Rewilding Ballard | Growing Small-Scale Community Habitat

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Abstract

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The current magnitude of global environmental challenges, including climate change and mass species extinctions demands an intensely greater level of integration between human and natural systems. This design thesis explores the incorporation of urban wildlife habitat into the built environment as one important approach for addressing these problems. It is argued that the mixing of humans and nature in urban natural environments will serve to not only bolster wildlife, but will help to grow ecological understanding amongst individuals as well as support human health and wellbeing. Focusing on the Ballard neighborhood in Seattle, Washington, the research and design presented emphasize the opportunities that small-scale sites present for both urban wildlife habitat as well social interactions with nature. The leveraging of small private and public sites for wildlife habitat is an effective strategy to address this goal in the face of intense population growth that renders the acquisition of property for parks and habit increasingly infeasible.

Two design proposals are offered, one addressing habitat opportunities across the neighborhood as part of a district-scale framework, and another for a small park at a shoreline street end site. In this second portion of the design strategies for small-scale habitat improvements are overlaid with programmatic elements to create a park space that will serve the Ballard community and function as habitat. It is hoped that the design proposal for this park will help garner neighborhood support for future planning of the site which consists of 3 acres of city owned properties.

Dedication

To the women in my life who have done so much to support, motivate, and challenge me. My mother Vicki, the memory of your kind heart is an inspiration and comfort for me every day. To my wife, Jamie, without your endless love and support I would never have gotten through these intense past three years. And for my daughter Lucie, I excitedly await your arrival in October.

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Photo 1.1: 1977 aerial of Hiram M. Chittenden Locks & Salmon Bay looking northeast. 24th Ave NW street and The Yankee Bar & Grill visible under construction in center right (circled). (Credit: King County Department of Engineering).

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"God has cared for these trees, saved them from drought, disease, avalanches, and a thousand tempests and floods. But he cannot save them from fools"

-John Muir

In light of the pressing environmental challenges we face today, the integration of urban wild spaces into the fabric of the built environment is an essential requirement of cities in the 21st century. As Seattle—like many cities across the country—continues to experience rapid population growth, public open green spaces within the built environment play an increasingly critical role for ensuring continued support for a high quality of life for local residents. Additionally, green open spaces are also

a special opportunity to support urban wildlife and biodiversity.

Lying within small, accessible urban wild spaces is a vital potential for supporting what environmental writer, Emma Marris, describes as a “gestalt switch” in public attitudes toward nature. This concept of a gestalt switch speaks to a shift in societal values of nature, a move towards the integration of the human and natural worlds in the minds of everyday citizens. In a world facing a myriad of environmental crises including climate change, habitat loss, mass species extinction, as well as the social costs of limited access to nature, a repositioning of our relationship with nature is of critical importance.

In highly urban contexts the agency of natural spaces can be magnified to support this values change, serving roles beyond the humble—though important—ecological services they also offer. At a societal and cultural level these small natural spaces have the potential to provide understanding of ecological principles, serve as a magnifying lens for the expression of dynamic landscape processes, and reinforce a rootedness to place within cities that is often lacking. Natural spaces also serve therapeutic functions for people. For example, views of nature have been associated with increased attention (Tennessen, 1995). Exposure to natural spaces has also been shown to reduce stress among adults and children (Barton, 2010) (Wells, 2003).

With this understanding of urban nature as a foundation, this thesis project focuses on the Ballard neighborhood in northwest

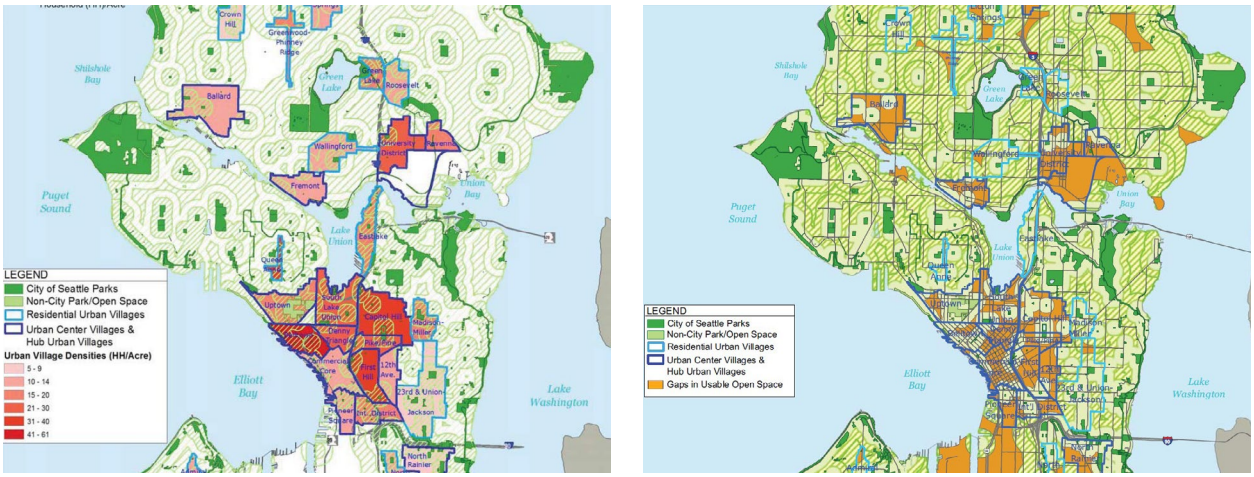

Figure 1.1: Maps from City of Seattle Parks and Recreation Gap Report, 2011. Map 1 shows high density urban village neighborhoods, including Ballard. Map 2 shows represents gaps in usable open space in orange. Ballard is among the densest neighborhoods outside of the downtown Seattle core, and also an area with significant gaps in open space. (Credit: maps by Seattle Parks & Recreation).

Seattle. As one of the city's fastest growing neighborhoods, Ballard is experiencing many of the challenges faced by the city as a whole. The neighborhood has also been historically underserved by open space, particularly in the neighborhood's central core. The 2011 Seattle Parks and Recreation Gap Analysis Report shows the majority Ballard's downtown core as being underserved by open space (Figure 1.1). And although it is flanked by a number of significant urban parks and habitat areas like Discovery Park and Golden Gardens Park, the neighborhood itself has a dearth of green open spaces, especially at its environmentally critical waterfront.

Since the acquisition of large-scale sites for ecological and public use is financially and logistically infeasible, small-scale opportunities represent the greatest chance for the growth of urban green space in the neighborhood and serve as opportunities for exposure to nearby nature.

Ballard is home to a number of small-scale sites that represent opportunities for the growth of urban ecology. These sites include schoolyards and other institutional sites, vacant properties, city owned properties, and public street right of ways. Among these, the shoreline street ends in Ballard represent one of the most critically

underutilized opportunities for habitat improvements. Shoreline street ends are dispersed throughout the city, offering chances to support everyday interactions with nature throughout the city as a whole. This is something that larger centralized parks cannot provide. Additionally, as Seattle continues to experience rising real estate values and increased population density, opportunities for the acquisition of sites to serve as public open space are becoming both more essential and inherently more difficult to fund.

Street ends represent a great solution for the city as a small-scale, yet impactful opportunity to integrate wildlife within the built environment and serve local residents by providing a dispersed network of public spaces along the city's ecologically important shorelines. Since street ends are already a part of the city right of way they require less capital expenditure to serve the goals of supporting wildlife and providing open space and shoreline access, since no funding is required for the acquisition of property. They also exist along environmentally critical riparian areas that are important potential habitat for both endangered salmon species and local and migratory bird populations, making them especially valuable potential ecological infrastructure (Kang, et al. 2015).

The following literature review is assembled to illustrate both the necessity of a greater integration of the natural and built environments as well as the need for a cultural perception change which that increased integration can support. Additionally, I review the state of local restoration efforts and shoreline

enhancements within the city of Seattle to illustrate that while many community scale urban wildlife and ecological enhancements reflect a clear ecological ethic amongst city residents, the implementation of such projects often misses important chances to support public appreciation, engagement, and understanding of nature both within cities and beyond. Many of these efforts rely on outmoded beliefs that restoring nature in cities means brining back nature as it was before humans disrupted it.

2 | Literature Review

Photo 2.1: October 12, 1915, barge repair at Ballard Marine Railway property. Photo taken at 24th Ave NW 20 feet southwest of Shilshole Ave NW looking south. (Credit: Seattle Municipal Archives).

2

"Now we must assume stewardship of the brownfields, the forsaken places, or as they say in Europe, the terrain vague."

-Richard Haag, 1998

As global human populations continue to grow, negative impacts on worldwide wildlife populations continue to worsen. Around the turn of the new millennium, these impacts began to be characterized by academics in terms of a new geologic era, the Anthropocene, the human-influenced era (Zalasiewicz et al. 2010). The significance of the term lies in the scale of human impact it implies. The effects of industrialization and human activities are no longer characterized as

being site or system specific. Our impacts on the environment should not be as of a series of discrete effects (e.g. localized pollution from a steel mill, or the effects of coal power plants on the atmospheric carbon composition). Instead, human activities now have a collective influence on the scale of a geologic epoch—on par with the effects of an ice age (Steffen et al. 2011). With this recognition of the far reaching impacts of human activities today due to the forces of industrialization, urbanization and consumerism, new and innovative interventions are required to support a fundamental repositioning of our relationship with nature.

Nature in Cities, Nature of Cities: Toward a Gestalt Switch

One challenge to such creative solutions has been the pessimistic attitudes of many environmentalists. In reaction to the magnitude of the problems we face today many contemporary environmental writings have taken on an almost apocalyptic tone in recent decades. For example, books like The End of Nature, by environmentalist and activist Bill McKibbon (1990), touch on the profound environmental impact that human influence has had on the natural world. McKibbon's hyperbolic argument expressed a viewpoint shared by many environmentalists: The global impact of human activities is creating a world where no areas of pristine wilderness remain untouched by human hands (Reginer, 1990). The implication of their thinking is clear, if no unadulterated natural areas remain, then no true nature remains either. This is a line of thought I find troubling and one that has led to calls for dramatically altering our economic, social, and cultural practices to protect these precious resources. While

these calls are certainly not unfounded, if we truly hope to save nature there needs to be room for a middle ground, an appreciation and understanding of human-created nature as holding as much value as the so called untouched areas. Otherwise the current state of environmental peril solicits a hopeless slip into nihilism rather than an effort to explore creative and productive solutions.

To be clear, there will always be value in large-scale wilderness areas, and I do not mean to undermine this value. Large-scale, contiguous wilderness areas play a critical role in supporting wildlife biodiversity (Maglioli, 2015). But urban ecological spaces hold special agency as accessible and informal places of interface with nature that less accessible wilderness areas do not offer. Additionally, small-scale habitat fragments have traditionally been undervalued by land use planners and ecologists yet they hold valuable potential for supporting wildlife (Dewaelheyns, 2014).

In order to support this evolved relationship with nature we need to be able to find places for ecological spaces within heavily human impacted areas like industrial zones. As Stuart B. Hill argues “Industry, like economics, politics, and religion, is a social construct. Designed and used appropriately, industry can serve us in supporting the well-being of both people and the planet” (Hill 2006, p. 37). This view of integrating human landscapes with ecology is a reflection of the need to revise our relationship with nature in the built environment.

Rather than viewing the contamination of pristine wilderness by human influence

as the end of nature, we need to work to incorporate ecological systems into anthropogenic ecosystems (Ellis, 2014). This is the idea that "human culture and nature are perceived and treated as separate realms, yet their interface offers fertile ground for the creation of new, hybridized natural/cultural ecologies and the rehabilitation and re(dis)covery of others" (Lister 2006, p. 16).

By embracing a home for nature in cities, as a part of wider ecological restoration strategies, we can support a new cultural understanding of nature. This new view supports "conservation everywhere…from industrial rivers like the Duwamish to the roofs of buildings and farmer's fields" (Marris, p. 135). Ballard's street ends are well suited to grow this new relationship – a coexistence of nature in the heart of an industrial waterfront. Echoing this need for an ecological and industrial relationship, as Stuart B. Hill writes, "What we are concerned with here is not just the redesign of industry but the fundamental redesign of our relationships with it" (Hill 2006, p. 38).

Restoring Beauty: Eco-revelatory Design and Landscape Narratives

To support a gestalt switch in public perceptions and attitudes toward nature, it is critical that urban restoration and habitat enhancements be designed with people in mind. These places should communicate the ecological services they provide to both people and wildlife. They should also emphasize beauty and challenge common perceptions of the singular purpose of nature as serving the needs of non-human ecology only. Elizabeth Meyer described this type of design as "sustaining beauty" (Meyer, 2008).

Much of the history of landscape architecture has been marked by this dual focus on ecological stewardship and artistic interpretation of sites. With the outgrowth of the environmental movement in the 1970's, marked by the first Earth Day, and the 1969 publication of Ian McHarg's Design with Nature, this duality was intensified. While arguably no designed landscape can be successful while ignoring either of these areas, the degree of emphasis placed on each has been a subject of contention.

There have been a number of efforts at reconciling these landscape design goals. In 1998 a special edition of Landscape Journal was devoted to the topic of "Eco-Revelatory Design" featuring contributions from Rich Haag, Joan Nassauer and Robert Thayer. The goal of the collaboration was to bridge the gap between ecologically focused landscape design, which emphasized empirical analysis, with more avant-garde design focused on art and metaphor. By bridging art and ecology, the authors of this collection of essays were attempting to reposition the focus of landscape architects by blurring the line between human-oriented and ecological-oriented landscape design.

In particular, Robert Thayer expanded on these goals by providing a number of criteria by which eco-revelatory design projects can be structured by designers and understood by audiences. Thayer offers four general spectrums: concrete to abstract, regenerative to passive, non-human to human ecosystems, and visible to invisible systems. By understanding the existing conditions of a site, and the ecological and social programing goals of a design, Thayer's categorical spectrums offer a lens through

which designers may seek to communicate ecological process. Ultimately this type of communication can serve to instigate community dialogue and initiate new patterns of landscape intervention (Sauer Le Hong, 19).

As a creative way of engaging the gap between aesthetic enjoyment of landscapes and the important ecological systems they sustain, the collection also included a number of art exhibits ranging from small site interventions, like sculptures and built elements, to large scale site designs, and infrastructural focused projects. Underlying all of these projects is an attempt to connect people to opaque ecological processes; that is, processes that are rendered invisible to people either by virtue of their highly constructed nature or their temporal scale. The goal is simple: "to embrace and distill ecological process and complexity," as John T. Lyle describes in his contribution to the exhibit. Ultimately this type of clear communication through artful interventions serves to raise awareness of ecological processes amongst site visitors while providing places that are aesthetically interesting and engaging, places that people want to be. This collection of works sought to refocus the work of landscape architects toward the integration of human experience and ecological design.

The ideas showcased in the eco-revelatory design exhibit, through the essays and related projects it presented offer a framework for the integration of expressive habitat design that can engage people in site history and ecology systems in landscapes. These ideas offer a strategy for the design of small-scale habitat interventions at Ballard's

street ends that can serve larger goals of repositioning our relationship with nature by engaging people with site history and ecological systems.

Street Ends: Untapped Potential

An Introduction to Street Ends

Because together they represent nearly 150 potential public spaces and habitat restoration sites throughout the city, shoreline street ends are ideal sites for the integration of wildlife and the built environment in Seattle. The city currently operates a Shoreline Street End Program which prioritizes improvements of the city's nearly 150 street end sites which includes two recently improved sites in Ballard, the 20th Ave NW and 28th Ave NW street ends. In email correspondences with Diane Walsh, the program's director I learned that the program is currently working restructuring their prioritization criteria and that it has an annual operating budget of approximately $500,000 and aims to spend $475,000 of that on improvements and maintenance.

These sites, where the street right of way dead ends into the waters of Puget Sound, Lake Union, Lake Washington, and the other waterbodies throughout Seattle average only about 1/10th of an acre in size, but are dispersed throughout the city (see Figure 2.1). In 2008, the city completed an analysis of street ends sites to be used for prioritizing improvements. Work is slow, but between 2014 and 2016 9 sites are up for improvement. Most of these improvements are quite small, consisting of the removal of shoreline armoring bulkheads or riprap, the addition of gravel beaches for migratory salmon, small plantings, and seating elements (Figure 2.2).

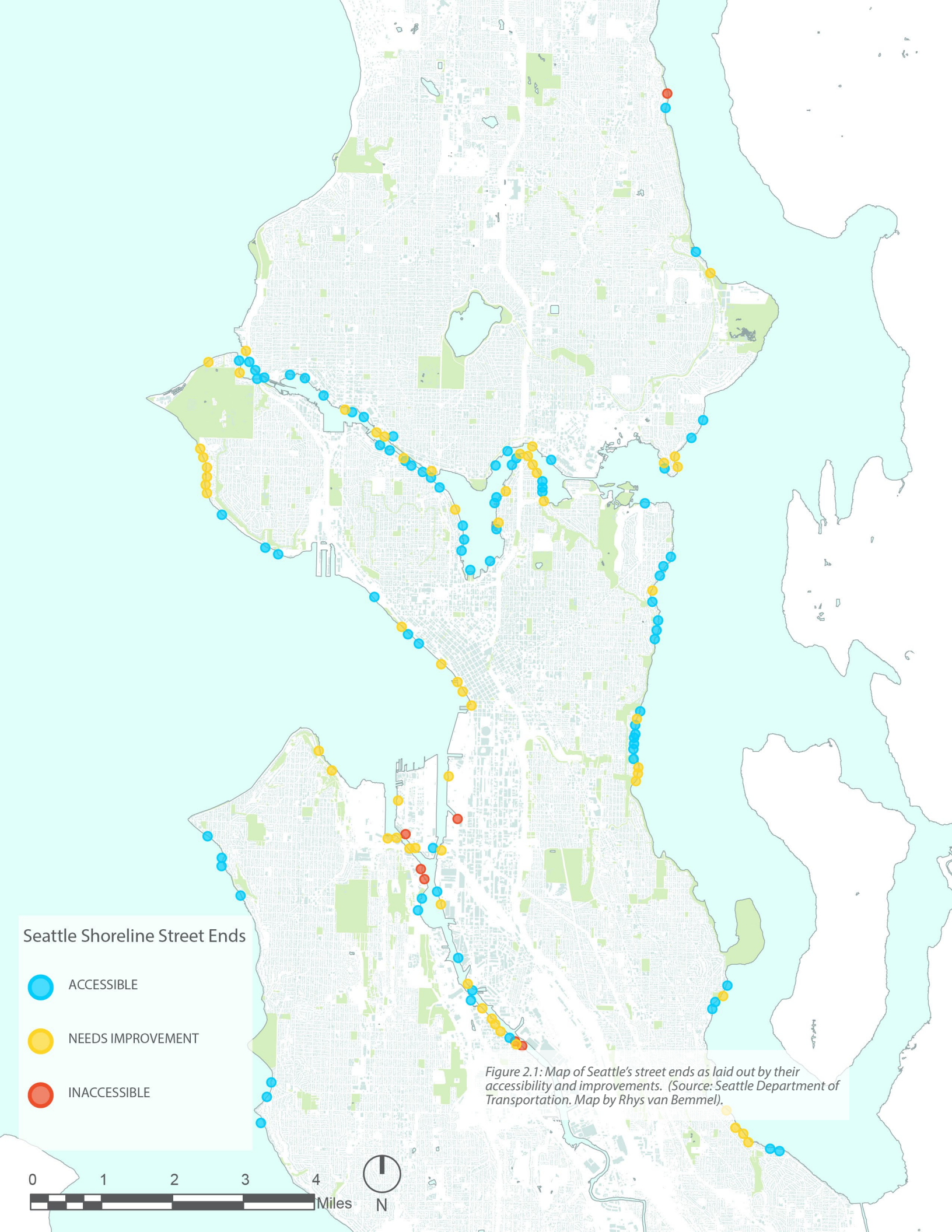

Figure 2.1: Map of Seattle's street ends as laid out by their accessibility and improvements. (Source: Seattle Department of Transportation. Map by Rhys van Bemmel).

Figure 2.2: Before and after photographs of recent street end improvements at 11th Ave NW and 28th Ave NW in Ballard, and at 51st Ave NE in the Laurelhust neighborhood. (Credit: photos by Seattle Department of Transportation).

Funding for these projects, and the program as a whole, comes from fees the city levies on property owners adjacent to street end sites who have structures encroaching on the public right of way. Though their budgets are not massive, this is a consistent and reliable revenue source.

The Seattle Shoreline Street End Program is the result of a 1996 Seattle City Council resolution that was the culmination of cooperative work of the Seattle Department of Engineering, Department of Parks and Recreation, and Department of Neighborhoods beginning in 1993 (Seattle City Council, 1996). Among the goals laid out by the legislation was the preservation of "public rights-of-way, to allow improvements for public uses and access." Today the Shoreline Street End Program's expressed goals also include the enhancement of shoreline habitat and community stewardship. These goals reflect the potential of street ends for supporting the integration of wildlife with the built-environment and enhancing the community's interaction with nature.

Origins of Street Ends

That these scattered compact public properties exist at all is partly the accidental result of a combination of infrastructural necessity, economic ambition, and geography. As Seattle's urbanization began to accelerate at the end of the 19th century, the desire to draw capital investment and real estate growth spurred the dredging of the city's tidelands in order to prepare them for industrial and trade development (Kingle, 55). The tidelands, wetlands, and shorelines of Elliott Bay, Lake Union and Lake Washington were the best opportunity

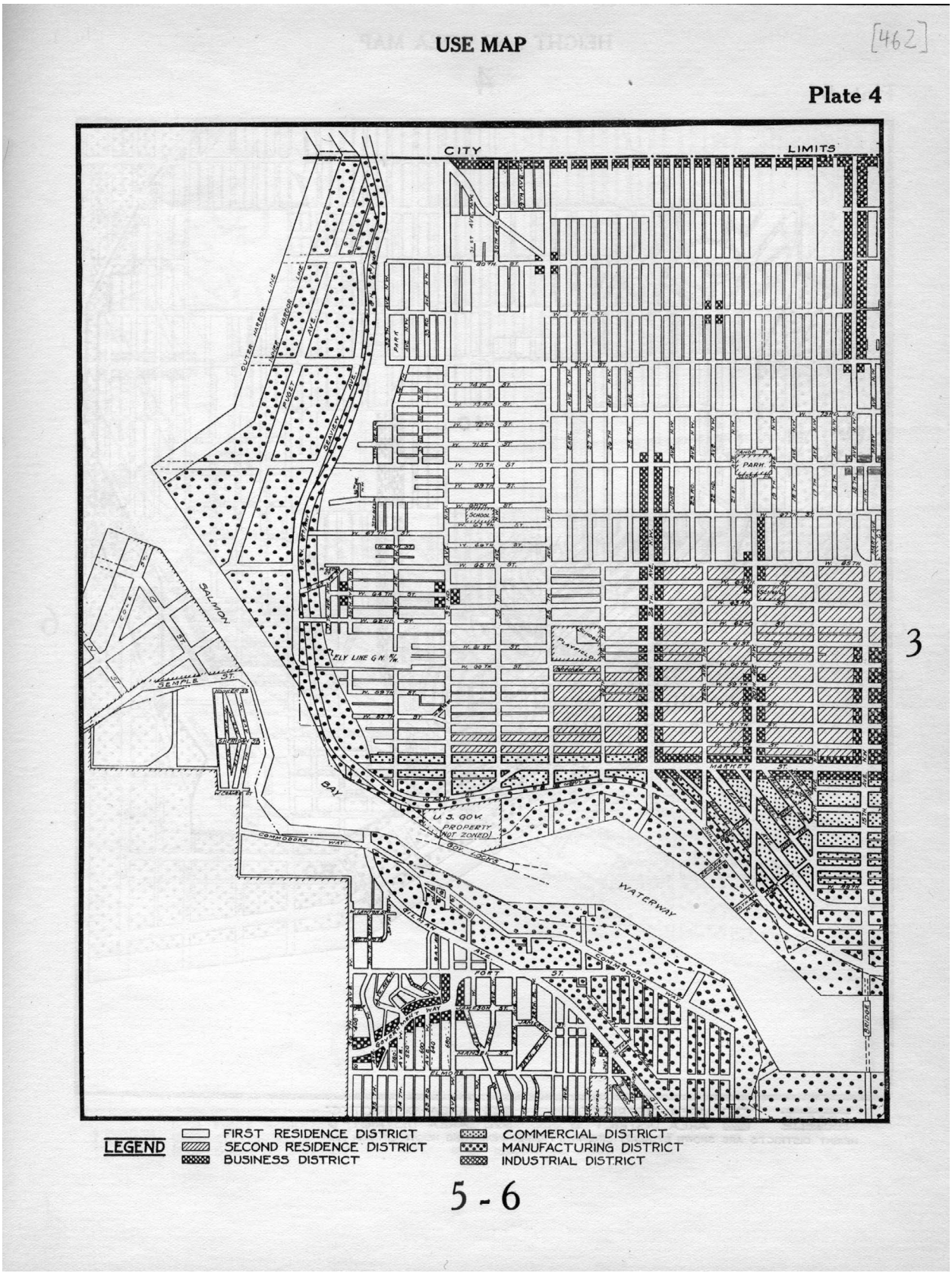

Figure 2.3: 1923 zoning map for the Ballard neighborhood. Future tideland industrial plats include the never developed city streets Puget Ave. & Cole St., as well as extensions of NW 65th & 70th St (upper left). (Credit: Seattle Municipal Archives).

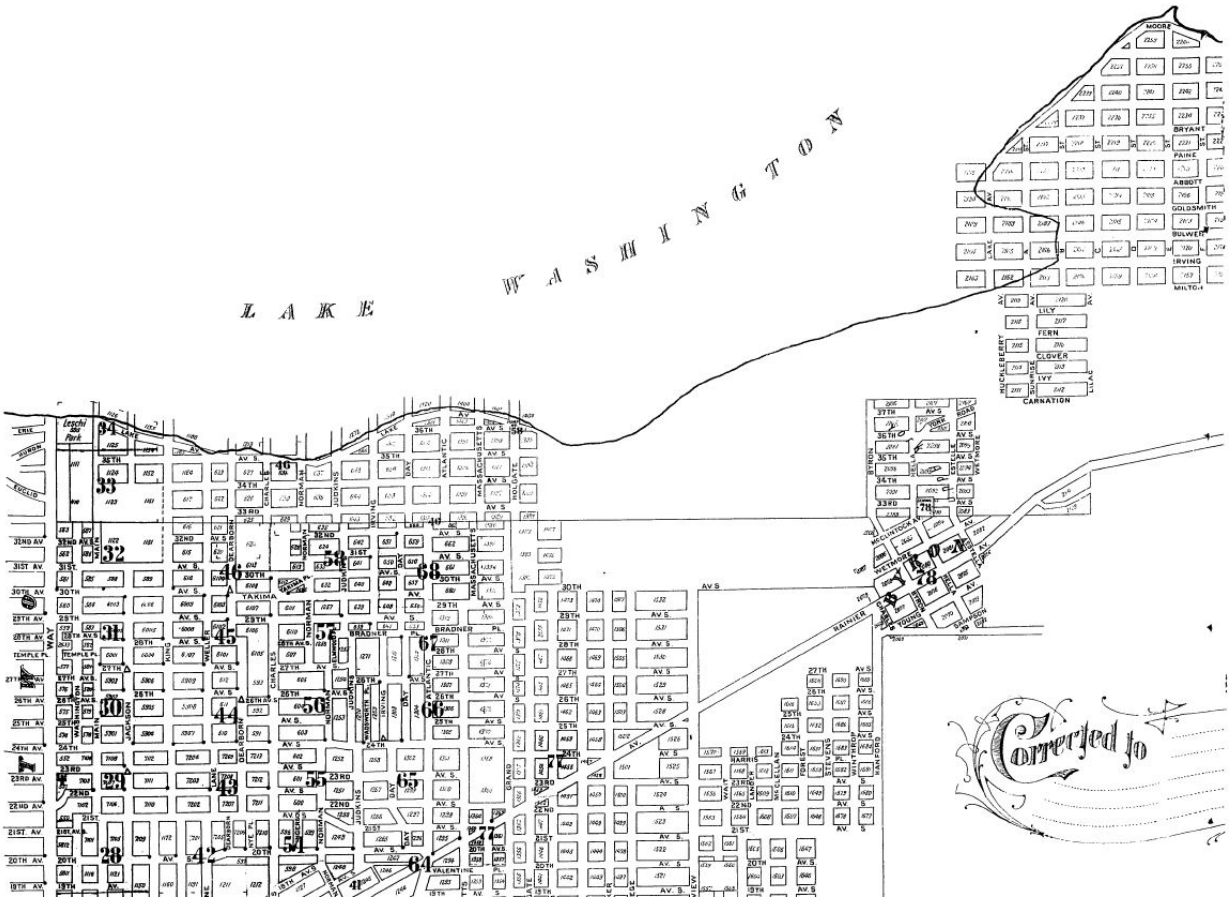

Figure 2.4: 1905 Sanborn Insurance map of Seattle's Leschi Neighborhood (oriented with East at top). City ambitions for reclamation of shoreline areas are apparent in the future plats surveyed beyond the shoreline (upper right). (Credit: Public Domain).

for the creation of new property for industry and commerce. Indeed, much of the current shoreline property throughout the city was created as part of massive land reclamation projects. However, the city's full ambitions were never entirely realized and many of the planned property plats were never reclaimed from Puget Sound, Lake Washington, or Lake Union (figures 4 and 5). Nonetheless, their presence has remained a mainstay in the area.

As the city continued to grow, the need for proper sanitation pressed the establishment of a city municipal sewer system. Public rights-of-way connecting to the water were the ideal place to connect this infrastructure to the city's waterbodies. And so, many of the city's street rights-of-way were maintained all the way out into Lake Union,

Lake Washington, and Elliott Bay as a means of connecting sanitary infrastructure and as a connection to potential future private properties. Ironically, today this means that these sites, which experience periodic raw sewage overflows during heavy rain events (known as combined sewer overflows), represent a valuable public asset and a critical opportunity for habitat enhancement and thus a great opportunity to be converted into street ends for public use.

