 1909 (held at the nearby University site), the Park Commissioners immediately asked the Olmsted Brothers to draw up plans for Cowen Park. Olmsted's initial November 1906 field notes indicate that the park contained less than an acre of level land, and a "cheap trestle bridge" being built across the ravine at Brooklyn Avenue - now the westerly boundary of Cowen Park. Much of the surrounding subdivision land by then had been roughly cleared. Preliminary plans were submitted in March 1907 but important details were subsequently disputed, based on issues of cost and inaccurate base information. The 2002 City of Seattle Landmarks Nomination states:

> *In completing the improvements to Cowen Park, the Parks Department used the Olmsted preliminary plan as a guide but did not faithfully execute all of the design elements, especially with regard to the structures proposed for the park. While labor-intensive, the work necessary to complete the landscape plan of paths and walkways was relatively inexpensive and generally followed the design secured from the Olmsted Brothers. By June of 1907, work had commenced on clearing and grading for walks, cleaning up of the slopes and other preliminary work, according to the Parks Department 1906-07 Annual Report. The report anticipated that the work would be carried to completion, including the planting to be done, during the fall and winter of 1907.*

Although left largely in a natural state, a series of bridges, small dams and trails paralleling the stream were created to welcome visitors. A children's play area was designed for its approximate modern location and configuration, but not immediately built. A rustic, Olmsted-designed gate structure at University Way was erected in 1909 but decayed within a decade, to be replaced in 1920 by the existing granite memorial entry – paid for by and honoring Cowen himself. The 1909 Annual Report of the Board of Park Commissioners describes the park as follows:

> *It consists largely of a winding ravine, with beautiful and natural growth on its slopes, while a babbling brook courses the ravine and affords a means of creating many charming effects. There is also a considerable area of level space, which has been beautified with lawns, walks and plantations. A unique shelter house has been constructed on a terrace, the roof forming an observatory and resting place with the comfort station beneath.*

The landmark nomination adds:

> *From this description, it is evident that the finished park contained many of the typical design characteristics employed by the Olmsted Brothers. While the park appeared to remain in its natural state, the effect was the result of extensive work based on a formal landscape plan. Curvilinear paths enabled visitors to stroll through the park and experience its natural beauty without seeing, hearing or feeling the bustle of the outside world. Broad lawns and plantings of flowers and shrubbery enhanced the natural features already present. The park's varied topography allowed for the passive activities preferred by the Olmsted Brothers, such as concerts and picnic parties, but prevented the inclusion of disruptive organized sports, such as baseball.*

Exactly what remains of Olmsted-vintage landscaping is not clear, as neither a detailed planting plan nor a plant list has been found - perhaps never in fact generated by the firm. Continuous street trees around the full park perimeter (except the15th Avenue bridge) correspond to the 1907 preliminary plan; whether the Olmsteds intended all to be of a single species, or which taxa, is not known. Several shrub varieties found in the park are common to other Seattle park landscapes the firm designed, including: *Ilex aquifolium*

(English holly), *Prunus lauracerus* (English laurel), *Abelia* spp. (abelia), *Viburnum tinus* (laurustinus), *Rhododendron* spp. (rhododendron and azalea), *Weigela* spp. (weigela), *Spirea douglasii* (spirea), *Hedera helix* (English ivy), and natives such as *Mahonia nervosa* (low Oregon grape) and *Philadelphus lewisii* (mock orange). At that early juncture, no one appreciated the eventual invasive qualities manifest by some of these ornamental species. The Olmsted firm often blended native and ornamental species, in a gradient from formal to natural landscaped areas.

According to Donald Sherwood history (Seattle Municipal Archives), in 1931 unemployed workers cleared and grubbed areas of Cowen and Ravenna Parks. The Federal WPA subsequently added plantings. No information is given as to what kinds of plants were removed, or where, nor what species were planted. The conifer "Monarchs" of Ravenna Park either declined or were overzealously felled over a period of years in the first third of the 20th Century, amidst much controversy and regret. Cowen Park may likewise have possessed great Douglas firs, hemlocks and cedars but if so, they are not so well documented or celebrated. Excerpts from a 1903 souvenir brochure about then-private Ravenna Park are included in Appendix A, describing native flora and fauna present at that time. These lists serve as an interesting baseline for current reforestation planning.

In late 1957, a short half-century after its original improvement, dramatic changes to Cowen Park began to occur. The precipitating event was the collapse of the main trunk sewer line beneath Ravenna Boulevard just two blocks east of the park, leaving 43,000 residents without service. The resultant sinkhole grew to 175 x 200 x 50 feet deep, water and gas lines broke, and raw sewage flowed westward to Green Lake as well as welling up through manholes to the east. The initial response was to divert sewage to the open Cowen-Ravenna creek. Within eleven days, an emergency bypass line of welded steel over a mile long was completed through the ravine. The two parks served as a staging area for reconstruction of the main Ravenna sewer line for a period of two years, closed to the public and sustaining considerable damage. The landmark nomination notes:

> *Local residents worried that their wooded natural retreats would never be the same after the disruptions caused by the sewer break. In responding to their concerns, Parks Superintendent Paul V. Brown assured them that the Engineering Department had allocated funds for the complete restoration of the ravine joining the parks, and that the Parks Department desired the ravine's full return to its original natural appearance. However, when 100,000 cubic yards of fill became available due to the construction of nearby Interstate 5, the local demand for additional athletic fields resulted in the filling of most of the Cowen Park ravine in the early 1960's. When initially formulated in the spring of 1960, the plan had been to fill and reclaim some 300 or 400 feet…at the narrow southwestern end of the ravine near Brooklyn Avenue NE and NE Ravenna Boulevard. …Within a few months, however, the Parks Department announced plans to fill almost the entire ravine to 15th Avenue NE, the invisible line separating Cowen and Ravenna Parks. This required the removal of all the trees within the ravine as well as additional trees along the edge of the filled area.*

The plan provoked strong reactions among local residents, both for and against filling the ravine. Newspaper articles quoted individuals who saw the ravine-filling project as a much-needed improvement for the "biggest nest of juvenile delinquency in the city" and who looked forward to enjoying the park's new amenities. Those who wrote letters to the Parks Department and the newspapers were decidedly opposed but for a variety of reasons. Most were appalled by the loss of the ravine, described in one letter as a "haven of peaceful rest amidst the bustle of the city," and the destruction of its trees, especially after having endured the previous two year of work of repairing the sewer line. They also decried the Parks Department's hasty decision to accept the freeway contractor's unwanted dirt and debris with little prior public notice and to fill the ravine based on the amount of material available. In a May 31, 1960 letter to Seattle Mayor Gordon Clinton, The Mountaineers expressed outrage over the fact that Seattle was destroying a "tree-lined, natural ravine, where retreat from work-a-day cares could be had". The organization also urged Mayor Clinton to guard with care Seattle's natural and semi-natural areas and not use them for convenient dumping grounds in the future. Others objected to the plan because they were concerned that the newly filled area would draw large crowds to the park and create noise and parking problems. In the end, the filling of the ravine proceeded as planned, obliterating most of the Olmsted-designed landscape. A playground and Little League playfield were later added.

Today, blatant disregard for Cowen's natural systems and its historic landscape legacy seems unimaginable. While Cowen has been permanently transformed into an almost unrecognizably different environment, recent years have brought more positive changes in wake of subsequent crises. In the mid-1990's, Cowen Park became a magnet for encampment and illegal, sometimes violent activity, a consequence in part of benign neglect. Fearful local residents avoided the park, exacerbating the decline.

As a first step toward reclaiming this valued neighborhood open space, in 1997 Allworth Design Group was commissioned to create a Site Improvement Plan (see Appendix A). The landscape architect suggested upgrading the existing play area to attract families back to the park, adding aesthetic enhancements like paving, sculpture and view benches, and implementing numerous vegetation management recommendations. These included: creating a curving stream with riparian plantings to echo - if not replicate - the original, a new generation street trees to succeed existing bigleaf maples and lindens, replacing blocking hedges of invasive ornamentals on steep slopes with low natives, and restoring the remaining ravine forest. Since 1997, considerable progress has been made on all fronts. Now the community makes almost nonstop use of the park for a great range of positive activity.

Following genesis of the Site Improvement Plan, neighbors sought funding to upgrade the play area. Some additions and alterations to park vegetation resulted. Just north of the playground a large sundial garden was created, its circular lawn surrounded by drought-tolerant shrubs, grasses, groundcovers and perennials. Large existing trees became more subject to foot traffic, with a resulting net increase in root zone compaction. Friends of

Cowen Park (FOCP) began tackling invasive plant removal and native plantings, in conjunction with Parks crews. Through a collaborative intervention process, police, Parks Department, neighbors and social service agencies further addressed identified problems. A December 1998 Neighborhood Assistance Team (NATS) Park Design report offers the following observations:

> *The diverse uses, size, and design of Cowen and Ravenna Parks as well as a lack of comprehensive maintenance schedule has resulted in a decline of park usability. The specific areas that need to be addressed are:*
>
> ***Existing drainage*** *(bridge, Cowen path, ball fields)*
> ***Undergrowth*** *(pruning, planting)*
> ***Silt in creek*** *(from bridge drainage)*
> ***Irrigation*** *(Capital Improvement Project)*
> ***Vegetation management*** *(plan)*
> ***Visibility*** *(Cowen open areas, both manicured and natural. Look at height of plants, look out from inside park, and in from outside, easier / less maintenance, promotion of native plants)*
> ***Erosion*** *(specific spots and long term)*
> ***Trail maintenance*** *(wood chips, gravel, log borders, water bars)*
> ***Signage***
> ***Field Maintenance*** *(mowing, sand, fertilizer)*
> ***Lighting***
> ***Sanitation***

The identified short-term goal was dubbed "Environmental harmonics". Components included "enhanced visibility, increased sense of security, enhanced health of desired vegetation, reduction of unwanted (invasive) vegetation, timely maintenance". It is important that these current vegetation management plans reinforce that identified goal and ensure that components to fulfill it receive ongoing emphasis.

Spring of 1999 saw the influx of Parks crews from throughout the city for an intensive, one-day landscape restoration Jamboree. The scope of work resulted from a December 1998 Park walkthrough in which vegetation and site management projects were identified. Detailed notes are included in Appendix B. From these were derived specific tasks as well as species lists and plans for target area replanting, among these the University memorial entry which was overgrown and lacked visibility. An enormous amount of tree work, vegetation removal, mulching and planting was accomplished; the benefits of which are evident in the park today. Although work along these lines is ongoing, essential improvements in all components are visible.

Tree loss at park street edges along Brooklyn and NE 62nd has occurred over the past 10-15 years. Two vehicles have been damaged by falling bigleaf maples during this period. Parks has removed other hazard trees proactively, with more likely in the near future. The bigleaf maples likely date to the Park's original development circa 1908, but even if planted a few decades later are now reaching advanced age and a state of natural decline.

This species is an early successional type, not built for great longevity like climax stage forest taxa. The escalating attrition has been a cause of great concern among neighbors, some advocating preservation at all cost. Replacement planting has become an increasingly urgent, shared priority.

The most recent chapter of park history is the funding of two ProParks bond issue projects for Cowen. First, the Shelter House upgrade (via renovation or replacement) is unlikely to significantly affect park vegetation. Construction will be confined largely to the existing structure's location. The Creek Daylighting project will implement the design concept laid out in the 1997 Site Improvement Plan, and create more extensive riparian wetlands than the park currently possesses. Such improvements will return full circle to reclaim a portion of the park's original natural and Olmsted landscape heritage.

Citizen Activities and Concerns

Two public meetings concerning vegetation management for Cowen Park were held during development of this plan, on September 12 and December 3, 2002. A detailed record of citizen comment received at these meetings and by other means (phone, letter, email, etc.) has been assembled in Appendix C. Prior meetings relating to park vegetation and surrounding issues occurred during the 1998-99 NATS process, and presumably in 1997 as the Cowen Park Site Improvement Plan was developed. The ProParks Cowen projects now underway are following a designated public process; of these, the Creek Daylighting project can be expected to generate comment regarding vegetation in wetland areas and perhaps overall impact on park character.

