Union Bay Natural Area and Shoreline Management Guidelines, 2010
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University of Washington Botanic Gardens
Sandra Lier, Director

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TO: Sandra Lier, Executive Director, University of Washington Botanic Gardens

FROM: Thomas M. Hinckley, Interim Director, School of Forest Resources

RE: Approval of the Union Bay Natural Area and Shoreline Management Guidelines

Following discussion at the Faculty Meeting held on February 2, 2010 the faculty of the School of Forest Resources approved the Union Bay Natural Area and Shoreline Management Guidelines by a vote of 31 Approve, 0 Oppose, 5 Abstain of 45 eligible to vote faculty.
Executive Summary

This document serves to update the *Union Bay Natural Areas (UBNA) and Shoreline Management Guidelines*, published in 1995. It includes a number of guidelines and specific recommended management actions to achieve the long-term goals for this area. An inventory and assessment includes presentation of current conditions by sub-area.

Site

The combined area of UBNA and the University of Washington shoreline is 73.5 acres. Of that area, 14.4 acres have been restored primarily through student projects and volunteer labor. An assessment of the condition of the restored sites indicates that 6.9 acres are in danger of reverting to a weed-dominated condition; 0.9 acres are in need of efforts to restore to the desired condition. Resources are needed both to begin new restoration projects and to maintain previously restored areas.

Staff

UBNA is maintained by a staff gardener, less than 0.5 full time equivalent employee (FTE); faculty-supervised students in class work; volunteers; and a half-time Research Assistant (RA) for two academic quarters each year. The majority of the work is invasive weed control; classes and volunteer groups have performed most of the plantings. Contractors installed two shoreline projects (Dempsey Indoor Practice Facility and Conibear Shellhouse) for the University. Based on staffing rates listed in the Arboretum Master Plan for primarily low-intensity maintenance, the core areas of UBNA, the University Slough, and the shoreline will require 3.5 FTEs to provide an adequate level of maintenance and care.

Volunteers

Volunteer work is central to restoration and maintenance of the natural ecosystem that has developed in UBNA. The RA works almost entirely with students in courses with restoration as a component, as well as students in natural science courses that can take advantage of the site. Potential opportunities exist to restore, teach, and gain active support among interested community volunteers; however, a volunteer coordinator is needed to organize the work of volunteers and recruit new volunteers by taking advantage of public interest in restoration, nature, and horticulture. The volunteer coordinator’s time could be shared among the programs of the
UWBG, with a certain percentage of time designated for work with UBNA; or be a restoration coordinator for the UW campus as a whole.

Site Improvements

The trails of UBNA are utilized extensively by the public and offer an important opportunity for teaching, outreach, and relationship-building between UWBG and the community. The trails follow Lake Washington’s shoreline and extend through the managed and restored areas. An expansion of the trail system would increase the site’s value and its utilization by the public. A loop trail is proposed for the northwest sub-area between wetland and grassland along the slough. Trail and boardwalk systems are also needed, both to access the lakeshore from the Center for Urban Horticulture by way of the small creek that runs into Lake Washington east of Shovelers Pond, and to open the swamp forest in the East Basin. The area behind the Center for Urban Horticulture would require only a short section of boardwalk, while the trail in East Basin would need at least 750’ of boardwalk construction. These plans would be coordinated with state agencies responsible for shoreline management.

Site Expansion

Parking lot E-5 has been envisioned as part of UBNA for many years. Its gravel surface is similar to the substrate of natural prairies, and hence the site has great potential for becoming a restored South Puget Sound prairie ecosystem. Approximately one-third of E-5 was turned over to the Center for Urban Horticulture in the mid-nineties and now supports camas, Garry oaks, and Idaho fescue. The expected date to obtain the remainder of E-5 is 2016. The site is suitable for part of a future system of trails and native plant communities. Plant propagation may begin earlier in anticipation of restoration.

Structural Improvements

Structural improvements would add many desirable features to UBNA. These might include bird photography blinds, kayak pullouts, wildlife structures and feeding stations, trail drains; short paths with lookouts for access to wetlands, slough, and the shoreline; and interpretative signage.