Challenges do exist, however, to this conversion effort and the original legislation was a clear compromise between vested business interests and public use. This is evidenced by the resolution's first evaluation criteria which states that, "in areas with a predominant pattern of industrial uses, shoreline street end public use and access improvements should be designed and located to minimize conflicts, taking into consideration any operational impacts upon the adjacent businesses [emphasis added]" (Seattle City Council Resolution 29370, 1996, "evaluation criteria"). Though the city's street end program was bolstered by additional legislation in 1999, and designed to discourage private encroachments and uses of these spaces, there has been some criticism from the business communities where these street-ends exist.

In Ballard, the local maritime business community located in the Salmon Bay industrial district continues to have strong local influence in the neighborhood. They have been primarily adversarial to city attempts to initiate street end improvements and they maintain great sway in the development of such improvements

(Seattle City Council, 1999). The primary motivation behind their resistance is fears about the erosion of industrial areas across the city. This is evidenced by their reaction to current proposals for the Burke-Gilman Trail missing link. The trail, a busy east-west bike and pedestrian route that runs nearly 20 miles, connects the city of Kenmore to the northeast of Seattle to Golden Gardens Park in Ballard. A portion of the trail in Ballard is missing, covering nearly 2 miles, and located right in the heart of the Salmon Bay industrial area. The City's attempts to connect the missing portion of the trail were met with a lawsuit from a coalition of Ballard industrial businesses.

This position of local industrial businesses stands in contrast to the Shoreline Street End Program's expressed goals to improve public access, enhance shoreline habitat, and help create great neighborhoods and represents a major hurtle for the actual implementation of shoreline improvements (Seattle Department of Transportation, 2015). Despite these challenges, the local community has expressed clear interest in increasing the incorporation of green space in these areas and growing public access to the Ballard waterfront at Salmon Bay. This community support has led to ecological restorations at some street end sites, and calls for further improvements at others.

Greening Ballard: Community Restoration Efforts

Overall, Seattle is a very green city. Dozens of community groups, non-profits, and government agencies are devoted to the greening of the city in various forms. From urban agriculture to habitat restoration, the initiatives devoted to the environment are numerous. The Ballard community is

no exception to this. A number community neighborhood groups are devoted to public open space and ecological restoration and small-scale restoration projects are common throughout the city (Figure 6). Most notably in Ballard, the group Groundswell NW is an advocate for public open space in the neighborhood and adjacent communities and is responsible for leading the restoration efforts at the Salmon Bay Natural Area and the 34th Ave NW Street end (Figure 2.5).

However, many of these small-scale community projects are missing the critical connection that Meyer and Nassauer describe – these projects do not support, nor do they value the performance of beauty. Rather, they reflect the viewpoint that nature and humans are separate. Signage warning people to keep out of wooded areas and restoration sites, such as those in figure 2.5, speak to the separation of people and nature. These restorations are for wildlife, not people, and as such the perception is that the presence of people here can only serve to hurt nature. This, in turn may limit our exposure, understanding, appreciation, and concern for nature. If we adjust our understanding of nature to one that connects people and nature together, then the presence of such physical barriers become unnecessary and stands in the way of engaging experiences with urban nature.

Many of these restoration projects set goals of establishing physical ecosystem forms (species composition) that pre-date urbanization. This further limits our ability to rethink the human/nature duality and is a major reason for their lack of success. The typical mindset here is that nature is best

photo 1

photo 2

photo 3

photo 4

photo 5

photo 6

photo 7

Figure 2.5: (Photos 1-4) Restoration plantings along Seattle's Burke-Gilman Trail highlight the challenge of urban restorations. Street End restoration enhancements in Ballard bar access to public waterfronts (photos 5-7).

without human influence and the only way to bring nature into the city is to return to a landscape that is untouched by humans. However, the limited success of many of these projects highlights the fallacy of this viewpoint. Contrarily, increased integration with the urban sites in which these projects exist leads to spaces that are more engaging, and therapeutic for people, as well as better serving the needs of wildlife.

Evidence for this argument can be seen in the work of Botanist and Harvard School of Design Lecturer Peter Del Tredici. He

argues that human activities have altered the nature of ecological systems to such a dramatic degree over the past 250 years that landscape architecture would be better served by accepting the nature of urban ecosystems as "novel ecosystems" rather than fighting them. Additionally, planting restoration projects cannot be successful by simply copying the species composition of the past and placing it on a new site (Planting Design in a Post Wild World, 2015). Rainer and West (2015) suggest that since ecologists no longer view "plant communities as kinds of superorganisms" where species of an ecosystem all cooperate together for the benefit of the group, success in restoration requires greater attention to the relationship of plants to place (Rainer, p. 30). Given the intense alterations of environmental conditions in urban environments: increased air temperatures, air, soil and water pollution, soil compaction and removal of topsoil, urban site plantings should be selected for their resilience and the ecosystem services they offer like providing nectar for pollinators or cover for wildlife. This is not to suggest that small habitat interventions cannot serve important roles for wildlife conservation. A growing body of research suggests that even small sized urban green patches can play an important role in supporting urban wildlife, particularly for invertebrate species (Goddard, 2009) (Sperling, 2010).

Through this work and others, we begin to see a strategy for successful habitat improvements that can emphasize beauty and natural processes through evocative planting design and artful habitat interventions. By engaging site history, designing plantings that prioritize hearty

species well suited to urban environments, and emphasizing specific urban wildlife species, as well as incorporating community programing to encourage neighborhood use of these sites, we can support urban wildlife and create urban wild spaces that support perceptual changes in what nature means in the city.

Community Habitat: Ballard's Community Wildlife Effort

Another important community effort in the Ballard neighborhood is the initiative to become certified as a Community Wildlife Habitat. This effort applies the National Wildlife Federation's Backyard Habitat and the Washington State Department of Fish and Wildlife's Backyard Wildlife Sanctuary Programs at a neighborhood scale. These programs are allied with one another. The NWF's applies nation-wide, while the WSDFW's is a coordinated effort at the state level. The community habitat effort involves promoting the implementation a large number of backyard habitats within the neighborhood as well as in a number of public open spaces, schools, and other institutional sites. This broader effort, which engages not just private properties, but also public spaces offers a framework for the application of small-scale habitat interventions across the neighborhood.

These programs encourage people to be conscientious in the gardening design of their backyards in order to support urban wildlife species. They do this by providing simple frameworks for people to follow. The NWF's framework involves five criteria for supporting wildlife: a) providing food in the form of pollinator friendly panting species, foliage, berries and seeds; b) providing

water sources for wildlife; c) providing places to raise young in the form of nesting boxes and specific planting species; d) including a variety of vegetative cover types at different canopy levels, especially mid-story shrub layers and tree cover; e) to provide cover for wildlife in the form of vegetation, rubble and brush piles; and finally f) to avoid the use of pesticides which are harmful to insect species that provide the base of urban food webs. This set of strategies supports not just small wins for wildlife like that of a backyard bird feeder or nesting box. Rather, programs like the NWF Community Habitat promote the growth of greater urban ecosystems by serving to support connections between larger urban habitat areas and buttressing the foundational aspects of urban food webs through the growth critical plant species that support robust invertebrate species as well as a smaller birds and mammals that form the foundation of the food web.

The community habitat initiative serves as a jumping off point for a greater network of neighborhood interventions including a specific site design at the 24th Avenue NW street end site in the heart of Ballard. We can support urban wildlife and community open space, and in so doing we can reinforce a gestalt switch. Ballard's street end sites represent an ideal opportunity for the application of such restoration framework.

3 | Community Outreach

Photo 3.1: Conducting visual preference survey at Groundswell NW annual meeting, February 21, 2016. (Credit: photo by Jamie Vann).

3

In order for the design proposal for the 24th Ave NW street end to reflect community priorities it was important to garner feedback from the community. To address this need a visual preference survey was conducted with community members at the Groundswell NW annual meeting on February 21, 2016. The survey was given during the opening 90 minutes of the meeting and covered four areas: planting design, site programing, materials selections, and seating types (See Figure

3.1-3.4, and Appendix i.i).

Each category was formatted as a series of four photos and survey participants were asked select the photo that represented the idea they liked the least and the photo that represented the idea they liked the most (Photo 3.1, 3.2). For the planting design section the goal was to understand community perception and preference for ecologically focused planting designs which can be perceived as messier and less desirable (Nassauer, 1998). To meet this goal the photos presented were photoshopped collages made identical in every way except for the planting plans. For the other categories in the survey the goal was to provide a variety of options for people to select from and so a mix of images was shown. Comment cards were also provided to offer a chance for additional suggestions and general comments from participants.

In total 40 people participated in the survey. Attempts were made to include other Ballard groups in the visual preference survey, including the Central Ballard Residents Association and the Ballard Chamber of Commerce, both of these groups were unresponsive and were ultimately not able to be included.

To guide the creation of the survey, I considered the following questions: what are community perceptions of good planting design? How can ecological plantings be structured to appeal to the community? Is there a desire for specific programming elements that may be included in the site design to help strengthen community engagement and interaction with the

Figure 3.1: Visual preference survey, planting design alternatives.

Figure 3.2: Visual preference survey, programming alternatives.

Figure 3.3: Visual preference survey, seating types.

Figure 3.4: Visual preference survey, wall types.

Photo 3.2, 3.3: Conducting the visual preference survey at the Groundswell NW annual meeting, February 21, 2016.

site? What are community preferences for materials and aesthetic styles in park design?

In forming the survey, particular emphasis was placed on the planting design as that related closely to the concepts of beauty and restoration. Since the design goal was to create a space that served ecological function and appealed to community aesthetics a balanced planting design strategy was necessary. In order to strike that balance it was necessary to understand what community preferences for planting styles were. The survey presented various planting design strategies that included naturalistic/ecological, large massing's/ drifts, formal, and sparse designs.

Results

Below is a breakdown of the results of their participation (for complete results see Appendix i.i). The general results from the survey showed a preference for natural materials for use in hardscape and retaining walls as well as seating elements.

Planting Design

For the planting design section, naturalistic plantings were by far the preferred category. A common theme among survey participants was that the four options presented were all very similar and difficult to distinguish from one another. A number of people also mistook the presented

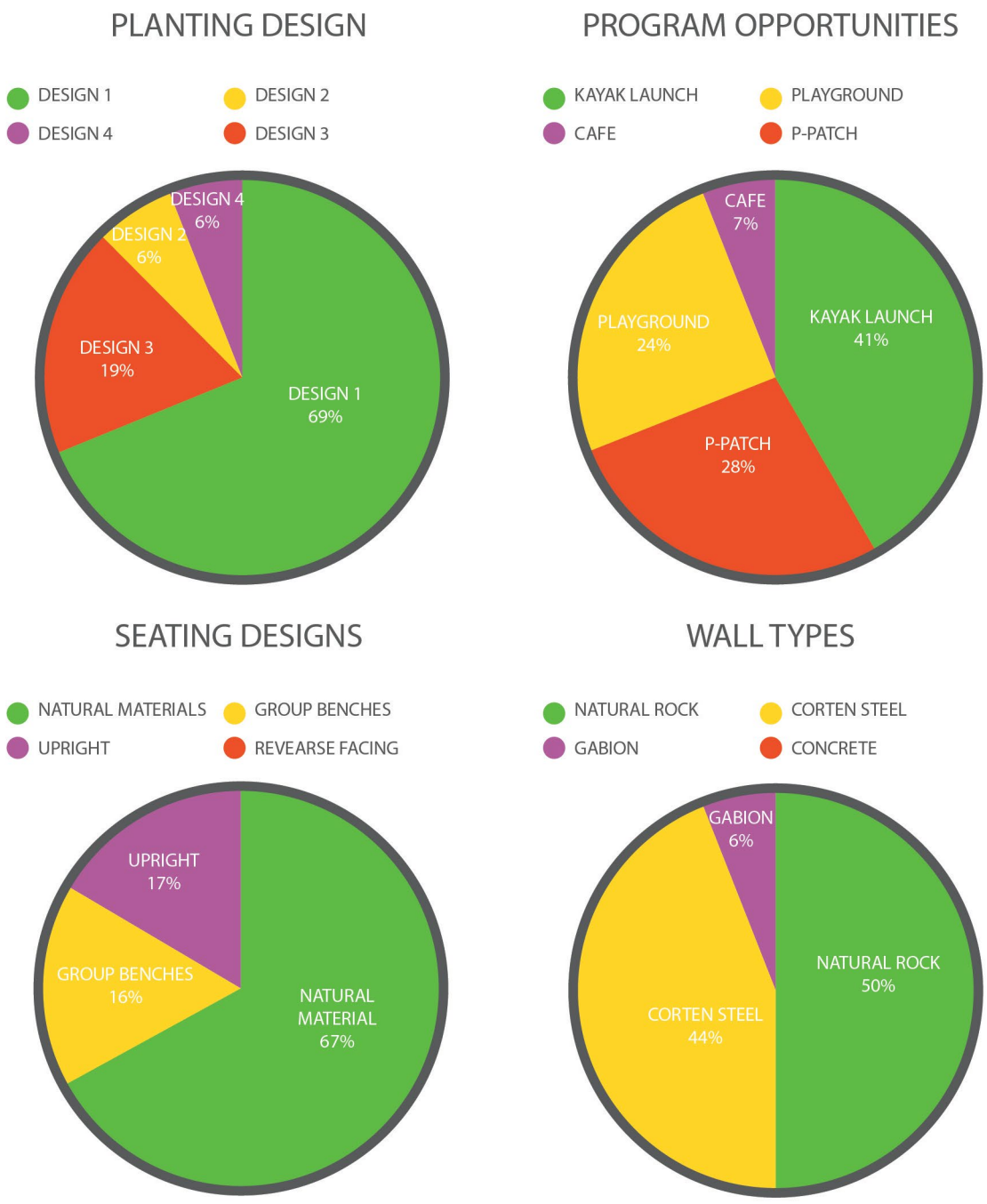

Figure 3.5: Overview of results of visual preference survey.

options as specific scenarios being proposed for the site design at 24th Ave NW. This was not in fact the intention. Since the images were photoshopped they were actually not meant to represent a specific site. Instead, they were intended to characterize the concepts of different planting design strategies: a) ecological focused planting design, in which species are planted in a non-geometric layout in order to support the survival of planted species and to offer habitat rather than for visual aesthetic appeal, b) formal, focusing on clear layout and linear arrangements; c) large massings or drifts wherein like species are planted in groupings to emphasize the texture and unique characeristics of each species and provide a visual cue to the intentionality of the plantings, and d) sporadic planting, whereby each plant is treated as a standalone object rather than a part of larger community of plants. The strategy behind creating the images for the various planting design strategies was to keep all variables the same in each set of the images, so that only the plantings themselves were different from one another. While this did help ensure the comparability of photos, they ultimately suffered from looking too similar to one another to this general audience.

In my opinion, survey participants had trouble distinguishing between the various examples of planting, and a few people expressed this to me. To help address this misunderstanding it may have been helpful to provide additional graphic representation for each of these categories in order to communcate the intended concepts. This could have been accomplished through the use of example photographs. Additionally, I

may have helped people in their selection by providing schematic planting plans for each of these styles of planting design. Given my time constraints, however, this was not possible. I would reconsider the format if I were to conduct this survey again in the future.

Program and Seating Types

The programming elements and seating types sections did not show any overwhelming preference, though the kayak launch was a popular proposal. Many participants mentioned they did not have a least favorite programming element because they liked them all. Additionally, participants' comments suggested that all were popular. This general positivity for items in the survey was a common theme across all elements. The feedback illustrated participants' willingness to see something productive designed for the 24th Ave Street-End and to have the opportunity to engage with a green space in the neighborhood.

Materials & Wall Types

As was the case with planting design, the wall type's portion of the survey showed a preference for natural and weathered materials. Natural rock (rockeries), and corten steel were the most popular selections. Participants showed an aversion to the gabion option and concrete. For the gabions I do not believe this represented a clear dislike of this type of wall, but rather, was a response to image selected to represent gabions which was a very large highway gabion wall. From conversations with participants it seemed clear that natural stone walls (including gabions) were viewed positively. The concrete option, on the other hand was a clearly unpopular

option. Again, adding additional photos to further describe these wall types would likely have helped people in their selection.

Discussion

In general the survey was a helpful exercise, particularly for engaging the community with the opportunity that the 24th Ave NW site represents. Even with the small sample size, the face to face interaction with community members was a useful way of hearing their preferences and opening up a dialogue about their values and preferences.

However, there were some challenges with the format of the survey. Most notably, the photos used to represent materials may have been somewhat misleading to people. For example, despite the fact that many people expressed a preference for natural materials, the gabion walls, which are made with natural stone, were very unpopular. I believe this is due to the limited number of example photos used in the survey. The image chosen to represent gabions was of a very large highway gabion wall.

Despite the formatting challenges, the survey still provided value. Interacting with the community face-to-face and engaging in a discussion about the project site was a very effective way of gleaning general community attitudes, gaining insight into what they would like to see in the neighborhood and concerns they had about potential development. It was through those conversations that I was able to gather general community preferences for possible programming and design elements for the 24th Ave NW street end. These elements were ultimately considered in my final design.

Generally speaking, the survey results suggest that the Ballard community holds a preference for traditional naturalistic design for their parks and open spaces. This suggests that the planting design aspects and materials selections of the design need to be more informal style, for example, the use of materials like wood and stone, and more sporadic planting design styles.

4 | Case Studies

Photo 4.1: Mural on Pacific Fishermen Shipyard fence at 24th Ave NW street end. (Credit: Photo by Rhys van Bemmel).

4

In this chapter I present a number of case studies in order to highlight some relevant community-oriented, urban habitat and eco-revelatory design projects. The strategies utilized by these projects offer insights for the design and integration of urban habitat both at a range of scales, from the site to the district scale. Some were selected for their unique use of sculptural elements and art that were effectively leveraged to communicate site history and ecology and promote dialogue and community

engagement between the users and the sites. They are presented in an order that roughly correlates to the degree of restoration or habitat focus as well as their emphasis on artistic interventions, beginning with the most art focused and least habitat oriented.

Though the projects included range in focus—from temporary art, sculpture, and performance exhibits to small-scale wildlife habitat, and city-wide open space plans—all address the unique historical and ecological conditions of their sites, offering examples of the integration of wildlife into the fabric of the built environment. Each project's creative and exciting engagement with environmental challenges and thoughtful design of public space offer applicable examples for growing Ballard's wildlife habitat. Additionally, they also support community understanding and reevaluation of local ecologies, offering educational examples of eco-revelatory design strategies that help support a cultural gestalt switch.

1. Duwamish Revealed, Seattle, WA, 2015

Designer: *More than 30 artists*

Design Strategies: *Sculpture, landscape narrative, performances*

The Duwamish River is a major river within Seattle that supports the city's primary industrial corridor (see Figure 4.3). It is also one of the most polluted areas in the United States. Over 170 acres of the industrial properties along the river are designated by the Environmental Protection Agency as superfund sites.

Though it is a heavily industrial area, the river is flanked by a number of residential neighborhoods, making it very similar in

Photo 4.2: Duwamish Revealed art installation "Traces of Obsolescence" by Sarah Kavage. (Credit: photo Ann Boyce).

character to Ballard's Salmon Bay industrial district.

The Duwamish Revealed project offers parallels for engaging Ballard's own waterways. Taking place over the course of the summer of 2015, Duwamish Revealed consisted of a series of art installations and performance events centered on the polluted waterbody. The project was designed to engage local community in the ongoing cleanup process. As a mix of art, science, and history, the collected works of the project represent excellent examples of the range of eco-revelatory design strategies described by Lyle (1999).

Projects ranged from conceptual sculptural art pieces like Ben Zamora's "Alone. Standing in the Middle of Darkness. Invisible." (Photo 4.5), to light installations, interpretive dance performances, musical performances, and Native Salish tribal events. Public engagement with the river

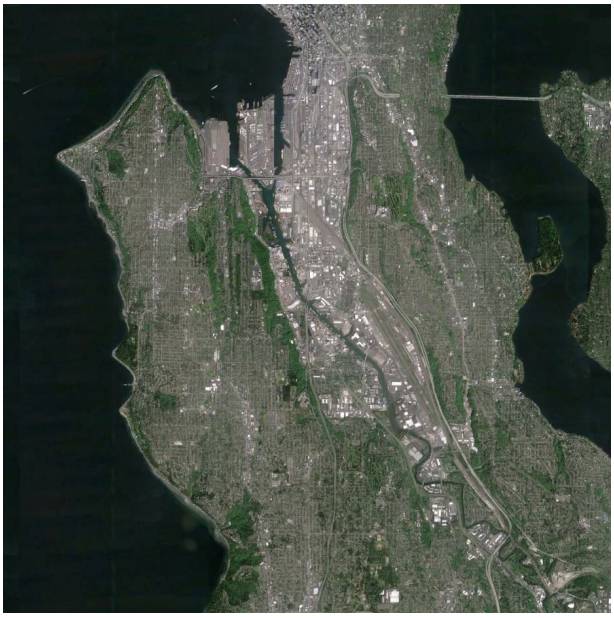

Photo 4.3: Aerial of the Duwamish River industrial area in south Seattle, 2015. (Credit: Google Maps).

Photo 4.4: Cambodian lantern ceremony as part of the Duwamish revealed celebration, summer 2015. (Credit: photo by Vansica Sun).

Photo 4.5: Ben Zamora's sculpture piece, "Alone. Standing in the Middle of Darkness. Invisible" was constructed of reflective steel panels. The piece morphs as lighting and weather conditions changed. (Credit: photo by Sy Bean, The Seattle Times).

was at the basis of the projects, with goals of revealing the river's history, engaging communities, supporting dialogue between various community stakeholders, envisioning a future for the river, and encouraging fun and thoughtful interaction with the river. The project garnered a great deal of press coverage and helped serve to support the work of local community groups like Environmental Coalition of South Seattle which are focused on engaging the South Seattle community and supporting restoration and cleanup efforts at the Duwamish.

As a dispersed collection of events taking place over the course of three months, Duwamish Revealed is an example of a project that successfully bridges community with ecology. Though not a traditional restoration project or permanent site intervention, the project's effective engagement with the community is an excellent example of supporting community dialogue about local ecology. As a spatially and temporally distributed series of events, it also offers lessons for engaging communities and ecologies at a neighborhood and district scale. Efforts to expand Ballard's wildlife habitat, both in the public and private realm, would be well served by leveraging the public engagement strategies utilized by Duwamish Revealed.

2. Growing Vine Street, Seattle, WA, 1997-2005

Designer: *Buster Simpson*

Design Strategies: *Water systems, rainwater collection, sculpture*

Growing Vine Street is a collaboration between neighborhood activists in Seattle's Belltown neighborhood, the City of Seattle,

Photo 4.6: The Beckoning Cistern on Vine Street is fed by roof runoff from an adjacent building and is the beginning of a series of rain gardens along Vine Street which help to clean and irrigate streetscape plantings. A portion of the water collected also feeds a cistern for use in gardening. (Credit: photo by Buster Simpson).

and local artist Buster Simpson. Much like Ballard's neighborhood habitat effort, the project was a community initiated effort with multiple overlapping goals including green infrastructure, community open space, and urban agriculture.

Belltown is a neighborhood in Seattle's urban core, located just north of the central business district, and among the city's neighborhoods that are least served by open space. Instigated by the initial creation of the Belltown P-Patch, the community vision for Growing Vine Street includes additional green space, re-appropriating portions of the street right-of-way, community gardens, and stormwater infrastructure throughout the neighborhood.

Photo 4.7: Sculptural planters incorporated into downspouts on a building on Vine Street. (Credit: photo by Buster Simpson).

Figure 4.8: Runnel and rain gardens fed by roof runoff. (Credit: photo by Buster Simpson).

Photo 4.9: Terraces and planters at vine street. (Credit: photo by Buster Simpson).

The primary design moves of the project are a rainwater collection system which runs through expanded streetscape planting areas, and is designed to serve as irrigation water for the neighborhood P-Patch (community garden). Seattle environmental artist Buster Simpson designed sculptural elements of the rainwater system like the Beckoning Cistern (Figure 4.6), as a means of communicating to the "citizens of Seattle [that they] have buried their urban watersheds in ever-larger pipes" and in so doing that they have lost "critical wildlife habitat as well as the joy of witnessing the normal hydrological cycle" (Simpson). Additional benefits include reductions of storm water loads that are responsible for combined sewer overflows that dump raw

sewage directly into Elliott Bay during heavy rain events.

By combining sculpture, rain gardens, and planting, while exposing previously buried urban watersheds, the project encourages public mindfulness and engagement with urban water systems while supporting community oriented open space and urban agriculture. As an ongoing series of projects, Growing Vine Street also offers lessons for the implementation of community driven project. Growing Vine Street is an instructive project for designing community oriented habitat in Ballard's street ends both in its size and scope. The project is small, community driven, and has been implemented in phases like Ballard's community habitat efforts. Its engagement of natural systems and water offer examples for supporting ecological awareness amongst Ballard residents.

3. Thomas C. Wales Park, 6th Ave N, Queen Anne neighborhood, Seattle, WA, 2011

Designer: *Site Workshop, landscape architects*

Design Strategies: *Urban habitat, sculpture*

Located on the site of a former quarry in Seattle's Queen Ann neighborhood, Thomas C. Wales Park is a small neighborhood pocket park. The project site was a formerly derelict open space that required a great deal of restoration work and slope stabilization. Until 1987 the property was a gravel quarry before being used by the city as a materials storage yard, and then finally being converted into a park in 2011. At 1.3 acres, it is an excellent example of the overlay of multiple programing and site elements on a very small site.

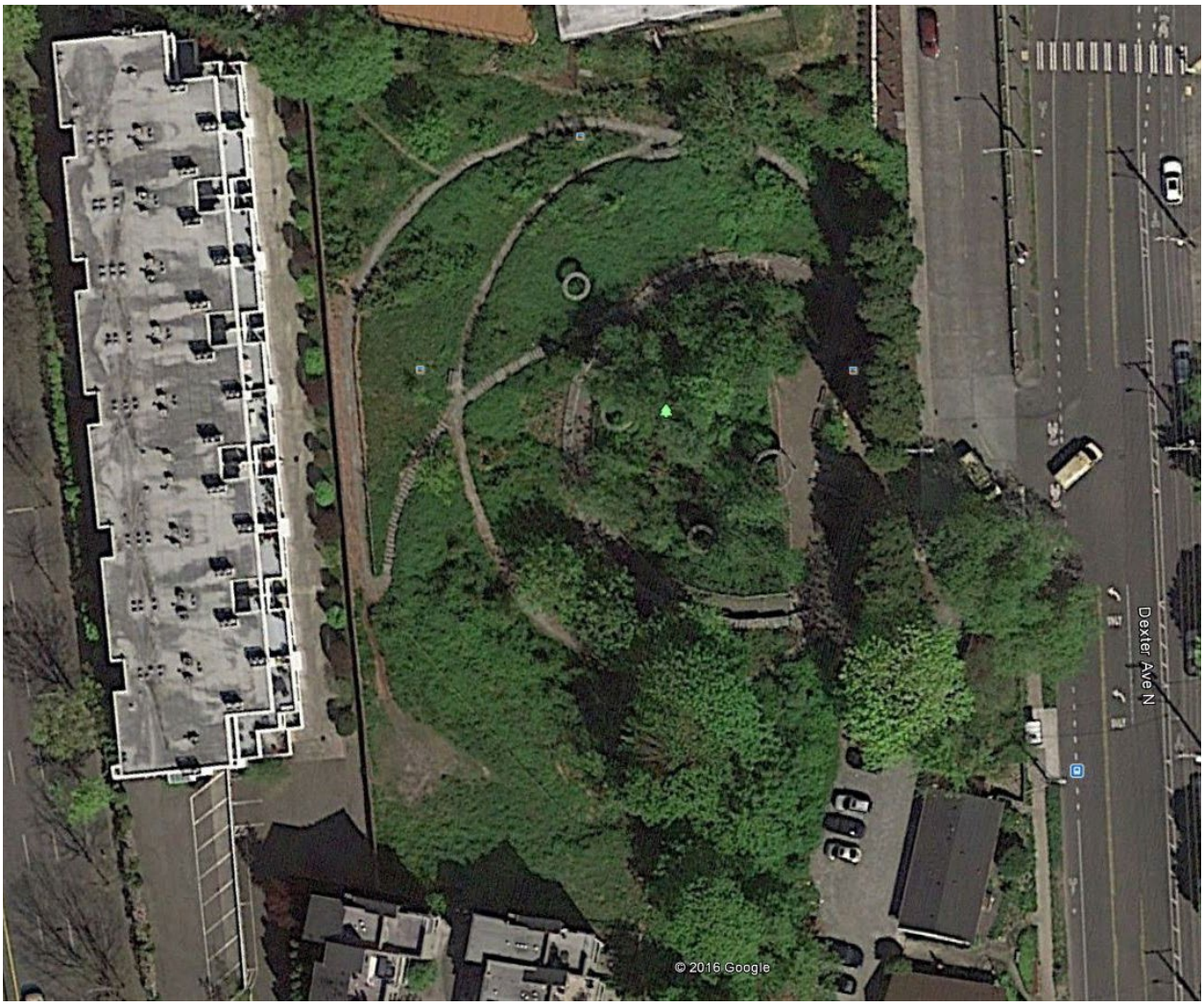

Photo 4.10: 2015 aerial of Thomas C. Wales Park. The circular path layout offer a stylistic connection the site sculptural features. (Credit: Google maps).

Seattle landscape architecture firm, Site Workshop collaborated with artist Adam Kuby to create the site's layout with the goal of ensuring a cohesive design with the artists' signature sculptural features, a series of elevated circular gabions that house bird and bat nesting sites. The circular language of the sculptures is reflected in the site layout, with a series of circular paths that allow access throughout the site and create a focal point at the center where a small wetlands serves to manage on site storm water (see Figure 4.10).

The site design addresses the twin goals of supporting urban bird and bat habitat

Photo 4.11, : The sculptural gabion rings at Thomas C. Wales Park. Incorporated into the ring are a number of nesting boxes for urban bat and bird species. (Credit: photo by Rhys van Bemmel).

