Inviting Species as Kin:

A Design Framework for Sensory Encounter

and Habitat Resilience through the Western Purple Martin

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Abstract

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This thesis proposes a Multispecies Design Framework built at the intersection of Animal-Aided Design (AAD), as described by Thomas E. Hauck and Wolfgang W. Weisser, and Kincentric Ecology, as articulated by Enrique Salmón. AAD provides efficient methods for translating a species' ecological requirements into spatial parameters. Still, it remains focused on functional provisioning and rarely fosters relational bonds between humans and non-human species. Kincentric Ecology, conversely, articulates the shared commitments that connect humans and non-human species as kin, but it offers limited operational guidance for spatial design. Bringing these two theories into dialogue, this research develops a framework organized around three

layers: ecological demands, which address the nesting, feeding, and habitat requirements of the target species; sensory kinship, which creates the conditions for humans to notice, encounter, and develop emotional reciprocity with their non-human co-inhabitants; and habitat resilience, where the two methods converge to sustain the future of the target species over time.

The Western Purple Martin (*Progne subis arboricola*) serves as the primary design collaborator throughout this research. This thesis conducts a post-occupancy evaluation of active nesting sites along the Seattle marine shoreline and a conceptual redesign of the inactive nest site at Jack Block Park. It investigates how multispecies design might move beyond merely providing functional habitat to invite humans and the Western Purple Martin into a shared, perceptual, and resilient coexistence.

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Thesis

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1.1 Problem Statement & Significance of Multispecies Design

What if we invited non-human species as kin with whom humans share mutual obligations? This question points to two different orientations in design: one asks what a species needs to survive; the other asks what humans owe to the species they share space with. This thesis explores this through multispecies design, an emerging critical field that seeks to move beyond anthropocentrism in architecture and landscape architecture. Ecological or sustainable design generally treats nature as a system to be managed for human benefit. In contrast, multispecies design takes a different approach. It asks designers to consider non-human species as stakeholders rather than objects. Recently, biodiversity loss and urban habitat fragmentation have accelerated in urban contexts. How might spatial practice move beyond accommodating non-human life to fostering genuine coexistence? Achieving this transition requires designers to examine the limitations of our current design disciplines.

Historically, architecture originated from human needs for shelter, stability, and order, which led to a predominantly human-centered focus. While sustainability has become an important design consideration, architectural strategies still rarely account for other species' demands.

Conversely, landscape architecture has a long history of engaging directly with ecological systems. Before the recent emergence of multispecies discourse, Lan McHarg's *Design with Nature* (1969) established ecological analysis as a foundation for planning and design. This tradition has continued through ecological restoration, native planting, and habitat creation, positioning the discipline much closer to living systems than architecture has typically been. However, within this ecologically engaged tradition, human-centered problems still exist. Nature is often still framed in terms of human understanding and aesthetic experience. Practices such as taming or curating landscapes to serve human visual preferences continue to shape the field.

The limitations described above reflect a deeper problem identified by Tsing et al. (2017) in *Arts of Living on a Damaged Planet*. Modern industrial thinking treats complex ecological relationships as flaws to be removed. This reinforces the separation between human and non-human worlds. Saeidi et al. (2023) observe a similar pattern in design, noticing that designers rarely consider whether their material or spatial decisions might affect the survival of other species. This separation results in a systematic exclusion of non-human life from design thinking, which exacerbates biodiversity loss. It is important to consider the capabilities of each discipline for cooperation. Architecture works at the scale of the structure and the building envelope. The dimensions of an opening, the choice of a material, or the form of a surface can be calibrated to a species' needs rather than only for humans. Approaches such as Animal-Aided Design (Weisser & Hauck, 2024) begin to address this gap by deriving these spatial decisions directly from a species' ecological requirements. Landscape architecture works at the large scale of the site to provide more opportunities for nature. However, even when designs successfully provide functional habitat, a further question remains: do they create any real opportunity for humans to notice, engage, and take responsibility for their non-human co-inhabitants? How can designers foster kinship awareness and future resilience through the coexisting design?