Key questions, concerns, and priorities articulated by citizens were:

What wildlife are we bringing back?
What are invasives?
Will wood be salvaged?
Where is the stream?
Will the wetland plans include a vegetative component?
Where are the signs for the project or Parks Foundation?
Species for replacement along perimeter of Park?
Concerns regarding use of sugar maples as they drip?
When will street trees be planted?
Only remove trees that we have to because of disease or other issues.
Will species include conifer trees?
What is spacing of trees along the roads?

Interested Organizations

FOCP is the one organization most directly involved with Cowen Park, and its vegetation in particular. Also interested is Roosevelt Community Council, many of whose members overlap. University District-based nonprofits serving street youth took a strong interest in Cowen during the NATS process, but have not participated in VMP discussions perceived

as less directly relevant to their mission. Ravenna-Eckstein Community Center runs a summer nature camp based in Cowen, utilizing the Park's vegetation resource for its program.

Washington Native Plant Society plant stewards and members often participate in FOCP forest restoration work parties; likewise, Audubon Society members advocate for and contribute to habitat preservation throughout Seattle's urban parks, Ravenna/Cowen among them. Friends of Seattle's Olmsted Parks provides direction and oversight concerning fidelity to the Olmsted Brothers legacy, their spirit and intent as well as preservation of executed design. While Cowen Park has evolved far from its original Olmsted plan, FOCP nonetheless takes interest in conserving whatever possible of their influence, including sympathetic vegetation treatment.

Vegetation-Related Uses

Because Cowen Park encompasses a broad range of vegetation types within its modest acreage, the park supports a great variety of uses. In all seasons, walkers traverse or skirt the park enroute to and from the University, Roosevelt and Green Lake districts. They – plus cyclists and runners – enter and exit Ravenna ravine via trails through Cowen Park. Individuals and small groups visit the park for relaxation whenever weather is conducive. Many use the popular lawn areas to sit, chat, read, sunbathe, make music or play with toddlers, dogs, balls or Frisbees. People also frequent the Shelter House's roof overlook, the 15th Avenue NE bridge and perimeter benches where the vista from above and through the trees is both dramatic and serene.

Open portions of the park landscape attract highest use, while secluded woodland edges provide quiet and seclusion. Artists occasionally work "en plein air," the bridge motif being much loved. In wilder reaches of the park, and beneath the bridge one occasionally encounters encampments and evidence of substance abusers. Litter, trampling, erosion and vegetation damage are visible consequences. District action to remove such illegal activity is compassionate but swift. Social trails created by visitors are evident along all three accessible edges, where steep slopes and limited developed entries thwart access from street to park interior. Until underlying deficiencies in access are remedied, cut-through paths are likely to continue developing regardless of spot closures by vegetation or other means.

A defined play area on the southeast side draws families year round, to its play structure, swings, picnic table and extremely popular "zip" swing ride. Informal activity occurs throughout the area and its periphery, resulting in root exposure and compaction at the base of mature, preexisting trees. Unless addressed, such stresses may lead long-term to tree decline, disease or even hazard failure. The adjacent Shelter House supports a summer nature day camp. This program increases user load on the play area and overall park, but also offers potential to teach and practice environmental stewardship within the park itself.

The south ballfield was originally built for Little League baseball circa 1962, after freeway fill placement. It receives limited team use but is not generally scheduled for play.

Recently, it has been reserved for weeknight volleyball. Poor turf drainage and uneven irrigation make the field inappropriate for higher level play without complete renovation, for which recent estimates ranged to a quarter million dollars. Local residents appear little interested in attracting more organized sports to the park. Ironically, a chief justification for filling Cowen's wooded ravine was to create more level land for active neighborhood recreation, for which there was great demand four decades ago. In our own era, informal use and contact with nature appear more important to Park users. Of course, one cannot presume unanimity given the wide range of activity evident at Cowen today. The landscape must be managed to support as many legitimate uses as possible without further detriment to the resource itself.

COWEN PARK VEGETATION MANAGEMENT PLAN
Chapter 3 - Assessment of Existing Resource

Soils
Cowen Park's native soil is predominantly composed of sandy loam. Hill slopes exposed beneath the East Bridge reveal almost pure, loose sand, unstabilized by vegetation. Large areas of the park are built on top of freeway excavation fill, and are generally more erratic and heavy than the native soil. Highly organic soils are found in the wetland and as imported topsoil in beds for ornamental entry plantings. Compaction is evident in many parts of the park, notably the heavily-used but unimproved paths along street edges and in the children's play zone. A map showing soil types is included in Appendix D.

Slope Stability and Erosion
Short, steep slopes exist on the park perimeter as remains of original ravine walls. Where de-vegetated, these are subject to surface water erosion. Fortunately, fairly continuous canopy intercepts rainfall in most locations. Some social trails and cut-through paths straight down slope create conditions for erosion. Soil ultimately moves to the small stream leading from Cowen to Ravenna ravine, where it compounds watercourse siltation. The Creek Daylighting project will address this situation. Although sand sloughs freely beneath the 15th Avenue NE bridge, slide activity is not evident within the park itself.

Forest Character and Condition
Cowen Park's remnant woodlands can best be described as mature deciduous forest, dominated by *Acer macrophyllum* (bigleaf maple), *Prunus emarginata* (bitter cherry) and scattered conifers such as *Pseudotsuga menziesii* (Douglas fir) and *Thuja plicata* (Western red cedar). The forest is dissected into small stands and fragments by trails and lawn. The largest portion is the continuous north perimeter hillside forming a narrow band on steep topography. A pronounced moisture gradient exists here, from the dry, south-facing upper slopes to moist riparian wetland at the base where a grove of cottonwoods grows.

South of the main ravine service road / trail lies a gentler, north-facing wooded slope of greater depth but bisected by a trail and once partially cleared for a now-abandoned lawn. Fragments of native forest also remain along short slopes at the west and south Park perimeter, with vestigial large maples and scattered understory species such as *Polystichum munitum* (sword fern), *Symphocarpus albus* (snowberry), and *Mahonia nervosa* (low Oregon grape). These slopes have been subjects of recent, partial restoration, which supplemented remnant native plants and removed invasive shrubbery.

Three vegetation plots of 1/10 acre, each a 74-foot circle, were inventoried to obtain detailed information concerning forest composition. Two are situated along the north hillside, a third in the Park's central woodland; locations are shown on the Cowen Park Vegetation Management Areas map found in Appendix D. Plot data sheets are also included, useful as a baseline for comparison in relation to future monitoring. While each

plot revealed distinct characteristics, the composite, overall forest composition can be summarized in the following findings:

COWEN PARK FOREST

Slope	Slight (0 – 15%) to Steep (40%)
Aspect	North, South, limited East
Soils	Sandy loam
Water	Wet to dry (latter dominant)
Bare Ground	26% average (fairly consistent among plots)
Canopy Closure	>80% in all plots
Snags	0 – 4 per plot, equivalent to average 20 snags / acre
Down Woody Debris	4% average coverage, equivalent to 137 large (3" + diameter) pieces / acre
Native Canopy Regeneration	Planted: none in plots (although some exist in stand) Natural: 167 trees / acre equivalent, all bitter cherry
Dominant Tree Species	*Acer macrophyllum* – bigleaf maple 48% average canopy coverage Found in all plots *Prunus emarginata* – bitter cherry 12% average canopy coverage Found in all plots *Populus trichocarpa* – black cottonwood 7% average canopy coverage Found in only one plot, where abundant *Robinia pseudoacacia* –black locust 3% average canopy coverage Present in only one plot, localized
Dominant Understory Species	*Cornus cornuta californica* – beaked hazelnut 31% average coverage Found in all plots, sometimes without overstory. *Hedera helix* – English ivy 16% average coverage Found in all plots, but widely variable extent *Gramineae* – Grass species 13% average coverage Found in 2 of 3 plots, highly variable extent *Mahonia nervosa* – low Oregon grape 5% average coverage Found in all plots *Polystichum munitum* – sword fern 5% average coverage Found in all plots

Dominant Invasive Trees	*Robinia pseudoacacia* – Black Locust 3% coverage 1 plot *Laburnum anagyroides* – Golden chain tree 1% coverage 2 plots
Dominant Understory Invasives	*Hedera helix* – English ivy 16% coverage all plots *Ilex aquifolium* – English holly 6% coverage all plots *Prunus laurocerasus* – English laurel 2% coverage 2 plots *Rubus discolor* – Himalayan Blackberry 1% coverage 2 plots *Calystegia sepium* – Hedge bindweed 1% coverage 1 plot

The above statistics reveal several characteristics relevant to future forest restoration. The woodland is unified by a consistently dense canopy composed largely of mature bigleaf maple with bitter cherry, plus scattered young-mature to mature Douglas fir, Western red cedar and wetland-associated black cottonwood. Self-sown, non-native trees representing seven species were recorded in plots, only 20% of which exceeded four inches in diameter. This finding suggests that significant non-native canopy regeneration is occurring, which could fundamentally alter future forest composition if left unchecked. Although twice as much native regeneration is evident as non-native (averaging 167 vs. 83 saplings per acre), virtually all were of a single species - weak, short-lived bitter cherry – not a tall, enduring canopy species.

Hazelnut dominates the understory, with other natives represented in small and variable amounts: sword fern, low Oregon grape, plus minimal *Rubus ursinus* (trailing blackberry), *Oemleria cerasiformis* (Indian plum), *Pteridum aquilinum* (bracken fern), *Athyrium filix-femina* (lady fern), *Rubus parviflorus* (thimbleberry), *Rosa* spp. (wild rose) and *Equisetum* spp. (horsetail). Herbaceous natives otherwise are all but absent, not uncommon in denuded or invasive-smothered urban forest environments. Invasive understory plants occupy an average of 40% of ground area, compared with only 5% invasive canopy coverage. The understory is a composite of natives, invasives and bare ground, the relative proportion and taxa varying by location according to several variables at work in the park:

moisture gradient, light level, degree of disturbance in recent or more distant past (lawn creation, invasives removal, trampling by social trails and encampment, canopy loss).

This resultant mosaic appears derived more from human activity than microclimate diversity. Restoration could yield a more consistent forest matrix, although different wooded locations within the park may require development of distinctive characteristics. Within a native plant collection, diverse results can be achieved. Potential objectives could be to minimize light and view blockage by conifers, to maximize light reaching street trees along the north park boundary, to enhance ornamental qualities, to discourage human entry and improve habitat continuity, or to preserve and frame particular views. Manipulation and intervention distinguish urban woodland restoration from wild forest regeneration, and are indeed a necessity for forest survival.

Landscape Trees

Cowen Park's other urban forest component is its planted specimen trees. These represent both native and introduced species, including coniferous, shade and flowering trees of all statures. The species include classic ornamental varieties such as *Tilia cordata* (linden), *Platanus x acerifolia* (London plane), *Ulmus procera* (English elm), *Aesculus hippocastanum* (horsechestnut), *Acer rubrum* (red maple) and *Fagus sylvatica* (European beech), as well as exotic conifers including *Picea orientalis* (Oriental spruce), *Picea abies* (Norway spruce), *Sequoia sempervirens* (Coast redwood), *Pinus sylvestris* (Scot's pine), *Pinus strobus* (Eastern white pine), and *Taxus baccata* (English yew). Flowering trees include the extremely rare *Rhus potaninii* (Chinese varnish tree), plus the more common *Malus* spp. (crabapples) *Prunus* spp. (cherries) and *Sorbus aucuparia* (mountain ash). Native species used ornamentally include *Pseudotsuga menziesii* (Douglas fir), *Thuja plicata* 'Zebrina' (variegated Western red cedar), *Tsuga heterophylla* (Western hemlock), *Betula nigra* (river birch) and *Acer macrophyllum* (bigleaf maple). The great majority of park trees are at or near maturity. Many perimeter trees were planted early in the 20th Century at the time of park development; another wave was planted in the aftermath of massive regrading to create lawns circa 1960. Few young trees of recent vintage are found in developed landscape areas, suggesting a need for proactive replenishment plantings.

Not all of Cowen Park's landscape trees were catalogued for purposes of vegetation management planning. However, all were screened for potential problems that could shorten their useful life or cause serious risk to people or property. Evaluation also included forest trees within range of regular park users; interior woodland trees away from likely targets were excluded. Cowen Park's native forest was evaluated by other methods, as described in the previous section.