Photo 4.12, 4.13: The rain gardens at the center of Thomas C. Wales Park (top). Gabions and stone stairs (bottom). (Credit: photo by Rhys van Bemmel).

as well as offering Seattle's Queen Anne neighborhood access to nearby nature. Site history is engaged through the evocative circular gabion sculptures and the use of stone, wood, and other natural materials in path and seating elements (Figure 4.11-4.15). Through their materiality these features call to mind the former use of the property as a gravel quarry, offering up a strong visual connection to stone through the use of gabions, stone stairs, and boulders. Additionally, the prominence of the central rain garden and the artwork nesting rings offer ties to the natural function of the site.

Photo 4.14: Thomas C. Wales Park, Seattle, WA. (Photo: Rhys van Bemmel)

Photo 4.15: Entrance at Thomas C. Wales Park, Seattle, WA. (Photo: Rhys van Bemmel)

Urban ecology is addressed in the park design through a number means including planting design, drainage, and layout. A wide variety of native plant species were selected to support bird species by providing shelter and nesting as well as offering berries and seeds throughout the year. Storm water is cleansed on site in the central raingarden that additionally serves as a water source for wildlife. Nesting boxes are provided for bats and birds in the gabion sculpture.

With its' mix of sculptural elements, habitat design and integrated circulation paths, the park is an excellent example of small-scale urban habitat that performs effectively as both neighborhood open space and well urban habitat. It is a space that engages urban wildlife habitat in new and unusual ways.

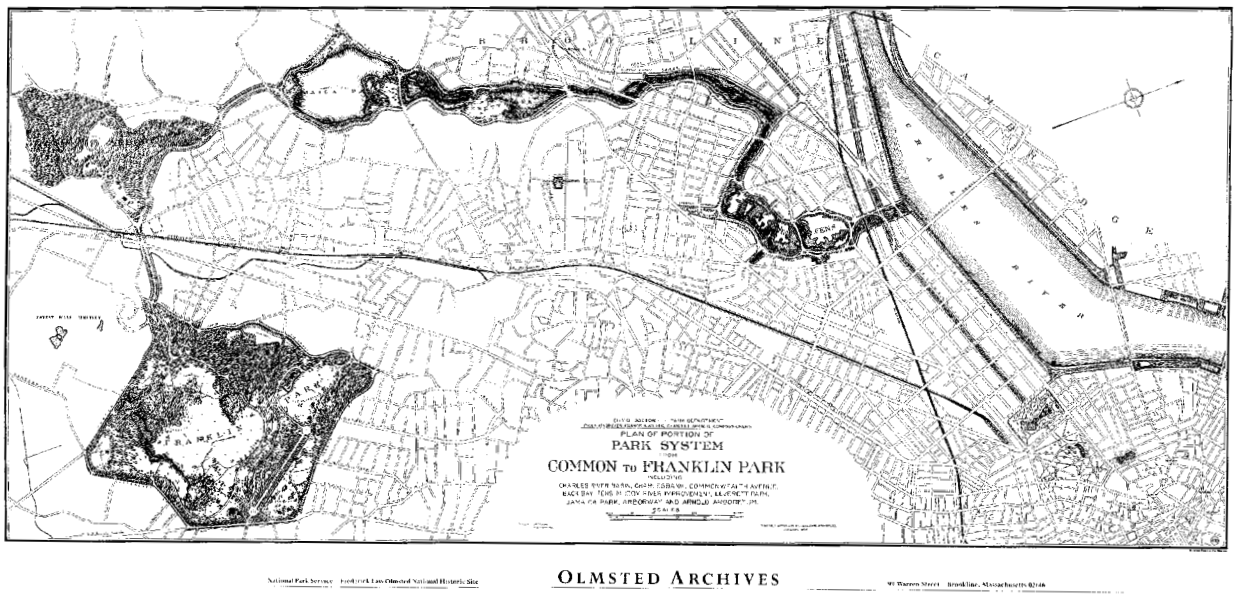

Figure 4.1: The original plan for Boston's Emerald Necklace by Frederick Law Olmsted, 1894. (Credit: public domain)

4. Boston's Emerald Necklace (1894) & Seattle's Olmsted Parks Plan (1903)

Designers: *Frederick Law Olmsted, Olmsted Brothers*

Design Strategies: *Open Space Network, Boulevard & Corridor Connections*

Both Boston's Emerald Necklace and Seattle's Olmsted Parks are examples of early American efforts to incorporate a network of natural areas in urban settings. Though they date from the turn of the 20th century, and as such represent values of nature that are somewhat out of step with contemporary views, placing greater emphasis on the experience of nature as an aesthetic scene or object to be looked at, rather than a dynamic system. Still, they are both significant examples of establishing networks of greenspaces both large and small throughout a city. Additionally, both precedents represent examples of early projects designed to support the health and wellbeing of urban residents.

The goal of these projects was to offer up a common space for relief from the crowding of urban environments. The Seattle Olmsted plan in particular called for broad access to parks and playfields throughout the city, with the goal of provide a park or

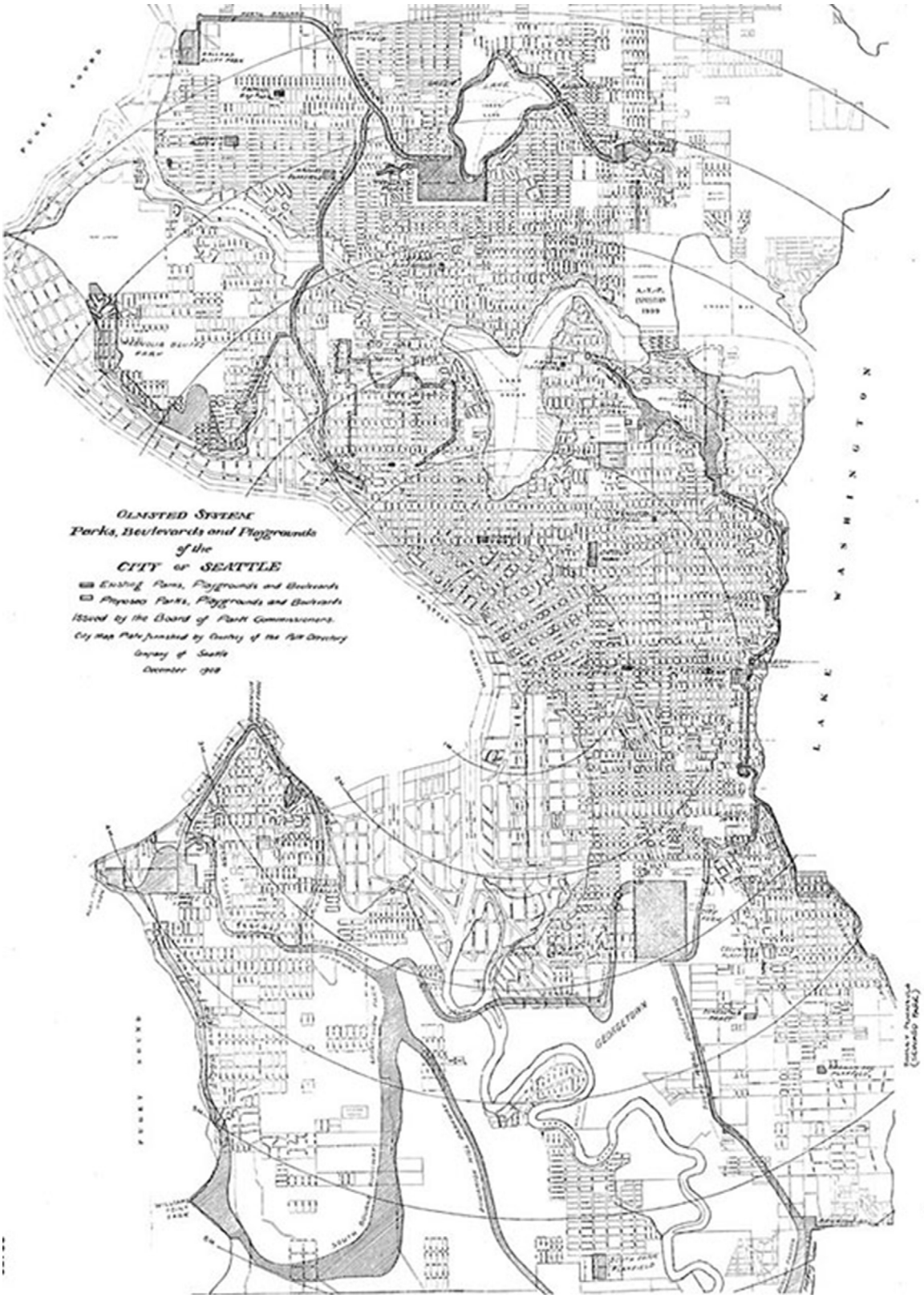

Figure 4.2: The Olmsted Plan for Seattle, 1903, which proposed a series of large and small parks connected with 50 miles of tree-lined boulevards. (Credit: public domain).

playground within a half mile of every home in the city.

Boston's Emerald Necklace consists of a series of nine parks that circle the city's downtown. Designed and built during the latter decades of the 19th century by legendary landscape architect Fredrick Law Olmsted, the parks run over seven miles and connect Boston Common in downtown Boston to Franklin Park on the outskirts of the city (Figure 4.1).

The parks that comprise the network were intended to provide places of respite from the crowding and pollution of the industrial city. Underlying this goal was the belief that exposure to natural settings could serve restorative functions for people. Today the Emerald Necklace continues to play an important role as part of Boston's open space network.

The Seattle Olmsted Parks Plan was completed in the early 20th century by Olmsted's step son John C. Olmsted and his firm the Olmsted Brothers. Designed with similar goals as the emerald necklace, the parks were laid out to provide the city with a ring of greenspaces surrounding the city center. The design consisted of a series of large, medium, and small parks connected to one another by a network of boulevards like Lake Washington Boulevard and Ravenna Boulevard (Figure 4.2). Parks designed as part of the plan include large parks like Volunteer Park, and smaller ones like Ballard's Salmon Bay Park.

This network strategy is intended to provide the neighborhoods of Seattle with access to nearby recreation and open space. The goal

is to add accessible park space within one half mile of every Seattle residence.

Though both the Emerald Necklace and the Seattle Olmsted Parks were designed to specifically emulate natural settings as a counterpoint to the stress of urban overcrowding and pollution, they are still powerful examples of meaningful public initiatives devoted to urban nature.

Because each involved the dedication of large swathes of land to public green space they serve as important precedents for envisioning a new relationship between contemporary cities and nature. Additionally, the use of street boulevards to provide connections between larger open spaces serves as a precedent for the growth of tree canopy and pollinator pathways in Ballard. The profound vision that each of these projects offered for Boston and Seattle should serve as an example of integrated urban green space for the future of our cities.

Case Studies Conclusion

The wide range of projects presented above is intended to highlight the flexibility and diversity of strategies that can be leveraged for supporting community engagement with urban ecology. These projects highlight a sample of designs centered on the interface of ecology and art in cities ranging in scale from small sites to city-wide plans. Each offers insights for ways that the design of urban habitats can be leveraged to support engagement with nature in cities and dialogue about our future relationship with urban ecologies.

Ranging from community events and

art installations to more traditional and permanent site designs, these projects all promote greater integration of habitat, ecology, and restoration in cities, and support meaningful interaction with nature. Additionally, as the Emerald Necklace and Olmsted Parks Plan highlight, visionary and concerted plans for urban nature have been created for American cities for more than a century. These last two projects serve as powerful precedents for the integration of habitat and public open space in cities and support a comprehensive re-imagining of Ballard's urban habitat.

5 | History & Site Analysis

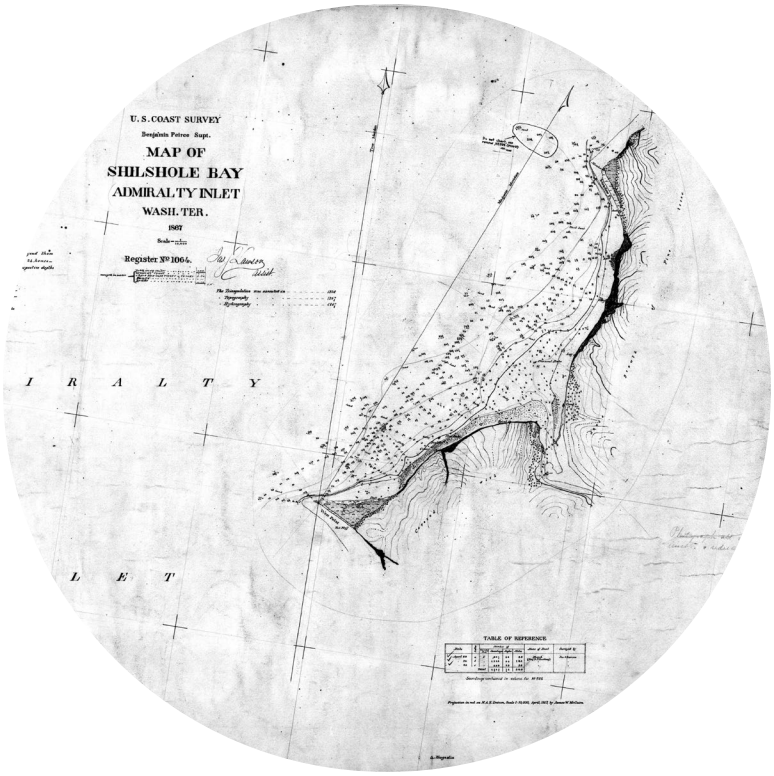

Figure 5.1: 1867 U.S. Coast Survey of Shilshole Bay and vicinity. (Credit: University of Washington Digital Archives).

5

"That men do not learn very much from the lessons of history is the most important of all the lessons that history has to teach."

-Aldous Huxley

This chapter provides an overview of the social and environmental history of Ballard beginning from the time of early American settlement through to the present. Particular attention is paid to the intense processes of hydrological and shoreline alterations that have been employed to reshape Salmon Bay in order to suit the area's maritime industry. These processes are largely responsible for both current state of the bay's ecological degradation as well as the limited public access and dearth

Photo 5.1: Photo from 1900 showing the tidal channel linking Shilshole Bay to Salmon Bay prior to the construction of the Hiram M. Chittenden Locks. Photo take approximately half a mile west of the 24th Ave NW street end. (Credit: photo by Anders Beer Wilse, courtesy of the Museum of History and Industry).

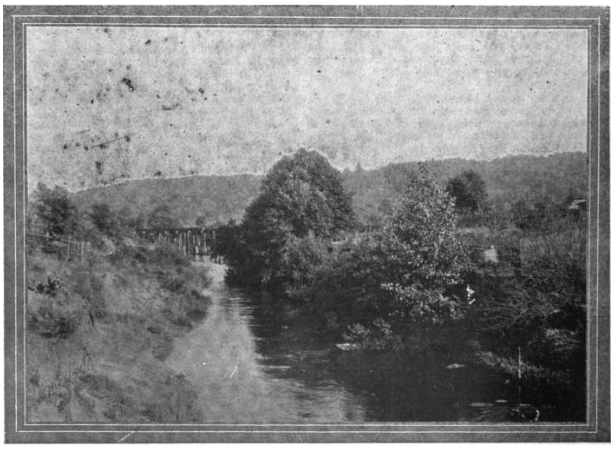

Photo 5.2: 1908 photo of the Montlake Portage Canal, dug in 1860 and expanded in 1883, provided access for small vessels and timber from Lake Washington to Lake Union prior to the construction of the Lake Washington Ship Canal. (Credit: public domain).

of open spaces in the area.

Both the highly urban and industrial context of the neighborhood, as well as profound degree of physical changes that have reshaped the ecology of the area support the argument that a hybrid ecology is an appropriate design strategy for incorporating wildlife habitat. The fact that Salmon Bay has been altered from an estuarine system to a freshwater ecology, and therefore now serves a different ecological role that it had in the past further supports the idea that restoration efforts in the area should embrace their human-made nature, rather than seek to replicate the past. By embracing this history and the highly constructed nature of the area we can support the goal of creating habitat interventions that serve to support new understandings of nature in the city.

This chapter concludes by highlighting a specific street end site as a major opportunity for urban habitat in the neighborhood. That site, the 24th Ave NW street end is flanked by 3 parcels of city owned property that will be used for construction staging and excavation for a future stormwater quality detention tunnel.

In the following chapter a design is

Photo 5.3: View to the east showing Salmon Bay from Magnolia in 1902. Duwamish tribal members Charlie and Chilohleet'sa's house is on the right. (Credit: Photo by Webster & Stevens, courtesy of the Museum of History and Industry).

proposed for a community space and habitat improvements on the site. Because the total area of the city-owned property on the site is more than 3 acres including in-water areas, it represents a sizable opportunity for the neighborhood. Additional strategies are also suggested in the following chapter for incorporating wildlife habitat throughout the neighborhood.

Site History

The area around the 24th Ave NW street end has been an important fishing and trade site since before the arrival of Euro-American

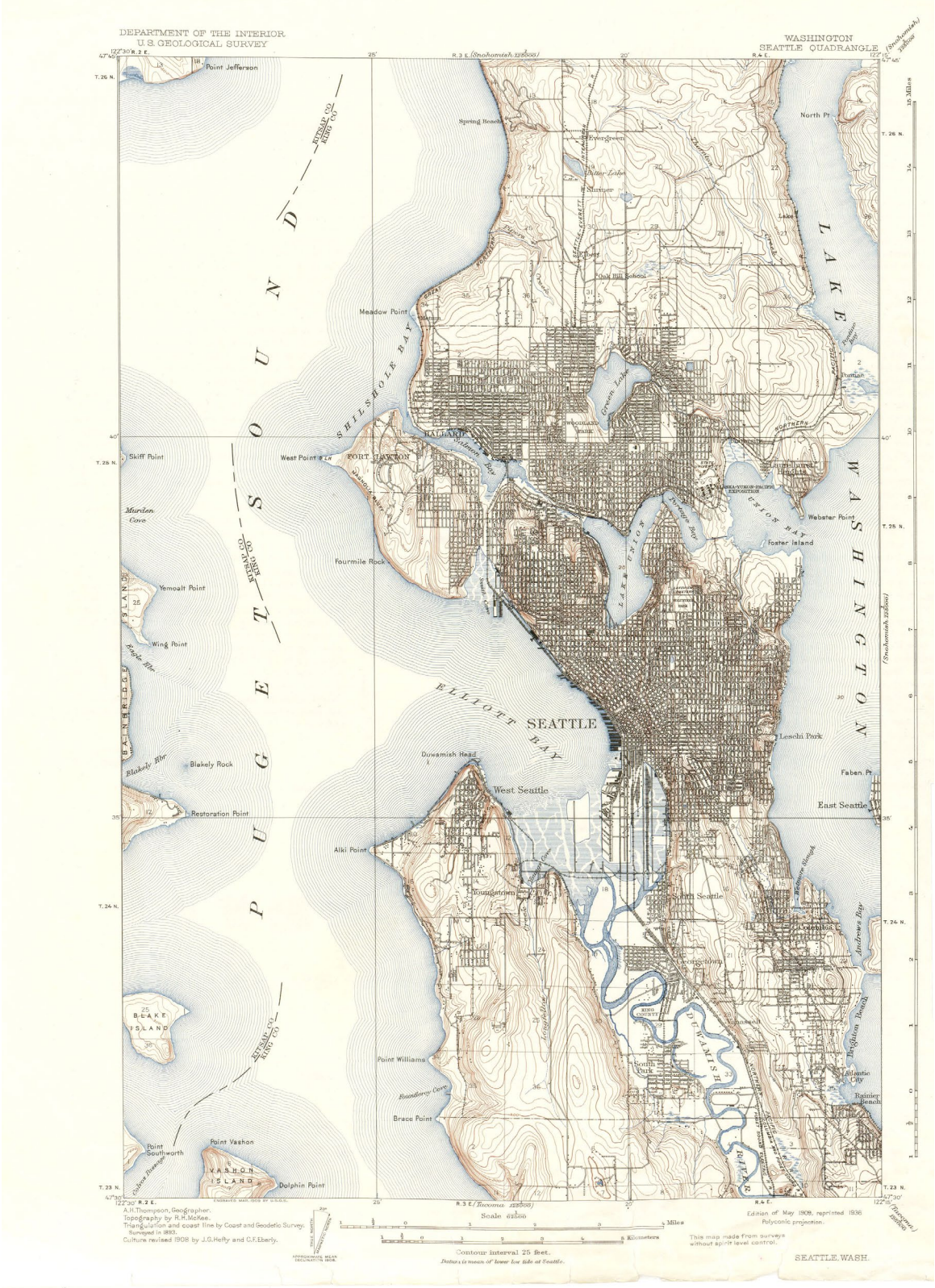

Figure 5.2: 1908 US Geological Survey map of Seattle, 9 years prior to the completion of the Lake Washington Ship Canal. Though the Lake Union/Salmon Bay drainage system is shown in its' unaltered state, the small Montlake Portage Canal is shown (see figure 5.2). (Credit: University of Texas, Austin Collections).

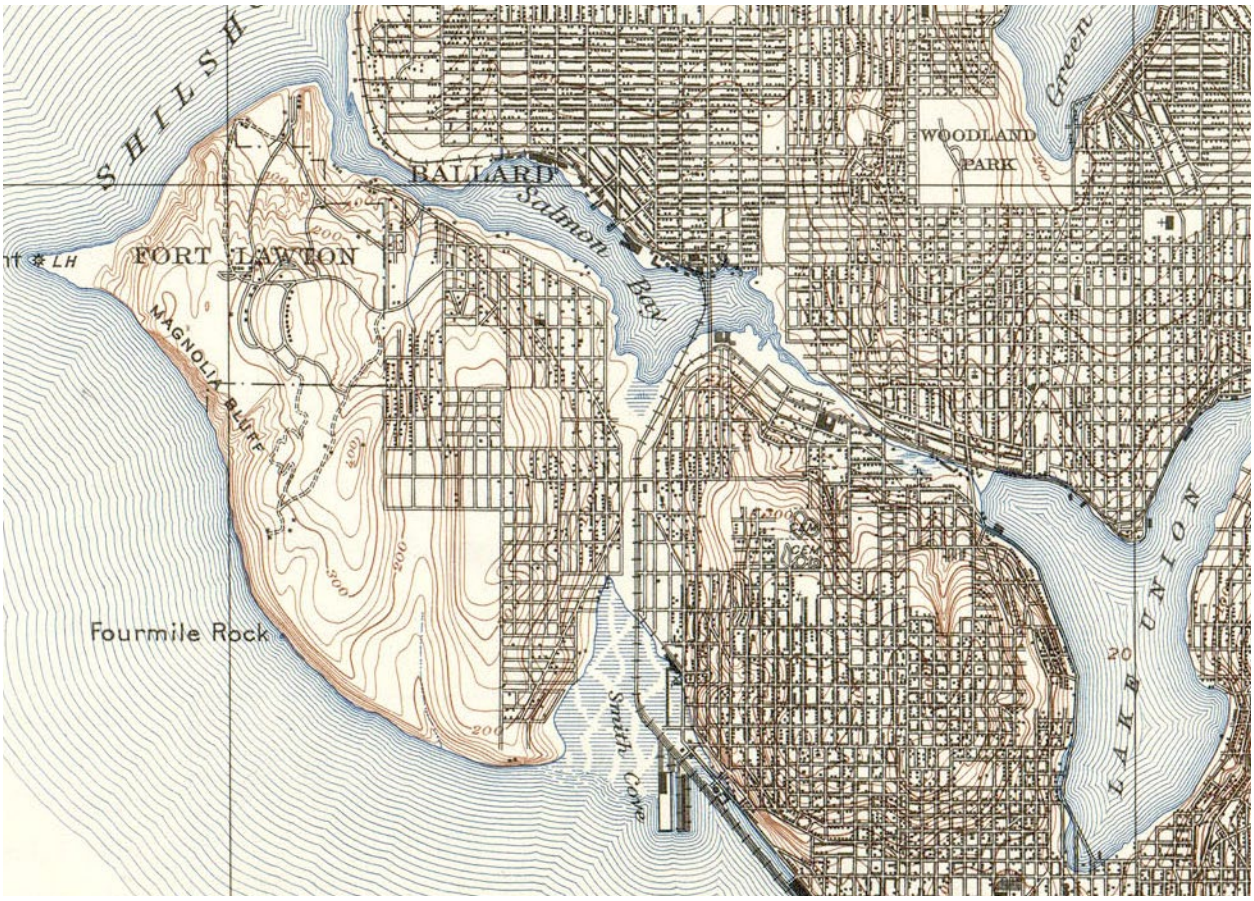

Figure 5.3: Enlargement of figure 5.2 showing the Neighborhoods of Ballard, Magnolia, Queen Anne, and Fremont, and the Salmon Bay, Lake Union, and Shilshole Bay water bodies that would later be connected to Puget Sound through the construction of the Lake Washington Ship Canal system.

settlers. Located on the north shore of Salmon Bay near a historic Duwamish village whose name translates roughly to "tucked away inside", the area served as a winter camp for indigenous families who would spend spring and summer months away at various regional fishing, gathering, and trading sites ("The Waterlines Project"). With the arrival of the first American settlers in the 1850s the area experienced rapid population and economic growth. The local ecology, as well as Duwamish livelihoods, was dramatically altered during this period as logging cleared forest and homestead farms divided up the land into individual ownership.

It was the growth of industry that would ultimately have the biggest impact on the ecology of the area. In particular, the

Photo 5.4: The Ballard locks under construction in 1912. View looking east toward Magnolia and Salmon Bay (Credit: US Army Corps of Engineers).

Photo 5.5: The Ballard Locks near completion of construction, December 9, 1914. View looking east into Salmon Bay. (Credit: University of Washington Digital Collections).

construction of the Lake Washington Ship Canal in 1914 and the loss of tree canopy due to deforestation of and urbanization severely impacted local salmon species and disrupted the basic ecology and hydrologic systems of the area (Seattle, “Lake Union” 34; Glowacki, 35). Salmon Bay, offering access to Puget Sound and shelter from more severe coastal weather, was situated along an important future shipping channel that eventually connected Lake Washington and Lake Union to Puget Sound (see Figure 5.2, 5.3). Though the first American settlers in Seattle understood that this connection would become an important piece of infrastructure, it wasn’t until 1917 that the Lake Washington Ship Canal was completed following the excavation of the Montlake Cut and the Ship Canal in Fremont, and the construction of the Hiram M. Chittenden Locks at the mouth of Salmon Bay (see Photos 5.4, 5,5, Figures 5.5, 5.6). Prior to its completion, news that the Great Northern Railroad would run its Seattle line from the north through Salmon Bay led to an explosion in land speculation during the 1880’s. Shortly thereafter Ballard’s first major land plat, Gilman Park, was completed in 1889 (Ballard Historical Society).

The establishment of the Lake Washington Ship Canal system and the development of railroads increased regional connectivity and was a historical turning point for the region. No longer was Salmon Bay a tidal estuary at the mouth of a creek that drained the Lake Union watershed into Puget Sound, nor a local fishing and wintering camp. It now tied the area to the greater Lake Washington/Lake Sammamish watershed providing a route for the flow of raw materials like coal and timber to be shipped

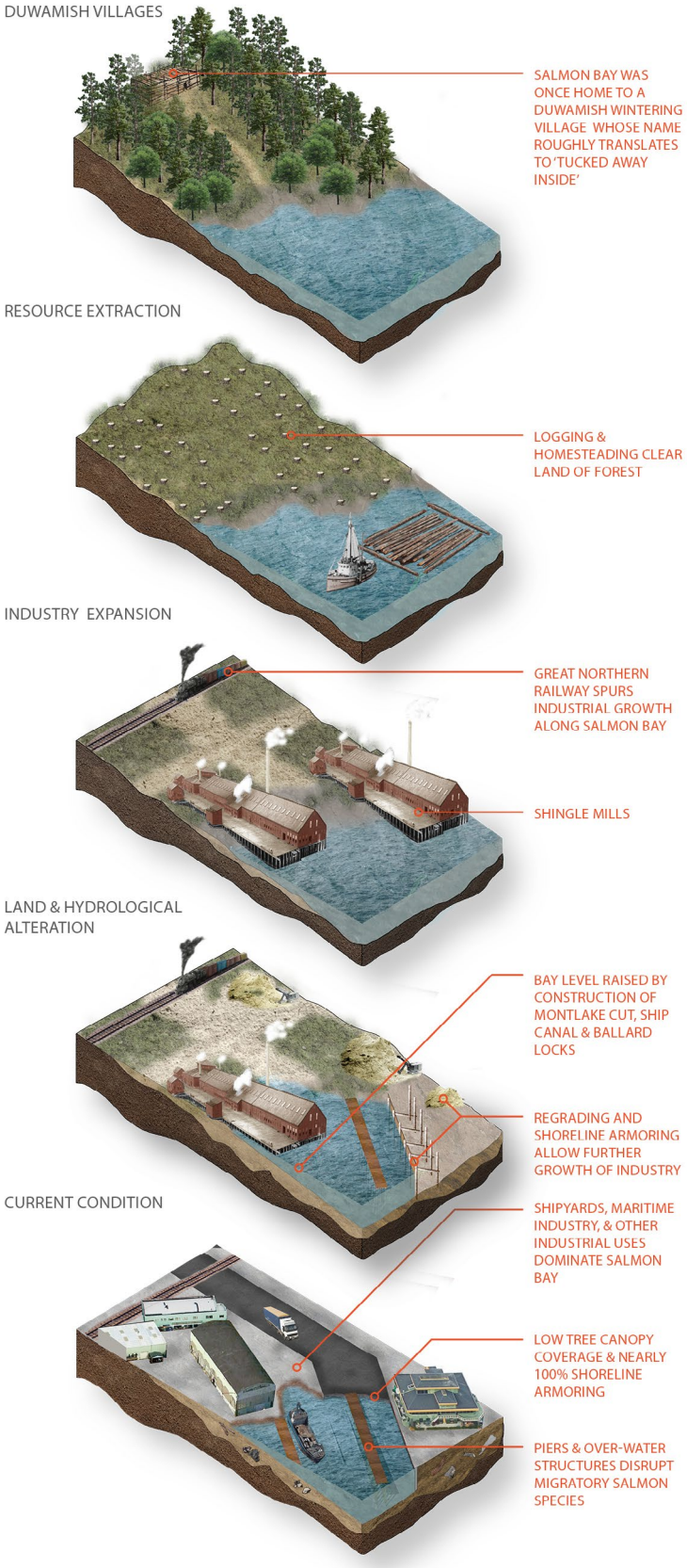

Figure 5.4: Diagrams of the alteration of Salmon Bay following the arrival of American settlers. (Credit: Rhys van Bemmel).

through Ballard en route to sites throughout Puget Sound and down the Pacific coast. This influx of raw goods spurred the establishment of timber mills and other processing plants along Salmon Bay and led to the nickname 'Shingletown' in honor of its massive output of manufactured cedar shingles. At the same time, commercial fishing also grew in the area, spurring the construction of Ballard's Fisherman's Terminal at the south shore of Salmon Bay. Soon any available waterfront property was quickly developed for maritime and industrial use.