1.2 Targeting species

To investigate these questions through a specific design context, this thesis invites the Western Purple Martin (Progne subis arboricola) as its primary non-human stakeholder. Purple Martins are the largest swallows in North America and are colonial cavity nesters, which means they nest in groups and rely on pre-existing cavities rather than excavating their own. They are migratory birds that arrive in the Seattle area in mid-April and remain through late August to breed. They also provide significant ecosystem services by consuming an estimated 262 billion insects each year, including many agricultural and human pest species (Purple Martin Conservation Association, n.d.). This research specifically addresses the Western subspecies, which has received less attention than the Eastern Purple Martin due to its smaller population and more restricted distribution. The Western subspecies is of particular conservation concern, with the population roughly estimated at only 3,500 pairs (Manquera, 2022). Even where some Western populations still nest in natural snags (Cornell Lab of Ornithology, n.d.), the subspecies would face serious threats of extinction without sustained human intervention.

The Western Purple Martin functions in this thesis not as a symbol but as an operational design collaborator. Their ecological requirements lead to the spatial and material decisions of the design. From an ecological demand perspective, Purple Martins present cross-disciplinary spatial demands, from the thermal performance of nesting cavities to the landscape connectivity required for aerial foraging. As an important environmental indicator and insect controller in the ecosystem, the Western Purple Martin faces a population decline that creates an urgent need for design intervention. From a kincentric perspective, Purple Martins have maintained a close relationship with human society for a long time. Apart from the desert subspecies, artificial nests built and maintained by people have become one of the most significant components of their habitat system in North America over the past century. Their survival now depends on this sustained human support, and it is precisely this dependence that makes these synanthropes such fertile ground for fostering kinship through the design process. All of these characteristics make the Western Purple Martin an ideal collaborator for examining how multispecies design can work through both ecological demand and the fostering of kinship.