A total of 65 park trees raised concerns, including 24 street trees, further discussed below. The full tabulation of problem trees is included in Appendix B. Trees were sorted by recommended action(s):

Action	#Trees	#Species
Priority Removal	10	5
Removal	8	7
Pruning and/or Root Zone Care	21	8
Further Diagnosis or Monitoring (which could dictate further removals)	26	12
Totals	65	32

Thirty of the trees – nearly half – were bigleaf maple. By contrast, of 32 total species involved, an average count per species would be one tenth that, or three trees. In addition, two thirds of bigleaf maples fell into the more serious concern categories (Priority Removal, Further Diagnosis or Monitoring), as opposed to 55% for all the identified trees. Cowen's aging bigleaf maples appear to represent a population in trouble, a large group that will require replenishment or replacement with other species within a generation – some much sooner. Whether such replacements should be in kind or should contribute broader genetic and aesthetic diversity to the park is an open question. As an early-successional species, this particular native is not well suited to long-term use in developed landscape settings.

Street trees were given special attention due to their aesthetic importance, age and high target potential. Since the 1980's, a number of bigleaf maples have fallen or been removed for hazard abatement along the park's west and north sides. Seattle Parks arborists screened all twenty trees along Brooklyn Avenue and NE 62nd Street in early September 2002. They performed detailed hazard evaluations using ISA (International Society of Arboriculture) protocols on 65 trees of particular concern. Resulting recommendations included 18 removals (10 of those were priority removals, carried out in November and December of 2003), 26 needing additional diagnostic inspection and/or monitoring for future hazardous decline, and 21 to be pruned or given root care for safety.

Clearly, a strategy for providing replacement generations of street trees needs to be developed. Past efforts to interplant maples have resulted in bent or suppressed trees with little potential to live up to their intended stature as grand street trees. To achieve high quality specimens, replanting will have to be coupled with removals or gaps created by attrition. Questions raised are how many, in what sequence, and replaced with what taxa? Fortunately, littleleaf lindens lining Ravenna Boulevard and Cowen Place show few serious signs of decline. Their eventual replacement therefore poses less immediate concern. All Cowen Park's street trees suffer root zone compaction from constant foot traffic on unprotected bare ground beneath them. Ameliorating this condition will be an important, potentially costly undertaking.

Other Vegetation Components

The dominant elements of Cowen Park's vegetation are its trees and native woodland, already described. The park's developed landscape does include additional components, which contribute significantly to the whole, and bear mention. Turf covers a significant proportion of park square footage. Its condition varies by location, according to patterns of

uneven drainage and irrigation, intensity of use, compaction and light level. On the whole, turf is currently maintained in good condition except where extreme drainage problems, shade or intensive foot traffic make proper care impossible. The south lawn / ballfield contains perennially wet areas toward its east end; another smaller wet area is found directly north.

Ornamental plantings are located in beds flanking the University Way memorial portal and the raised planter in front of the shelter house. The latter is primarily a seasonal herbaceous planting maintained year round for color. The University entry beds contain mixed flowering shrubs, ornamental cherries, perennials, bulbs and annuals. These beds were renovated in 1999 to enhance the park's image and interior visibility from the street. Regenerated and arborized shrubs will require continued pruning to maintain the intended open landscape structure. Lack of automatic irrigation results in wasted labor and water to maintain these prominent plantings in good condition. By contrast, another new ornamental planting area, the Sundial Garden, has irrigation and is composed of exclusively low-water demand species. These include groundcovers, ornamental grasses and herbaceous perennials, as well as native ferns and flowering shrubs. Irrigation adjustments are needed to properly deliver water to the small central lawn.

Mixed native-ornamental shrubberies cover banks along the Park's southeast and west peripheries. Such areas were the focus of Parks crew renovation during the Spring 1999 Jamboree. Tall, view-blocking laurel was cut to the ground and many native species interplanted. Currently, much laurel is regenerating and few areas have filled in well with natives. An appropriate direction has been set for returning these sloping beds to more sustainable, natural condition, but additional, concentrated effort will be needed to succeed more fully. Shade, tree roots, cut-through behavior and steepness of grade all coalesce to make the conversion especially challenging. An isolated, ivy bed with diverse tree canopy is located at the west end of the Cowen Place promenade; it could easily be transformed from invasive understory to natives or even deeply mulched with its own leaves. A larger sloping bed immediately west of the shelter house contains ivy and several large, invasive shrubs (laurel, golden chain). The gardener recently has begun clearing undesirable plants from the area, for replacement with less problematic ornamentals. Attractive and durable laurustinus, which anchors the bed, shows no proclivity to self-seed. Finally, scattered ornamental shrubs intersperse the curving west bed near the Park's midblock entry on Brooklyn.

Wildlife Habitat

Wildlife historically found in Cowen and Ravenna is recorded in a 1903 booklet about Ravenna Park. Before development of Green Lake Park and Ravenna Boulevard circa 1912, the ravine corridor no doubt provided a key wildlife connection between Green Lake and Lake Washington. Bird species included the red-tailed hawk, American crow, varied thrush, Swainson's thrush, black-capped chickadee, Steller's jay, and northern flicker. Small mammals included the deer mouse, mountain beaver, Townsend's chipmunk, short-

tailed weasel, and raccoon. Common amphibians species likely included the northwestern salamander, ensatina, and the Pacific tree frog.

Though species diversity has undoubtedly declined with increasing human use and loss of both forested and riparian habitat, Cowen Park remains home to many birds, small mammals, reptiles, invertebrates and amphibians. To the degree that the quantity and complexity of the remaining native vegetative component can be enriched, native fauna will proliferate at Cowen. Forest restoration (particularly riparian forest), pesticide reduction and stream reconstruction all point to a future more abundant with wildlife. The Creek Daylighting project will provide breeding ponds for Pacific tree frogs. Vegetation management measures can substantially improve both the habitat niches and movement corridors long associated with Cowen Park.

Encroachments

No encroachments exist at Cowen Park, because it is entirely surrounded by park and streets - all public property.

COWEN PARK VEGETATION MANAGEMENT PLAN

Chapter 4 - Findings

Vegetation management for Cowen Park needs to be grounded in overarching goals and specific objectives. These are derived from a review of contextual influences (Chapter 2) and detailed resource evaluation (Chapter 3). This chapter summarizes overall findings and key issues, which in turn shape the VMP goals laid out at the beginning of this document. The interaction between humans and the landscape, and the intervention by humans on behalf of nature are the crux of park vegetation management. Human factors and natural processes must be understood and integrated to ensure successful long-term care for the Cowen Park landscape.

Finding:
Cowen Park's tree population is dominated by native bigleaf maple, many in decline.
Issues:
How to provide continuity of street tree canopy along the north and west park perimeter.
How to ensure user safety from increasingly hazardous maples throughout the park.
How to promote greater species diversity without reducing natural habitat value.

Finding:
Cowen Park holds an important place in both Seattle's natural and cultural heritage.
Issues:
How to reinforce Cowen's role as part of a larger ecosystem and reverse past losses.
How to respect Cowen Park's legacy as an Olmsted-designed landscape and integral component of Seattle's historic park and boulevard system.
How to maximize Cowen Park's value as wildlife habitat and movement corridor.

Finding:
Cowen Park has experienced a recent history of challenges to community use which by collaborative effort are being addressed.
Issues:
How to consolidate gains in positive public use attributable to vegetation management.
How to foster ongoing community involvement in park stewardship.
How to eliminate settings for illegal activity without destroying fundamental park landscape character.
How to repair habitat damage from illegal uses.

Finding:
Cowen Park's natural and developed landscape components both fall short of their potential for vegetative richness.
Issues:
How to increase vegetative biodiversity to benefit wildlife.
How to add beauty and longevity to the tree canopy in developed areas.
How to replace invasive species with sustainable ornamental and native plants.

Finding:
Cowen Park contains invasive exotic plants in both natural and developed landscape areas.
Issues:
Whether and how to eliminate intentionally-planted invasive species from the developed park landscape.
How to remove, then exclude invasive plants from park natural areas.
How to predict which new ornamental species may safely be introduced to the park.

Finding:
Cowen Park lacks maintenance and capital funding adequate to fully address vegetation management and landscape restoration needs.
Issues:
How to remedy irrigation, compaction and drainage problems which compromise park use.
How to ensure success of efforts to transform landscape areas for long-term sustainability.
How to simplify park landscape management to reduce demand on resources and funding.
How to nurture and sustain volunteer interest in stewarding park vegetation.

COWEN PARK VEGETATION MANAGEMENT PLAN

Chapter 5 – Vegetation Management Recommendations

Management Area Delineation

For purposes of vegetation management, the Cowen Park landscape has been divided into six Management Areas (MA's). These units are based on current plant composition, use, and intended long-term character. Where appropriate, sub-units have been created to address treatment of particular environments within a Management Area. For ease of reference, the Cowen Park Vegetation Management Areas map is placed at the very end of this document, in Appendix D.

The six Management Areas are:

- Street Edge / Park Perimeter
- Native Forest Remnant
- Riparian / Wetland
- Greensward & Lawn
- Mixed Native / Ornamental Landscape
- Playground

Complete recommendations are given by Management Area, so that each can stand alone and be extracted from the larger document for concentrated use, like a recipe. Each section includes a brief summary of Management Area characteristics and key management objectives, followed by an annual calendar of management and maintenance activities according to season, with narrative explanations of recommended practices by category (weeding and invasives control, planting, pruning, etc.)

The intent of Chapter 5 is to describe the WHAT, WHEN, WHERE and WHY of needed vegetation care, supplying tailored, site-specific direction. Since management and maintenance practices are more or less universal, depending more on the nature of the task than its setting, recommendations given in this chapter exclude most standard "how-to" details. For simplicity, and to reduce repetitive information, activities are detailed in the following chapter, encyclopedia-style. Chapter 6 explains the HOW of vegetation management practices, covering proper techniques to accomplish specific treatments.

Vegetation Management Recommendations

Street Edge / Park Perimeter Management Area

Characteristics:

This narrow, linear management area encompasses the street tree edges of Cowen Park on all sides except the east, which is defined by a high, overhead bridge along 15th Ave. NE. Although lacking sidewalks, this MA essentially consists of planting strip or "tree lawn" areas, and major park entries. Vegetation is generally limited to mature street trees, once regularly spaced in single-species rows, but now losing uniform character through attrition of individual trees. Street trees along Cowen Place and Ravenna Boulevard are *Tilia cordata* (littleleaf linden) and along Brooklyn Avenue and NE 62nd St. are *Acer macrophyllum* (bigleaf maple), plus single *Acer platanoides* (Norway maple) and *Acer pseudoplatanus* (Sycamore maple) interplanted toward the south end of Brooklyn near Ravenna. Presumably, the mostly-bare ground beneath these trees once was planted in turf, except along Cowen Place where soil level lies well below sidewalk grade. Trees here are planted in a shaded landscape bed adjacent to the concrete retaining wall which supports the sidewalk. In this MA, foot traffic-induced compaction is extreme, and many tree roots crowd the curb, scalped and exposed.

This MA also encompasses Park entries, each having distinctive character. The Cowen Place entry leads into the Park via concrete steps; further east at 15th Avenue NE, another set of steps descends from sidewalk to historic shelter house. Highly visible to passersby, here are planted raised beds featuring seasonal color. The commemorative stone Cowen gate at the junction University Way, Cowen Place and Ravenna Boulevard is flanked by mixed plantings incorporating shrubs, small ornamental trees and seasonal bulbs and perennials, behind a small lawn area.

The southwest corner at Ravenna and Brooklyn is marked by a Park "rainbow" sign and grass berm, without landscape enhancement. The popular mid-Park entry from Brooklyn is delineated by bollards and worn concrete-reinforced turf. The northwest entry leads from the planting strip directly to a stair descending the steep, native-covered slope to open lawn below. The eastern park entrance is a trail beneath the 15th Avenue bridge and lies outside this MA.