The Ecological Impacts of Ballard's Growth

The ecological and social impacts of the growth of industry on Salmon Bay were profound. With the completion of the Lake Washington Ship Canal the hydrology of the bay was irrevocably altered. The

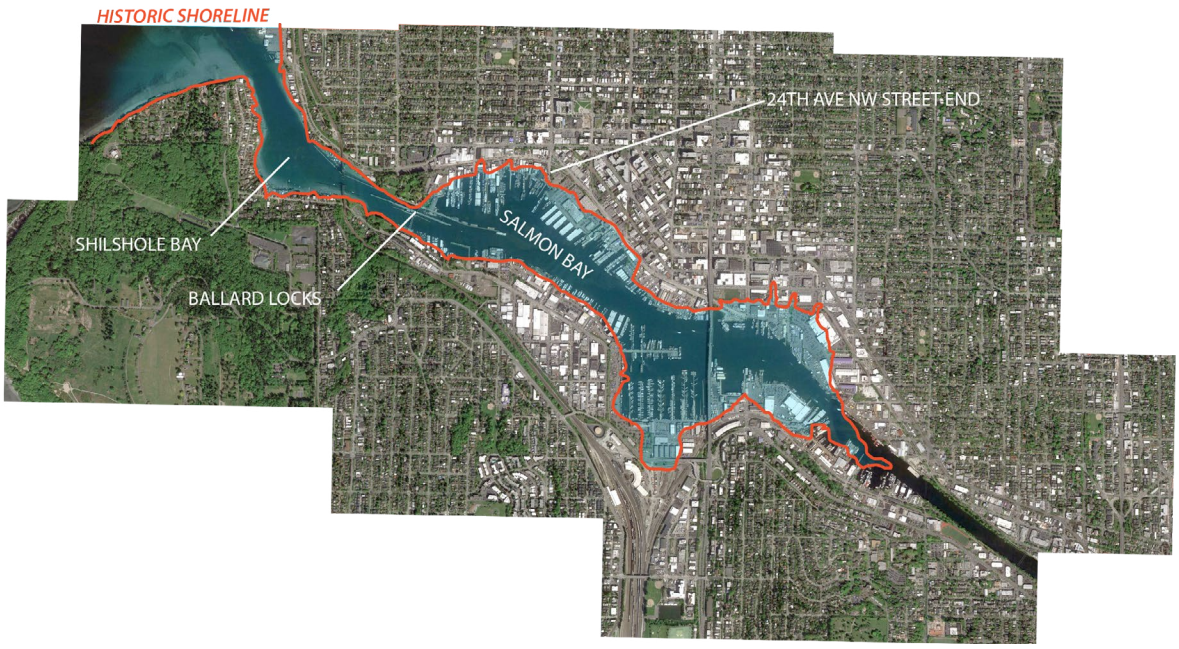

Figure 5.5: Salmon Bay's historic shoreline overlaid on an aerial photo from 2015 current shoreline. Historic shoreline based on 1903 Ballard Sewer map. (Credit: Rhys van Bemmel).

Hiram Chittenden Locks separated Lake Washington's freshwater from Puget Sound's saltwater. The locks also raised the level of Salmon Bay by about 10 feet above the average high tide level, flooding any remaining riparian areas that had not been already cleared and filled for industrial use. This, combined with the need for clear, deep shipping channels, and the desire for waterfront property, spurred the implementation of a number of ambitious regrading projects throughout Ballard. Salmon Bay's new shorelines were soon constructed, using a process of bulkhead construction and filling resulting in a nearly complete removal of any natural shorelines (Seattle, "Lake Union" 34).

This marked a period of severe ecological decline for the area, as the lack of forest canopy disrupted riparian habitats and the terrestrial species that depended on them. The removal of natural beaches also made the waterbody a hostile environment for local salmon species. Pollution from the many factories, foundries, and oil storage facilities in the area, as well as sewage output from the dozen combined sewer

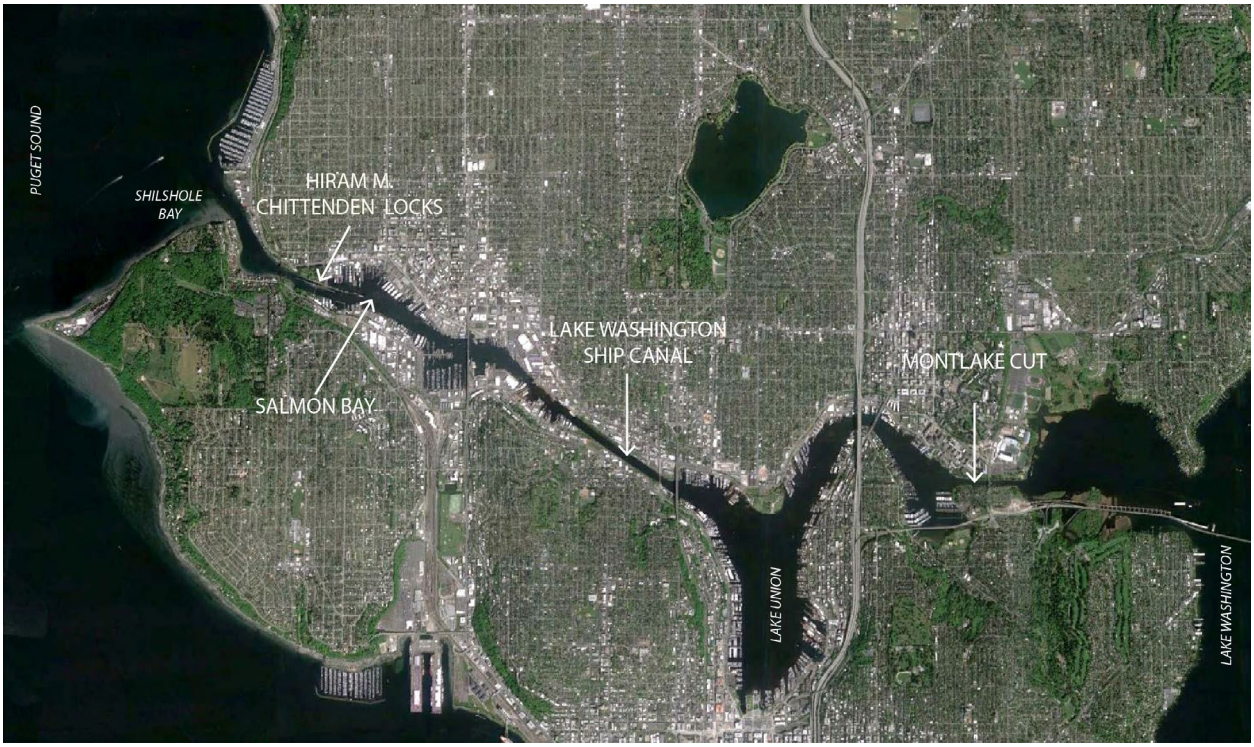

Figure 5.6: 2015 aerial of the Lake Washington Ship Canal and vicinity. Shown are the Montlake Cut, Fremont Canal, and Hiram M. Chittenden Locks. (Credit: Google Maps).

overflows that discharged into Salmon Bay helped to create anaerobic conditions within the channel further degrading the ecosystem. This was exacerbated by saltwater infiltration from the Locks that continued until 1966 when a saltwater barrier was constructed, which helped to mitigate the development of anaerobic conditions caused by salt water in the bay (Seattle, "Seattle's Aquatic Environments" 50).

Though the biggest declines in environmental quality were experienced in the period immediately following the growth of industry and construction of the locks and canal system in the early 20th century, the continuing transformation of Salmon Bay has been profound. Where critical riparian forests and wetlands once existed there now exists a highly developed, armored shoreline, actively used by the maritime industry, cement plants and recreational users. Missing are all but a few

Photo 5.6: Shoreline armoring during the construction of Ballard's Fisherman's Terminal in Salmon Bay, April 11, 1914. (Credit: Seattle Municipal Archives).

patches of tree canopy that offer nesting sites for local bird species like blue heron and hunting opportunities for osprey and bald eagles. Also gone are critical feeding and resting areas for migrating juvenile salmon. With the near total armoring of Salmon Bay's shorelines, construction of piers that shade out light that salmon require to ensure their route is clear of predators, the ecological integrity of the area is dramatically impaired (Glowacki, 35; Seattle, "Lake Union" 34; Toft, 3-8).

Current Context: Ecological Health of Salmon Bay

Today the ecological state of Salmon Bay has improved some from its nadir at the beginning of the 20th century. The

Photo 5.7: Campbell Shingle Mill in Ballard, 1924. (Credit: photo by Webster & Stevens, courtesy of the Museum of History and Industry).

anaerobic conditions of the past have largely been eliminated. Though sewage overflows still occur with regularity, they are less common than in the past as mitigation efforts have been implemented to prevent them. Further steps are being taken to reduce their frequency including the construction of a stormwater quality tunnel planned for construction in 2017 that will run from the Ballard neighborhood to Fremont.

But despite some minor improvements, basic indicators highlight the ecological deficiencies in and around Salmon Bay (see Figure 5.7). The area's tree canopy cover is a mere fraction of what it is for the city and county overall—only 4.9% for Salmon Bay,

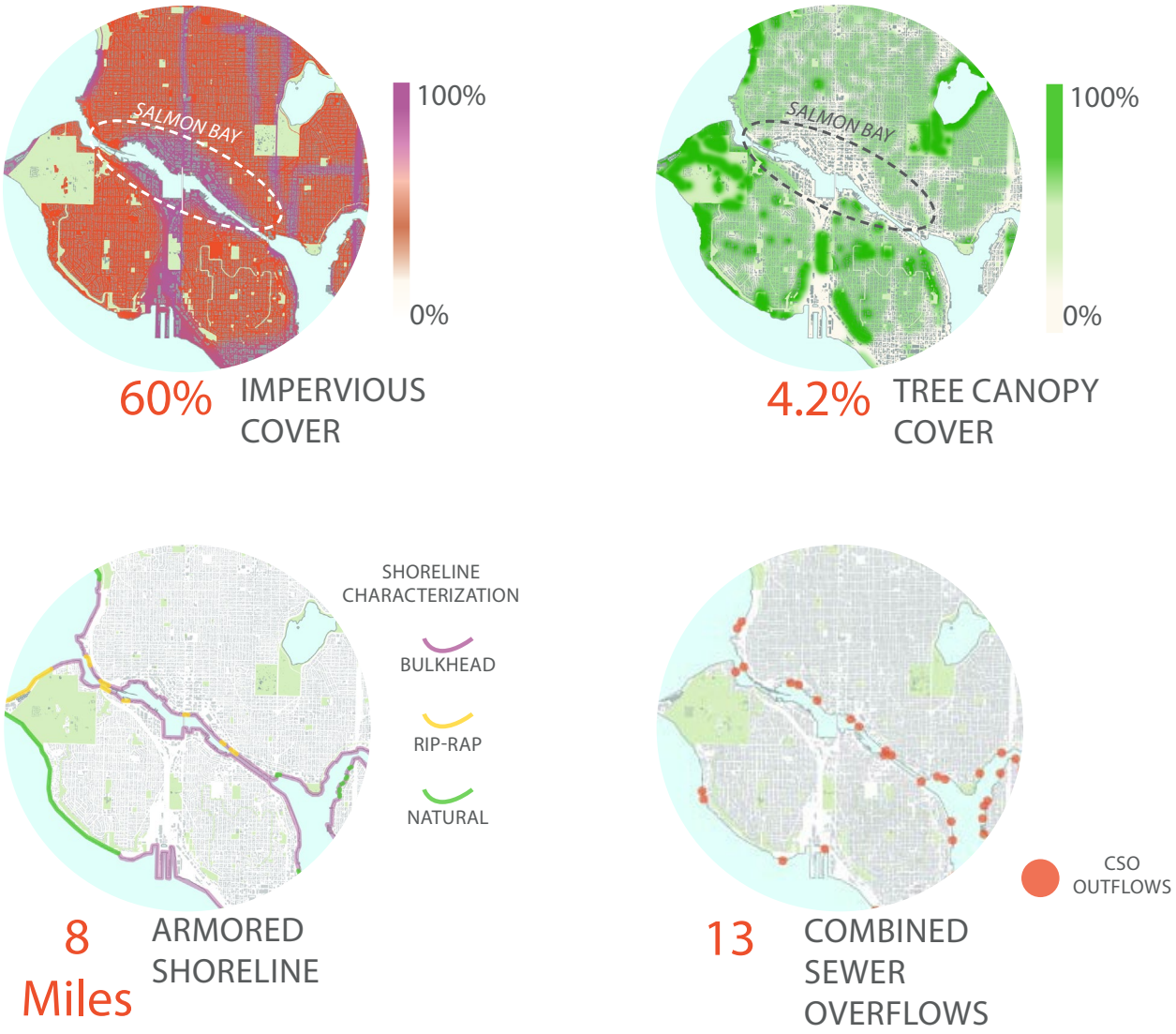

Figure 5.7: Maps series portraying some of the ecological indicators and influences for Salmon Bay and Ballard. (Credit: Rhys van Bemmel).

compared to 27.5% city wide and 58.2% for King County. Impervious surfaces make up nearly two thirds (59.6%) of the Salmon Bay area, while they occupy a little over half of the city surfaces as a whole (52.1%), and only about 9.5% county wide. Additionally, the lack of natural shorelines is a major strain on the ecological recovery of the area.

The waterbody itself is also deficient in a number of key indicators of ecological health. With the effects of reduced canopy cover, water temperatures often reach their summer peak earlier in the season and

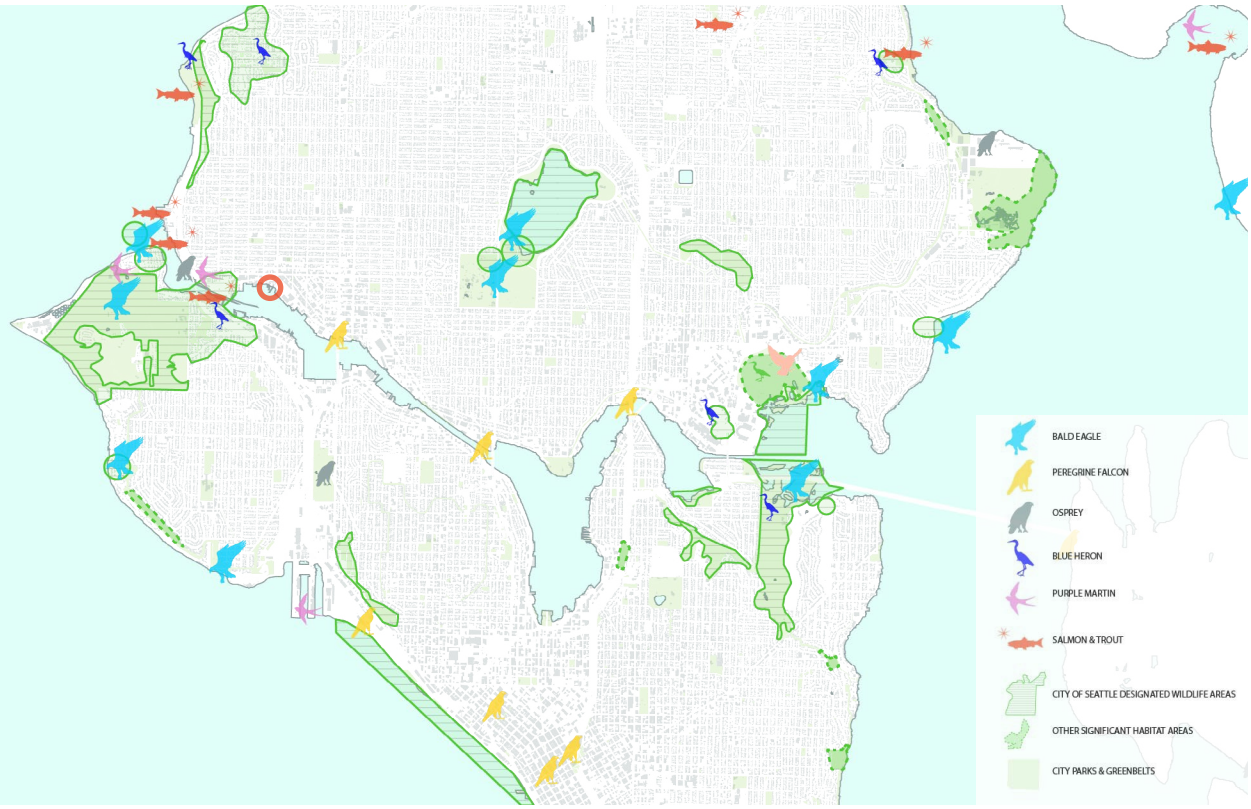

Figure 5.8: Showing significant urban forest and habitat areas of North Seattle. Icons represent documented nesting or breeding areas for various bird and salmon species (24th Ave NW street end site circled in red). (Source: Washington Department of Fish and Wildlife).

stay high for longer. Warmer temperatures are also tied to lower levels of dissolved oxygen which creates hostile conditions for migratory salmon, limiting the range of usable space for searching for food and avoiding predators (Seattle, "Lake Union" 34-37). Additionally, pollution from street runoff as well as gasoline and oil runoff from industrial sites presents as great an issue as sewage overflows for the water quality of the area.

With that said, some significant habitat areas still exist near Ballard. Immediately to the west lies a very large patch of urban forest which includes Discovery Park, Kiwanis Ravine, and Commodore Park (Figure 5.8). Together these areas are home to important nesting, feeding, and breeding sites for larger bird species like osprey, bald eagles, barred, great horned, and saw-whet owls, as well and blue heron, and dozens of smaller perching birds, seabirds,

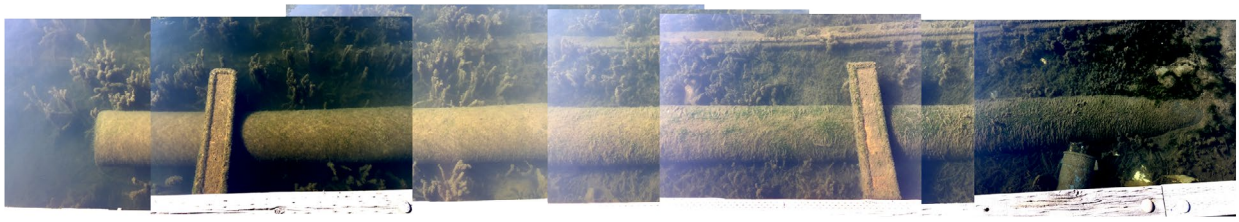

Photo 5.8: One of three combined sewer outflows at 24th Ave NW. (Credit: Photo by Rhys van Bemmel).

and waterfowl. Discovery Park, at more than 500 acres in size, is home to a variety of habitat types including woodlands, meadows, freshwater creeks, rocky shores, and beaches that make the area desirable to a broad range of species. To the north, the area around Golden Gardens Park is another significant urban forest patch, home to blue heron nesting sites and salmon runs. Important areas to East include the Washington Park Arboretum, Union Bay Natural Area, Magnuson Park, and Green Lake and Woodland Park which are home to a broad range wildlife species.

From both a social and ecological standpoint, the presence of these larger urban wildlife areas is critical for supporting higher trophic species like bald eagles, and it is an important opportunity for human interactions with nature. In order for these larger habitat areas to more effectively support urban wildlife there is a need for strong connections between them and greater feeding and nesting opportunities throughout the area. The Salmon Bay area has a dearth of such connections and opportunities.

Given the inherent challenge of creating new areas of this scale for urban habitat, the next best opportunity for supporting the species that utilize these large sites are Ballard's many small-scale sites like the street end sites that exist throughout the neighborhood. Leveraging Ballard's shoreline street end sites, as well as community habitat gardens in private yards and on vacant lots offers a means of reinforcing these larger habitat districts and

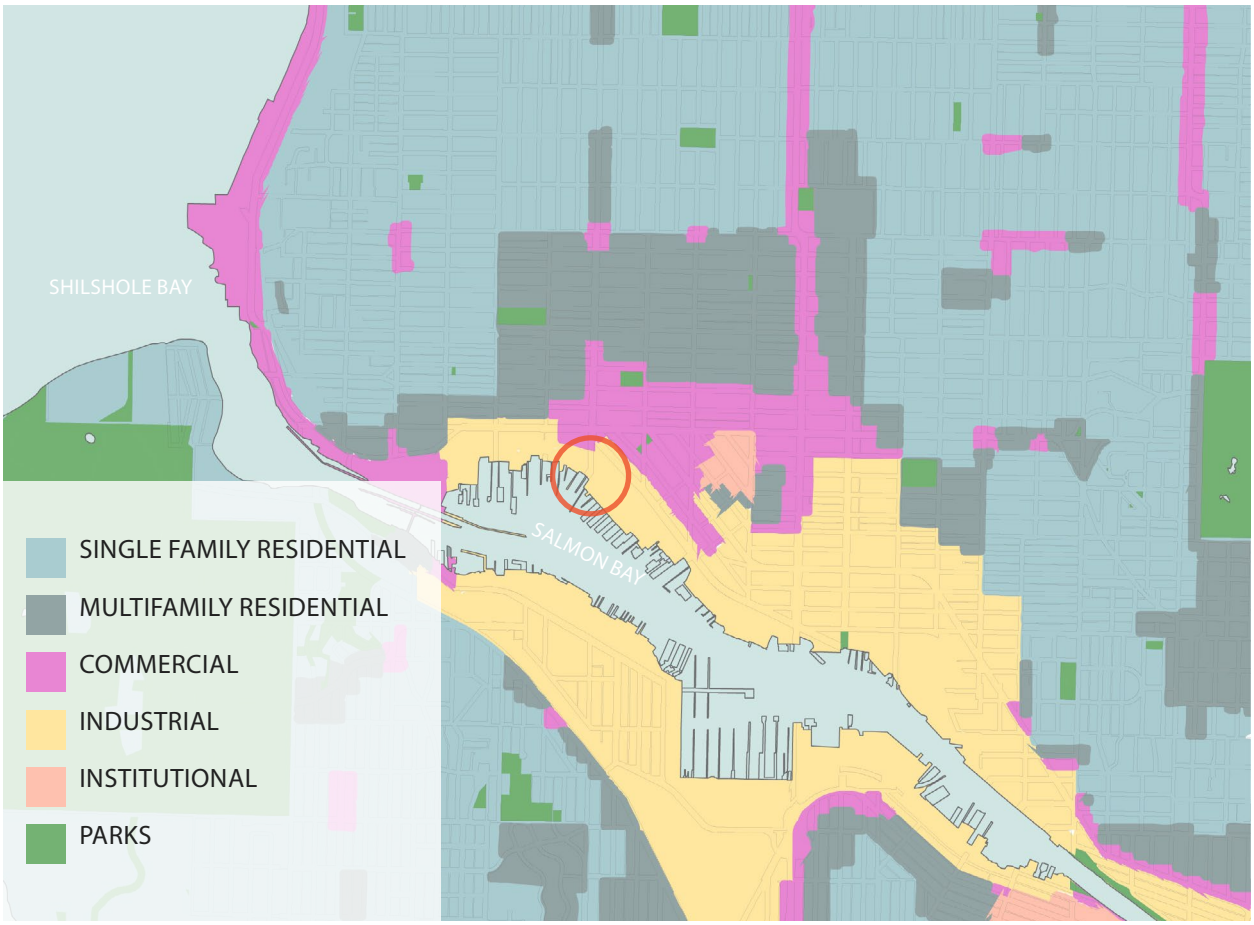

Figure 5.9: Zoning map of Ballard and vicinity (24th Ave NW street end site circled in red). (Credit: Rhys van Bemmel).

will provide small-scale connections.

Current Context: The Social Role of Ballard's Open Space

Today Ballard is a neighborhood largely lacking ecological health or integrated systems. The massive growth of manufacturing and industrial fishing that followed the construction of the Hiram M. Chittenden Locks is not only responsible for the decline of Salmon Bay's riparian habitat, but also serves as a barrier to access the waterfront.

The Salmon Bay Industrial area is Seattle's second largest industrial district and home to the majority of the local maritime fishing industry. Following the export of American manufacturing jobs overseas

Photo 5.9: Boathouse at 24th Ave NW street end, 1908. Boats were available for rental for excursions onto Salmon Bay and Beyond. (Credit: Museum of History and Industry).

Photo 5.10: The Harbor Patrol Station No. 2 at the 24th Ave NW Street end in 1956. (Credit: Seattle Municipal Archives).

beginning in the 1970's, the preservation of working class jobs provided by the city's industrial zones has become of paramount importance. Thusly city zoning and land-use regulations offer extra protections for the Salmon Bay industrial district to protect against uses that may impede industrial operations. This presents a major barrier to any ecological recovery efforts for the area. The city of Seattle is also currently undergoing a large growth spurt, and the Ballard neighborhood has borne a large portion of that growth. Since 2010 the population of Seattle has grown by nearly 10%, reaching 668,342 in 2014 (U.S. Census Bureau). This population growth has increased pressure on the neighborhood's green open spaces.

According to the city of Seattle, Ballard's urban core is underserved by open space (City of Seattle, Department of Parks and Recreation, 63) (see Figure 1.1, Chapter 1). Given the challenges present for the acquisition of significant properties for public green space in a neighborhood experiencing a rapid spurt of population growth (and the accompanying rise in real

estate values), the utilization of any existing open spaces to improve ecological health offers an ideal opportunity for supporting habitat and public space goals. The incorporation of Ballard's street ends into a network of small-scale habitat patches offers a significant opportunity to improve urban wildlife habitat and grow community public space.

A Unique Opportunity: The 24th Ave NW Street End

In order to provide grounding for the habitat and eco-revelatory concepts discussed previously a design proposal is included in the next chapter for the site of the 24th Ave NW street end. This property sits in the heart of the Salmon Bay industrial area and is adjacent to three parcels of city owned property. Together with the 24th Ave NW street end these adjacent properties will serve as the construction staging site for the future Ship Canal Water Quality Tunnel and will ultimately house a Seattle Public Utilities Pump Station (see Photo 5.11, Figures 5.10, 5.11). The parcels neighboring the street end are the former site of the Yankee Bar and Grill and have laid vacant since the restaurant closed in 2006. In 2015 the City of Seattle acquired the properties to serve as the construction staging and excavation site for a future stormwater quality tunnel to be constructed from Ballard to Fremont.

In January 2016 I made contact with a couple of Seattle administrators to discuss the site. During a meeting with Seattle Public Utilities Engineer, Dylan Menes I was provided an overview of the project which will take place over the course of the next five to years and is in its early phase currently (10% design development). Mr.

Photo 5.11: Panorama at 24th Ave NW street end, April 24, 2016. The defunct Yankee Bar & Grill building is visible on the left. Chain-link fencing around the existing parking lot is in place for the future construction staging for the Ship Canal Water Quality Tunnel Project. (Credit: Rhys van Bemmel).

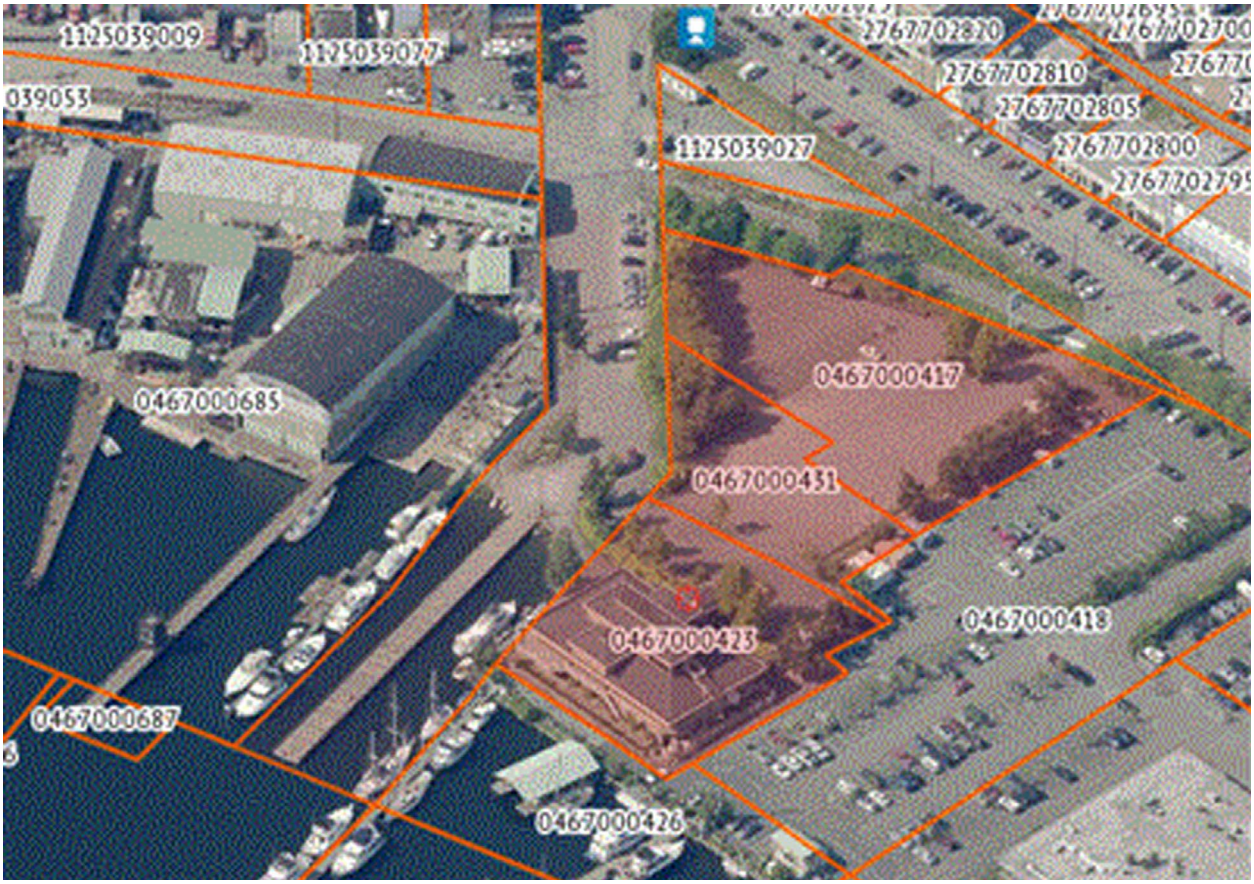

Figure 5.10: Aerial of the 24th Ave NW street end and adjacent parcels. The former Yankee Bar and Grill property which was acquired by the City of Seattle in 2015. In preparation for the construction of Ship Canal Water Quality Tunnel the property subdivided into three parcels (shown in red). The north parcel (0467000417) will house a stormwater utility pump station, while the fate of the other two parcels is undecided. (Credit: Photo from King County property report).