Priority Items to Fund

- 3.5 FTE staff
- Volunteer Coordinator/Restoration Coordinator
• Two additional quarters support for UBNA Research Assistant
• Northwest Trail – 2160 feet
• East Basin Loop Trail – 590 feet dry, 750 feet boardwalk
• Center for Urban Horticulture South Trail to UBNA – 460 feet dry, 50 feet boardwalk
• Kayak pullouts
• Bird blind
• Solar trail lighting
• Blue emergency phones
Chapter 1: Introduction and Background

The Union Bay Natural Area (UBNA) is a keystone ecosystem site: as a point of interaction between terrestrial and aquatic systems, it is central to the functioning of a number of lakeside systems. Though it was severely degraded, the area is now an integral element in the second-largest surviving natural ecosystem along the shores of Lake Washington¹. The Union Bay Natural Area is open, free to the public, on a well-travelled hiking and biking trail, adjacent to Husky Stadium, and a major urban birding area. It is without a doubt a highly visible asset of the University of Washington (UW). The UW’s restoration program and the Union Bay Natural Area have received national and international recognition.

Botanic gardens may have initially existed to showcase exotic plant species, but plant conservation has long been a mission of major importance to gardens. Restoration is an extension of conservation; it is what you do to protect the environment when there are fewer and fewer surviving natural systems to conserve. Restoration also allows a dynamic, on-site experience with environmental responsibility for members of the community. There is a natural connection between the UWBG study and practice of ecosystem restoration and the ecosystem-based collections at the Washington Park Arboretum. They are two parts of a whole: knowledge of what intact systems look like and the resources and knowledge that allow the reconstruction of damaged systems.

This document was produced to update the 1995 Management Plan for the Union Bay Shoreline and Natural Areas (referred to in this text as the Management Plan). The Management Plan contains maps, historical information, and a discussion of the regulatory environment in which the Union Bay Natural Area (UBNA) developed. It also recommended actions to reach the following overarching goals for the site:

1) To maintain and to restore biodiversity and ecosystem functions;
2) To increase wildlife habitat;
3) To increase research and teaching, and the coordination thereof; and
4) To increase the area’s service to the public.

Furthermore, this document presents specific recommended actions, in addition to those previously discussed in the Management Plan, which would help managers assess the landscape and make informed management decisions.

¹ Mercer Slough in Bellevue is the largest.
Background

The Union Bay Natural Area is built upon an old cultural artifact of the Laurelhurst and University District communities: the Montlake Landfill or Montlake Dump. The dump lay fallow for decades after closing in the late 1960s. Several faculty members at the University envisioned it as part of the new Center for Urban Horticulture, a focus for University teaching, research and public outreach. In a letter proposing this vision, the faculty listed the attributes of the place: it was natural, open, ecologically diverse, and accessible. Almost as an afterthought, they added that it could become a *model for natural area restoration*. Forty years later, UBNA has become such a model; 35 restoration projects have been completed in this area, and over 1500 students have been trained in restoration ecology through UBNA’s community-based restoration program, the University of Washington Restoration Ecology Network. This program has received national and international recognition, with a feature article in *Science* and the John Rieger Award from the Society for Ecological Restoration International.

Historically, the riparian systems comprised of Yesler Creek, Kincaid Ravine, and Ravenna Creek converged at what is now UBNA, and the flows of their substantial combined watershed created the delta upon which it sits. To the south, the large forested systems of the Washington Park Arboretum, Interlaken Boulevard, and Lake Washington Boulevard converge on the south shore of Union Bay. Between those two remnant systems lie the Montlake Cut and the Ship Canal, a passageway through which must pass all salmon that swim up the streams that enter both Lake Sammamish and Lake Washington. Conserving and restoring this important natural system is a critical task; the work at UBNA is a significant part of that effort.

Natural resource conservation is one of the main challenges of our time. More than 95% of global terrestrial ecosystems have been degraded or converted to urban and agricultural needs. There is more land to restore than there is to conserve; restoration now must play a vital role in sustaining global ecosystem health. The work of restoring UBNA can add an important habitat to the world’s natural systems. The work that is done teaching restoration to students and showing neighbors the results of good land stewardship can multiply that total many fold.