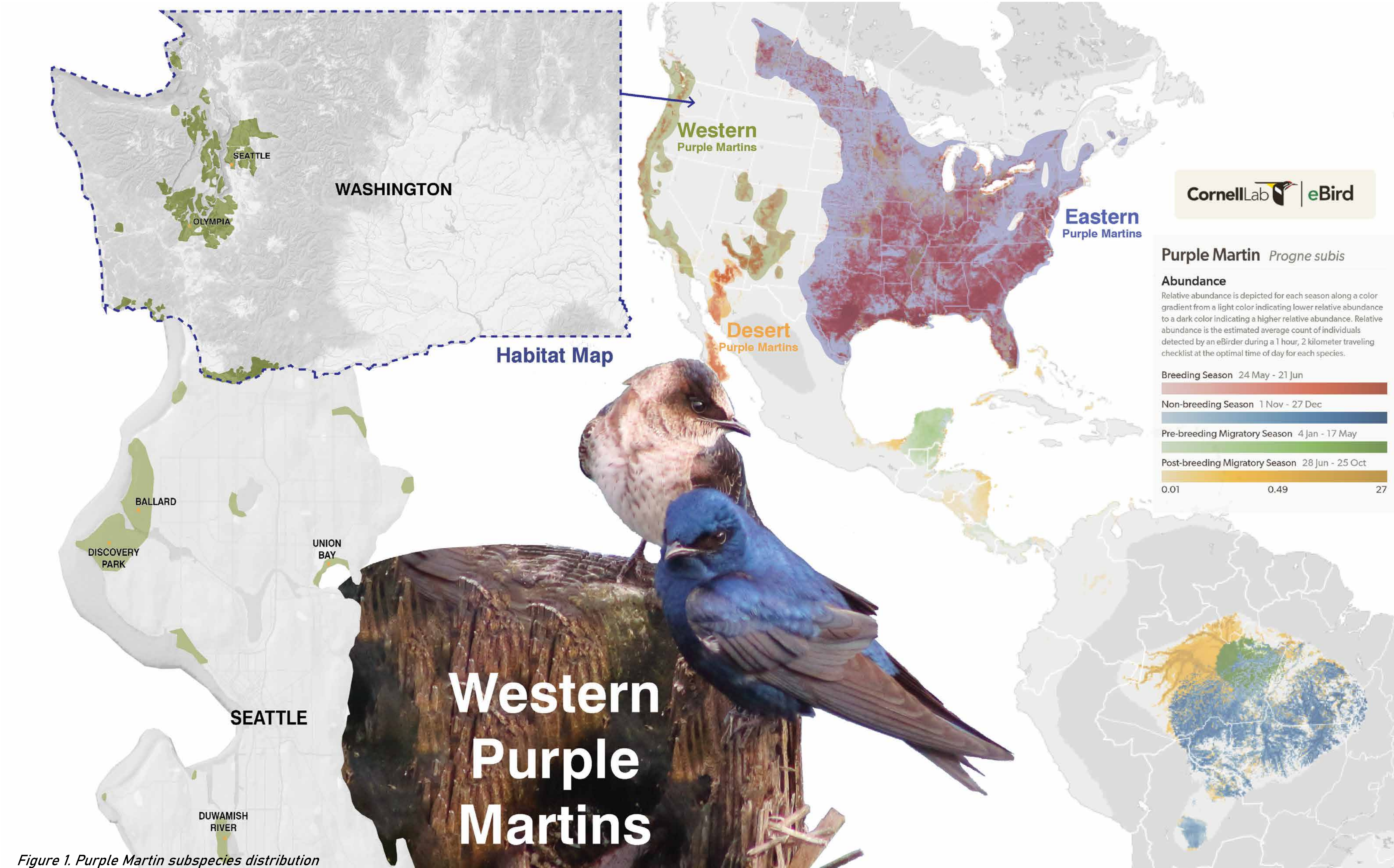


Figure 1. Purple Martin subspecies distribution

1.3 Research Questions & Methodologies

This thesis aims to develop a Multispecies Design Framework and cooperate with Western Purple Martin. First, identifying the specific ecological and spatial demands of the Western Purple Martin and translating them into design parameters. Second, analyzing how current site conditions shape opportunities for humans to perceive and engage with the species, and proposing design strategies that foster sensory kinship. Third, developing and evaluating a conceptual design for Jack Block Park that embeds adaptive ecological capacity for long-term habitat resilience. Across all three stages, the research methods (interviews, field observation, and precedent analysis) generate the ecological and relational parameters that the design methodology then translates into spatial proposals. Research establishes what the site and species require, and design tests how those requirements can take built form.

These three aims lead to a core research question: How can a multispecies design framework foster sensory kinship and long-term resilience between humans and non-human species in architecture and landscape architecture? To address this overarching question, the research investigates the following three specific sub-questions:

1. What ecological and spatial conditions are necessary to support the Western Purple Martin's nesting requirements at Jack Block Park?
2. How can design create multisensory opportunities, such as visual, auditory, and embodied ones, that enable humans to perceive and develop relational connections with the Western Purple Martin?
3. What design strategies can embed adaptive ecological capacity to support the long-term resilience of Western Purple Martin habitat?

The methodology proceeds in three stages, corresponding directly to the sub-questions outlined above:

The first stage uses interviews with volunteers from the King County Purple Martin Conservation Program, field research at active nesting sites along the Seattle shoreline, ecological mapping of site conditions, and a synthesis of species-specific knowledge from existing online databases. These methods establish the ecological and spatial parameters required for Western Purple Martin habitat at Jack Block Park.

The second stage compares active and inactive nesting sites along the Seattle shoreline to examine how site conditions correlate with observable opportunities for human-non-human interaction. It also analyzes precedent multispecies and sensory-oriented design projects to identify strategies that improve human perception and engagement with non-human species. These methods create potential design principles for fostering kinship between humans and the Western Purple Martin.

In the third stage, this research applies the previously developed principles to conceptual design proposals for Jack Block Park.