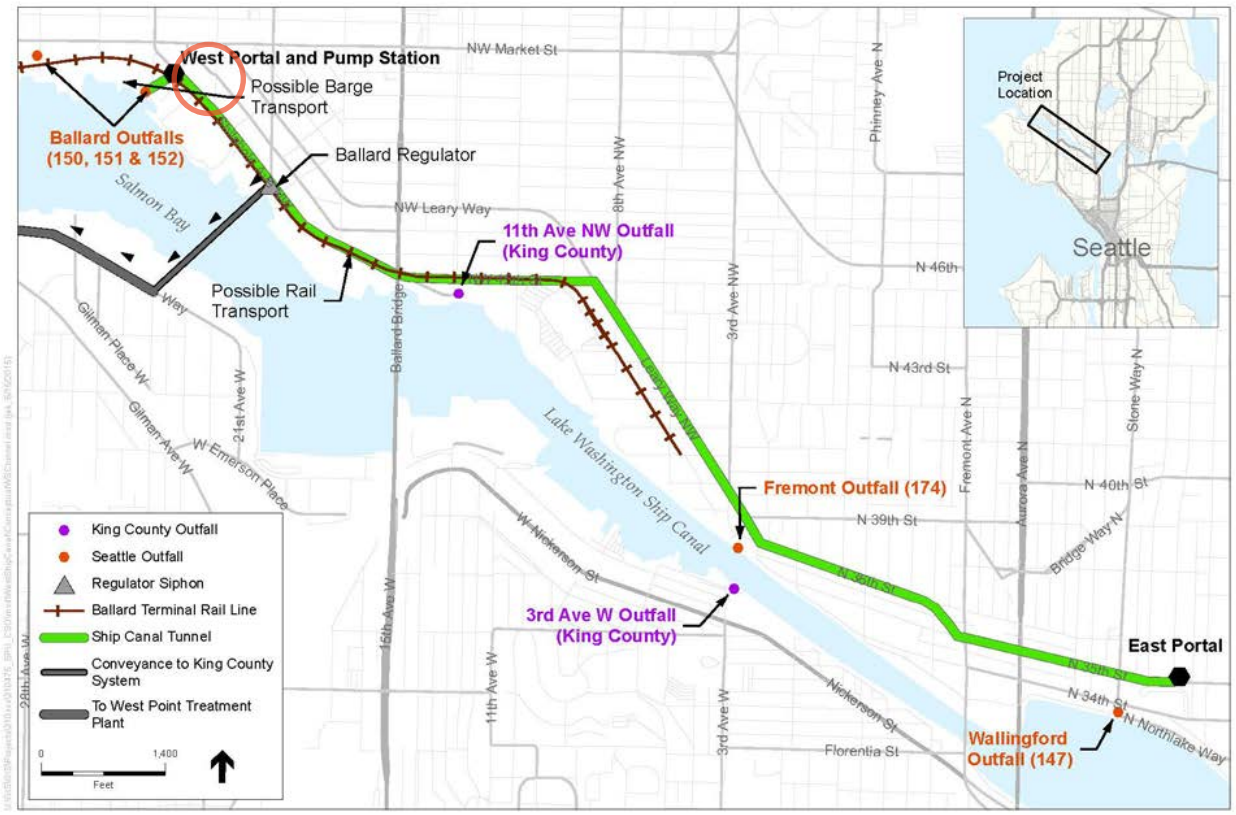

Figure 5.11: Proposed Ship Canal water quality tunnel project. Designed to help mitigate the occurrence combined sewer overflows by adding extra capacity to the sewer system for heavy storm events. The 24th Ave NW street end is site of the West Portal and Pump Station indicated on the map (circled in red). (Credit: Seattle Public Utilities).

Menes informed me that the plans for the city-owned parcels have not determined at this time but that SPU will likely try to sell them. One of the properties, however, will be retained and house a pump station following completion of the tunnel project, but the future of other two parcels closest to the shore line is undetermined. In email correspondence with Seattle Parks Department, Michael Shiosaki, the Director of Planning and Development expressed the Parks Department's desire to acquire the properties for a future park following the completion of the Ship Canal Stormwater Tunnel project. Though he admitted that no planning has taken place yet at this early stage.

There are a number factors that make these properties a major opportunity as green

open space for the community. Flanked to the east and west by maritime industrial properties, and to the north and west by the commercial and retail businesses of Ballard's historic district, the site is also very close to the multifamily and single family residential areas of old Ballard. This close proximity to Ballard's high, medium, and low density residential districts as well as its' commercial and industrial zones firmly roots the site in the neighborhood and offers grounding in the many aspects of Ballard's cultural and economic fabric. Additionally, unlike most street ends which generally only comprise about a quarter to a third of an acre, (half of which may be in water), the 24th Ave NW street end and adjoining properties cover an effective area of about 3 acres. That such a sizable publicly-owned piece of land exists in close proximity to Ballard's urban core is a major opportunity that should be leveraged by the neighborhood residents.

In the following chapter I propose a site design for this property as well as a broader neighborhood-scale vision for the application of small-scale habitat interventions throughout Ballard. While the site design for the 24th Ave NW street end and adjoining properties is intended to embody the habitat and eco-revelatory design strategies discussed in earlier chapters, it is also designed as a tool to support community action for the future of the property. It is hoped that this visioning can be used to solicit support for the transition of the property into a public space and urban wildlife habitat following the completion of the city's stormwater quality tunnel.

6 | Design Overview

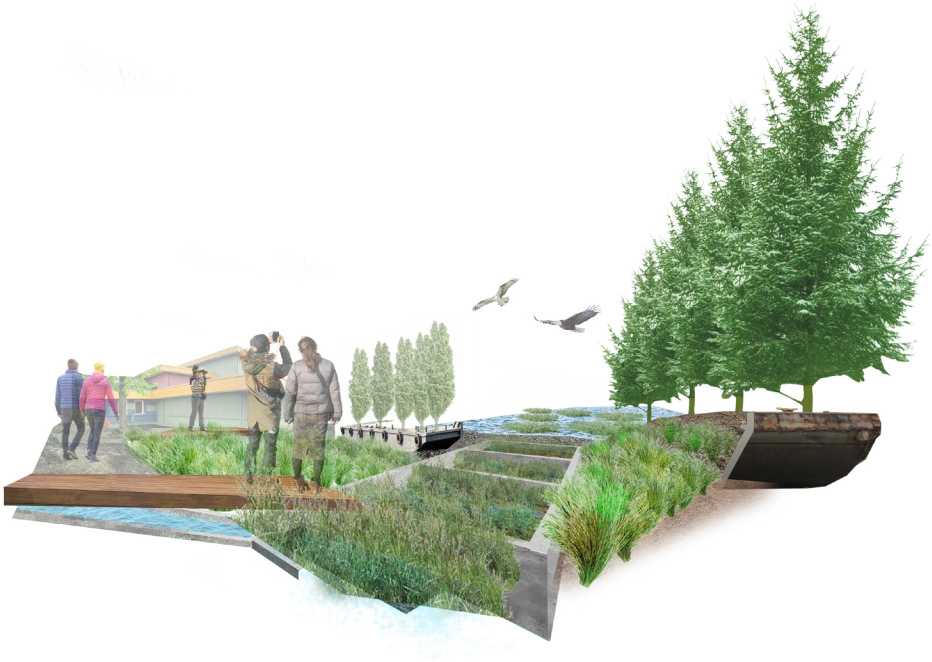

Figure 6.1: Rendering of shoreline overlook, biofiltration swale, and barge planters.

6

"The most insignificant insects and reptiles are of much more consequence, and have much more influence in the economy of nature, than the incurious are aware of and are mighty in their effect, from their minuteness, which renders them less an object of attention and from their numbers and fecundity."

-Gilbert White, 1777

The idea that a series of small-scale habitat inventions can have significant impacts on both the success of urban wildlife species as well as the degree to which society values nature is foundational to this thesis. John Lyle described this idea in 1998, noting that "a culture does not gain new ground by the same means an army does. Rather, a culture grows and develops more along the lines of natural succession" (Lyle, 37). It is this ethos that lies at the heart of this thesis; a belief that small

changes will grow and have ripple effects, serving to support larger cultural and ecological changes.

Inspired by the Ballard community's effort to become a certified community wildlife habitat, the design portion of this thesis addresses opportunities for increasing urban wildlife habitat and community space in Ballard at two scales. First, at the neighborhood scale, a district framework is proposed through a strategy of employing small sites to increase habitat opportunities through simple interventions like the addition of planters with pollinator friendly species. The goal of this district scale framework is to leverage any and all available sites within the neighborhood in order to provide connections between existing nearby habitat areas and to expand urban ecosystem robustness through the addition of urban tree canopy and pollinator friendly planting species and the installation of nesting and roosting boxes for various bird and bat species. The small-scale sites offered in this plan include public right of ways for example Ballard's shoreline street ends, neighborhood streets, parks, schools, as well as privately owned vacant properties.

Second, this plan proposes a site design for a park at the 24th Ave NW street end site. In this site design the goals of Ballard's community wildlife habitat effort are overlaid with programmatic elements that will create a park that serves as an educational facility, a community gathering space, and an active café and kayak rental location for neighborhood use and enjoyment. This mix of programming and habitat improvements will help the site

serve dual functions as a community space and as ecological infrastructure.

These plans offer strategies for supporting habitat across the neighborhood in the near and long-term and at different scales. Whereas the intention of the district scale framework is to propose strategies that address deficiencies in urban forest canopy, wildlife food systems, and habitat as part of a broader and longer-term vision; the site design offers a more grounded proposal for how one particular site might be utilized to support these goals as well as to support neighborhood engagement with the site. The hope is to provide a tangible community-driven vision for the 24th Ave NW street end site. This vision can serve as a tool for future site planning following the completion of Seattle Public Utility's construction work for the Ship Canal Water Quality Tunnel project and, may help garner support in the community for city retention of the site as a public park.

What follows is an overview of the details of the district framework and site plan for the 24th Ave NW street end. Before providing an overview of the final design proposal I will present some early process work to help provide context on the design iterations that led up to the final design. After that I discus of the possible sites and strategies employed for the district scale framework, and before concluding with an in depth walk through of the proposed site design at the 24th Ave NW street end.

Process

In the beginning of my design process I was primarily focused on the site of the 24th Ave NW street end. Before coming to the final site design I explored a pair of

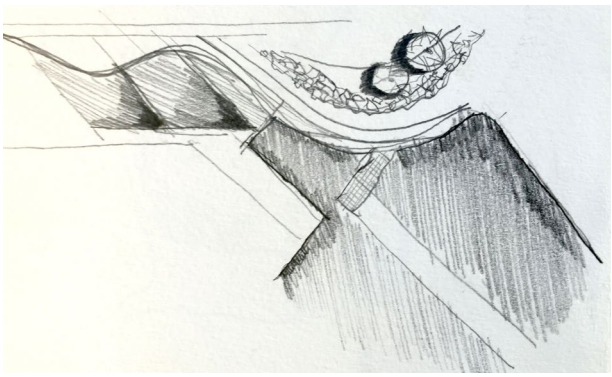

Figure 6.2: sketch of shoreline enhancement and biofiltration swale.

schematic site designs. The first schematic design represented a rough exploration of possible circulation layouts, an initial attempt at siting the Seattle Public Utilities pump station, and a look at possibilities for shoreline and upland ecological enhancements (Figures 6.3, 6.5). In the second iteration I reconsidered the placement of the pump station with an eye towards its impact on sightlines and general effect of inviting people into the site (Figure 6.6). In that iteration I also investigated a strategy of restoring the beach while retaining the existing building on site to be leveraged as a community space.

As another part of my early design studies I explored the concept of sculptural habitat features catered to specific urban wildlife species (Figure 6.4). While these were carried through to the final design I did not place as much emphasis on them, focusing instead on the site design itself, and the district framework.

After receiving feedback during the midterm review and speaking with my advisors I concluded that my first iteration was far too impractical for as a site design considering my project goals and chose to adapt the second schematic design into my final. Since I hope to have the design proposal serve as a tool for building support for an actual park at the site I concluded that the strategy employed in the second schematic iteration was more appropriate because it requires

Figure 6.3: Initial schematic design for the 24th Ave NW street end.

Figure 6.4: Sculptural habitat features. From top left to bottom right clockwise: bat boxes, wildlife water feature, swift nesting chimneys, tree snags, rubble and brush piles, raptor perching and nesting towers, shoreline woody debris, pollinator meadow.

Figure 6.5: Site plan rendering of first schematic design. Emphasis in this iteration was placed on the habitat, by limiting human access to the shore and removing the existing building to create a salmon cove.

Figure 6.6: Second iteration schematic design. In this version, which was adapted for the final design, considerations seek a greater balance between site alteration, human oriented programming, and ecological enhancements.

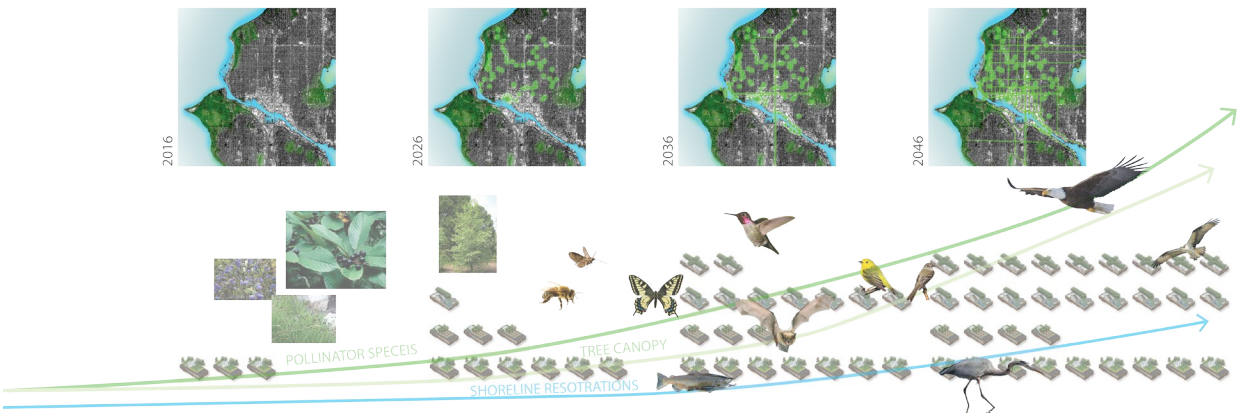

Figure 6.7: Diagram expressing the long term goals of the district wildlife plan to bolster urban wildlife habitat by increasing tree cover and pollinator plantings. By bolstering the pollinator and invertebrate species in the neighborhood upper trophic species will also be supported.

much less site alteration and provides opportunities for the site to bring in revenue. I was also challenged by midterm reviewers to consider the degree to which I was engaging the neighborhood context, history, and to place greater emphasis on habitat enhancements. This feedback is what spurred the creation of the district framework. It is also what let me to choose to screen the beach area and eliminate the existing pier, as well as increase the tree canopy plantings in the final design proposal for the 24th Ave NW street end site.

In the next section I provide an overview of this district framework, followed by the final site design proposal for the 24th Ave NW street end. Both of these design proposals are expansions of the design thinking that informed my early schematic plans.

District Vision

The strategy of the Ballard wildlife habitat effort is to promote the use of native species within private residential yards that serve as nesting, feeding, and rearing locations for urban wildlife species. This self-initiated project is the inspiration for a broader district scale vision proposed in this thesis. Working at a macro scale, the intention is to connect significant regional habitat areas to one another and to any and all available open spaces within the neighborhood via pollinator pathways and street tree

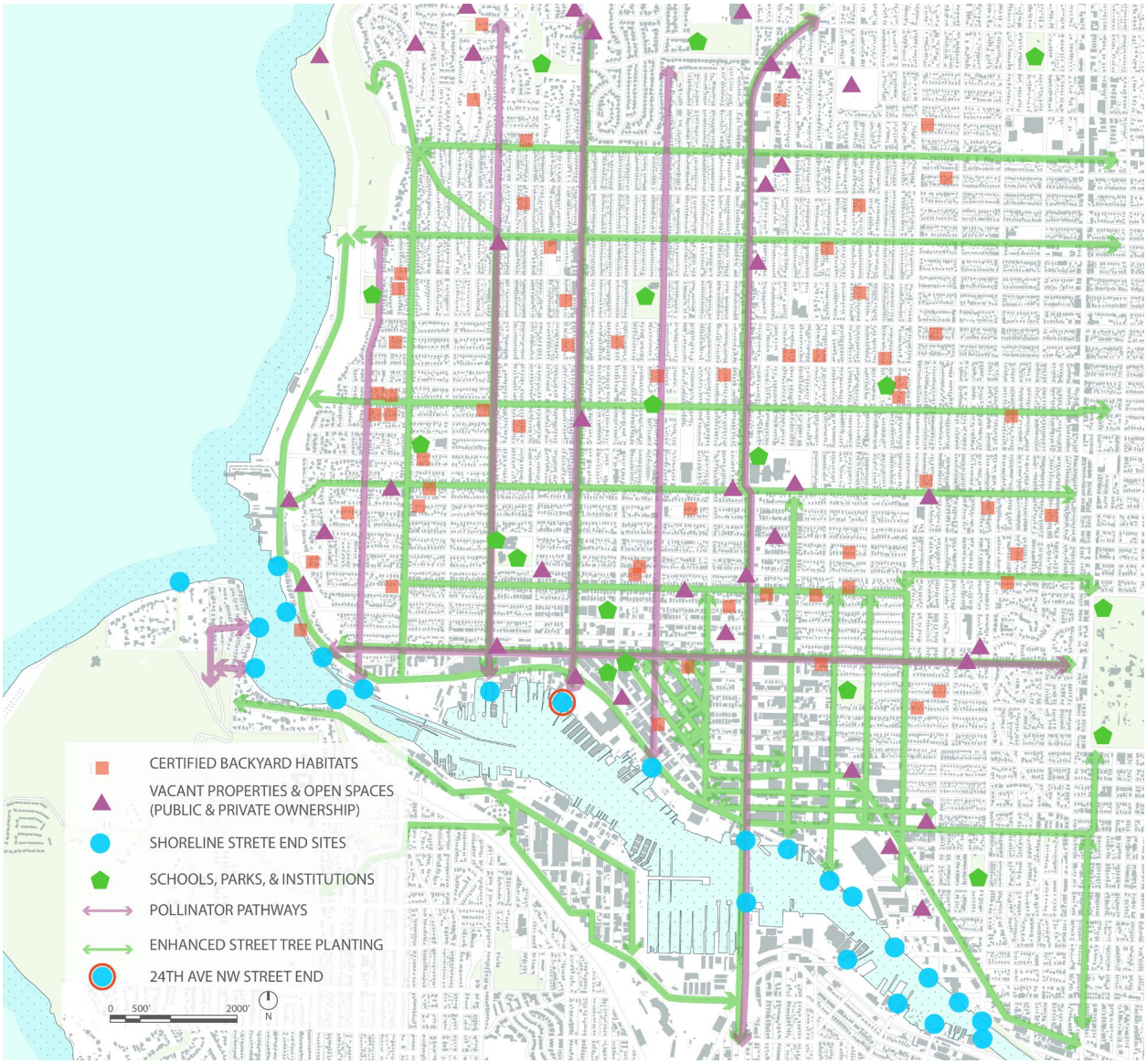

Figure 6.8: Map showing potential small-scale habitat interventions, pollinator pathways, and enhanced tree cover canopy as part of the Ballard habitat district scale plan.

corridors (Figures 6.7, 6.8). This matrix will serve to expand the community wildlife effort beyond the residential gardens and yards into an urban ecological infrastructure within the public realm.

The Ballard neighborhood lies between a number of significant urban forests, parks and open spaces that are important wildlife areas (see Figure 5.8, Chapter 5). These areas include Discovery and Commodore Parks to the south and west, Golden Gardens

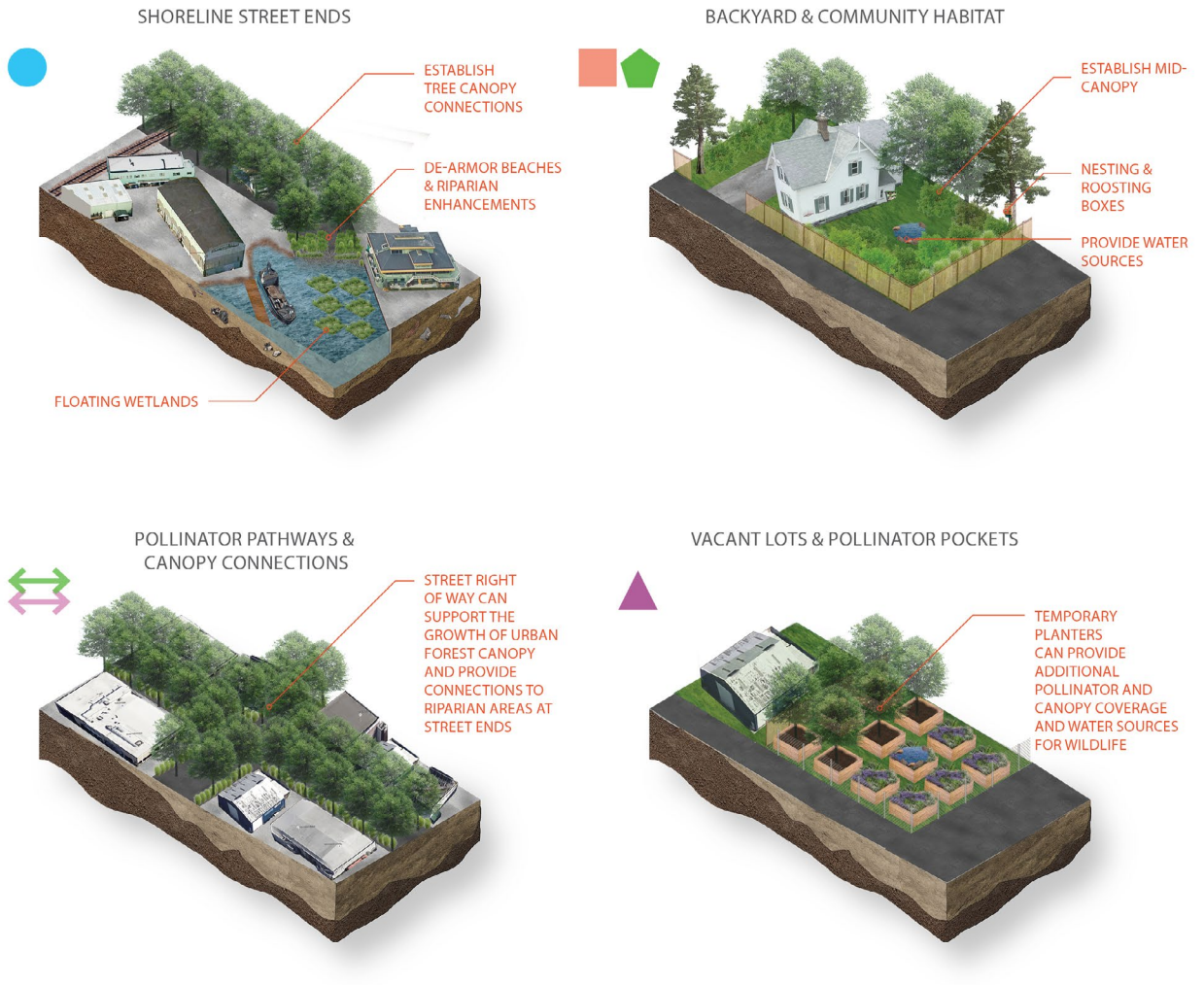

Figure 6.9: Overview of the small-scale habitat interventions proposed for growing Ballard's urban wildlife habitat.

Park and the Sunset Hill forest to the northwest, and Green Lake and Woodland Park to the Northeast. By establishing connection corridors and interstitial gardens these areas can more robustly serve as urban habitat (Figure 6.9).

Small Sites

A number of existing small sites in the neighborhood offer major linkage opportunites including some privately owned vacant properties, schools, and vacant public lands. Many of these sites were surveyed in 2015 by University of Washington environmental horticulture Master's student Theresa Yoder as part of her thesis (Yoder, 2015).

Photo 6.1: Brush piles, like this one at Discovery Park in Seattle offer shelter for small animals and support invertebrate populations. (Credit: Photo by Rhys van Bemmel).

Photo 6.2: A snag at the wetlands near the Washington Park Arboretum in Seattle. Tree snags support cavity nesting bird species and offer . (Credit: Photo by The Seattle Times).

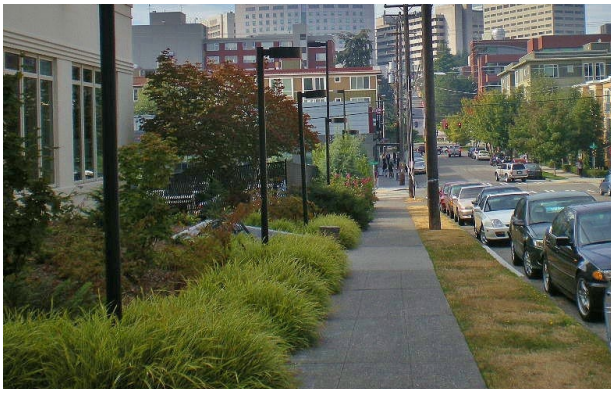

Photo 6.3: Pollinator pathway along E. Columbia St in Seattle. (Credit: metropalitan.gardens.blogspot.com).

Though the initial effort to establish this district vision for Ballard originates in the many backyard habitats included in the neighborhood's community wildlife effort, additional sites will reinforce this effort. To support the utilization of these sites simple interventions like the addition of planter boxes with pollinator friendly species, the preservation of existing tree cover, planting of mid-canopy shrubs, and addition of small water sources can be implemented quickly and with relatively little effort. Depending on the nature of the properties these interventions may be temporary, or in the case of properties like the Seattle City Light decommissioned substations could

Photo 6.4: Armored shoreline at the NW 57th St street end site in Ballard. (Credit: photo by Rhys van Bemmel).

Photo 6.5: Formerly armored shoreline that has been restored to a gravel beach condition. (Credit: photo by Hugh Shipman).

be more long-term focused. In the latter example, more robust restorations may be appropriate including permanent plantings and minor regrading to support planting success and habitat functions.

Street Plantings

The next major opportunity for establishing linkages and increased habitat lies in the street right-of-way. Although most Seattle streets include street trees, significant areas of the Ballard neighborhood have little tree canopy cover. These areas would be enhanced by the addition of street tree plantings and thoughtfully selected lower-canopy plantings. In particular, the Salmon Bay Industrial area with its low tree cover canopy percentage, high impervious surface cover and high levels of pollution is a unique opportunity. Through the addition of shrubs the street can provide additional food and nesting sources for pollinators. This strategy can also be implemented on streets with relative higher tree canopy cover percentage. Expanding the street planting network through additional tree canopy and greater use of pollinator friendly shrub is a highly visible means of integrating nature into the built environment. Streets lined with plantings specifically designed to support wildlife communicate the potential for successful integration of nature into cities.

Street Ends

Finally, the street ends in Ballard offer the

best opportunity for supporting growth of urban wildlife habitat and prompting public engagement with urban nature. Because these sites exist in public ownership and a city program is in place to support improvements in them, they host great potential for supporting these goals. Shoreline areas are also powerful attractions for people and important potential habitat areas for aquatic and terrestrial species.

There are many improvements that will help these areas urban wildlife performance, including the removal of over-water structures like docks that impede use of beach areas by migratory juvenile salmon. Increasing tree cover and mid-story shrub species is another essential component to increasing street end habitat as is de-armoring of shorelines. This is easier to do in the case of rip-rap beaches than it is with bulkheads, but this strategy is essential for restoring riparian beaches nonetheless. Removing shoreline armoring and installing vegetated gravel beaches will help create a network of miniature feeding, nesting, and hunting areas for both terrestrial and aquatic species.

Another, more experimental intervention is the use of floating wetlands to reduce high urban water temperatures, pollution, and provide habitat for aquatic species (Rottle et al. 2014). Especially useful on street ends in Salmon Bay these benefits can help extend the effective area of habitat interventions on street ends beyond the shoreline. They will help to address the area's high levels of water pollution, high aquatic temperatures and support increases in zoo-plankton and insect species that are foundational to the aquatic food system.

Photo 6.6: The vacant Yankee Bar & Grill building and parking lot. (Credit: Rhys van Bemmel).

Together, the reclamation and design of multiple types of small-scale sites: street ends, backyards, public parks and open spaces, vacant properties, and streetscapes represent a multitude of opportunities to support urban wildlife and public access to nearby nature. This district vision is offered to highlight the scalable nature of small habitat interventions, and to highlight the hidden potential that lies in the Ballard neighborhood. Indeed, this framework could likely be applied to neighborhoods across the country with similar ease and effect. The next portion of this design proposal looks at the application of similar small-scale habitat improvements as part of a small park design at the 24th Ave NW street end.