Management Objectives:

Key objectives for vegetation management are to mitigate tree hazard potential and to reinforce the traditional perimeter street tree character. A related objective is to reduce root zone compaction while accommodating heavy foot traffic. Objectives for entry landscape management are defined by the 1997 Site Improvement Plan, to the extent this plan is implemented. Where opportunity exists, the perimeter landscape should reflect Cowen Park's Olmsted heritage, primarily through plant selection and arrangement.

Treatments:

Management and Maintenance Annual Calendar
Street Edge / Park Perimeter Management Area

	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Management and Maintenance Practices												
Establishment Care	▢	▢	▢	▢	▢	▢	•	•	•	•	•	•
Monitoring / Inspection	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
Mulching	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
Planting												
Trees		▢	▢	▢						▢	▢	▢
Shrubs		▢	▢	▢	▢					▢	▢	▢
Herbs				▢	▢				▢	▢		
Pruning	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
Removing Plants	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
Amending Soils				▢	▢	▢	▢	▢	▢			
Turf Care	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
Watering							▢	•	•	•	•	
Weeding and Invasive Control												
Shrubs					▢	▢	▢	▢	▢			
Herbs					▢	▢	▢	▢				

▢ Indicates range of time to perform action as needed
• Indicates specific time to perform action

Establishment Care

All new plantings require follow-up care for three years to insure their healthy survival.

Monitoring / Inspection

- **Diagnose & Address Hazard Trees**
  Ravenna - 1 Linden Brooklyn / 62nd - 2+ Maples
- **Monitor Tree Condition Annually**

Mulching

Beds and street trees must be well-mulched to suppress unwanted plants, improve tilth, reduce compaction and erosion, protect exposed roots, and conserve soil moisture. Ground beneath perimeter trees should be mulched deeply with wood chips wherever space allows, and replenished at least annually. In areas such as Brooklyn, which experience intense foot traffic across the planting strip as well as along the path, organic mulch is unrealistic to maintain. In such areas, crushed rock should be used instead, with durable edging installed to confine rock along path edges, especially where abutting turf areas. This approach will help retain mulch and reduce its dispersal into lawns and planting beds. Informal perimeter paths paralleling the street should be defined, smoothed where uneven, and surfaced with crushed rock, in accordance with Seattle Parks Trail Construction standards.

Planting

Trees

New street trees are to be planted to fill voids created by past losses and recent hazard removals. Replacement plantings should be completed in a coordinated manner, and initiated as soon as possible. Additional sites will open up over time as existing mature trees decline; these should be replanted promptly, matching species and spacing of other street trees as closely as possible.

Tree spacing needs to respect existing precedent as well as the original 1907 Olmsted Brothers Cowen Park Preliminary Plan, which shows uniform trees located approximately 35 feet apart. For most effective reinstatement of character, trees should be replanted in blocks or rows rather than by uneven-age infill. Infill trees toward the south end of Brooklyn have been visibly suppressed by adjacent, mature maples outcompeting them for light, water and nutrients. Learning by this example, interplanting should be considered viable only where conditions favor proper tree establishment.

Favorable conditions can be expected to exist between healthy trees with considerable remaining life expectancy, where the gap is wide enough to allow full canopy and root development of a young tree. A single vacancy at typical existing spacing should be sufficient along parts of NE 62nd Street where shade-tolerant understory species are recommended for replacements , but not on frontages where replacements are large, sun-demanding canopy species. For these, a two tree gap minimum is recommended.

Historic precedent regarding species will be respected but cannot be replicated, since bigleaf maple is prohibited for street tree planting in Seattle. Its relatively short life span and history of catastrophic failure as a Cowen Park street tree bear out the logic of this City policy. Insufficient records exist to confirm which species the Olmsted Brothers originally envisioned for street tree planting, so bigleaf maple may or may not be historic in that sense. Replacement taxa have been selected with the heritage maples in mind, together with other key criteria and current site conditions.

One major current condition is that the northerly (62nd St) Park edge now receives considerable shade from adjacent woodland trees. Future intent is that forest remain along this side, and with increasing numbers of large conifers, this shading will only persist and intensify. Species adapted to low light conditions include very few typical large street trees. Those few that do tolerate shade have a track record of aggressive reseeding to the wild, already evident in Cowen and Ravenna Parks: Norway maple, horsechestnut, London plane. Canopies likely would develop asymmetrically even if used, reaching toward the street for light. Such imbalance can lead to structural as well as aesthetic problems as a tree matures.

Given varied existing and anticipated conditions along Cowen's perimeter, it is not prudent to select a single species to replace bigleaf maple. No one tree exists that is durable, grows to large stature, establishes well in shade and sun, does not self-sow to the wild, and possesses a broad, deciduous canopy. Regular tree spacings can be maintained in the

future, but at least two species will need to be planted to maintain this effect in response to prevailing light conditions. This will also aid in creating needed biodiversity.

Ravenna Boulevard and Cowen Place:
Lindens should be replaced in kind, at such time as they can no longer be maintained in safe condition. While lindens have enjoyed a long and popular tradition for street tree use, in Seattle their performance has been mixed. Summer water stress, compaction and aphid susceptibility all present issues for their street tree use and success. Anticipating replacement, locally-planted linden species and cultivars should be evaluated to identify the best-performing types, and new trees selected accordingly. Promising varieties include: *Tilia tomentosa 'Sterling', Tilia Americana 'Sentry'* and *Tilia cordata 'Glenleven'* or *T.c. 'Greenspire'*. Equivalent mature stature is the other important characteristic to keep in mind, linden size being somewhat variable among taxa.

Tilia is not a shade tolerant genus and attempts to interplant would result in stunted trees with asymmetrical form. Replacement will be accomplished successfully only after removing existing specimens, preferably in blocks to create optimal conditions for regeneration. The linden rows represent a longer-term planting priority than the bigleaf maples along Brooklyn and 62nd, Street, which required immediate attention.

Brooklyn:
Several planting sites already exist along Brooklyn, resulting from hazard removals. South of the mid-Park entrance facing NE 61st Street, new maples should be planted at each end to strengthen the existing row of five trees and spaced to match. Eventually when the remaining bigleaf maples fail, the single Norway and Sycamore maples interplanted with them should be replaced concurrently. Both the Norway maple and the Sycamore maple are becoming locally-invasive tree species. In addition, the individual trees are quite suppressed.

From the mid-Park entry north, seven to nine trees need to be planted near-term, to replace recent removals; two or three of the existing maples require additional diagnosis, which could result in either retention or removal. Either way, a major gap exists between Trees 50 & 55 (marked on Cowen Park Tree Inventory and Vegetation Plots map, Appendix D). Care should be taken in siting replacements to maintain minimum clearances - from drive edge (7.5 feet), face of curb (3.5 feet), existing trees (20 feet) and utilities like hydrants and water vault (5 feet). Spacing should match existing 33 ft as closely as possible, by modern standards an absolute minimum for large street trees.

The species recommended for replanting along Brooklyn is *Acer saccharum* (sugar maple), native to the eastern part of the United States. Appropriate cultivars include: *'Green Mountain', 'Legacy', 'Commemoration'* or *'Bonfire'*, of which the tallest with most consistent fall color in the Pacific Northwest should be used. References vary concerning best-performing local selections. Another good maple option is *Acer fremanii 'Autumn Blaze'*.

At the far north end of the block, a smaller-stature tree might be added beyond the last maple, the distance to the intersection being too short for another large shade tree. This location could provide a replacement site for the severely-leaning ornamental cherry growing immediately west of the park entry stairs, and without breaking its uniformity, punctuate the maple row. Given increasingly prevalent Cherry Bark Tortrix (*Enarmonia formosana)* infestations, a less susceptible species than *Prunus serrulata* (Japanese cherry) should be chosen. Unfortunately, *Prunus* (cherry, laurel, plum), *Malus* (apple, crabapple) and *Pyrus* (pear) all are vulnerable to varying degrees, with the potential for cumulatively-fatal damage. Recommended alternatives include: *Styrax japonica* (Japanese snowdrop), *Magnolia kobus* (Kobus magnolia), *Cercis Canadensis* (Eastern redbud), *Stewartia pseudocamellia* (Stewartia) and *Cornus kousa* (Kousa dogwood).

Northeast 62nd Street:

Recommended species for this area include:

Parrotia persica (Persian parrotia)
Umbellularia californica (California bay)
Cornus kousa (Kousa dogwood)
Stewartia monadelpha (tall Stewartia)
Prunus virginiana (choke cherry)
Acer circinatum (vine maple)
Oxydendrum arboretum (sourwood)
Acer palmatum (Japanese maple)
Styrax japonica (Japanese snowdrop)
Acer griseum (paperbark maple)
Acer truncatum 'Pacific Sunset' (Shantung maple)
Amelanchier x grandiflora 'Autumn Brilliance' (serviceberry)

NOTE: LINK TREE PLANTING AND PATH WORK

- **Plant in Blocks - Gaps First**
  Brooklyn - North Half and SW Corner
  62nd - East and West ends
- **Match Species to Site & Context**
  Current Conditions over Precedent
  Respect Heritage
- **Selection Criteria**
  North - Shade / Native / Small
  West - Sun / Large / Durable
  South / SE - Linden / Replace in kind

Pruning

- **Perform Priority Pruning**
  Hazard Abatement Tree Health

Removing Plants
Seattle Parks and Recreation tree crew removed identified highest-hazard trees in November and December, 2003. Replacement is scheduled for the next planting season. These removals were based on evaluations summarized on Cowen Park Tree Inventory and Vegetation Plots map (Appendix D) and inventory/inspection database (Appendix B).

Recent removals included bigleaf maples, five on Brooklyn between 61st and 62nd, and two at the east end of NE 62nd Street. One more bigleaf maple toward the north end of Brooklyn was pruned, but is slated for removal in January, 2004. A severely-declining Japanese flowering cherry just east of the park's northwest stair may also be removed, due both to very poor condition and the resulting opportunity to replant with a species consistent with other perimeter street trees. A few trees close to this MA on adjacent slopes have been identified for detailed inspection and/or removal as well. Some could affect new street tree planting conditions, particularly regarding light level.

Amending Soils
- **Option A**
  Define and Construct Paths (Rock / Asphalt)
  Loosen Remaining Compacted Soil
  Add Beneficial Soil Fungi (Mycorrhizae)
  Incorporate No Organic Amendments - Mulch Top
- **Option B**
  Replace Soil with Structural Planting Mix
  Crushed Rock Areawide for Path and Mulch

Turf Care - See below under "Greensward and Lawn" section.

Watering – See Chapter 6 for details.

Weeding and Invasive Control
Invasive plant species should be removed to the largest extent possible, preferably by hand while they are still small. If this is done on a regular basis during the growing season, it will alleviate many problems during the rest of the year.

Native Forest Remnant Management Area
Characteristics:
This MA encompasses the remains of native forest which almost completely covered Cowen Park until forty years ago, when 1,000+ cubic yards of fill were imported, fundamentally altering both the original contours and vegetation. Remaining today are steep, narrow perimeter areas along the Park's north and northwest edges, and a wooded area between the main Cowen-Ravenna trail and the developed play area along the east side.

Few native conifers remain, and mature bigleaf maple now dominates the canopy. Understory composition varies from ivy and invasive shrubs to mixed low and tall native shrub species. Considerable effort has been expended to eradicate invasive exotic plants in recent years, although control is not yet complete and the work is expected to be ongoing. Many native plants have been added along northwest slope areas, primarily understory species. Cut-through trails exist in two or three locations, and have proven difficult to control.

Management Objectives:
The primary objective for vegetation management in this area is to establish a sustainable, invasives-free, native forest with conifer-dominated canopy. A closely-related objective is to increase quality and quantity of wildlife habitat. Secondary objectives are to discourage uses that are illegal or harmful to vegetation, to enhance public access and safety, and to support community stewardship and environmental education activities.