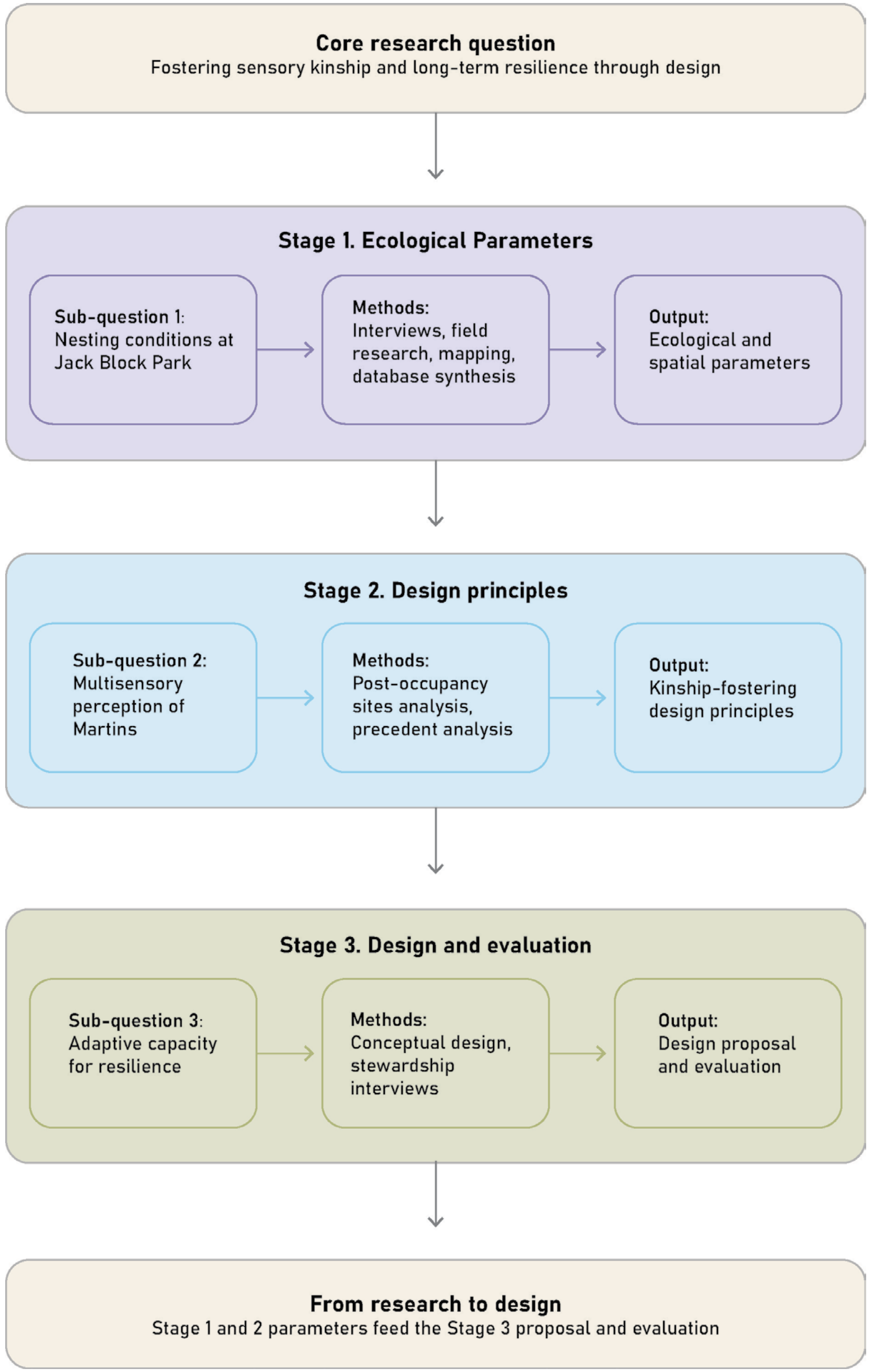


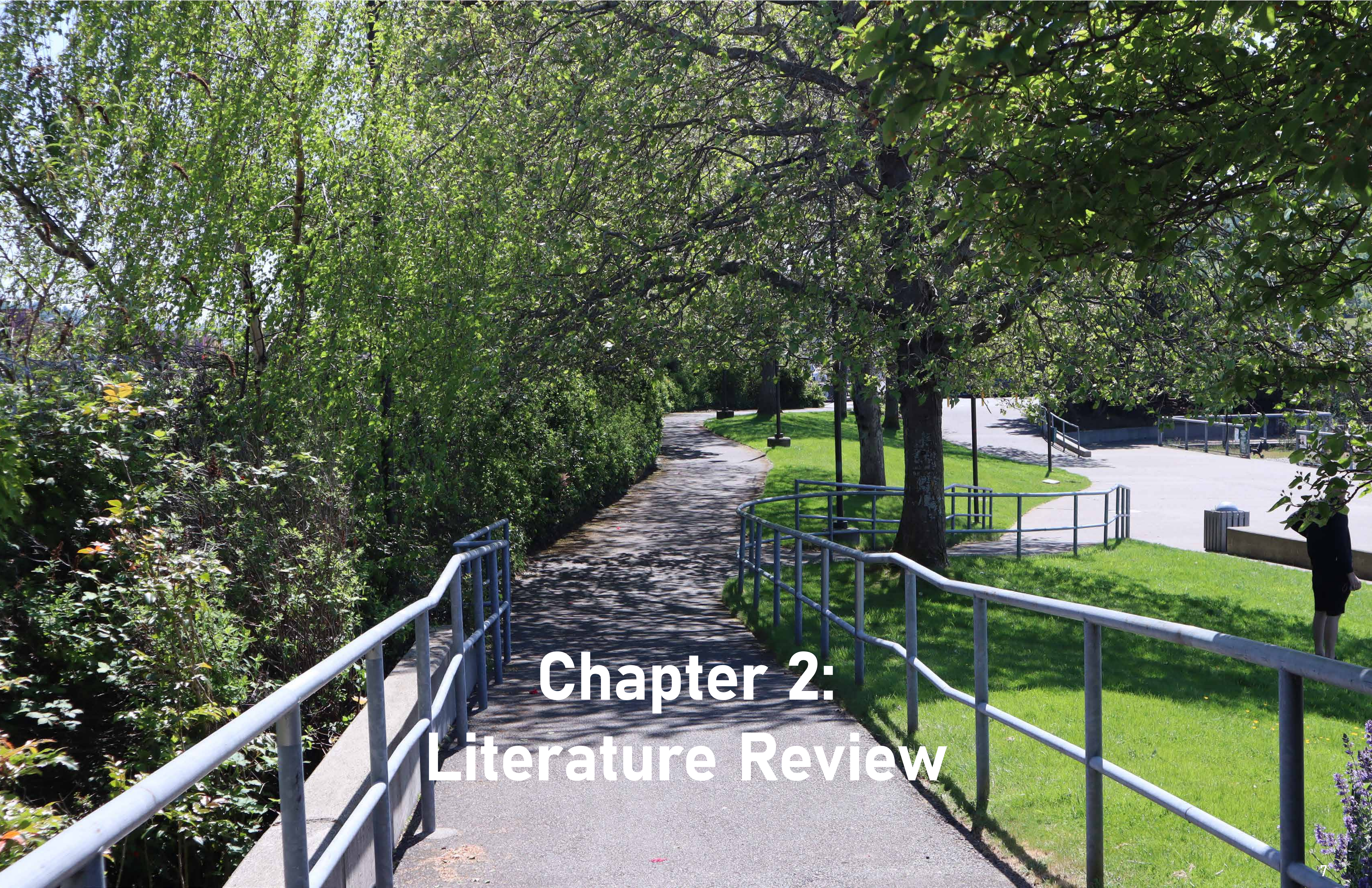
Figure 2. The three-stage research methodology

Volunteer interviews regarding long-term maintenance practices and site stewardship inform the adaptive dimension of these designs. Finally, design outcomes are evaluated through habitat resilience criteria drawn from the framework, including adaptive capacity, ecological continuity, and maintenance sustainability.

1.4 Scope & limitation

This research focuses on the Western Purple Martin (P. s. arboricola) population along the Seattle marine shoreline, with Jack Block Park as the primary design site. It is an inactive nesting location within the local conservation program. Comparative analysis is based on three active sites (Point Shilshole Beach, Terminal 105, and Kellogg Island) to establish a habitat requirements frame. The study operates at three intervention scales: the design of nest colony structures and supportive ecological layers that meet the Western Purple Martin's specific habitat requirements; a shared frame structure that enables humans and birds to inhabit the same spatial field simultaneously; and experiential design elements that heighten human perception of the species' presence and simulate aspects of the Purple Martin's sensory environment.

The Western Purple Martin's seasonal presence in Seattle (mid-April to late August) prevents real-time occupancy monitoring and live ecological testing. Therefore, this study evaluates design proposals through computer modeling, cross-site comparative analysis, and framework-based criteria.



Chapter 2: Literature Review

2.1 Limitations of Anthropocentrism in Design