Tucked Away Park: Site Design Proposal for the 24th Ave NW Street End

Design Overview

The 24th Ave NW street end site consists

Figure 6.10: Aerial view of the 24th Ave NW street end site (in red) and vicinity. (Credit: Google Maps, 2015).

four separate pieces of property that together total more than 3 acres. These properties include the 24th Ave NW street right-of-way and three adjacent city-owned parcels to the east owned by Seattle Public Utilities (Figure 6.10). The proposed park's name, "Tucked Away Park" is derived from the name of the historic Duwamish winter village that once existed in the area.

Lying in the heart of Ballard's industrial area, within close walking distance to both downtown Ballard and many residential areas, the site can serve as a powerful public space for the neighborhood. The proposed site design for this project has

been inspired in part to support the Ballard neighborhood's open space goals. Thus the intent of the 24th Ave NW street end design is to provide a vision that could be leveraged by the community in planning negotiations for future site revitalization following the completion of work for the Ship Canal Water Quality Tunnel. As such, the design strikes a balance between the pragmatic necessities of a site lying in an active maritime industrial zone with a more ambitious vision for urban habitat enhancement and public open space. Certain consideration like property lines, access requirements, and a programmatic framework to address the large park budgetary and maintenance restraints that exist in city of Seattle Parks played a role in the design of the park.

The primary design goal for Tucked Away Park is to increase urban wildlife habitat. Though this objective informed a great deal of the site design, the highly urban context of the site and the dearth of public parks in the central Ballard area makes the incorporation of strong social programming imperative for its success. The social and economic needs of the site underpin the programming and portions of the spatial layout of the site design. These considerations include the community desire for quality public space, shoreline water access, and need for programmatic elements that support the funding and maintenance requirements of the park. The shoreline treatment, tree and shrub species selections, the incorporation of green roofs and biofiltration swales, and sculptural habitat elements were all crafted to support urban wildlife by applying the National Wildlife Federation/Washington Department of Fish and Wildlife frameworks

Figure 6.11: Site plan for Tucked Away Park.

Photo 6.7: Panorama of the 24th Ave NW street end shoreline area with Yankee Bar & Grill building out of frame to the left. (Credit: Rhys van Bemmel).

Photo 6.8: Panorama from the existing Yankee Bar & Grill parking lot looking to the northwest across 24th Ave NW to the Pacific Fishermen Shipyard property. The barrels and crates in the foreground are part of early construction staging for the Ship Canal Water Quality Tunnel project (Credit: Rhys van Bemmel).

and other ecological enhancement strategies. These design decisions are centered on the basic strategies of the NWF's backyard habitat program; to provide food, water, shelter, and places to raise young for wildlife. Additionally, the needs of butterfly and moth species, small perching birds like flickers, chickadees, and warblers, as well as salmon, and predatory bird species like bald eagles, osprey, and blue herons was considered. These species were selected for their relative success in urban environments or because they've been listed as priority habitat species by

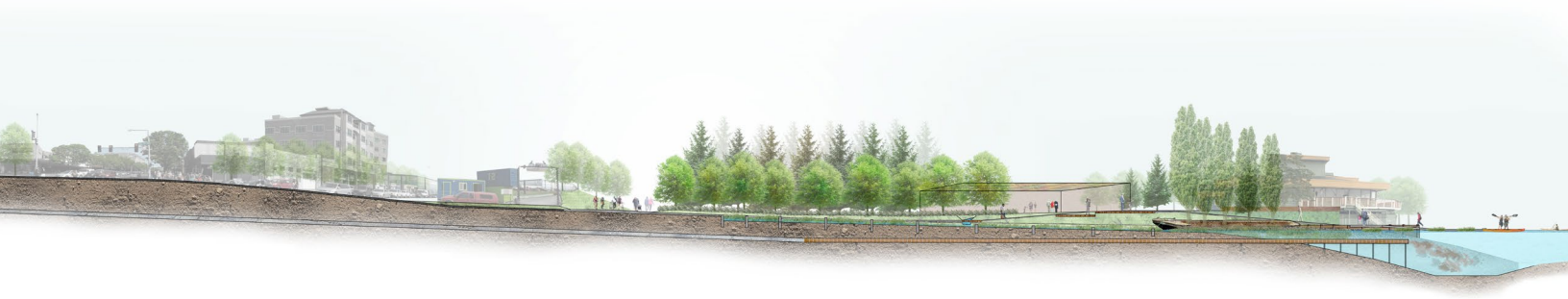

Figure 6.12: Transverse section through 24th Ave NW from shoreline to Market Street showing Tucked Away Park.

the Washington Department of Fish and Wildlife.

Together these design interventions are overlaid with other ecologically and socially oriented elements to provide a site design that serves the Ballard neighborhood both as wildlife habitat and as a public park. The mix of these design elements creates a dynamic site that will be an asset for the community and offer chances for neighborhood residents to view, interact, and engage with nature in a highly urban context. Below is an overview of the various design elements that comprise the design proposal for Tucked Away Park. First I provide a summary of the ecologically focused features followed by the more human oriented design elements.

Ecological Enhancements

Shoreline Restoration

The existing beach area at the 24th Avenue NW street end consists of a concrete bulkhead and a small beach area that is flooded in the summer by the annual raising of the Lake Washington and canal system. Additionally, a 250 foot long pier currently runs from the shoreline into salmon bay. With primary consideration along the beach directed toward migratory juvenile salmon and water fowl, the design calls for the removal of both the pier and bulkhead and installation of a large gravel beach area. Removing the existing pier allows light to

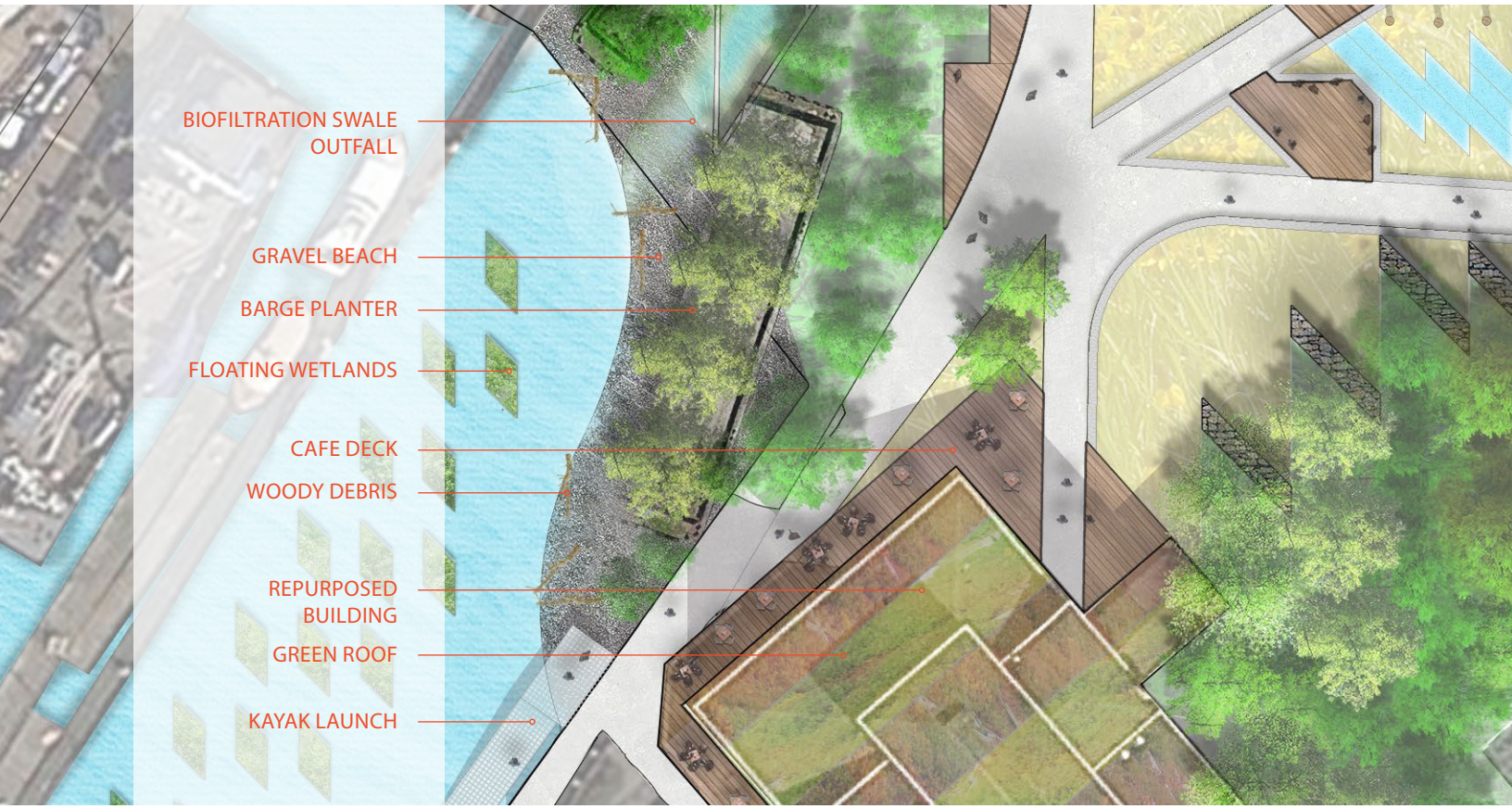

Figure 6.13: Enlargement of enhanced shoreline design for Tucked Away Park.

penetrate the water surface, a requirement for migrating juvenile salmon to safely move through the area. In place of the pier, floating wetlands will help to filter the pollutants, particularly hydrocarbons from ship diesel engines and street runoff. These wetlands will also help increase dissolved oxygen levels, promote the growth aquatic plankton and insects, an important food sources for fish, and will serve as shelter for fish from predatory birds (figure 6.13). Although they may serve to create some shading of the water, this screening is not as intense as that caused by a structure, allowing some light penetration. That, along with the other benefits mentioned make the floating wetlands a worthwhile design intervention. They will also help mitigate the lack of canopy cover in the area, serving cool water temperatures during summer months. At the shore, with the removal of the bulkhead, a regraded,

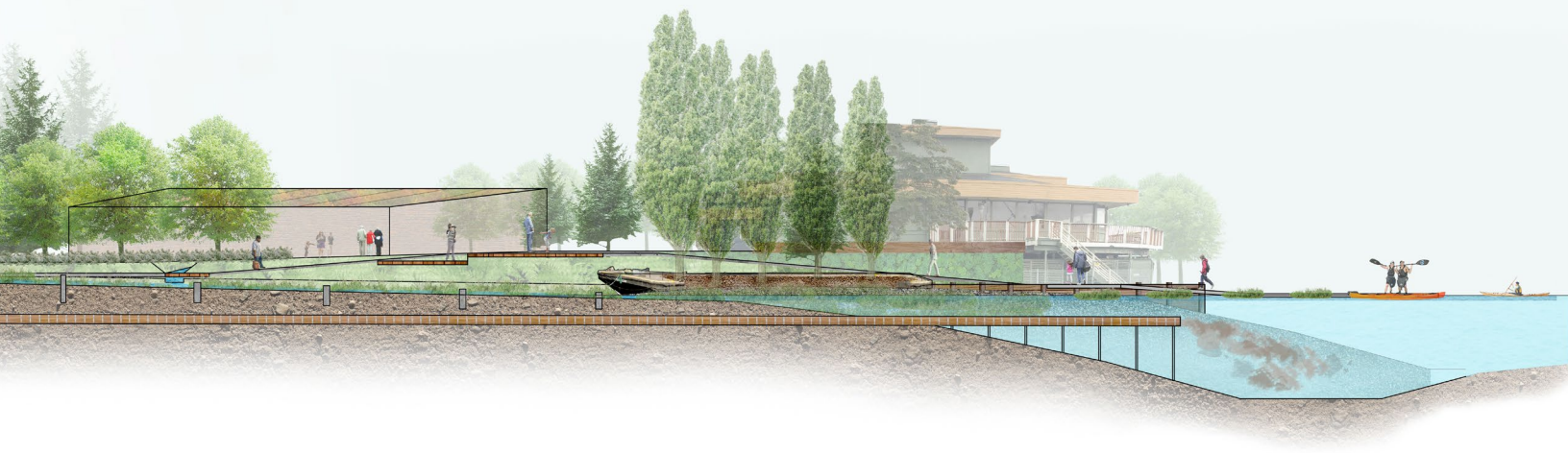

Figure 6.14: Section at shoreline showing kayak launch, CSO outflow and biofiltration swale.

shallow-sloped pebble beach offers refuge and feeding areas for salmon and waterfowl. These types of beaches are sorely lacking in Salmon Bay, and serve as important shelter opportunities for juvenile salmon making their way to the Puget Sound. Tree and shrub plantings at the shoreline also supplement the floating wetlands by mitigating high water temperatures and help shelter the beach from human disturbance, further supporting its function of the shoreline as a habitat area.

On-Site Water

The design of Tucked Away Park addresses on-site water in two ways. First, moving up 24th Ave NW from the beach, biofiltration swales cleanse street runoff and serve to further buffer the beach area from human disturbance (figure 6.14, 6.15). These swales will treat on-site water north of 24th Ave NW and from the portion of 24th Ave NW running through the northwest of the site. Pollutants are removed as the water moves through the multiple cells of the biofiltration swale. This happens through a process of settling out of suspended particles as the water is slowed passing through each cell. Additionally, the root structure and biomass of the swale

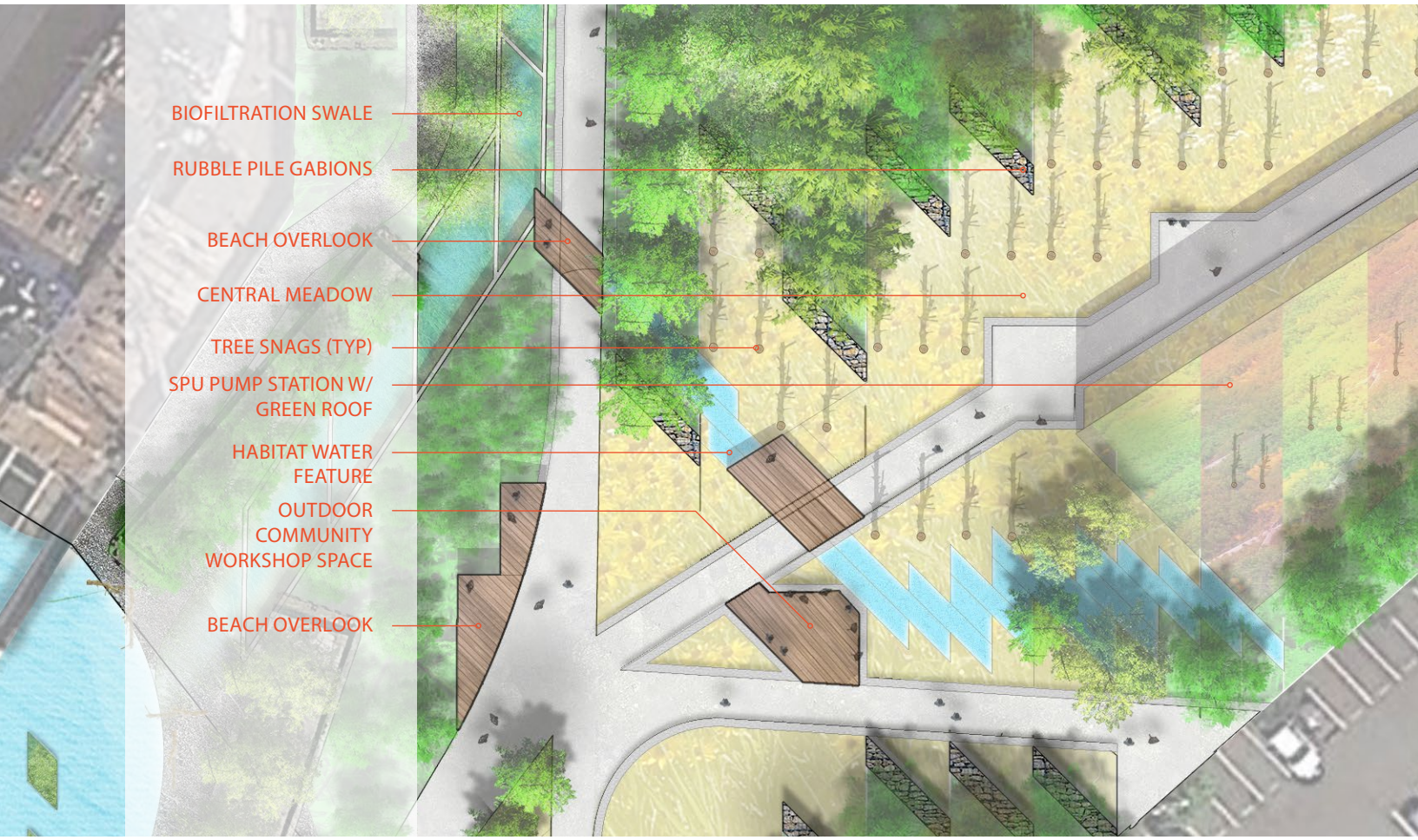

Figure 6.15: Enlargement of site plan showing biofiltration swale (at left) and wildlife water feature.

plantings serve to filter out pollutants like oil, gasoline, chemicals and fertilizer that is common in street runoff. The swales also help to address larger watershed pollution and reduce peak flows during storm events that result in combined sewer overflows. By retaining a portion of the load of peak flows, they lessen the likelihood and occurrence of combined sewer overflows that are responsible for pouring untreated sewage into Salmon Bay.

The other water feature is designed to provide clean water sources for wildlife. This water feature runs diagonally across the pollinator meadow, connecting to the biofiltration swale along the west portion of the site and drains into Salmon Bay at

the restored beach area (see Figure xx site plan enlargement). Water is collected on site from the roofs of the existing building and new sewer pump station. Running east to west across the site, the water feature serves as both a habitat feature as well as an aesthetic site element at the central meadow where it crosses under the pedestrian path. To support its function as a wildlife water source, the water feature was designed to cross through a variety of habitat areas. Beginning at the eastern portion of the site next to the pump station the water is sheltered from human disturbance by tree and shrub plantings. It then moves through the more open meadow areas before running into the very sheltered forest zone, and finally into the biofiltration swale (see Figure 6.15). These types of water features play a critical role in supporting wildlife, particularly insect species. In order to support butterfly, moth, and other invertebrate utilization of the water feature a number of shallow pools and boulders are included. These help to provide areas with calmer waters and appropriate landing areas for invertebrates.

Planting Strategies

Plantings are foundational to the urban wildlife framework, serving as shelter and breeding sites for many different animal species, and as sources of food; both directly through foliage, fruit and seeds, and indirectly by supporting vital insect species like moth and butterfly. The species selected for planting at the park are all native or native adaptive, chosen primarily for their drought hardiness and appropriateness for urban sites (see Figure 6.16). With the exclusion of a few of the riparian herbaceous species, all were also selected because they

Figure 6.1: Rendering of shoreline overlook, biofiltration swale, and barge planters.

are attractive to pollinators.

To help support the goal of increased tree canopy, existing trees are retained and others added to create sizable forest canopy patches to the north and southeast portions of the site (see Figure 6.20). The staggered layout of the central forest area helps to increase the proportion of edges and a variety canopy heights. This structural foliage diversity supports a greater variety of species utilization by providing a greater variety of species niches (Huang et al.). To the east of the central forest is a pollinator meadow, primarily populated by low shrubby species to support moth, butterfly, bee and other pollinator species. Many of these species are also part of the

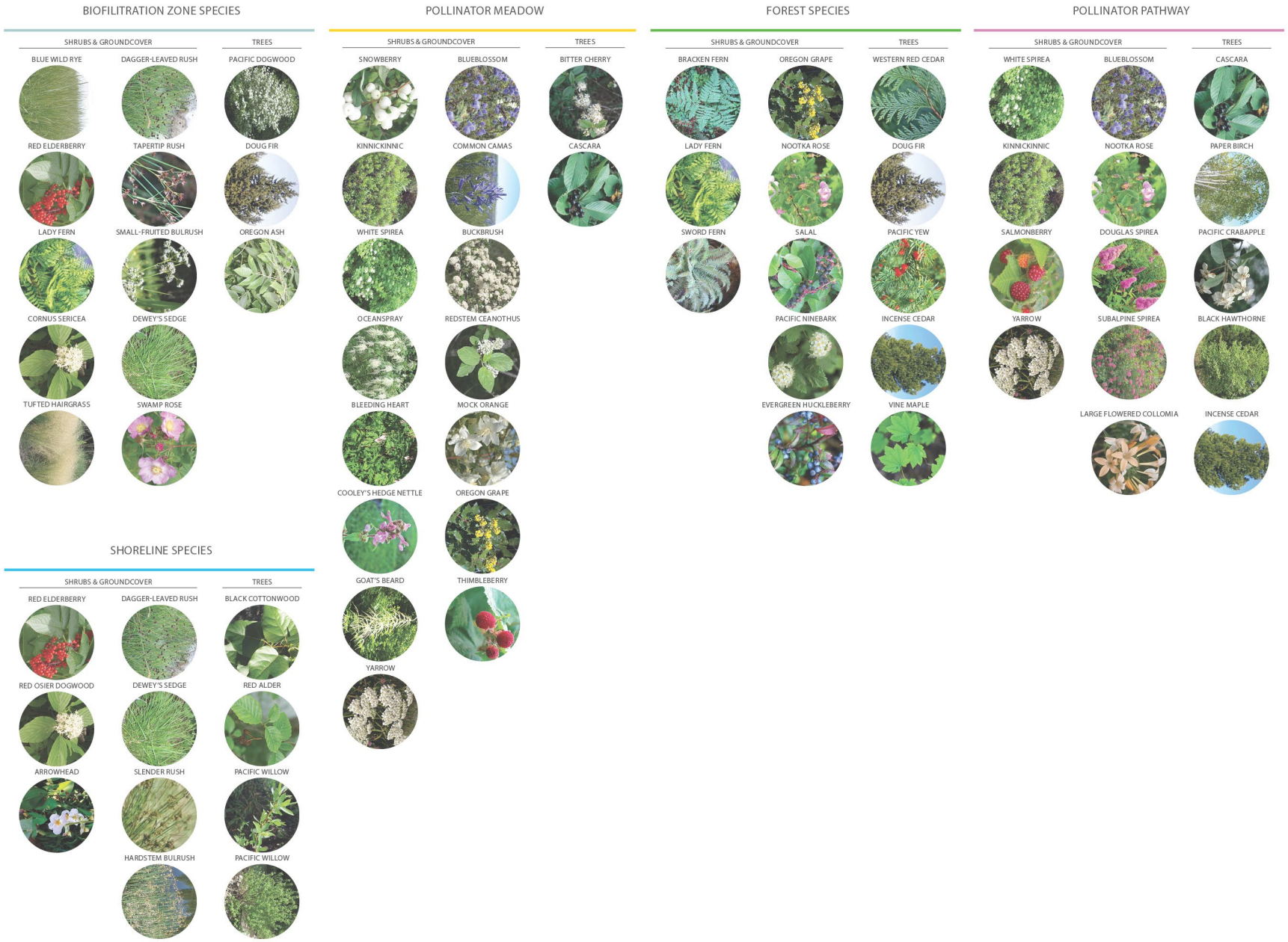

Figure 6.16: Plant pallets for the various habitat zones consisting of Pacific Northwest natives and native adaptives. All species selected for their pollinator benefits and drought tolerance.

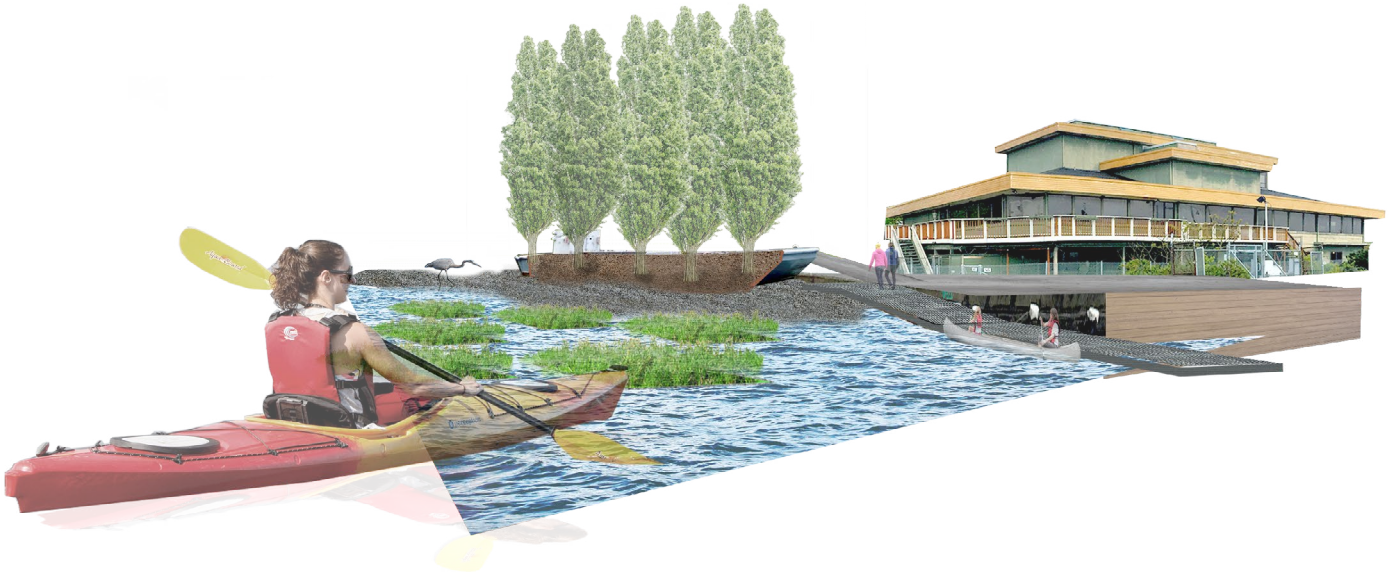

Figure 6.17: Rendering of view approaching from Salmon Bay of kayak launch and floating wetlands.

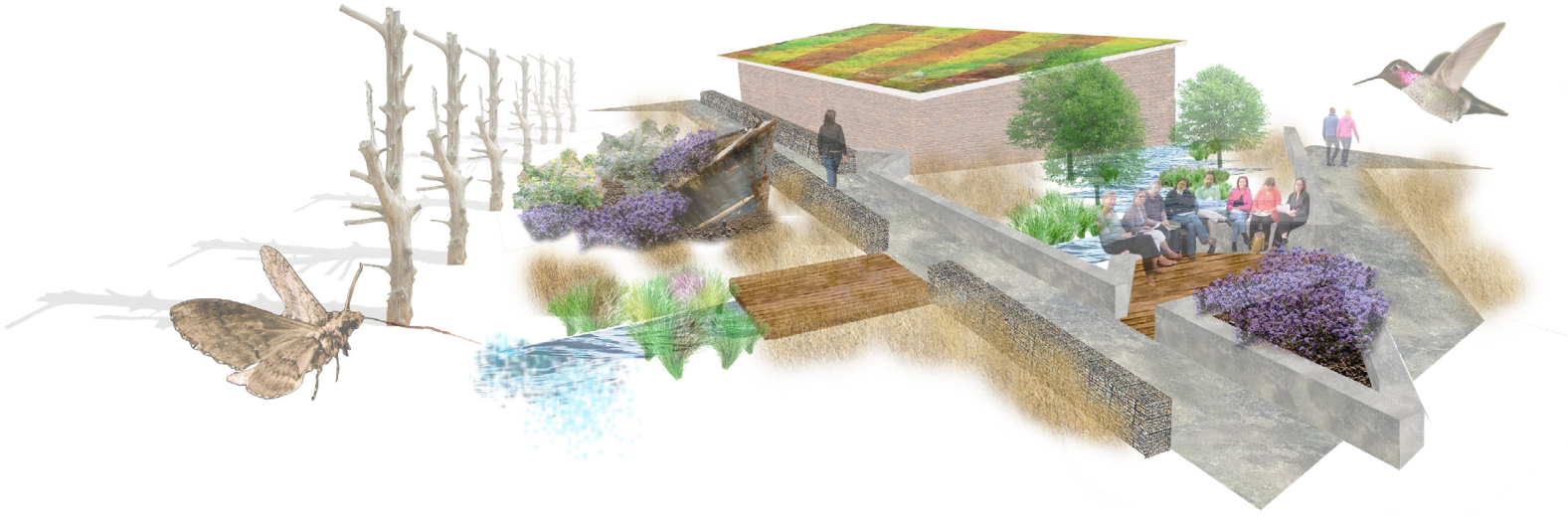

Figure 6.18: Rendering of community gather space at the pollinator meadow.

Figure 6.19: Section at Burke-Gilman Trail extension showing biofiltration swale and access drive to Pacific Fishmen's Shipyard.

street plantings in the district plan and the meadow is a natural extension of the streetscape plantings. Rounding out the plantings, green roofs on both the SPU pump station, as well as the former Yankee Bar and Grill offer addition foraging and habitat opportunities.

Sculptural Interventions

Supplementing these habitat features are a number of sculptural interventions designed to simultaneously provide habitat functions and serve as a visual connection to the history of the site. These include tree snags at the pollinator meadow, rubble piles at the forest edge, floating wetlands, and freight barge tree planters. By evoking the highly constructed nature of the site while also supporting urban wildlife habitat, these site features help to serve as a visual cue about the role of nature in the built environment.

Lining the pollinator meadow, a grid of tree snags will serve as a temporary habitat

intervention, providing foraging for bird species like flickers, and also provide cavity nesters with habitat. These snags evoke the shoreline armoring process that transformed Salmon Bay into a maritime industrial hub, where pilings are driven into the formerly tidal riparian areas as to support bulkheads and piers and, as these decay will enrich the soils.

At the forest edge, gabion rubble and brush piles comprised of recycled concrete from on-site offer a tangible connection to the site's recent history as restaurant and parking lot. The rubble piles provide shelter for smaller mammal and reptile species and help support healthy insect populations, which provide food sources for birds and other species.

Large planters made from old barges are located at the shore area and at the northeast corner of the site near the Burke-Gilman trail extension. These planters recall the site's history as well as relate the habitat functions of the vegetation to the industrial context. They provide a buffer for the shoreline habitat area and help screen the industrial activities of the adjacent business to the west. They will also serve as iconic elements in the park, helping to draw people into the site.