- **Eradicate Invasive Species**
  1. Vines off Trees
  2. Cut and Stump Treat Invasive Trees / Shrubs
  2. Liberate Native Understory
  3. Clear Heavy Ground Infestations
  4. Mulch Deeply vs. Erosion

- **Plant Native Trees**

- **Provide Establishment Care**

- **Eliminate Cut-through Trails / Improve Access**

Treatments:

Management and Maintenance Annual Calendar
Native Forest Remnant Management Area

	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Management and Maintenance Practices												
Establishment Care	▒	▒	▒	▒	▒	▒	•	•	•	•	▒	▒
Mulching	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
Planting												
Trees		▒	▒	▒						▒	▒	▒
Shrubs		▒	▒	▒						▒	▒	▒
Herbs			▒	▒					▒	▒		
Pruning	•	•	•	•	▒	▒	▒	•	•	•	•	•
Removing Plants	•	•	•	•	▒	▒	▒	•	•	•	•	•
Amending Soils							▒	▒	▒			
Weeding and Invasive Control												
Trees							▒	▒	▒			
Shrubs						▒	▒	▒	▒			
Herbs					▒	▒	▒	▒				

▒ Indicates range of time to perform action as needed

• Indicates specific time to perform action

Establishment Care

Establishment care will be necessary for any newly-installed woody plants that replace invasive trees and shrubs, as well as trees replenishing the forest canopy.

Mulching

The ground immediately surrounding newly-installed plants should be covered with coarse woody mulch, taking care not to pile mulch on root crowns or against plant stems. Coarse woody mulch should be spread deeply on compacted areas and decommissioned social trails, to improve soil tilth and microfauna for restoration planting.

Planting

Planting should be undertaken only if at least three-year establishment care can be assured, and generally done in concert with restoration of target areas within the MA. Species selection should consider the potential for invasiveness, microclimate conditions at each planting site, sustainability, habitat enhancement, and the historic landscape character of Cowen Park. Native species should clearly dominate Forest plantings, except where helping perpetuate the tradition of interspersed non-native groves.

Pruning

Tree pruning should be performed only by a certified arborist or plant health care professional. Pruning should be limited to removal of limbs that pose a hazard to human safety or infrastructure. Dead limbs should be allowed to fall to the forest floor as coarse woody debris. Best professional judgement should prevail when assessing limb or tree removals. Pruning decisions should reflect consideration of safety and habitat enhancement priorities. Where documented personal safety concerns exist, it may be desirable to undertake selective thinning of tall understory vegetation to improve sight lines. Such thinning should relate to major pedestrian routes, and be performed in consultation with law enforcement and Parks management acquainted with Cowen Park. Overthinning will result in significant loss of habitat and species diversity and thus, is not recommended.

Amending Soils

As much material as possible from tree removals and pruning should remain on site. Chipped, it may be spread in areas where more organic material is desired and will, over time, help rebuild the soil. One caveat is that debris from invasive plants (see below) should not be left on site as large, woody debris, due to resprouting potential.

Weeding and Invasive Control

Invasive plant species should be removed to the largest extent possible. Weeding and removal of woody and herbaceous species should take place as needed during the growing season, but at least monthly for the first year in newly planted areas. Woody debris generated by invasive removal that is unlikely to sprout from cuttings may be left on site to improve wildlife habitat. Woody debris placed in brush piles, coarse woody debris, snags and stumps all provide significant wildlife habitat. English holly and English laurel should not be left as snags or stumps because of resprouting potential.

Removing Plants

Other than invasives, removals should be conducted only in the case of hazard trees or to improve growth environment for selected high-value trees like light-stressed historic groves of ornamental species. When possible removals should be done between August and March to avoid disruption of nests. If a failing tree does not pose a threat to human safety, girdling or trimming to provide snag habitat or felling and leaving as coarse woody debris is preferable to complete removal. Limbs from trees infected with saprophytic fungi such as *Phytopthora* should either be chipped or removed. Large woody debris should never be placed directly on the root crown of desirable plants.

Riparian / Wetland Management Area

Characteristics:

This linear area encompasses current and future delineated wetlands. The ultimate perimeter will be established by the Cowen Creek Daylighting project, for which work is now underway. The wetland may extend southward along the Park's west side, toward existing redwoods, expanding the current extent from the northwest entry stairs eastward to the Park boundary. A small stream develops from marshy, open ground roughly midway, and native shrubs will be planted along the water course. At present the MA is mostly sunny, although future tree and understory growth could alter these conditions.

Management Objectives:

Objectives for vegetation management are to enhance and protect native wetland vegetation and water quality, to encourage visual but not physical access, and to improve the quality and extent of wildlife corridor habitat.

- **Limit Invasives (Near term)**
  Keep off Trees / Shrubs — Confine Extent
- **Implement Creek Daylighting**
  Eradicate Invasives — Plant Wetland Species
  Retain Quality Trees — Follow-up Care
- **Restore Remaining Wetland**
  Smother Invasives — Plant Wetland Species
  Respect Bridge Vista — Monitor & Maintain

Treatments:

Management and Maintenance Annual Calendar
Riparian / Wetland Management Area

	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Management and Maintenance Practices												
Establishment Care	▢	▢	▢	▢	▢	▢	•	•	•	•	•	▢
Planting												
Trees			▢	▢	▢					▢	▢	▢
Shrubs			▢	▢	▢					▢	▢	▢
Herbs					▢	▢				▢	▢	
Pruning	•	•	•	•	▢	▢	▢	•	•	•	•	•
Removing Plants	•	•	•	•	▢	▢	▢	•	•	•	•	•
Weeding and Invasive Control												
Trees							▢	▢	▢			
Shrubs							▢	▢	▢			
Herbs					▢	▢	▢	▢				

▢ Indicates range of time to perform action as needed

• Indicates specific time to perform action

Greensward & Lawn Management Area

Characteristics:

This MA is characterized by flat to gently-sloping expanses of turf. Scattered trees occupy the peripheries, as lawn specimens and small groups. Deciduous shade and ornamental species, conifers, and both native and exotic taxa are represented. Most trees are near, at, or somewhat beyond maturity; few young trees exist in this MA. Besides turf, understory plants are basically absent.

This open "greensward" landscape occupies most of the park's westerly half, the result of extensive filling and grading which occurred around 1960. The turf is used mostly for informal recreation, with limited team sports played on the south field (volleyball, Little League baseball). Areas of very poor drainage exist south and immediately north of the park's central east-west path. A few hazardous trees have been identified in this MA, where use generally is high and access beneath trees open.

Management Objectives:

Objectives for vegetation management relate to lawn and trees separately and as they affect each other. Turf management objectives include: maintaining healthy lawn while minimizing chemical inputs, improving turf condition and usability where irrigation and drainage problems exist, and eliminating turf where unsuitable. Tree-related objectives include: mitigating current tree hazards and preventing future hazard, enriching tree age and species diversity, and sustaining established patterns of canopy and open areas.

Treatments:

Management and Maintenance Annual Calendar
Greensward & Lawn Management Area

	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Management and Maintenance Practices												
3 Yr. Establishment Care	☐	☐	☐	☐	☐	☐	•	•	•	•	•	•
Mulching	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Planting												
Trees		☐	☐	☐						☐	☐	☐
Shrubs		☐	☐	☐	☐					☐	☐	☐
Pruning	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Removing Plants	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Taking Care of Turf	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Watering							☐	•	•	•	•	
Weeding and Invasive Control												
Trees						☐	☐	☐	☐			
Shrubs					☐	☐	☐	☐	☐			

☐ Indicates range of time to perform action as needed

• *Indicates specific time to perform action*

- **Deep Mulch under Trees**
  Remove Grass First Create Mulch "Islands" Shred and Use Leaves
  Replenish Annually
- **Remove Dangerous Trees**
  Bigleaf Maples – 2 (removed) Native Dogwood - 1
- **Inspect / Monitor Identified Trees**
- **Remove Poor Quality Trees**
  Structural Problems Badly Sited Declining
- **Replenish Trees Continually**
  Replant 2:1 ratio Keep Lawns Open Diversify
- **Replant @ 2:1 Ratio Minimum**
- **Inspect Trees Annually & Fix Problems**
  Structure Root Zone Prompt Action
- **Improve Turf Irrigation**
  Uniform Coverage Simplify zoning
- **Correct Lawn Drainage**
  Diagnose Severe Areas Add Underdrainage
  Direct Excess Water to Creek
- **Replace Turf Reinforcement**
  West Entry Service Drive
- **Reduce Lawn Area**
  Under Trees Deep Shade Upgraded Entries

Mixed Native / Ornamental Landscape Management Area
Characteristics:
The mixed native and ornamental landscape encompasses shallow to steeply sloping banks along the southeast side of the park, between the main walk and ballfield expanse below. Also included is a small flat lawn known as "The Triangle" and a steep ornamental bed beside the Shelter House steps. The slopes are mostly vestiges of the original ravine which regrading stopped short of covering. Vegetation on these slopes includes both ornamental and native plant species. It is impossible to ascertain whether or not Olmsted-recommended species persist from 1909, since neither planting plan nor plant list remains. The shaded informal allee along the area's straight bordering walk makes this MA's character unique.

A legacy of English laurel and ivy has been partially removed from slopes, and native understory replanted with some success. Steep, dry, rooty soil, cut-through trampling and compaction, deep shade, and incomplete invasives eradication have thwarted full establishment. The canopy is generally dense, composed of Douglas fir, bigleaf maple, and diverse non-native species. Most trees are at or near maturity, several crowd one another. Seven trees of concern have been identified in this MA, among them only one – a large, damaged and decaying elm - for priority removal. The rare Chinese Lacquer tree, *Rhus potaninii*, grows nearby.

Management Objectives:

For this MA, the overarching objective is to achieve and sustain healthy, attractive, but very low maintenance plantings dominated by native species. Related and additional objectives are to eliminate ornamental invasive species, preserve visibility through planting areas, reinforce Cowen's Olmsted landscape heritage, maintain a safe, diverse and healthy tree canopy, improve wildlife habitat richness and extent, and reduce destructive trampling and erosion by Park users.

- **Remove Invasive Ornamentals**
- **Retain Historic Species**
- **Plant for Scale and Easy Care**
- **Maintain Visibility**
- **Prune and Monitor Trees**
- **Thin Canopy / Favor Best Trees**
- **Add Flowering Trees at Triangle**
- **Define Paths / Reduce Compaction**

Treatments:

Management and Maintenance Annual Calendar
Mixed Native / Ornamental Landscape Management Area

	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Management and Maintenance Practices												
3 Yr. Establishment Care	▒	▒	▒	▒	▒	▒	•	•	•	•	•	•
Mulching	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
Planting												
Trees		▒	▒	▒						▒	▒	▒
Shrubs		▒	▒	▒	▒					▒	▒	▒
Herbs				▒	▒				▒	▒		
Pruning	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
Removing Plants	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
Amending Soils			▒	▒	▒	▒	▒	▒	▒			
Taking Care of Turf	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
Watering							▒	•	•	•	•	
Weeding and Invasive Control												
Trees						▒	▒	▒	▒			
Shrubs					▒	▒	▒	▒	▒			
Herbs					▒	▒	▒	▒				

▒ Indicates range of time to perform action as needed
• Indicates specific time to perform action

Playground Management Area
Characteristics:
This area represents Cowen Park's highest-use landscape, encompassing a play terrace and Shelter House originally sited as part of the Park's Olmsted plan, a recently-developed Sundial Garden immediately to the northwest, and peripheral circulation and vegetation. At the heart are play structures set in a large sand bed. Just northeast runs a "zip line" swing partly overhung by mature ornamental conifers and shade trees. Beyond this is bare, compacted ground beneath these trees. The MA edge is defined by the adjacent wooded slope, tall concrete bridge abutment and to the west, lawn.

The Sundial Garden includes a small lawn and sundial sculpture surrounded by beds of ornamental grasses, shrubs, perennials and groundcovers, some native. Most trees overhanging the active play and circulation along the MA's north and east sides have compacted, exposed roots and correctable canopy defects important to address due to high level of occupancy. One white pine requires additional evaluation. An old English yew and an ornamental cherry on opposite sides of the south end likewise suffer from severe compaction. Overland drainage from slopes above adds erosion to these areas, particularly severe by the cherry.

Management Objectives:
The key management objective for the Playground MA is to maintain a safe, sheltering tree canopy, while preserving the existing sunny opening suited for year-round play. Additional objectives are to ensure good visibility into and through the area, to enhance and protect adjacent native vegetation, and to maintain Sundial garden plantings in good condition.