Anthropocentrism imposes numerous limitations on design in architecture and landscape architecture. However, these limitations differ between the two disciplines, and each is worth analyzing separately. Architecture offers the clearest case. Architectural practice has historically prioritized human demands while neglecting the integration of nature into the urban context (Grobman et al., 2023). This disconnection from nature traces back to the advent of agriculture, which deepened the separation between humans and non-humans (Saeidi et al., 2023). Design decisions that prioritize human aesthetics and functionality can actively endanger non-human species, as in the common case of bird collisions with windows (Grobman et al., 2023). Ultimately, the conventional design framework fails to provide equality between non-human and human demands.

Landscape architecture presents a different but related problem. Although landscape architecture engages more closely with natural systems and wildlife, it faces similar dilemmas. Both modern urbanism and traditional landscape architecture, as Weisser and Hauck (2024) observe, set out to create what they describe as civilised and hygienic spaces of human mastery over nature. In this logic, “civility” and “hygiene” are not neutral aims but express a desire to control nature and prevent the city from its unpredictability. Cities are not planning for other non-human species in this context. On the contrary, modern urban planning sought to regulate, displace, and exclude them, treating species that crossed the boundary into human space as intruders to be managed. Biodiversity and sustainability have become key topics in the design field. However, a lack of cross-disciplinary understanding between design and ecology persists. This gap might result in simplified ecosystems and even cause additional problems (Weisser & Hauck, 2024).