Together, these habitat and sculptural features represent a more vigorous embodiment of the strategies discussed as part of the district plan. Underpinning these interventions is a robust plant palette that will bolster urban wildlife food webs, provide habitat, and mitigate the challenging environmental conditions found in urban environments including high temperatures

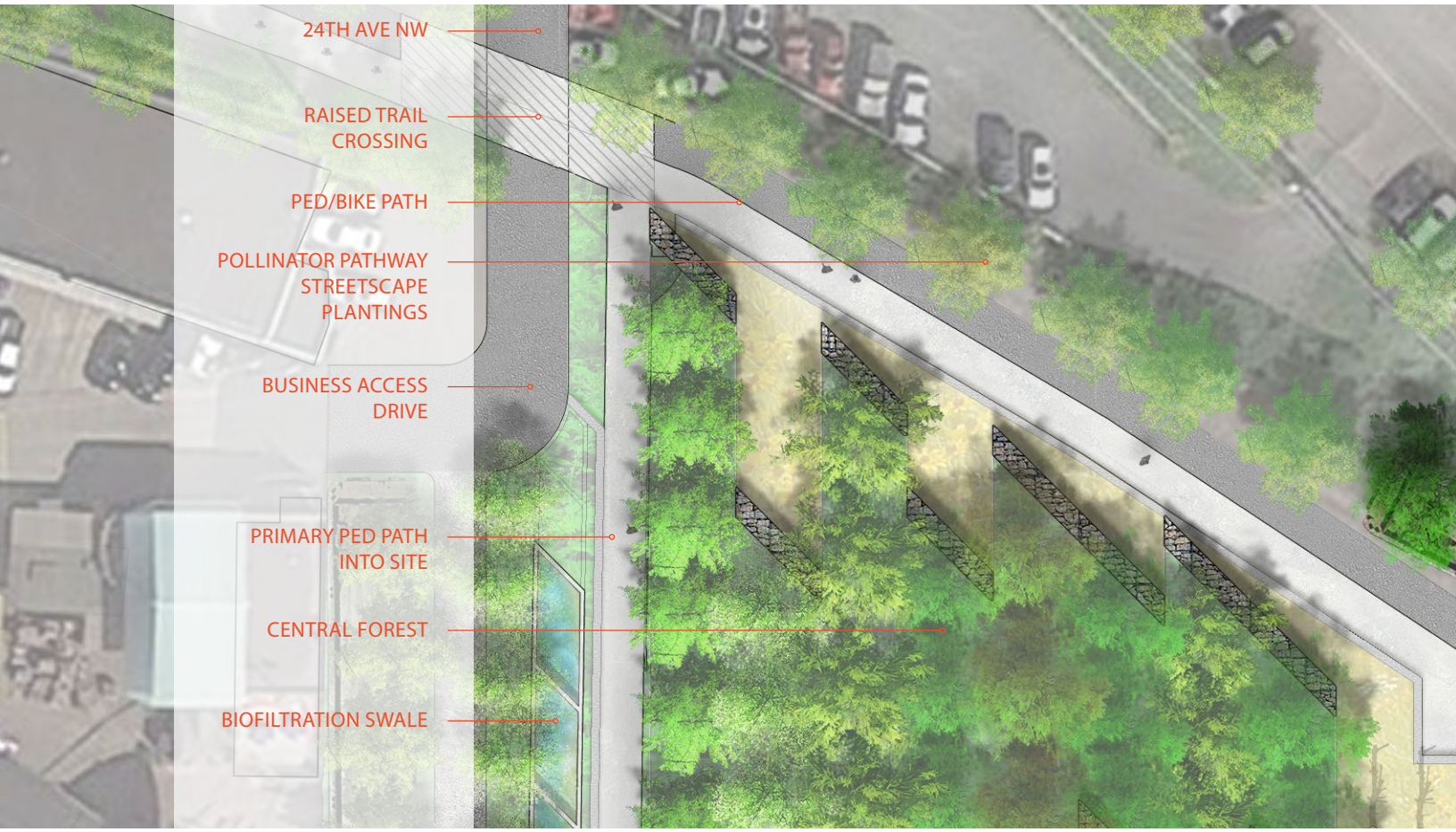

Figure 6.20: Enlargement of north portion of Tucked Away Park showing Burke-Gilman Trail connection and road access to Pacific Fishermen Shipyard.

associated with urban heat island effect and water pollution from street runoff. Additionally, the sculptural interventions help bridge the gap between the habitat functions and aesthetic experience of the site, serving as a connection to the site's history. These interventions help to push the concept of a gestalt switch, calling into question what the essence of nature is and suggesting a greater space for it in cities.

Program Overview and Human Uses

In order for Tucked Away Park to promote visitor interactions with nature and serve as habitat, a number of community oriented programming elements are included as part of the design. These programming features help engage people and serve as a draw, attracting neighborhood residents

to the site and allow the site to serve dual goals of supporting urban wildlife habitat and community oriented social programming elements. These elements, a kayak rental shop and boat launch, café space, community hall, outdoor educational space, wildlife viewing areas, and bike and pedestrian route connection will activate the site throughout the year and support visitors' interaction with and contemplation of nature.

In order to minimize the monetary expense of the site design and offer as much value for community the general design strategy was to minimize regrading and site alterations to the extent possible. Emphasis is placed on repurposing and reworking of the existing site elements and layout. To begin with, the existing building is salvaged for use as a café, community hall, and kayak rental shop. From a programmatic standpoint, the retention of the existing Yankee Bar and Grill building offers a number of opportunities for visitors. The revenue from renting out the café space can help serve as a funding source for the maintenance and other programming activities of the site. The Kayak launch and rental facility can serve a similar function, and offers the community a convenient opportunity to explore Salmon Bay.

At the entrance to the café, a gathering space offers a place of rest and views out to the bay. This flexible outdoor space can be utilized by non-profit groups like the National Wildlife Federation for community events and public engagement, further supporting human engagement with nature and helping to grow Ballard's wildlife habitat beyond the site itself. Additional

outdoor gathering spaces are included throughout the site, providing wildlife viewing opportunities at the shoreline and gathering and resting areas for site visitors. Neighborhood connections are critical to the success of the park. The path layout is designed to provide clear connections to the main pedestrian route to the north along 24th Ave NW, as well as a secondary path to the northeast offering access to Shilshole Ave—the most direct route to Ballard Ave. An additional access point at the east end of the site provides access to the neighboring property, and is currently utilized by workers at the Stimson Industrial Park who cut across the site en route to Market Street and 24th Ave NW. An extension of the Burke-Gilman bike and pedestrian trail missing link runs across the north portion of the site. These pathways are fully ADA accessible, and have been laid out in such a manner as to almost completely eliminate the need for site regrading.

Together the multiple program elements included in the design for Tucked Away Park add additional layers of complexity to the site, promoting community use of this neighborhood public space, encouraging interaction with nature, and offering a system for supporting park maintenance and stewardship. The diversity of activities on the site, as well as the underlying habitat functions provide a design that can serve as a powerful example of the integration of nature in the built environment. By engaging site history and overlaying habitat elements, human uses, and sculptural interventions the park engages with Ballard's industrial history, supports neighborhood open space, and provides urban wildlife habitat.

7 | Reflection

Photo 7.1: Clover growing along the old Great Northern Railroad lines at the 24th Ave NW street end. (Credit: Photo by Rhys van Bemmel).

7

As a lover of both cities and nature I was originally drawn to the profession of landscape architecture for its agency to bridge the realms of human and natural environments—to create, advocate for, and reinforce the humane treatment of people and the environment. In cities, particularly in our public spaces, I find hope for the future of a democratic society. In the mixing of people and cohabitation that takes place in our collective commons, we are brought together and forced to

recognize one another's humanity; and in even the smallest way, we move towards a greater understanding of the impacts we have on one another. In nature I have found opportunities to escape myself, as have countless others no doubt. My experiences have shown that the chance to be away from modern world distractions repositions you, and can be awe-inspiring, humbling, and thrilling. Experiences in nature serve to remind us that we are part of a much larger world; although humans may cover the earth from pole to pole, we are but one species occupying a place in a much greater network of organisms and systems. Nature also serves to soothe us, offering a chance to re-center ourselves as a bulwark against the fast pace of contemporary society. These are opportunities not all people have to experience, but they should. And that need has been my motivation, both for this project and as a student and emerging professional.

I know our cities are far from perfect places and a great deal of work remains, especially in the face of rising inequality and economic and racial segregation as well as environmental degradation and pollution. While these are problems with roots far beyond the scope of landscape architecture, or even urban planning and architecture, I appreciate the power of landscape architecture to bolster natural systems and to unify people together in our common spaces. I find a hope in cities that motivates me as an aspiring professional. There is a real power in cities.

My initial thesis explorations were centered on bringing the powers of cities and nature together to create urban spaces that support

urban wildlife and access to nearby nature. This project began as an exploration of urban ecology. My original goal was to investigate a specific site in need of ecological and programmatic enhancement, and then research its history, degradation, and social and cultural potential. It was my hope that I could use this exploration to support the future of an actual space. I was lucky to be able to work with the public open space advocacy group Groundswell NW to identify a promising site, the 24th Ave NW street end – an overlooked site with great potential to engage the community through renewed ecological design.

As I began to narrow my scope during the beginning of this project I found it challenging to try and reconcile the many different interests I was pursuing. My initial aspirations focused both on landscape architectural theory and ecological restoration. I also had goals of engaging the public in some manner, so that my work would be able to support a tangible action or improvement in my neighborhood. Working through these various areas of interest to come to a clear, synthesized project goal was challenging.

Ultimately the theoretical research informed my why—my goals and critical stance—but fell short in providing more a foundational framework for design. Engaging with scholarly scientific research helped address this, but I found it challenging as a scientific layperson to sort through the vast amount of literature that engages urban ecology and restoration. The best research and design frameworks for addressing urban wildlife goals ended up coming from books and publications supported by non-profit groups

like the National Wildlife Federation and governmental agencies like the Washington State Department of Fish and Wildlife, the City of Seattle, and King County. These books, like Brining Nature Home, and Living with Wildlife in the Pacific Northwest, as well as reports by the City of Seattle and King County, are generally intended for average people with limited knowledge about ecology and wildlife. The information offered within them, along with the background in landscape systems and urban issues that I bring from my coursework and professional work provided me the foundation I needed for the design of the 24th Ave NW street end.

Looking back, I may have had the opportunity to engage in more specific design interventions at a spatial and detail level if had started with these sources to begin with rather than scouring through a great deal of cutting edge ecology literature that was ultimately less instructive. I had originally hoped to be able to work at a detail level, creating interventions specifically designed for certain species, for instance swift nesting towers, or bat boxes. This may also have been possible if I had focused on a couple specific species to design for from the start. As it happened, I wasn't able to focus down until midway through the thesis process, and so much of the ecological enhancements are centered on larger systems, like urban stormwater runoff, or they rely on less heavy-handed approaches, like planting design. I find the lack of these types of specific interventions may be more appropriate to the design of such small space. Focusing on planting and special layout rather than specific details offers a more flexible and adaptable design.

Engaging with the neighborhood offered an additional level of depth to this project, and helped to keep me inspired and motivated. I did find it challenging, however, to drum up a great deal of enthusiasm for a habitat focused park design. This is partly what informed the integration of community programing elements into the design, as community members were more interested in how the park would serve recreation and general use by the public than how it would perform for wildlife. It was also difficult to involve community members outside of the core group of Groundswell NW members that I met with. I made attempts to include both the Ballard Chamber of Commerce and the Central Ballard Residents Association in the visual preference survey but neither group expressed interest. I believe this is owed in part the fact that my project was a theoretical student design, and not an actual proposal.

Although the level of community engagement I was able to promote was somewhat limited, working with a devoted group of community advocates was both rewarding and extremely informative. If cities are to be able to implement the types of small-scale habitat improvements I have proposed, the integration of a strong core group of community volunteers is essential for its success. These neighborhood activists serve to not only drum up support for small projects like the proposal for Tucked Away Park, or the projects referenced in the case studies, they also offer important long-term stewardship for these sites. As maintenance budgets continue to be under supported in Seattle, this type of community stewardship in the form of work parties and park oversight is

essential for supporting successful parks and open spaces.

This may be the biggest area that is not explored in this thesis, the funding models that can help to support the long term health of urban ecological open spaces. Research on this issue could fill volumes and would certainly make a compelling thesis topic on its own. Though the incorporation of the café space in the design proposal for Tucked Away Park is meant to help address the financial needs of park maintenance, as well as serve as a draw for the site, not all sites have this opportunity.

From and urban ecological perspective, the National Wildlife Federation's community habitat program also helps address opportunities for ecological enhancements in cities, but mostly on private property. For public sites the challenge still remains. Though most ecological plantings are designed to be self-sustaining, they often require years of maintenance during their establishment period, possible more in highly urban contexts where disturbances and poor soils hinder plant success. This is where the power of long-term community involvement is so important.

Looking back on the work of the past six months, perhaps the biggest realization I have had is that supporting urban wildlife and nearby nature need not be a profoundly expensive or intense exercise. Simple interventions like supporting the growth of healthy tree canopy, and including a mid-story shrub layer can have powerful habitat implications. Smart planting selection is also a really easy win for urban habitat. Focusing on species that provide wildlife

services, especially pollinator species, rather than ornamental species can make all the difference. As an added bonus many of these species do have high aesthetic appeal.

Ultimately the types of interventions I propose are fairly simple, but they have the potential to make a real impact if implemented on a district scale. Simple, thoughtful interventions in the designs of our open spaces can have profound impacts. More than anything else, what is required is a simple recognition of the potential that all sites, no matter how small, have to support urban ecosystems and provide habitat. This potential need not come at the expense of human use and enjoyment of city open spaces, but rather it can serve to amplify that delight and help promote further integration of nature in the built environment.

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Appendices

i | Visual Preference Survey

Figure i.i: Page 1 of visual preference survey.

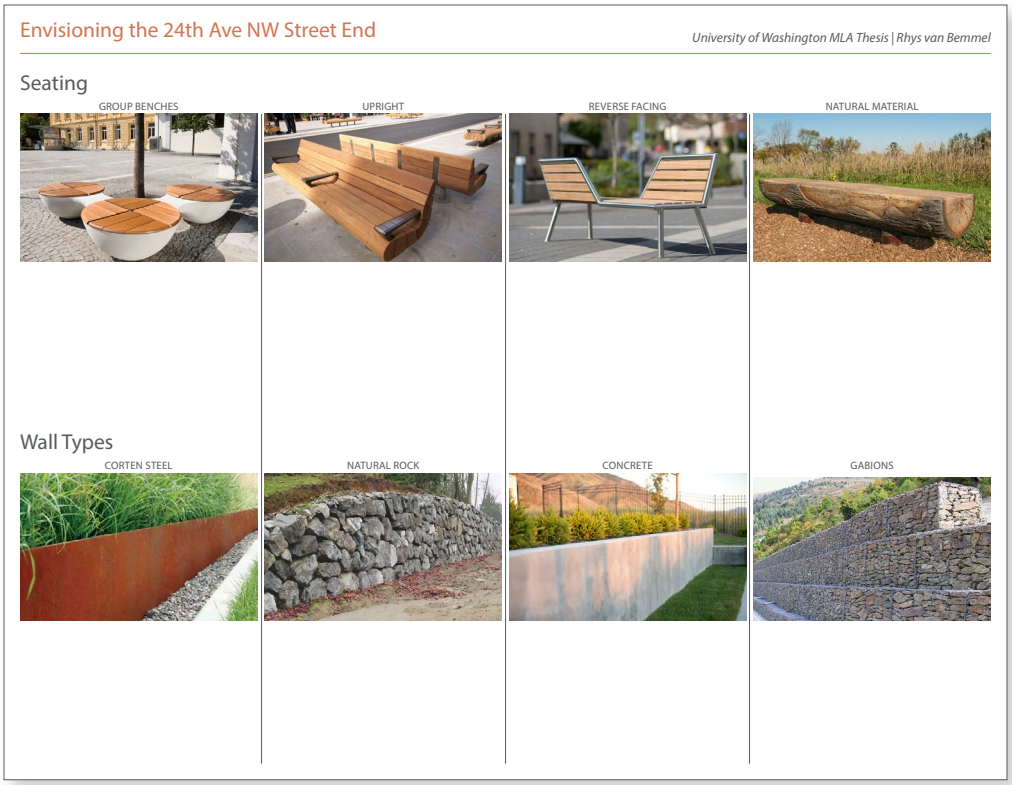


Figure i.ii: Page 2 of visual preference survey.

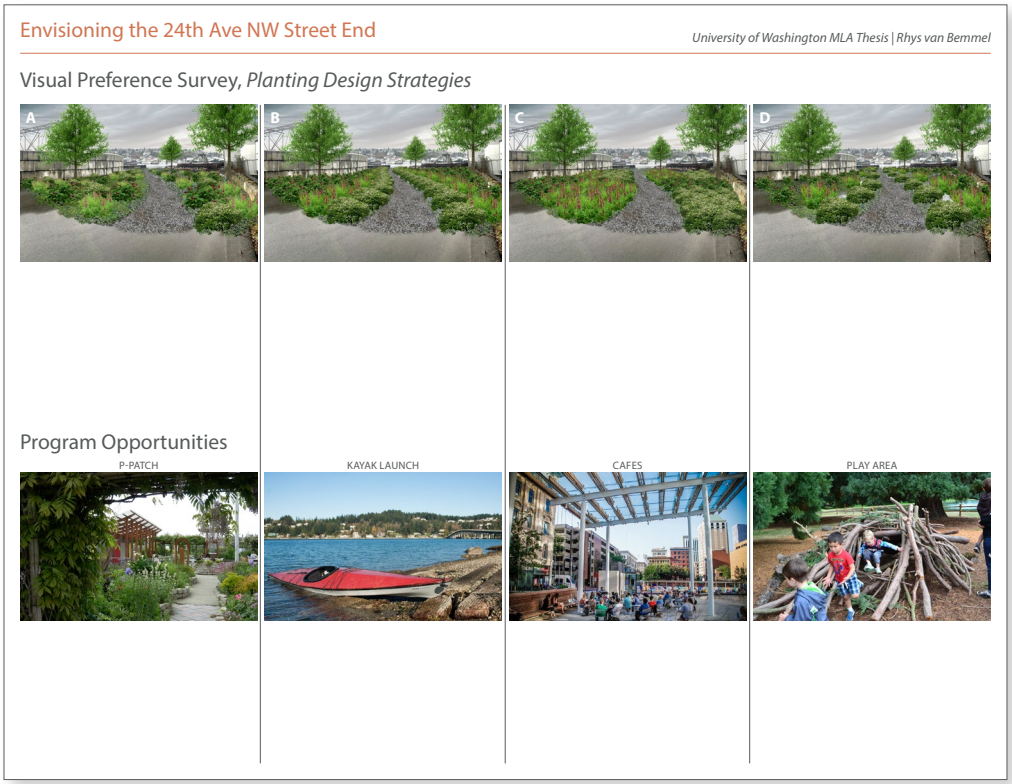


Figure i.iii: Page 3 of visual preference survey.

	Planting Design			Program Opportunities			Seating Designs			Wall Types	
	Yes	No		Yes	No		Yes	No		Yes	No
Design 1	11	1	Kayak Launch	12	1	Natural Material	12	2	Natural Rock	8	3
Design 3	3	2	P-Patch	8	0	Group Benches	3	3	Corten Steel	7	1
Design 2	1	0	Playground	7	1	Upright	3	4	Gabion	1	0
Design 4	1	5	Café	2	9	Reverse Facing	0	3	Concrete	0	10
Subtotal	16	8		29	11		18	12		16	14
Total	24			40			30			30	

Figure i.iv: Totals from visual preference survey. Sample size: 40.

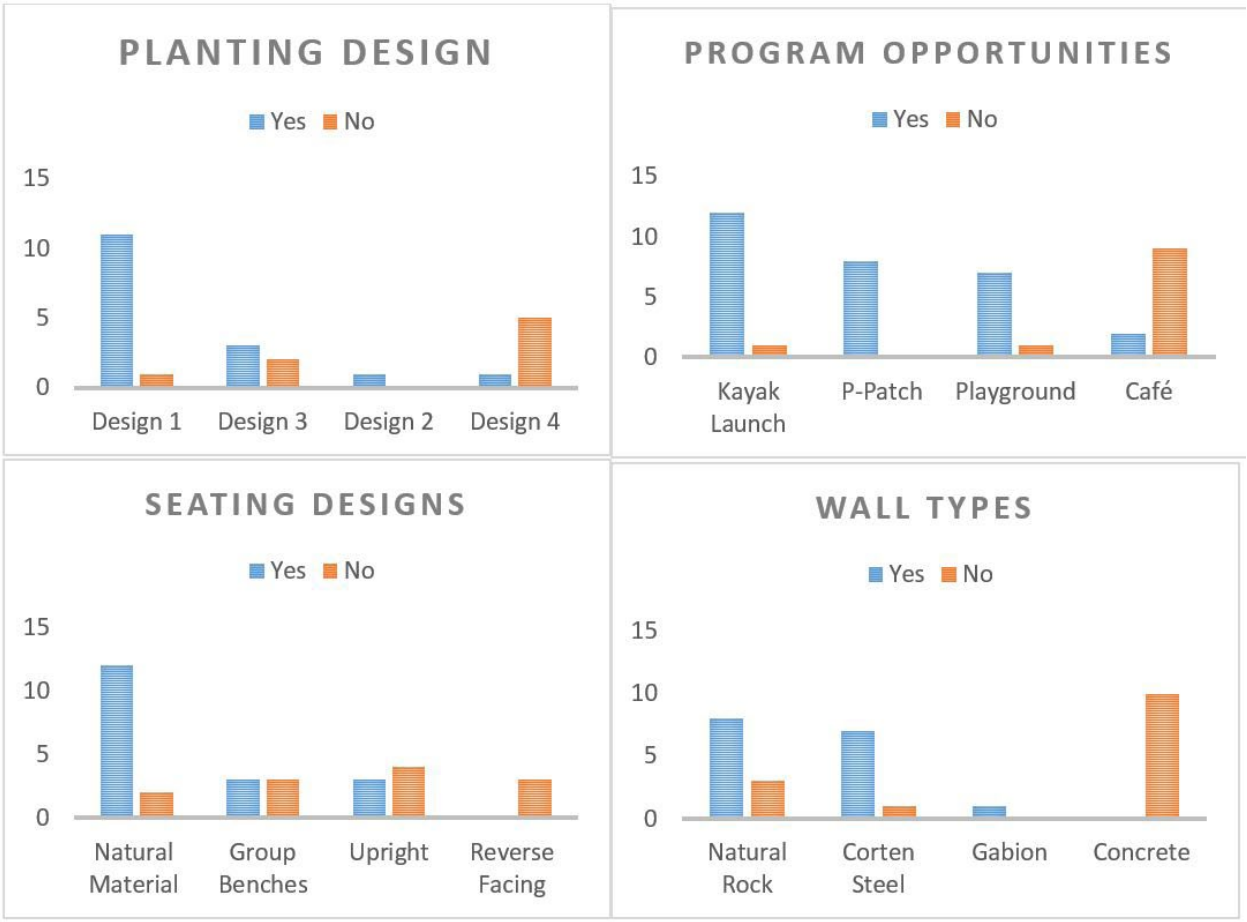


Figure i.v: Graphs of visual preference survey results.

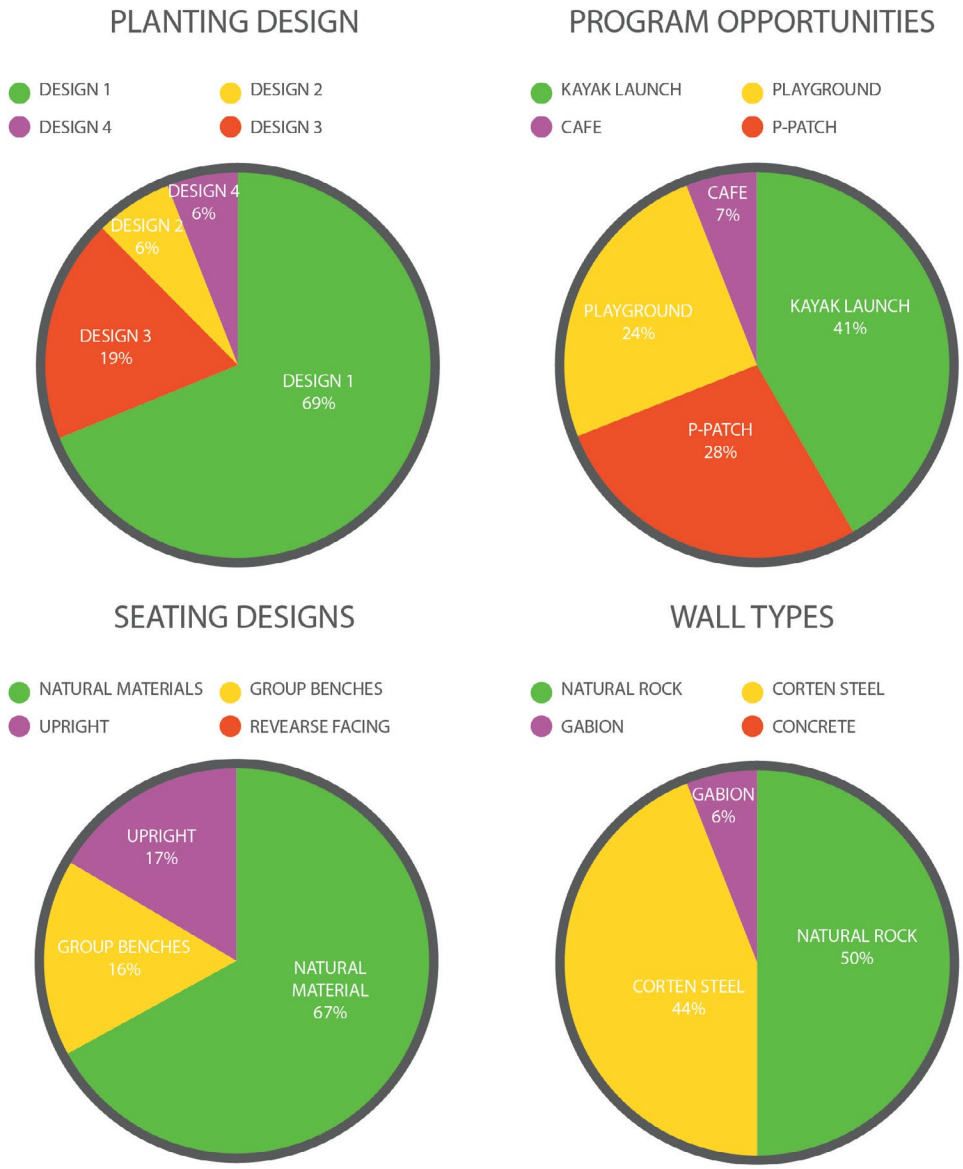
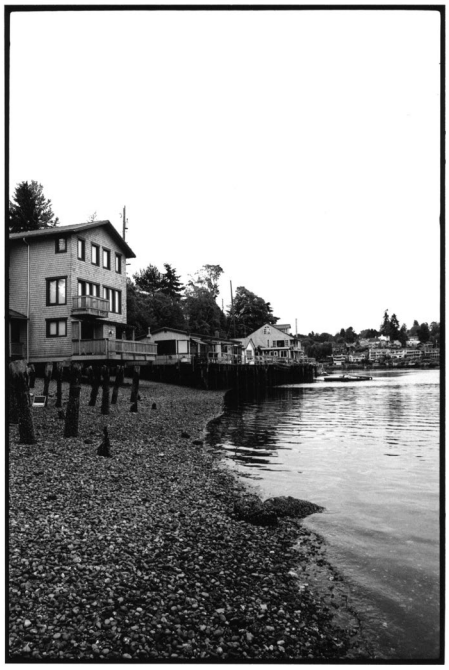
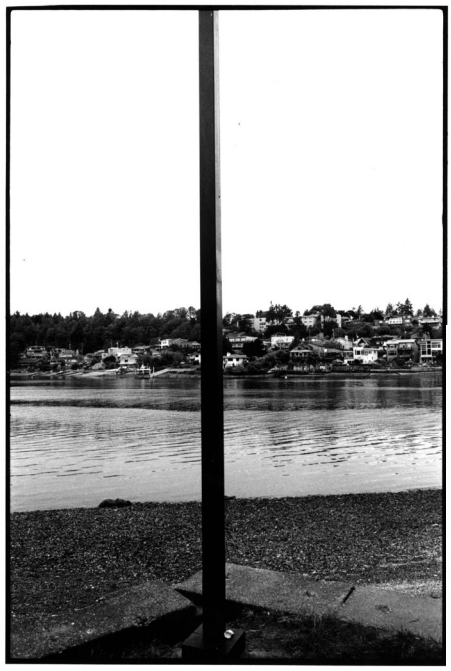


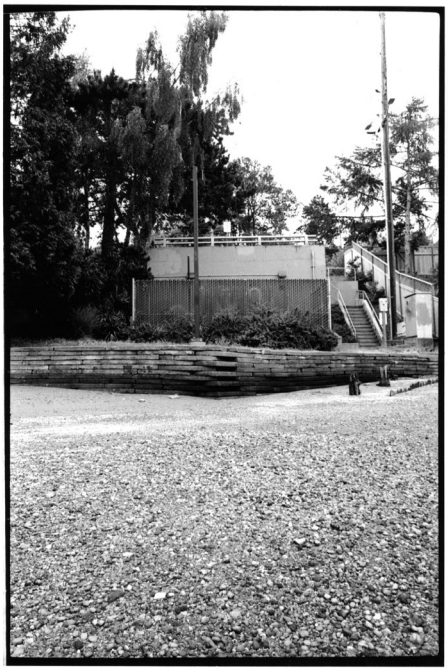
Figure i.vi: Graphs comparing top selections from visual preference survey.

ii | Photo Essay | *Right of Way: Ballard's Shoreline Street Ends*

35mm black and white film photo documentation of Ballard's Shoreline street end sites.