The plan for restoring UBNA is based on working with nature. The land is dynamic and the surface contours have been changing since the landfill days. Ravenna Creek has been re-connected to University Slough, creating a now-living stream. For decades, students have pulled blackberries and planted native plants; woodlands, wetlands, and grasslands currently support diverse plant and animal populations. The overall management guidelines have been, and remain, to plant native plants and increase the site’s natural diversity by creating complex habitat for as many creatures as can be supported.

Woody plant restoration projects often begin to yield results after 15 to 20 years. Before then, the woody plants compete with herbaceous invasives and devote significant energy into roots rather than leaf area. After that period, plants are able to put more resources into producing leaf area, biomass, and canopy, hence providing the restoration site with the benefits intended. According
to this principle, UBNA should now be reaching its golden age, where past work pays off in significant habitat improvement.

UBNA is first and foremost an outdoor laboratory of the University. All other outcomes result from the work that faculty, students, and staff provide in support of teaching and research. Using various techniques, UBNA can demonstrate to the public how restoration can change the landscape in a major metropolitan area.

The site has had many significant changes and many names over its short history, including Union Bay Swamp, Montlake Fill, East Campus, Union Bay Teaching/Research Arboretum, Union Bay Research Natural Area (which included the Ecological Research Area), and finally, the Union Bay Natural Area, or UBNA. UBNA is now part of the Center for Urban Horticulture, one of two sites of the University of Washington Botanic Gardens. The other site is the Washington Park Arboretum, jointly owned and managed with the City of Seattle.
Chapter 2: History of Site

Ravenna Creek once flowed out of Green Lake in a southeastern direction through what is now Ravenna Park before emptying into Union Bay. Ravenna Boulevard approximates the course that the old channel took out of Green Lake. Over the time period between the last glaciation and now, between 10,000 and 15,000 years ago, the creek deposited an underwater delta into Lake Washington; the mouth of the creek was near the location of the Burke-Gilman trail crossing 25th Ave NE. In 1911, at the recommendation of the Olmsted brothers, Green Lake was lowered about seven feet to provide additional parkland. As a result, the lake stopped flowing into Ravenna Creek. Since then, groundwater within Ravenna Park provides the primary flow into Ravenna Creek. The creek was subsequently disconnected by re-routing its flow into the sewer system near the lower end of Ravenna Park.

In 1916, the level of Lake Washington dropped by about nine feet with the construction of the Ship Canal: the lake level has subsequently been regulated with a single water control structure at Ballard’s Chittendon Locks. With the lowering of the lake, the subaqueous delta of Ravenna Creek was exposed, and wetland vegetation began to colonize the area. The delta is now the location for the University Village shopping center and the University’s E-1 parking lot, the golf driving range, intramural fields, the soccer and baseball stadiums, and the Union Bay Natural Area.

According to Dunn (1966), the Union Bay site was used as a repository for waste soon after the lake was lowered; infilling with rubbish started in 1925 (Center for Urban Horticulture Draft Environmental Impact Statement 1980) and the site opened for public dumping in 1933. It was hoped that the filled site eventually could be used for buildings or for other uses (such as parking by University of Washington students). The City of Seattle began formal disposal of domestic garbage in 1956. Because the deltaic deposits below UBNA initially were composed of as much as 50’ of soft clay, 20’ of soft peat, upon which 15’ of wood fill and 20’ of landfill were deposited, the surface began to subside. Today, it continues to subside, though rates of subsidence have slowed (Shannon and Wilson 2008). Methane was produced in large enough quantities to be flared from the site for several years after the landfill was closed and still is produced in sufficient quantities to require accommodations in both construction and facilities operation. The public disposal site closed in 1964, and garbage landfilling ceased in 1966. Filling, grading, and seeding of the surface continued until 1971. A University Advisory Committee on Arboretum selected the location in 1971 for a new arboretum site. The Master Plan for the Union Bay Teaching/Research Arboretum (later to become the Center for Urban Horticulture) was submitted to the University in 1976. Construction of the first CUH buildings (at the eastern end of the landfill area) began in 1983 and finished in 1984 (old Merrill Hall and NHS Hall). Isaacson Hall was completed in 1985 and Douglas Conservatory in 1988.
In 1972, the Ad Hoc Study Committee for East Campus Development made the following recommendations for the site, later summarized in the CUH Environmental Impact Statement (Union Bay Planning Committee 1994):

1) Maintain the marshy shoreline for its educational, recreational, wildlife, and aesthetic values.