Tsing et al. (2017) extend this critique in *Arts of Living on a Damaged Planet*, arguing that industrial logic treats ecological entanglements as impurities to be eliminated, which denies the fundamental importance of symbiosis to all life. This logic reinforces human separation from other species and leads designers to ignore nature’s demands. Without restructuring this logic, designers not only degrade the ecosystems they depend on but also undermine the conditions for human survival (Latour, 2019).

2.2 The Importance of Nature

The restoration of ecological entanglement is not only an ethical imperative but a practical necessity for human health. Current research in environmental psychology and global health indicates that human well-being is not an isolated field but links directly to biological systems.

Stephen Kaplan (1995) provides a foundational framework for understanding why natural settings are necessary for human cognitive function. His Attention Restoration Theory (ART) identifies “directed attention” as a finite mental resource that modern life continually demands, and requires the filtering of distractions.When this resource is taxed over a long period, it gives way to a state Kaplan calls directed attention fatigue. It is a decline that shows up as poorer performance, a shorter temper, and more frequent mistakes. Kaplan argues that natural environments restore this capacity because they offer “soft fascination”. It is a type of attention that is effortless and allows the brain’s inhibitory mechanisms to rest.

Bratman et al. (2012) indicating that contact with nature not only provides aesthetic benefits but also regulates emotion and improves working memory. They emphasize that as urban populations grow, the loss of these natural experiences creates a public health risk by increasing the prevalence of stress-related disorders and cognitive exhaustion.

Moving beyond individual psychology, the concept of “Planetary Health” situates human health within the broader context of Earth’s living systems. Whitmee et al. (2015) describe the Anthropocene as an era in which human activity threatens the ecological foundations that support our survival. As Latour (2019) notes, nature is not a passive backdrop but an agent that reacts to human action in unpredictable ways. The degradation of these systems, driven by habitat loss or climate change, creates a feedback loop that directly affects human physical and mental health. Whitmee et al. (2015) advocate a transition that integrates human health goals with environmental protection. This systemic view suggests that meeting the needs of non-human species is not a secondary concern but a primary requirement for human health in a changing climate.

2.3 Ecological Frameworks of Entanglement and Symbiosis

Tsing discusses entanglement and symbiosis in her work of understanding and cooperating with natural systems, arguing that symbiosis is the essence of life. Gan and Tsing (2018) experiment with understanding how more-than-human worlds function through coordination, assemblage, and diagramming. Through their study of a satoyama forest in central Japan where matsutake mushrooms grow, they argue that multispecies assemblages emerge not through unified purpose or design but through evolutionary and historical adaptations to life cycles, seasonal rhythms, and activity patterns. Their research methodology maps how the temporalities of different species intersect. They discover that matsutake mushrooms flourish or decline based on coordination among several factors. These include human disturbance patterns such as periodic clearing that prevents excessive forest succession, pine tree growth cycles, soil conditions shaped by decomposition rates, and seasonal variations. These coordinations occur without any organism consciously designing the system. Instead, species accommodate each other’s presence through evolutionary and behavioral adaptations across different timescales. Similar to Tsing’s (2015) argument in *The Mushroom at the End of the World*, this process shifts the human role from control to participation and waiting. Humans cannot control or restrict the existence of mushrooms or any other species; designers cannot fix or solve damaged ecologies through drawing alone. These theories reframe coexistence: design opens possibilities and provides conditions for other species rather than controlling nature. However, while these perspectives redefine the human role, they offer little guidance on how to enact it spatially.

2.4 Animal-aided Design: Methodology and Ecological Demands

Animal-aided Design offers a methodology that directly addresses the gap identified in section 2.1. Thomas Hauck and Wolfgang Weisser developed AAD at TU Munich in 2017 (Weisser & Hauck, 2017), proposing that non-human species should not merely occupy designed spaces but should generate them. The methodology begins by selecting a target species whose life-cycle requirements then define the ecological conditions the site must provide. Designers then analyze the species' needs across five categories of ecological demands: nesting and reproduction, feeding and foraging, habitat structure, seasonal behavioral stages, and ecological relationships with other species (Weisser & Hauck, 2024). These demands become the primary inputs for spatial and material decisions rather than afterthoughts.