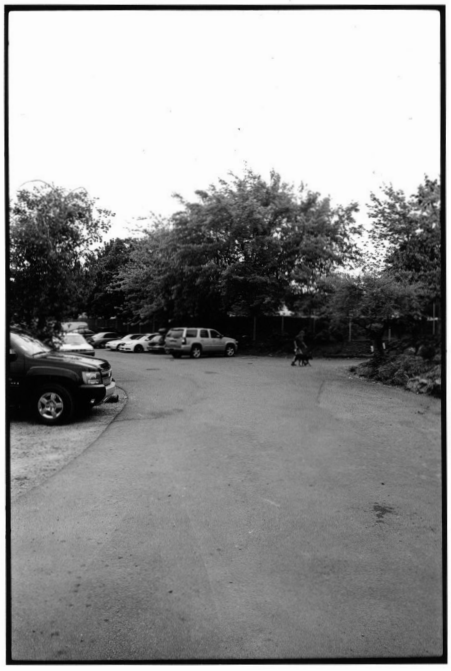




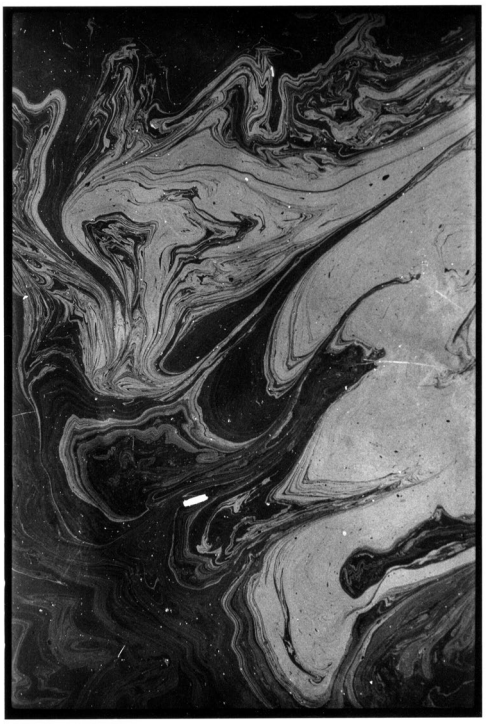


Photos ii.i: NW 57th St street end

Photos ii.ii: Textures, details, and found items at NW 57th St street end

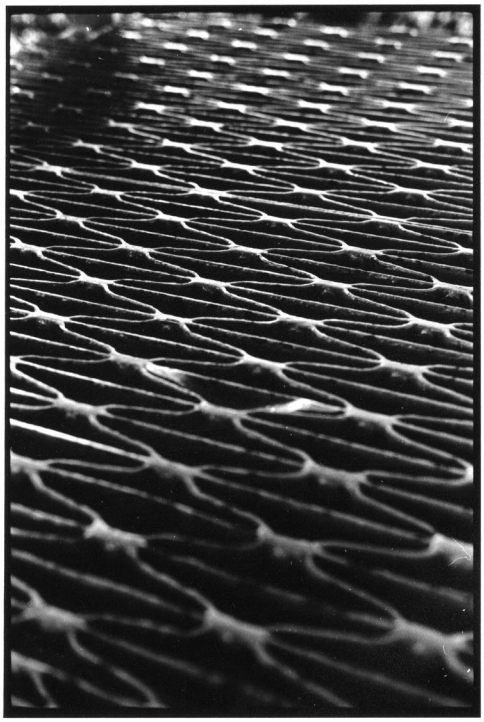


Photos ii.iii: 24th Ave NW street end.

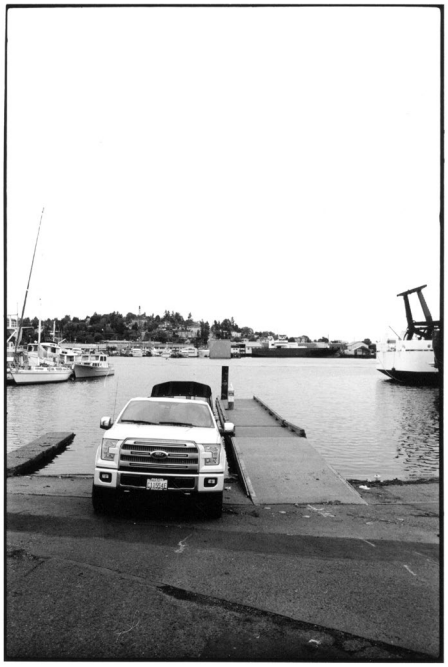


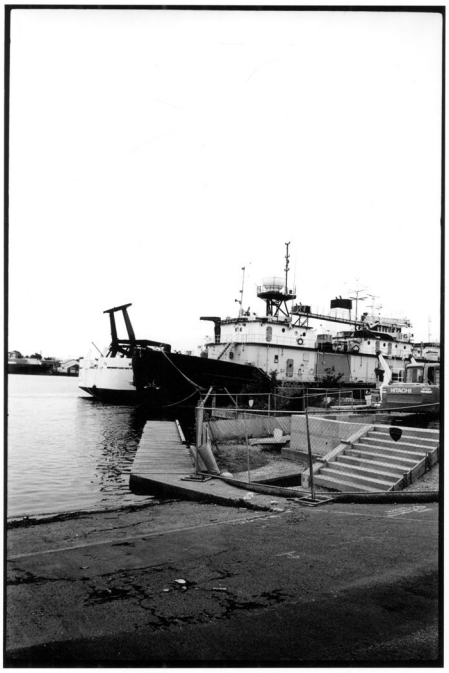
Photos ii.iv: Textures, details, and found items at 24th Ave NW street end.

Photos ii.v: 15th Ave NW street end.

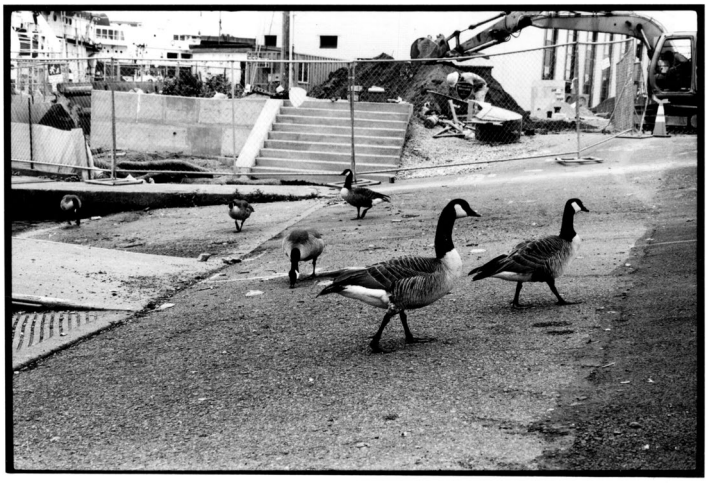


Photos ii.vi: Textures, details, and found items at 15th Ave NW street end.

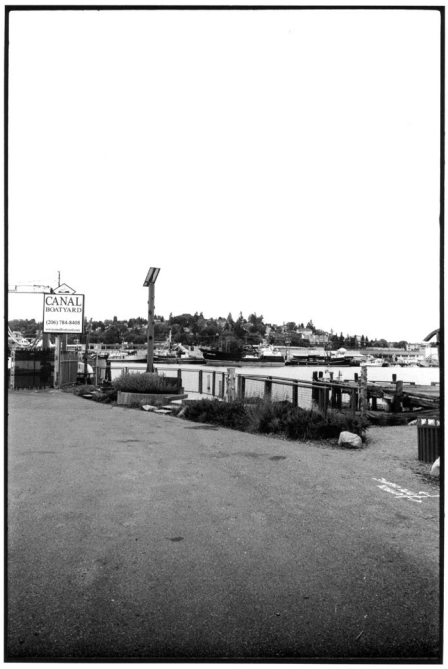




Photos ii.vii: 14th Ave NW street end

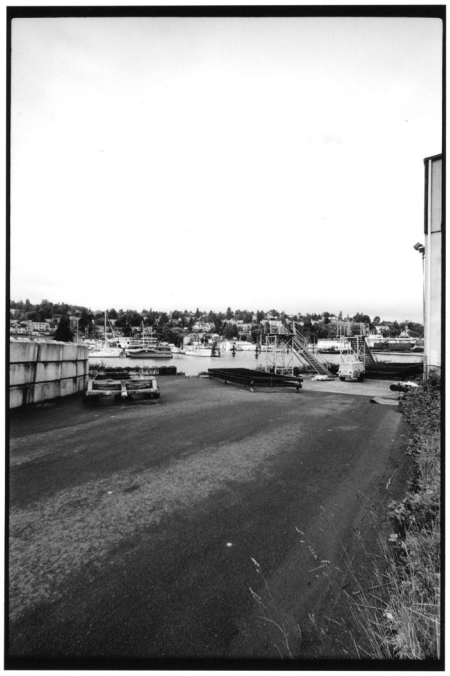


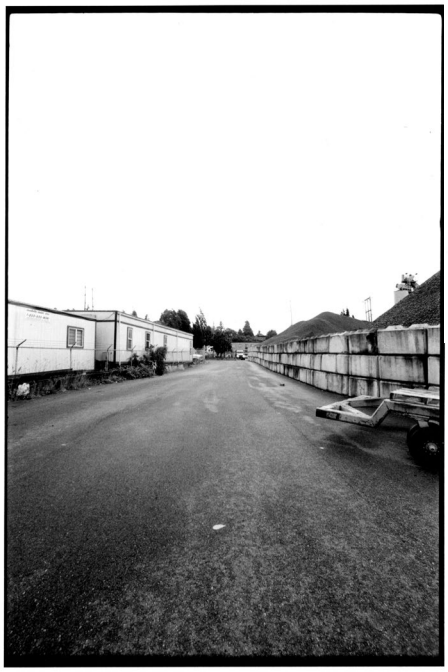
Photos ii.viii: Textures, details, and found items at 14th Ave NW street end



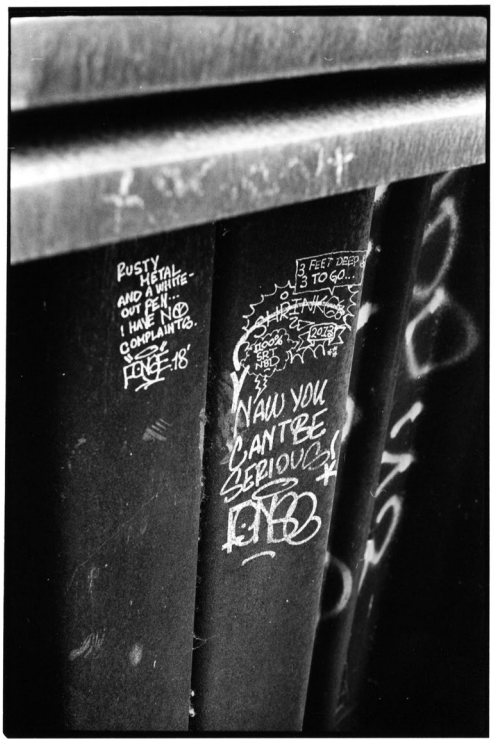
Photos ii.ix: 11th Ave NW street end

Photos ii.x: Textures, details, and found items at 11th Ave NW street end





Photos ii.xi: NW 39th St. street end



Photos ii.xii: Textures, details, and found items at NW 39th St. street end.

iii | Presentation Graphics

Photo iii.i: Site model of existing conditions 24th Ave NW street end and vicinity.

Photo iii.ii & iii.iii: Site model of schematic 1st schematic design.

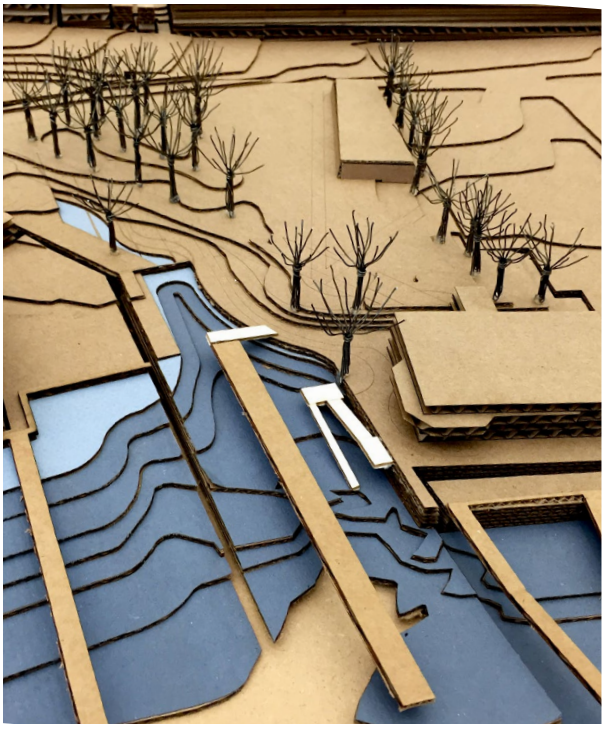
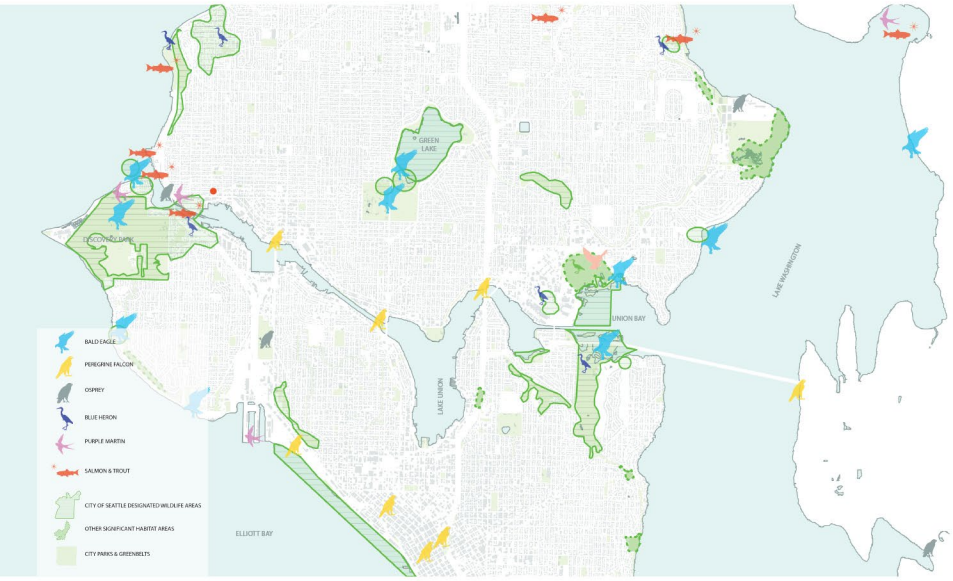


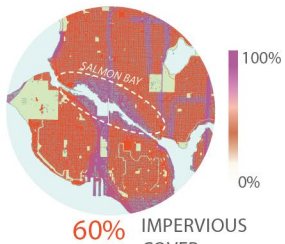
Photo iii.iv & iii.v: Site model of schematic 2nd schematic design.

SALMON BAY ESTUARY HISTORY

SEATTLE'S URBAN WILDLIFE

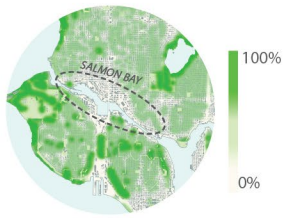


SALMON BAY HABITAT HEALTH AT A GLANCE



60% IMPERVIOUS COVER

8 Miles ARMORED SHORELINE

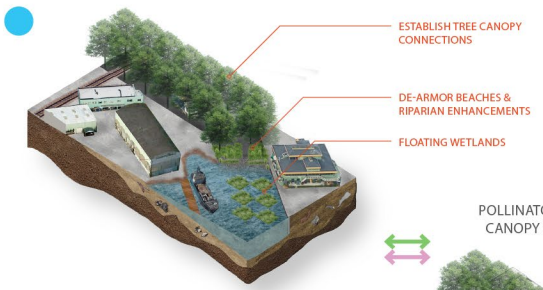


4.2% TREE CANOPY COVER

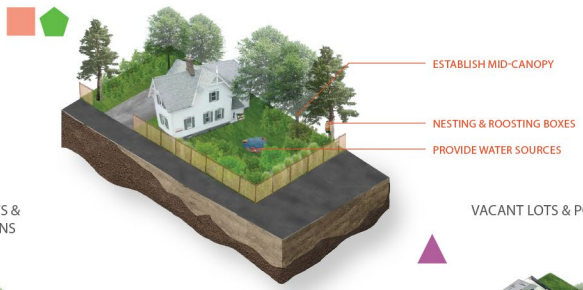
13 COMBINED SEWER OVERFLOWS

IDENTIFYING SMALL-SCALE HABITAT OPPORTUNITIES

SHORELINE STREET ENDS

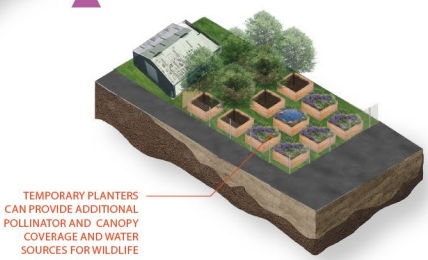


BACKYARD & COMMUNITY HABITAT



POLLINATOR PATHWAYS & CANOPY CONNECTIONS

VACANT LOTS & POLLINATOR POCKETS



PRIORITY DESIGN SPECIES

POLLINATORS & INVERTEBRATES

ECOSYSTEM ROLE:
Insect and bird pollinator species play a vital ecosystem role by supporting plant reproduction through the transfer of pollen between flowers. They also provide food sources for other wildlife species.

CURRENT NEED:
Pollinators, especially bees and butterflies have been in decline due to pesticide use and habitat fragmentation. Specific planting species can support these species and provide connections important habitat areas.

POLLINATOR PLANTINGS · BRUSH PILES · WATER SOURCES · TREE CANOPY

SALMON

ECOSYSTEM ROLE:
An indicator species foundational to PNW ecosystems and culture, salmon area major source of food for upper trophic species like eagles. They are also culturally important having served as primary protein source for PNW indigenous species.

CURRENT NEED:
Heavily impacted by urbanization and habitat removal, Salmon Bay's biggest challenges are lack of natural beaches and lack of shore tree plantings. Biggest opportunities lie in providing de-armoring shores, growing tree canopy floating wetlands to support migrating juveniles.

SHORE RESTORATION · TREE CANOPY

INSECTIVORES

ECOSYSTEM ROLE:
Bats and bird species provide an important ecosystem function keeping insect populations in check, notably mosquitoes. They are also food sources for upper trophic species like Eagles.

CURRENT NEED:
As successful urban species, nesting and roosting sites for little-brown bats, big-brown bats and swifts and other small bird species provide great opportunities for supporting local populations. Planting species and other design interventions that support robust moth and insect populations provide critical food sources for these species.

SNAGS · NESTING SITES · WATER SOURCES · TREE CANOPY

ADDITIONAL URBAN WILDLIFE SPECIES

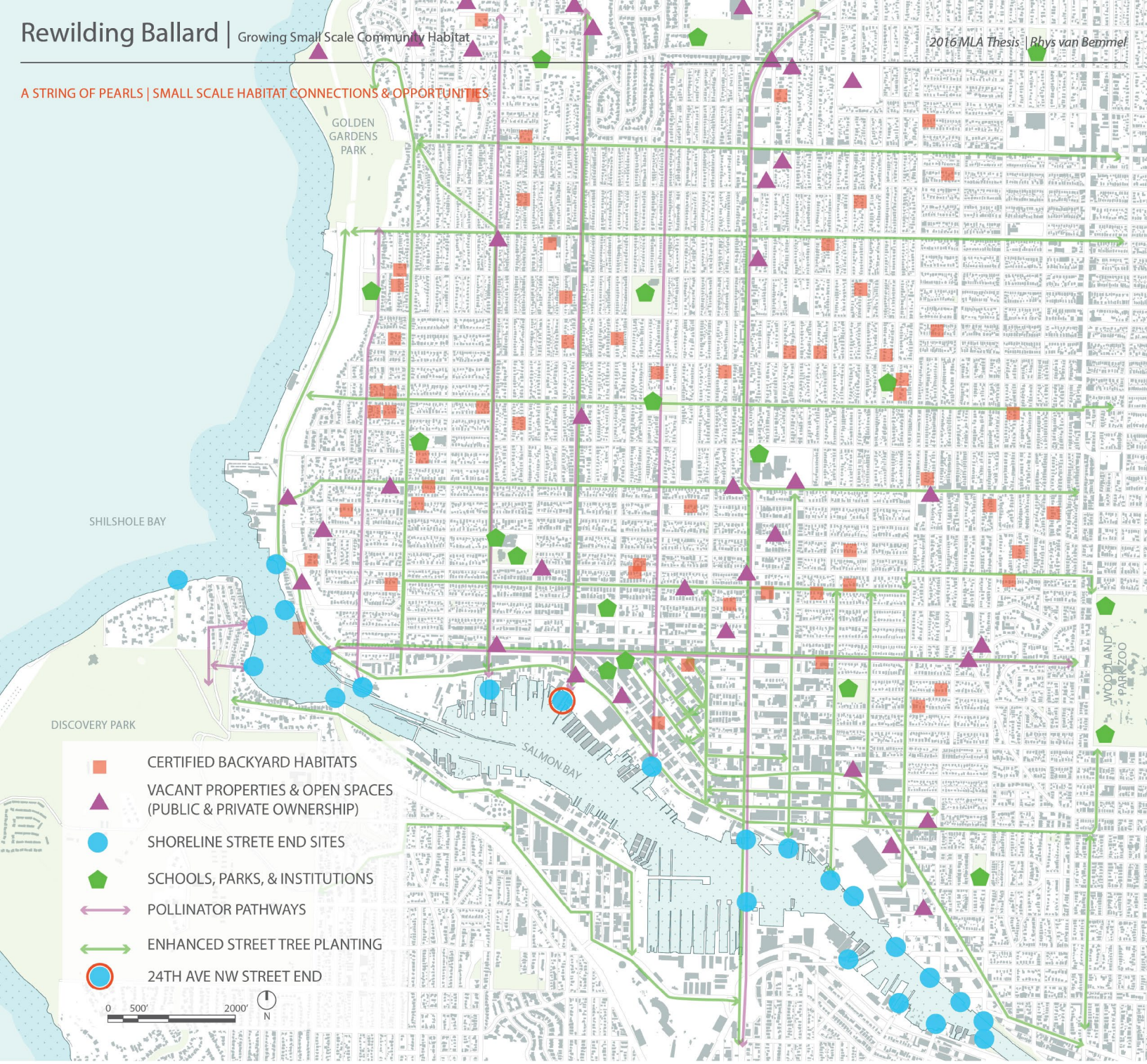
ECOSYSTEM ROLE:
As predators at the top of the food-chain raptors and wading birds are indicators of overall ecosystem health. These species mainly prey on fish in near-shore habitats, as well as smaller bird and mammal species.

CURRENT NEED:
Important gains have been made in recent decades following dramatic population losses due to the use pesticide DDT and habitat loss. However, these species remain dependent on robust fish populations and require healthier shoreline areas. Opportunities include provide shoreline trees, nesting towers, and beach restorations.

SHORE RESTORATION · NESTING SITES · PERCHING SITES

Figure iii.i: Final presentation board 1.

A STRING OF PEARLS | SMALL SCALE HABITAT CONNECTIONS & OPPORTUNITIES



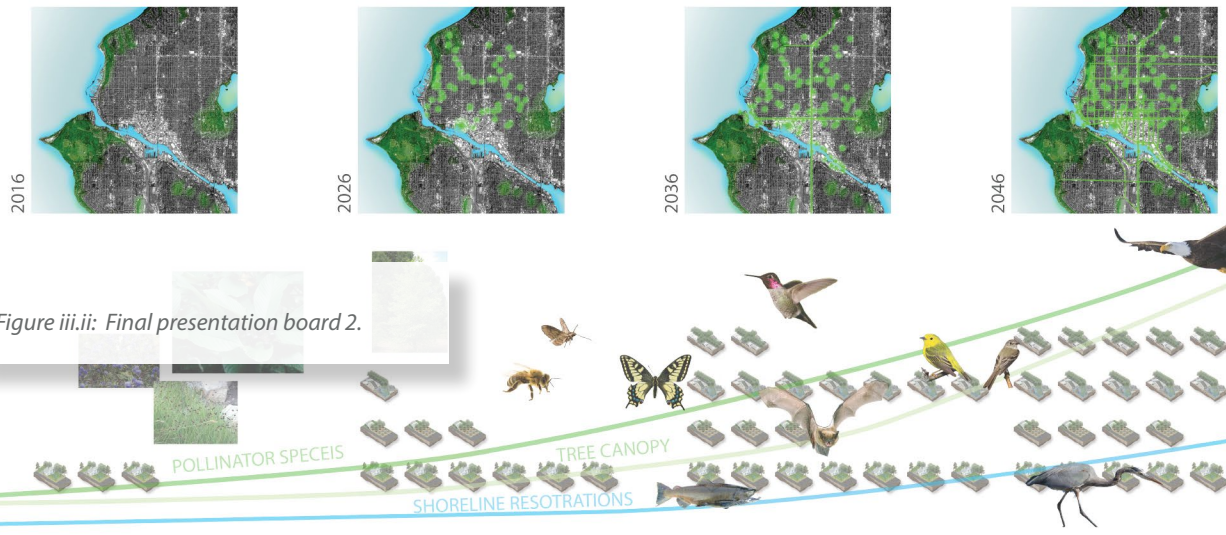


Figure iii.ii: Final presentation board 2.

Figure iii.iii: Final presentation board 3.

Site Features

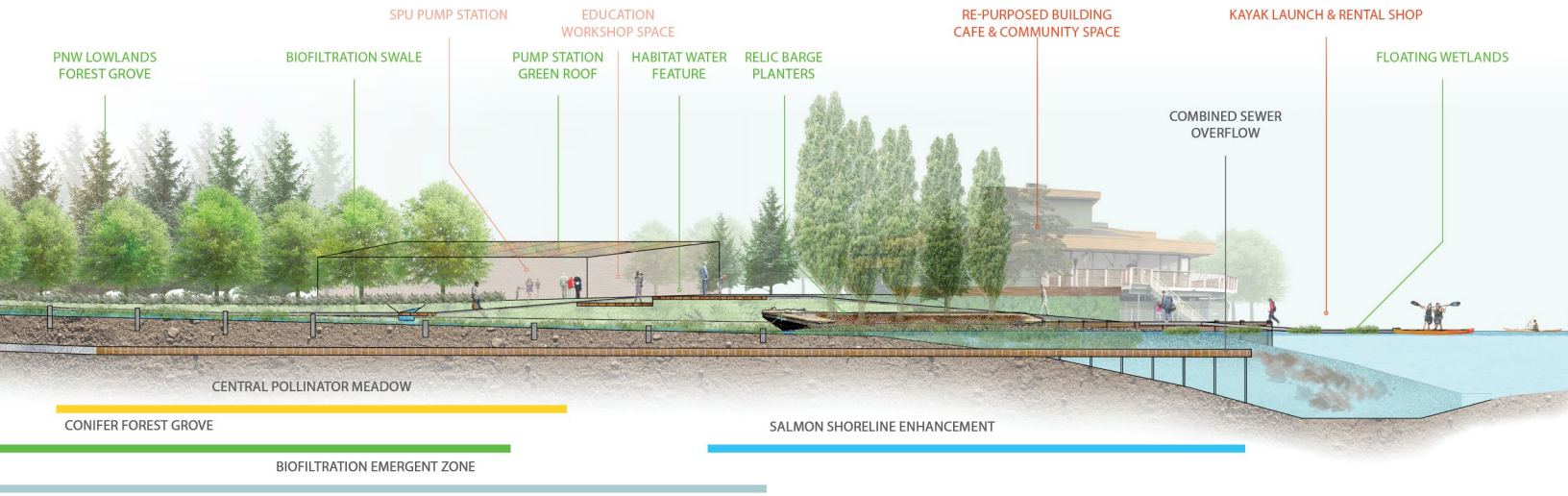
1. SPU Pump Station
2. Burke-Gilman Trail Missing-Link Connection
3. Raised Ped-Bike Crossing
4. Pacific Fisherman Shipyard Drive Access
5. Pacific Fisherman Shipyard Gate Access
6. Beach Overlook & Bird Blind
7. Gathering Area & Community Workshop Space
8. Pedestrian Access to Adjacent Businesses
9. Cafe Deck
10. Kayak Rental and Boat Launch
11. Community Center & Cafe

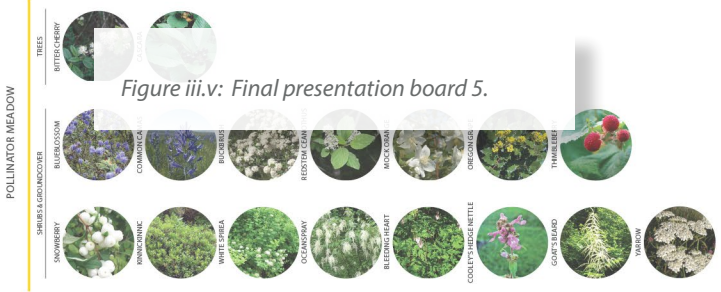
Habitat Features

1. Floating Wetlands
2. Salmon Riparian Beach
3. Biofiltration Swale
4. Cistern Fed Water Feature
5. Pollinator Meadow
6. Snags
7. Brush & Stone Piles
8. Swift Chimneys
9. Bat Boxes
10. Green Roof
11. Barge Planters

SECTION AT 24TH AVE NW
A-A'

Figure iii.iv: Final presentation board 4.





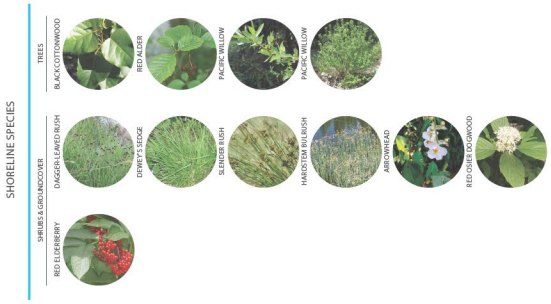


Figure iii.v: Final presentation board 5.