- **Deep Mulch under Trees**
  Fiber Chips Replenish Often
- **Prune Trees**
  Safety Health Clearance Balance
- **Inspect Trees Annually & Fix Problems**
  Structure Root Zone Prompt Action
- **Improve Sundial Lawn Irrigation**

Treatments:

Management and Maintenance Annual Calendar
Playground Management Area

	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Management and Maintenance Practices												
3 Yr. Establishment Care	▒	▒	▒	▒	▒	▒	•	•	•	•	•	•
Mulching	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
Planting												
Trees		▒	▒	▒						▒	▒	▒
Shrubs		▒	▒	▒	▒					▒	▒	▒
Herbs			▒	▒					▒	▒		
Pruning	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
Removing Plants	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
Amending Soils			▒	▒	▒	▒	▒	▒	▒			
Taking Care of Turf	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
Watering							▒	•	•	•	•	▒
Weeding and Invasive Control												
Trees						▒	▒	▒	▒			
Shrubs					▒	▒	▒	▒	▒			
Herbs					▒	▒	▒	▒				

▒ Indicates range of time to perform action as needed
• Indicates specific time to perform action

COWEN PARK VEGETATION MANAGEMENT PLAN
Chapter 6 – Maintenance, Management, and Monitoring

Basic Maintenance Practices

The practices described below are meant to provide the greater level of detail needed to carry out maintenance and project-specific work outlined in Chapter 5 of this VMP, and monitor those practices for long-term success. The following practices for maintaining, restoring, establishing or removing vegetation have been adapted from those in the Lincoln Park VMP, written by Eliza Davidson, David Bergendorf and Ann Hirschi. They are based on selections from Seattle DPR Landscape, Horticulture and Urban Forestry Best Management Practices Manual (BMPs) (1999) and 'City Among the Trees' (1998). Specific emphasis has been provided for control of non-native invasive species, and how to care for, establish, and maintain native vegetation in natural area restoration and enhancement projects at the Park.

Mulching

[Adapted from DPR Landscape, Horticulture and Urban Forestry BMPs (1999) & 'City Among the Trees' (1998).]

Mulching is one of the easiest and most important maintenance practices for protecting and nurturing all vegetation types. Mulching is an essential component of any natural area planting project to suppress weeds/ invasives and thereby reducing root competition, to conserve soil moisture and keep soil cool, and to add organics to nutrient-deficient soils. In developed landscape areas it also serves these functions, as well as adding a cared-for appearance. Mulching material in developed landscape areas may include bark products, wood chips, compost, grass clippings, cardboard, leaves or pebbles. In natural areas, the most desirable mulch material is a combination of cardboard sheet mulch overlain by 4-6" of wood chips. Compost, or leaf mulch can be added either on top of or underneath the cardboard layer if soil amendments are desired. Where large areas of invasives have been removed, the entire planting area should be sheet mulched and wood chipped to minimize re-invasion. In most cases, wood chips of recycled Parks Department plant materials are available at no cost. Plastic, landscape fabric or inorganic mulch should be avoided in most cases, except as specified for highly invaded areas, where it may be the most effective strategy.

Trees

• Clear weeds and grass from under the tree, in a circle out to the drip line at the tips of the branches.
• Where weeds are very aggressive, use a "sheet mulch" of thick layers of newspaper or cardboard.
• Spread layer of organic mulch, 2-4" deep in developed landscape areas, 4-6" deep in natural areas, in a circle out to the tree's drip line or in a 3' diameter circle (whichever is greater).
• Keep mulch away from the tree trunk to prevent crown rot or insect damage.
• Maintain 3"-4" of mulch annually in developed landscape areas, 4-6" in natural areas (during 3 year establishment period or beyond as needed).

Shrubs
• Follow similar procedures as for trees, above.
• Spread layer of organic mulch 2-3" deep in developed landscape areas, 4-6" deep in natural areas and 2-3' in diameter around shrub.
• Cover entire planting bed with mulch where applicable.
• Keep mulch away from contact with crown of plant.

Herbs
• Flowerbeds and smaller plant material should be mulched with finer material.
• Spread layer of mulch 1-2" deep depending on size and spacing of plants.
• Avoid drift of mulch onto turf or pavement by recessing edge of beds.
• Do not smother plant crowns with mulch.

Planting
The basic procedure of plant installation is essentially the same whether in a developed landscape or in a natural area. Site preparation, species selection, and planting layout are site-specific and depend on the goals of the project as well as the micro-site conditions. Instructions for planting trees, shrubs, and herbaceous material are given below. Because the broad goals of any natural area planting include restoration of a functional native plant community, information about species choices for planting in natural areas is given in Tables immediately following. Plant selection for use in developed landscapes can have a wider range of options, in particular including non-native species, and should also be informed by historic information when relevant.

Trees
The two basic steps in planting are preparing the site, and setting the tree or shrub. Proper preparation will encourage root growth rather than adding to the difficulties already challenging the newly planted trees or shrubs.
• Ideal planting hole is 2-3x the diameter of the root spread or the root ball (depending on existing soil conditions).
• Minimum planting hole is 12" wider than root spread or root ball.
• Hole shall be no deeper than the ball and the ball shall sit firmly on the undisturbed subsoil.
• Native soil shall be used to backfill the planting hole except in situations where the existing soil is contaminated or filled with rubble or pure clay.
• Trees shall not be fertilized at the time of planting.
• Balled-and-burlapped trees shall be placed in the hole and plumbed vertically. All rope shall be removed from around the trunk of the tree and the top 1/3 of the burlap shall be folded back down into the hole. Whenever possible complete removal of the top third of burlap by cutting it away with a sharp knife is preferred. Do not remove any B&B packaging material until the tree is placed in the hole and securely plumbed into its final position.
• Trees in wire baskets shall have the entire basket removed, using bolt cutters.
• Backfill soil in lifts of 4-6" at a time with compaction of each layer. Do not compact muddy backfill. Water thoroughly after backfilling to settle the soil,

eliminate air pockets and re-wet the root system.
• If project scope allows, watering soil rather than compacting is preferred. Backfill ½ the soil in the tree pit and thoroughly drench with water to settle. Complete backfilling and then thoroughly drench with water again. This method is preferred for removing air pockets and settling soil, but can be impractical on big jobs or jobs using volunteers.
• Trees planted in sandy or loamy soils should have a 3" high berm erected just past the perimeter of the planting hole to funnel water to the root ball and wet the hole/sidewall interface.
• Berms should not be constructed in clay soils or on heavily compacted sites.
• Stake only in situations where normal planting procedures does not provide a stable plant, otherwise, staking is not generally required.
• Staking is sometimes recommended as a vandal deterrent device or to prevent mechanical injury from mowers or trimmers. Ties for stakes should be some biodegradable or flexible fastener that precludes collaring of the trunk if the ties are not removed in a timely fashion.
• Stakes shall be removed at the end of the first year.
• Plant trees at the depth they were growing in the nursery.
• Do not wrap tree trunks.
• Remove tree trunk wrapping materials, tags, and all ties at the time of planting.

Shrubs (refer to general guidelines for trees, above)
• If needed, incorporate fertilizer into soil before adding plants.
• Wait until plants are established before adding chemical fertilizer.
• Plant at proper depth taking into consideration room for mulch.
• Plant shrubs with proper spacing to allow for spread at mature size.
• Plant bareroot stock at the same grade as grown in the nursery.

Herbs
• Plant ground cover and floral plantings to provide adequate coverage to compete with weeds.
• In landscaped beds, plant to provide effective display.
• Do not crowd.
• Remove containers prior to placement in the planting pit.
• Tease pot-bound roots with hands or tools prior to final placement in planting pit.
• Protect bare root plants from root drying prior to and immediately after planting.
• Cleanly prune exceptionally long roots to create a uniform root mass.

Live Stakes
Live stakes are cuttings harvested from live native plants. Stakes are cut from the parent plant, and then installed directly into the soil where they establish roots and grow to maturity. The best species to use for live stakes are willow species, black cottonwood, and red osier dogwood. Stakes should be planted in areas that will be consistently moist through out the growing season, such as along the waterline in wetland areas. Although live staking can be done throughout the year, to maximize survival the best time for taking cuttings and installing them is during the dormant season, between early

November and late February. Stakes can be harvested from an appropriate site or purchased. They should be installed as soon as possible after harvesting – ideally within 24-72 hours – and kept wet in a bucket and in the shade until installation. Stakes should be at least 2-3' in length and >¾" diameter for willows and cottonwood, and >½" diameter for red osier dogwood. If harvesting your own stakes, no more than 5% of the parent plant should be removed at any one time. Stakes should be installed with a rubber mallet if the ground is soft enough, or by using a planting bar to create the hole in more compacted soils. The stake should be installed with ¼ of stake above ground and ¾ of stake below ground. There should be good soil contact below ground for the length of the stake. [Adapted from DPR's Landscape, Horticulture and Urban Forestry BMPs (1999) and King County Water and Land Resources Bulletin "Live Stake Cutting and Planting Tips."]

Pruning

Pruning is a maintenance action used primarily in developed landscape areas. Pruning in natural areas should be limited to addressing hazard trees that pose a threat to public safety, and maintaining visibility through understory where specific security concerns dictate. Pruning can produce strong, healthy, attractive plants, but only if done well. Poorly pruned plants often develop problems far worse than when left alone. The need for pruning is minimized when plants are appropriately sited at the outset; plants outgrowing their available space should be evaluated for radical renovation or removal and replacement with more appropriate species.

The first step in pruning is thus to evaluate whether it is the appropriate action for the situation, and to clarify pruning objectives. Pruning can stimulate fruit production, invigorate a plant, promote growth, repair injury, and increase value of trees and shrubs. It also can reduce hazard and enhance wildlife habitat if dead wood remains on site.

As a general rule, it is best to begin pruning by removing the "three D's": Dead, Diseased and Damaged wood. Always use clean, sharp pruning tools including handsaws, loppers, pruners, and where appropriate, chainsaws. Use of power tool by volunteers in Seattle parks is prohibited. All tree pruning must conform to current ANSI and ISA (International Society of Arboriculture) standards.

Trees

Prune for Safety

- Remove branches that grow too low and could cause injury or property damage.
- Trim branches that interfere with site lines on streets or driveways.
- Remove branches that grow into utility lines.
- Remove or trim branches in natural areas that are a hazard to public safety.

Prune for Health

- Create a strong structure when tree is young.
- Remove dead, diseased or damaged branches to increase strength and longevity.
- Thin crown to increase airflow and reduce pest problems.
- Remove crossing and rubbing branches.
- Do not apply dressing to pruning wounds, as this may invite disease problems.

Prune for Aesthetics
• Enhance the natural form and character of the tree.
• Never 'top' trees. It is against adopted Parks Tree Policy (2001) to do so on public lands for views from private lands.

Shrubs
Prune for Health
• Follow principles of natural target pruning.
• Make cuts as close to the bud as possible.
• Do not make flush cuts.
• Do not leave stubs.
• Reinvigorate or regenerate overgrown plant.
Prune for Aesthetics
• Enhance balanced, natural shape of shrub species.
• Remove crowded and crossing branches.
• Remove terminal bud to stimulate lower branching.
• Remove reverted shoots on grafted cultivars.
• Enhance flowering and fruiting.

Removing Plants
Besides control of invasive non-native plants, removals are done for the following reasons: poor tree architecture, summer branch drop, increased exposure, root loss, unstable rooting, girdling roots, severe lean, cracks, cankers, conks, seams, decay, cavities, and root and butt diseases. Unfavorable soil conditions, chronic insect or disease problems, crowding and decline are additional reasons relating to shrubs and herbaceous plants as well. Trees in particular may present a risk because of old age, storm damage, poor structure, past construction activities or death of the tree. Derelict trees in natural areas that do not pose a hazard should be left standing to enrich wildlife habitat. If a tree is defective AND has a target, it is considered a hazard.
• Remove derelict trees that cannot be made safe or functional by corrective pruning.
• Remove trees that constitute a high hazard if no other treatment will eliminate the risk.
• Alert the community before tree removal begins to provide opportunity for comment.
At times, trees and shrubs may be removed for new park construction, access or other issues not related to the plant's viability. Cost and availability of funds for tree-spade work should be weighed against the cost of replacing the tree with a new, smaller caliper tree. Establishment of larger trees is often less successful than planting younger replacements.
• Determine value of specimen to be transplanted, by appraisal, when considering replacement vs. transplanting.
• Transplant trees smaller than 10-12" in diameter with a large tree-spade.
• Transplant shrubs by carefully digging rootball and placing in pots or balling and burlapping.
• Do not let roots dry out.
• Remove plant material that is too large for the allotted space.
• Remove plant material that is diseased or dead and dispose off site.