The distinction between AAD and conventional sustainability strategies lies in the direction of causality. Green roofs and green walls add vegetation to buildings that designers have already configured for human use. AAD reverses this: the spatial and material requirements of the target species shape the design program. A wall section, a structural opening, or a planting zone emerges from the question "what does this species need here?" rather than from human aesthetic or functional preferences. This reversal also introduces a temporal dimension, since a species' requirements shift across its life cycle. For migratory species in particular, this temporal logic operates less through year-round seasonal change on a single site than through the timing of arrival, residence, and departure that a site must anticipate.

Through this attention to a species' changing needs, AAD produces what Weisser and Hauck (2024) describe as a dynamic habitat rather than a fixed artifact. The designed environment is calibrated to the rhythms of its non-human inhabitants rather than held static. This directly counters the "inert and static" conception of the building envelope that Grobman et al. (2023) identify as a central limitation of conventional design.

However, AAD focuses primarily on the technical translation of species requirements into spatial decisions. It addresses what non-human species need and how designers can provide it, but it does not address why humans should cultivate a relationship with those species beyond habitat provision. The ethical and relational dimension of multispecies coexistence, including how humans perceive, recognize, and develop mutual awareness with non-human species, requires a different theoretical perspective, which can be provided by Kincentric Ecology.

2.5 Kincentric Ecology

Building on the concepts of entanglement and symbiosis, the multispecies concept prompts a critical question: how can humans restore their relationships with non-human species and come to treat the upkeep of those relationships as an ethical responsibility? Within Indigenous knowledge systems, kincentric awareness offers one way to recognize this responsibility. Kincentric Ecology, articulated by Salmón (2000), describes an Indigenous worldview in which humans and the natural world belong to an extended ecological family bound by shared origins. In this view, ecosystem sustainability depends on whether humans recognize and sustain these reciprocal relationships and extend relational obligations to other living beings and ecological systems.

But how might designers translate this kinship into spatial and ecological strategies? While Kincentric Ecology establishes an ethical framework for reciprocal relationships, it does not explain how designers might bring those relationships into the design process. Several scholars suggest that the answer begins with the senses. Tsing et al. (2017) emphasize curiosity and attentive observation as essential practices for living within multispecies worlds. Despret (2020) develops this sensory turn most fully through sound. She argues that hearing places humans in a different relation to the world. Different from vision, which tends toward certainty and verification, sound foregrounds doubt and curiosity, leading the listener to seek out the source of what they hear. For birds, song is not only for communication but also a way of occupying space and singing to mark their territories. Crucially, compared with mammals' scent, this singing is relational rather than purely defensive. Song is the point, and territory is the stage for it. However, Despret also warns that these songs may disappear as fewer humans attend to them. Therefore, starting to listen is a first step toward the kind of relational obligation that Kincentric Ecology describes. Because architecture and landscape design often organize space around human vision and aesthetic judgment, engaging additional sensory registers such as sound, smell, and texture can expand design beyond human-centered perception. By recognizing the behaviors and vocalizations of specific species instead of treating them as abstract ecological elements, designers can cultivate familiarity and intimacy in everyday multispecies encounters (Saeidi et al., 2023).

2.6 Design Precedents: Methods and Typologies

With the growing emphasis on incorporating nature into design, several categories of strategies have emerged in architecture and landscape architecture. The most immediate category consists of mitigation strategies, such as anti-collision window decals that reduce bird collisions with glass (Architizer, 2016). This category addresses the most pressing ecological demands but does not reconfigure the spatial program from the most fundamental design process. It treats the symptom rather than engaging the methodology that AAD suggests.

A second category includes sustainable strategies such as green roofs and green walls (Besir and Cuce, 2018), which incorporate vegetation and habitat into the building system. These strategies contain the landscape within the building but cannot support a complete ecosystem, because they do not account for species-specific or life-cycle requirements. They acknowledge ecological demands in a general sense but do not translate them into the specific spatial and material terms that AAD requires.