2) Provide limited shoreline access.

3) Allow shoreline areas to settle and vegetate naturally.

4) Provide for ecological demonstration areas.

5) Retain the ponds (wetlands) to the extent feasible.

6) Reduce parking as permitted by lessening demand.

7) Improve the site with plantings.

8) Allow minimal building construction

These recommendations have been followed, and most objectives have been reached.

In 1976, the Jones and Jones Master Plan proposed that the landfill be used for plant collections and for landfill research. There would need to be protection of the ephemeral ponds, grasslands, associated wildlife, and remnant marsh (referred to as the Unmanaged Wildlife Area). Further, it was proposed that additional ponds and peat islands should be established and shrub and tree cover should be increased. The eastern channel should be re-excavated: University Slough is the west arm of a horseshoe-shaped drainage channel that once carried runoff from the landfill area into Lake Washington. In order to achieve the establishment and protection of this natural system, limits to access would be inevitable. The plan proposed a woody plant teaching collection along the east bank of University Slough.

The Draft Environmental Impact Statement for the Center for Urban Horticulture at Union Bay (1980) stated that the focus of the Center and its surrounding open lands would be activities to further urban horticulture: the study of plants as functional units to maintain and enhance the urban and suburban environments. The major portion of the site would continue to be open grassland (including parking lot E-5, converted to grassland—see map, Appendix A), utilized for passive recreation and interdisciplinary research projects compatible with the site’s existing recreational and wildlife uses. The area would be lightly managed, and ponds would be retained. It was expected that new ponds would form with continued subsidence. A proposal to dredge the eastern canal was deleted from the Master Plan. An interpretive walk through the Unmanaged Wildlife area, shelters, new ponds, and artificial peat islands were also removed from the plan. The Final Environmental Impact Statement (1981) added little to the basic proposals for use of the site; shrub buffers would be planted between research collections, and grassland and deciduous trees valuable to wildlife would be planted.
In the early days of the Center for Urban Horticulture the capped landfill was used infrequently, but there were plans to begin developing the proposed woody plant teaching collection. Himalayan blackberry colonized the site and began to spread. An initial effort to clear and prepare the site for the proposed teaching collection caused some mortality among nesting birds, and bird-watchers complained to the President of the University. As a consequence, in 1986 a committee was formed to develop management guidelines for the then-designated Union Bay Research Natural Area, and Professor Eugene Hunn was appointed its chair.

A committee letter dated 14 May 1987 and entitled “Draft: Management Proposal for the Union Bay Research Natural Area of the University of Washington” outlined the goals and rationale for management (Hunn 1987). The natural area included the present day UBNA described in the Draft CUH EIS and included the adjacent shorelines under University control. The functions of the natural area were correlated with activities defining the mission of the University: teaching, research, and public service. The research value of the site was attributed to its ability to serve as a focus for the study of ecological processes, particularly in urban environments. Maintaining a diverse ecosystem close to the University provided research value. The public service value was as a public amenity with great views and excellent bird-watching. The characteristics that made it valuable in these areas were listed as:

1) a natural environment in an urban area
2) an open space, unusual for western Washington,
3) a diverse natural habitat, and
4) accessibility

A range of potential intervention levels for management was proposed. These levels ranged from minimal maintenance, to management to protect the character of the site, to intensive management for horticultural, silvicultural or other experimental or management regimes. Different parts of the site might be appropriate for more- or less-intense intervention. Whatever the level of management, it was clear that the prescribed level should be intended to preserve and enhance the valuable characteristics of this unusual place. A faculty manager was to be appointed to oversee the operations of the site, with the assistance of a committee of faculty who worked on or had interest in the site. Further, there was to be an advisory committee of faculty, staff, and neighborhood and community groups. Finally, under a section identified as a “vision for the future,” it was proposed that the area could be made into a national and international model of natural area restoration.