Large woody debris and brush piles are critical elements in habitat areas of Cowen Park. When large trees have been removed, recycle as much of the woody debris on site as possible. Trunks and large branches that will not sprout can be placed directly on the ground within any of the habitat areas. Brush (i.e. non-sprouting limbs and branches) can be used for wildlife brush piles dispersed throughout park natural areas. Debris not used for brush piles can be chipped onsite and used as mulch.

CAUTION: Do **NOT** place trunks or large branches from non-native *Populus* species (Lombardy, white poplar, or their hybrids) directly on the ground. These species will live sprout from large woody debris kept in contact with moist soil. To use the remains of those species appropriately, prop them off the ground (on both ends) by placing the log on 6-8" thick pieces of wood from non-invasive species (red alder, big leaf maple). In that manner, the native softwood will rapidly decompose from direct contact with the soil while the potential live-sprouting log will dry out and become non-viable. Eventually poplar wood will rest on the ground while smaller pieces of wood decompose, resulting in large pieces of woody debris that pose no risk for sprouting and spreading unwanted invasive species.

Taking Care of Turf

Turf is the term applied to any lawn or grasses grown in the developed landscapes within the Park and is the traditional "green carpet" many visitors associate with parks. The wide variety of type of use indicates varied maintenance and management practices.

Maintenance

Mowing

Frequency

• Mow weekly from MARCH through OCTOBER; bi-weekly in FEBRUARY and NOVEMBER; and at least monthly in DECEMBER and JANUARY.

Cutting Height

• Mow to a height of 2 to 2.5 inches (avoid removing more than 1/3 leaf blade height at any one time). Care should be taken in areas where tree roots protrude above the ground surface, and mower height should be raised whenever possible to avoid excessive root damage.

Mulch Mowing

• Do not remove grass clippings from mowed turf areas.
• Alternate mowing patterns to avoid ruts and compaction from the wheels.
• Avoid driving on frozen turf.
• Avoid driving on wet ground where ruts will remain.

Trimming

• Use walk-behind mowers and line trimmers where site cannot be accessed by riding mowers, and around trees to avoid trunk damage from riding mowers.

Edging

• Edge 2 to 4 times per year, depending on the maintenance standard for the site.

Cultural Care

Fertilization

• Soil test routinely fertilized turf on a 4-year cycle.
• Provide turf fertilizer 5-1-4 NPK unless otherwise indicated by soil tests.
• Apply approximately 1 lb. of N per 1000 square feet.
• Fertilizers N should be approx. 50% water insoluble N preferable with some organic sources.
• Avoid applications during heavy rainfall to avoid runoff.
• Avoid applications in very hot weather.
• Irrigation systems should be operational before growing season applications.
• Mark sprinkler heads to avoid damaging them during truck applications.
• Add micronutrients and lime as soil tests indicate.

Use site-specific fertilizers, and only organic formulations near streams, wetlands, and shorelines.

Irrigation

• Apply approximately one inch of water per week.
• Monitor auto irrigation effectiveness on a weekly basis.

Aeration

• 2 to 3 times per year using .75 inch hollow tines.
• Best periods: March/April, late June, late August.
• Make two passes at 90-degree angles.

Top Dressing

• Use 80% coarse sand and 20% composted organic material.
• Most effective when done lightly and frequently.
• Apply ¼ inch, each application.
• Monthly applications in heavy wear areas during peak seasons.

Overseeding

• Overseed entire area at least once per year.
• Overseed in fall and slicer seed in spring.
• Overseed 5 lb. / 1000 square feet.
• Site characteristics, usage, and maintenance practices guide seed selection. Ideal sites (full sun, good drainage, reasonable fertility) are suited for perennial ryegrass blends. Lawns that are in partial shade or on poorly drained sites should be seeded with mixes of perennial rye and fescues. Avoid Kentucky Bluegrass.

Site Standards

Prominent Irrigated Lawn Areas:

These are high visibility or high use landscapes. Examples include: community center lawns; popular picnic/sunbathing areas; lawns adjacent to busy arterials.
*Fertilizatio*n: 5-1-4 NPK ratio at 2 to 6 lb. N per year applied in 3 to 4 applications. Only organic fertilizers should be used near riparian areas.
*Aeratio*n: 2 to 3 times per year with conventional 0.75” hollow tines.
*Overseedin*g: Once per year at 5 lb. per 1000 sq. Monthly applications in heavy wear areas.

General Irrigated Lawn Areas:
*Fertilizatio*n: apply 5-1-4 NPK ratio at 1 to 2 lb. N per year applied in 1 to 2 applications. Only organic fertilizers should be used near riparian areas.
*Aeratio*n: 1 to 2 times per year with conventional 0.75" hollow tines.
*Overseedin*g: as needed, in April/May and October.
Non-Irrigated Lawn Areas:
*Fertilizatio*n: apply 5-1-4 NPK ratio once October/November, only organic fertilizers should be used near riparian areas.
*Overseedin*g: as needed, in October.
Steep Slopes:
Leave unmowed or mow only once or twice per year. Replace existing slope vegetation with "low grow" turf cultivars or woody groundcovers.
Soil Based Athletic Fields:
Maintain as general irrigated lawn unless there is exceptionally high usage.
*Fertilizatio*n: apply 5-1-4 NPK ratio at 2 to 6 lb. N per year applied in 3 to 4 applications.
*Aeratio*n: 2 to 3 times per year with conventional 0.75" hollow tines.
*Overseedin*g: Once per year at 5 lb. per 1000 sq. ft or about 375 lb. per soccer field. Monthly in heavy wear areas such as goal months through the playing season.

Three Year Establishment Care

All new plantings require follow-up care for a period of three years that is more intensive and frequent than plants that are already established. Main components of this three year care program are: mulching, watering, and weeding. One-time maintenance actions that are project dependent are things like removing tree stakes and inorganic sheet or fabric mulch. Detailed instructions on how to perform these maintenance actions can be found in this section under the title of the specific practice, i.e. "Mulching". Once the three-year period is over and the plantings have established, care of these planted areas should be incorporated into the regular ongoing maintenance within the management area that they are located.

Watering: All new plantings should be watered in at the time of planting. Regular three year watering should consist of at least 1" weekly for first two growing seasons, then taper to ½" weekly for plantings in natural areas. See M&M Practice "Watering".
Removing Tree Stakes: Do not use tree stakes in natural area plantings. Tree stakes used elsewhere should be removed after 1 year.
Removing Inorganic Mulch: Inorganic sheet mulch used in areas of severe invasive species problems should be removed during the dormant season after 3 years and entire area should be mulched with 4-5" layer of wood chips. Depending on site conditions and concern about re-invasion by weeds, entire planting area can be sheet mulched with a double layer of cardboard underneath the wood chips. Application of these techniques is usually limited to planting in natural areas and would not typically be necessary in a more developed landscape area.

Watering

Watering is the key to plant survival. Seattle receives an average of 39 inches of rain each year, but only 13 of those inches fall during the growing season. This is why summer watering is so important, particularly for plant installations in the first three years of establishment. Water management is a term used to describe the efficient use of supplemental irrigation, which is needed to sustain many planted landscapes in the Puget Sound region. By controlling the application of water for irrigation, water management conserves this resource, reduces urban runoff and saves money. For most efficient watering, establishment of an irrigation infrastructure for areas that require regular watering is recommended. Water sources for temporary irrigation during 3 year establishment care of newly planted areas may include watering trucks, fire hydrants (permit required), hoses from existing bibbs and permanent irrigation lines.

Irrigate the following Park areas:

- Newly installed landscapes.
- High-use or high-visibility turf planting.
- High-use or high-visibility shrub and annual plant beds.

Do NOT irrigate:

- Low-use or low-visibility park turf areas.
- Turf meadow areas.
- Natural areas - except during period of establishment.

In general:

- Water new trees and shrubs thoroughly at planting.
- Provide water to new trees and shrubs during first two summers, totaling at least 1" per week of precipitation and/or irrigation; taper watering (to ½" weekly) in the third year.
- Established trees and shrubs do not require supplemental watering except during periods of extreme drought (dependent, however, on species characteristics).
- Water valuable, specimen trees and high-use or high-visibility planting beds during periods of extreme drought even if established.
- Prepare irrigation systems for season as weather warms in spring; early irrigation may be required during early dry periods, especially following or during ongoing drought conditions.
- Field check soil moisture for drying regularly from May through late September: water content will vary significantly with soil type, temperature, drainage and year-to-year.
- Modify turf irrigation around established trees to accommodate the water requirements of the trees.
- Do not direct water spray on tree trunks.

See Seattle DPR Landscape, Horticulture and Urban Forestry Best Management Practices Manual (BMPs) (1999) for additional information on irrigation systems. See Planting and 3-Year Establishment Care for instructions on watering newly installed trees and shrubs.

Weeding and Invasive Plant Control

Weeding and controlling invasives are necessary as an ongoing maintenance action throughout the Park in developed landscaped areas as well as natural areas. In addition, most natural area planting projects will include initial removal and ongoing control of invasives as a major component of the project. Invasive control is also an important part

of 3-year establishment care for all newly planted areas throughout the Park. The most commonly occurring and problematic non-native invasive species in the Park are listed below with a brief description of their characteristics, some information about where each species is typically found in the Park, and some recommended eradication and control methods for that particular species. Recommendations and protocols (including herbicide use) are in accordance with DPR's 1999 Landscape, Horticulture, and Urban Forestry BMPs), and focus on using an integrated pest management approach characterized by a combination of control and removal methods. Generally, the most effective long-term control of invasive species is achieved by using a combination of control methods, reducing site disturbance, and establishing healthy native plant communities. All control efforts should be directed over time towards establishing and maintaining more sustainable plant communities. To this end, weedy species and infestations that pose the greatest threat to healthy desirable plant communities are those that should be targeted. In addition, to keep the weed control workload at the most reasonable level possible, new infestations should be targeted for control before they become widespread or well established, and the extent of current invasion should be controlled at or below existing levels for those species that threaten to spread. Thus, invasive control should focus on those species and specific infestations that are:

1) the fastest-growing,
2) the least established but potentially threatening,
3) the most disruptive to functional habitat, and
4) listed noxious weeds with mandated control.

Large woody debris and brush piles are critical elements in the natural areas of the Park. When large trees have been removed, recycle as much of the parts of the woody debris on site as possible. Trunks and large branches that will not live sprout can be placed directly on the ground within any of the habitat areas, except for within the existing wetlands on site. Brush (non-sprouting limbs and branches from the treetops) can be used for wildlife brush piles. Other plant debris not appropriate for wildlife features should be disposed of following current DPR protocol. All areas are accessible; thus debris can be removed from the site.

The following text describes in detail how to remove non-native invasive plants identified as a significant presence at Cowen Park. At the end of the text are found tables describing specifics such as removal quantities, seasonal timing, replacement ratios, and removal intervals for major targeted species. Non-native invasive species that are not specified in these tables can be removed without limitation, as appropriate.

Invasive Removal – Noxious Weeds
All listed noxious weed species found in Cowen Park will be controlled as required by County regulations and in accordance with Seattle Parks BMP's.