Initially, the University of Washington committee charged with recommending the goals and management requirements for the closed Montlake Landfill, around 1970, was focused on preventing erosion of the un-vegetated surface and resultant problems with dust and the
unearthing of fill materials. The committee prescribed broadcast seeding with a common pasture grass mix that contained an assortment of European grasses.

The Montlake Landfill Oversight Committee was formed by the University of Washington in 1999 to "provide administrative oversight of future landfill activities, track on-going development, and respond to public requests for information regarding the landfill." (Montlake Landfill Work Group 1999). The committee includes representation from relevant departments at the University of Washington, as well as the Seattle-King County Department of Public Health, Seattle Public Utilities, Washington State Department of Ecology, and Washington State Department of Health. The Montlake Landfill Project Guide, 2009, presents guidelines for maintenance and construction activities over the landfill area.

A study of the vegetation of the area in 1986 found 150 species of flowering plants and noted that “most vascular plant species on the Wildlife Area are not native.” The study also found clumps of Himalayan blackberry and Scotch broom scattered across the open area (Huang 1988).

Ecological restoration of the site began in 1990 with the removal of purple loosestrife (*Lythrum salicaria*), from Shovelers Pond. This invasive species covered UBNA wetlands in 1990. Acres were removed by hand, but in the mid-1990s the Washington Department of Agriculture and the King County Noxious Weed Control Board cooperated in the experimental release of *Gallerucella* beetles on the site. *Gallerucella* is a genus adapted to feed on purple loosestrife in its native landscape. As a bio-control it was quite effective, reducing the very large number of loosestrife plants inhabiting every wetland in UBNA to a few widely spaced plants. The plants continue to act as hosts to the beetles, and the beetles continue to control the expansion of loosestrife.

In the mid-1990s the Himalayan blackberry posed an obvious threat to plant diversity. Blackberry bushes were 10 feet tall and pressed into the trail from both sides of Wahkiakum Lane. Comparison of sequential aerial photographs of UBNA showed Himalayan blackberry cover of 0% in 1975, less than 5% in 1986, 20% in 1992 and almost 40% in 1996. As a consequence, it was decided to mow blackberry for control in open grassland areas. This practice has been carried out late in summer every year since 1998.

Thirty five restoration projects, impacting about 10 acres of the land available for restoration in the core of UBNA, have been completed by students and volunteers to date. Adjacent to the Conibear Shellhouse and the Dempsey Indoor Practice Facility, private firms under contract with the University have initiated 3.7 more acres of restoration. An additional 1.0 acre is undergoing restoration at the time of this writing by King County. See Appendix B for a list of restoration projects.

In the early 1990’s, there were no graveled trails in UBNA other than Wahkiakum Lane, and the cumulative length of social trails used by walkers and birders was very much greater than the total length now. The improvement of the loop trail with all-weather surfacing focused use on that trail; the network of unwanted social trails began to diminish (but did not disappear).
Another significant action that improved site conditions was the reconnection of Ravenna Creek with the University Slough. In 2006, the waters of Ravenna Creek, which had been discharged into the regional sanitary sewer system for decades, were re-routed into Lake Washington through the University Slough.

In 1993, the University Provost commissioned a broad synthesis of management guidelines for the UBNA site. The formal title of the synthesis document was *Management Plan for the Union Bay Shoreline and Natural Areas* (hereafter referred to as the *Management Plan*), and it was published in 1995. This Management Plan cited the 1992 University of Washington General Physical Development Plan, which called for “…management of the area (UBNA) in a manner which respects the substantial environmental values and resources of the area. This includes removal of invading species to preserve the open grassland areas.”

The recommendations from the *Management Plan* were divided into nine broad categories of action:

1) Remove invasive non-native plants and animals.

2) Add native plants.

3) Maximize habitat diversity and native biodiversity.

4) Control human impacts.

5) Monitor physical and biological conditions.

6) Increase and coordinate teaching and research.

7) Enhance personal safety.

8) Ensure public accessibility.

9) Provide educational interpretation.

These recommendations have been followed, and the objectives are being accomplished to the extent possible given limited funding. New guidelines and management actions related to each of these areas are discussed in Chapter 4.