English Holly *(Ilex aquifolium)*
English Laurel *(Prunus laurocerasus)*
Laurel and holly are broad-leaved evergreen trees (initially, shrubs) that are spread

readily by birds due to their prolific and tasty fruit and abundance in the general landscape. These species also sucker and re-sprout vigorously. Laurel and holly prefer – but do not require - partial shade and are generally found in upland forest in the understory, or along forest edges. Removal of these species from the Native Forest Remnant MA should be a high priority. Young plants can be pulled by hand, removed with a weed wrench, or grubbed using pick or shovel. Plants too large to remove with roots intact are most effectively eliminated by a combination of mechanical means and herbicide. A 25% solution of Garlon 4 is recommended in upland areas away from aquatic resources (e.g. creek, wetland). Within 100' of aquatic resources, a 50% solution of Rodeo in a water base (no surfactant) is recommended. Herbicide should be mixed with a water-soluble dye. Several cut–and-paint methods can be used:

1) Cut shrub to a stump at or near ground level and paint entire cut surface immediately with herbicide.
2) Cut shrub to a stump at or near chest level and with a portable drill, make 1/8" diameter holes 1" deep into the stump from the outer sides all the way around the circumference of the stump every 2". Then inject herbicide with syringe directly into each hole. If standing dead brush is desired, this method can be used without cutting the plant to a stump.
3) Girdle the standing plant by making a series of downward overlapping cuts all the way around the trunk (also called frilling), leaving the chips attached to the trunk at the base of the cut, then paint herbicide onto fresh cuts. This technique should be used before fruit production so that standing dead plant does not have fruit on it. Treated cut stumps should be checked for resprouts every 2 to 6 months for the first year after cutting and re-treated if necessary. If no herbicide is used, repeated cutting will be required to weaken and eventually kill the plant over time. This is a more labor-intensive method and will require diligent follow-up visits over a period of at least several years to remove suckering growth resulting from initial cutting. (But it should be noted that neighborhood volunteers may be recruited for this type of ongoing work, though they **cannot** be recruited to apply herbicides.)

Himalayan Blackberry *(Rubus discolor))*

Though the bulk of Himalayan blackberry has been removed from Cowen Park, it is still found in small areas around the newly created wetland and as an understory species along forest edges. Because it is still present in some areas of Ravenna Park, ongoing removal efforts will be necessary to keep it from spreading back to Cowen Park. Blackberry is shade-intolerant, so long-term control is linked to successful establishment of healthy native plant communities that will create undesirable conditions for this species. Removal methods include hand grubbing with root removal, repeated cutting or mowing, cutting and dabbing stubs with herbicide (cut and dab), or combinations of two or more of these techniques. But because neighbors may eat blackberries in late summer, herbicide is generally not recommended for Cowen Park.

Hand-grubbing is a reasonable method for small areas, or for maintenance around trees or shrubs. Removal, other than in areas with sparse occurrences and a relatively intact

healthy existing plant community, should not be done unless subsequent replacement planting is planned. For sparse occurrences, hand-grubbing is recommended. This will likely be the removal method of choice in Cowen Park. Removal of thickets will result in displacement of wildlife that may use these areas for cover and forage. Therefore, whenever possible removal work should accommodate wildlife by occurring after July 31st . Depending on the removal method chosen, this may not always be possible, and maximum removal effectiveness may take precedence over wildlife impacts. Removal methods include:

1) Mow or cut to the ground numerous times during the growing season (May-Oct) to reduce plant vigor.
OR
2) Mow or cut to the ground late in the growing season (after July 31st), and immediately cover entire area with heavy weed fabric firmly stapled to the ground. In fall, cut slits in the fabric to install plants. After 2-3 years, remove fabric, hand pull any resprouts, and apply double layer of cardboard sheet mulch covered with 4-6" of wood chips.

Removal of large stands should be done incrementally, as thickets provide forage, refuge and cover for wildlife. Native wildlife should have nearby comparable habitat to take the place of what is removed. In edge habitat where invasion is low and coverage sparse, replant gaps created by removals with native species to prevent re-colonization, based on site-specific evaluation.

English Ivy *(Hedera helix)*
English ivy is a broad-leaved evergreen found in the forest ground layer and climbing up tree trunks in a few areas of the park. Ivy is shade-tolerant, and forms dense mats on the ground. Hand-pulling appears to be the most effective removal method for this plant. Any efforts to control ivy should initially target vines climbing into trees. Vines should be cut at shoulder height and again at the base of the tree all the way around its circumference. For safety reasons, cut vines should not be pulled out of trees. A radius of at least 5' all around the base of the tree also should be cleared of ivy. Patches of ivy on the ground are best removed by hand-pulling and rolling into a mat. Removal of dense mats in the ground layer should only be undertaken if coupled with deep mulching and/or replanting. New planting areas should have an additional 10'-wide strip cleared around the edges. Removal of sparse occurrences of ivy can be done without replacement planting, where existing native species exist and can rebound and refill the area. Control in areas of low infestation should receive high priority, to prevent further ivy spread.

A BASIC GUIDE TO MONITORING

How and Why to Monitor

An important part of both restoration and maintenance of Cowen Park vegetation is active monitoring of vegetation condition and composition over time. Systematic monitoring and record keeping adds to organizational memory for citizen groups and Seattle Parks staff. Accurate records can highlight relative effectiveness of different management practices. Records also can be used to refine management practices, to determine who is best suited to perform particular tasks, and to learn how to make best use of limited citizen and Seattle Parks staff resources. Monitoring of work performed consistent with this plan thus completes a feedback loop, and assesses whether or not the management is meeting stated Goals and Objectives for the VMP.

Monitoring is an interesting and valuable activity that can be performed by citizen groups or individuals using standardized forms and methods to insure a consistent approach. For long-term monitoring to succeed, each monitor must collect information about an area identically.

Monitoring of management areas may be done either in conjunction with active maintenance, or as a separate task. When choosing to monitor particular areas, volunteers or staff should refer to the management area map (Appendix D) to confirm appropriate MA names.

What, When and Where to Monitor

Monitors should resist the temptation to simply step off a Park trail and begin monitoring, or to choose areas of particular personal interest. For monitoring information to be useful, it is important to sample randomly throughout a management area, not just at the edges or in a preferred spot. In the case of designated restoration projects, monitoring plots must lie entirely within the project area. Restoration monitoring will follow particular protocols established individually for projects.

Maintenance monitoring ideally should be completed in each Management Area, every year. The number of plots sampled does not need to be large, but should be dispersed over the entire geographical area. If this standard proves unrealistic to meet within resources available, greatest attention should be paid to high value and/or high hazard Park areas where resources and users are most vulnerable to changing conditions. This emphasis corresponds to recommended VMP implementation priorities. While not an entirely scientific approach, targeted monitoring can provide early warning about significant trends or situations needing prompt attention.

Maintenance Monitoring

A generic Maintenance Monitoring form follows. It is designed to be copied and used for standardized monitoring of park vegetation maintenance and management by trained volunteers, Seattle Parks staff, or possibly, consultants. A separate form should be prepared for each MA, as needed.

Cowen Park
Maintenance Monitoring Form

Date: _____ Observer's Name: _____

Management Area: _____

Boundaries of Management Area Monitored on This Date (describe or draw the limits):

Are there hazard trees that pose a risk to public health or safety? If so, describe in detail their location and condition. Schedule care and/or removal with Park Staff.

Note species and percent coverage of either woody or herbaceous weedy invasives present. If percent cover is >10% do weeding and invasive control per Maintenance section.

If there is a plant installation in this Management Area, do any shrubs or plants require pruning or other care? Schedule work to be done by Park Staff.

For Wetland Area: This is a new area. Describe overall condition of the wetland. Are newly installed plants looking healthy? Spreading? Does there appear to be any predation on the plants? Are there invasives present? If so, note species and percent cover. Remove any garbage that may have collected in ponds or stream.

SCHEDULE:
Work to be done by: □Park staff □volunteers □others
Targeted Completion Date: _____
Responsible DPR Staff _____
Date Work Completed _____

COWEN PARK VEGETATION MANAGEMENT PLAN

Chapter 7 – Implementation – Priorities and Strategies

The following priorities and strategies relate directly back to Chapter 4 (Findings).

• **New Trees** - The issue of the declining bigleaf maples has largely been addressed and replanting is expected to be complete by mid-January, 2004.

• **Feed the Earth!** - One significant issue, related to several of the findings, is that the Park's natural landscape components fall short of their potential for vegetative richness. Vegetative richness contributes significantly to the overall biodiversity of Park flora and fauna. Several projects will contribute to increasing this vegetative richness, including:

Re-vegetatation of the northwest slope and edge. This area should be a high priority for revegetation, both to guard against erosion and to address neighborhood concerns that the area now looks bare due to gaps created by the removal of laurel. Further, new plantings will help shield the "habitat tree" from view (some neighbors find offensive). Species chosen should be able to withstand sun and, on the slope itself, drier conditions. A mixture of taller, mid-sized, and shorter plants would be ideal. Some suggestions are included in a small table at the end of this section.

Completion of invasive species removal. Much has been done in the regard, but there is still significant work to be completed. Invasives should be removed from the Native Forest Remnant as soon as possible. This will include the south side of access road/trail, where laurel, blackberry, and holly should be removed.

Completion of invasives removal from the wetland area should also be a priority, and happen before the installation of wetland plants. This will include ivy, holly, nightshade, blackberry, and laurel on the north slope of the wetland, just above area where new bridge is to be created. Creeping buttercup and chickweed may be left, as they are seasonal and not likely to present a problem.

Native Remnant. As invasives are completely removed from the Native Forest Remnant, in-planting with more species may begin. Suggestions are included in the small Table at the end of this section.

Stay on Top of Laurel. On the west side of the access road next to the Shelter House and behind backstop area, it is recommended to keep laurel cut low; removal is not a priority.

• **Footpaths** - Another key finding was that there is a tremendous amount of soil compaction around the perimeter of the Park. It is recommended that gravel paths be put down as soon as possible. Those around new wetland are excellent, and the same could be extended to all the perimeter footpaths.

• **Hot Wheeling Hooligans** - To protect the Greensward and Lawn it is recommended that several large boulders be placed on either side of the rainbow sign at the SW corner of the

Park. Judiciously spaced, they would effectively make entry by "hot wheelers" impossible at that location. Further, the return of a locking bollard at the Ravenna Ave. access road would prevent entry at that location.

• **Drainage Experiment** - The Greensward and Lawn is often soggy during the rainy seasons. It is therefore recommended that low-growing willow species (e.g., Salix purpurea 'nana') be planted in several locations to see if it will help absorb this excess water. One area would be along the foot of the west berm, another would be along the foot of thee south slope by the backstop.

Table of Suggested Species for Cowen Park Revegetation Projects

Scientific Name	Common Name	Max. Ht.	Site & Light*	Comments
Shrubs and Herbs				
Acer circinatum	vine maple	25'	M,X / SD	needs canopy shad or lots of moisture
Achillea millefolium	yarrow	1'	X / SI	self-seeds, robust, tolerant
Amelanchier alnifolia	serviceberry	20'	X / SI	edge-loving
Cornus sericea	red-osier dogwood	20'	WE,SS,M / ST	takes sun if it has lots of moisture
Fragaria vesca	woodland strawberry	6"	X / SI	rapid spreader, evergreen
Gaultheria shallon	salal	7'	X / ST-SD	basic forest groundcover
Holodiscus discolor	ocean spray	10'	X / SI-ST	drought-tolerant, edge-loving
Mahonia nervosa	low Oregon grape	2'	X / ST-SD	dry sites
Maianthemum dilatum	wild lily of the valley	14"	M,X / ST	rapid spreader
Oemleria cerasiformis	Indian plum	15'	M,X / SD	sub-canopy
Oplopanax horridus	Devil's club	7'	WE,M / ST	forms thickets, great barrier species
Oxalis oregana	wood-sorrel	9"	M,X / ST	rapid spreader, robust, highly tolerant
Philadelphus lewisii	mock orange	10'	M,X / SI-ST	needs good drainage
Polystichum munitum	sword fern	4'	M,X / ST	needs shade or moisture
Pteridium aquilinium	bracken fern	5'	X / SI	seral on disturbed areas
Rubus parviflorus	thimbleberry	10'	M,X / SI	drought-tolerant
Symphoricarpus alba	snowberry	7'	M,X / SI	common, tolerant

Trees				
Taxus brevifolia	Pacific yew	80'	M / ST-SD	very slow growing
Thuja plicata	western red cedar	230'	SS,WE,M / SD	basic to PNW and wetlands
Tsuga heterophylla	western hemlock	200'	X,M / SD	dry conifer, needs lots or organic soil, climax species

***KEY:**
M - moister (mesic) upland
SS - saturated soils
WE - wetter
X - drier (xeric) upland
SD - shade dependent
SI - shade intolerant
ST - shade tolerant