A third and more integrative category has emerged as the design field develops a more conscious engagement with nature: cross-disciplinary strategies such as biological co-authorship. This approach brings multispecies thinking into the design task, treating architecture or landscape as a living, evolving habitat shaped by biological growth. Some conceptual projects, such as Fab Tree Hab proposed by Javier Arbona, Lara Greden, and Mitchell Joachim in 2003, aimed to dissolve the boundary between design and biological growth. Two decades later, Terreform ONE (n.d.) realized a physical structure based on this concept. These precedents move closest to the two-pillar framework this thesis proposes, combining ecological demand analysis with an acknowledgment that design and biological growth unfold over time. However, they tend to foreground the technical dimension of AAD without fully incorporating the relational and sensory ethics that Kincentric Ecology contributes.

2.7 Summary and Gaps

These precedents trace a progression from harm reduction to habitat provision to biological co-authorship. Across all three categories, a consistent gap persists: no established methodology begins from the spatial and behavioral requirements of non-human species while simultaneously addressing the relational ethics of human–non-human coexistence. As Grobman et al. (2023) identify, research in architecture on the deliberate inclusion of fauna at the building scale remains limited. Weisser and Hauck's (2024) study further highlights that this methodological deficiency grows when combined with a lack of knowledge regarding specific design requirements, including the exact forms, dimensions, and materiality suitable for target species. Moreover, the prevailing perception of the building envelope as an “inert and static entity” fails to account for the dynamic nature of multispecies habitation, often leading to ecological traps or high-maintenance conflicts. On the other hand, researchers have critiqued solution-driven ecological design in landscape architecture. As Holmes (2020) argues in The Problem with Solutions, many sustainable strategies function as standardized responses that oversimplify complex environmental conditions, prioritizing measurable performance over long-term ecological relationships and reducing design to a technocratic output rather than a sustained process.

These critiques converge on the same shortcoming from two directions. Some approaches translate a species' requirements into spatial decisions, but without the relational ethics that build real connection; others emphasize human awareness of non-human life without the technical methods to translate that awareness into design language. Therefore, this thesis aims to build a framework that integrates these two aspects.

Chapter 3: Framework for Design

This design framework draws two established theories, Animal-aided Design (AAD) and Kincentric Ecology, into an overlapping structure. Habitat Resilience is the future condition that this structure works toward.

AAD establishes ecological demands across five categories: habitat requirements, nesting, feeding, seasonal stages, and species relationships. Based on the Western Purple Martin's life stages and migratory pattern, this analysis covers the habitat requirements for nesting, feeding, mating, breeding, and fledging, along with the species' ecological relationships. This database analysis and field observation then translate into the specific parameters that guide the design process. Alongside this, the research examines the interspecies relationships present in the ecosystem and accounts for the needs of other species connected to the Western Purple Martin, so that the site can support a complex ecological network rather than a single species.

This thesis engages Kincentric Ecology as an outside researcher rather than as a member of the Indigenous communities from which it originates. It draws specifically on Salmón's (2000) concept of kinship, with attribution to its Indigenous roots, as a way to foster relational connection between humans and non-human species without claiming to represent that worldview. Kincentric Ecology contributes a sensory and relational approach centered on awareness, co-presence, visibility, and emotional reciprocity. This thesis terms that contribution Sensory Kinship. It is a relational connection that forms when humans become able to perceive and respond to the active presence of a non-human species across the senses, their calls, movements, and seasonal returns. As this attentiveness becomes mutual, it sustains an ongoing relationship of obligation. Following Despret (2020), the Western Purple Martin is understood here not as a passive object to be observed but as an agent that announces its presence and addresses others. Design does not simply make the species visible to people, but also opens a shared sensory field in which the bird's signals and human attention can meet.

Overall, these two layers meet the species' ecological needs and build a human relationship with it at the same time. Habitat Resilience is where they converge: the design works toward a habitat that can adapt to changing conditions, stay connected across the wider landscape, and remain cared for over time. The Western Purple Martin still depends on artificial nests that people build, clean, and maintain each season. Consequently, its habitat persists only as long as humans remain willing to care for it. This reliance will continue at least until natural nesting conditions can be restored. Sensory Kinship is therefore one of its conditions of resilience. People's notice and response to the martins will motivate the ongoing maintenance of their survival requirements.

The Ecological Demands layer asks whether the design meets the Western Purple Martin's nesting, feeding, and seasonal requirements. The Sensory Kinship layer asks whether the design enables humans to perceive the species' active presence and enter a relationship of mutual attentiveness with it. The Habitat Resilience layer asks whether the design can adapt, stay continuous, and remain maintainable as conditions change.

Because resilience describes a projected future rather than a present state, the chapters that follow assess it through modeling and comparison rather than direct observation, applying these criteria to the three intervention scales at Jack Block Park.

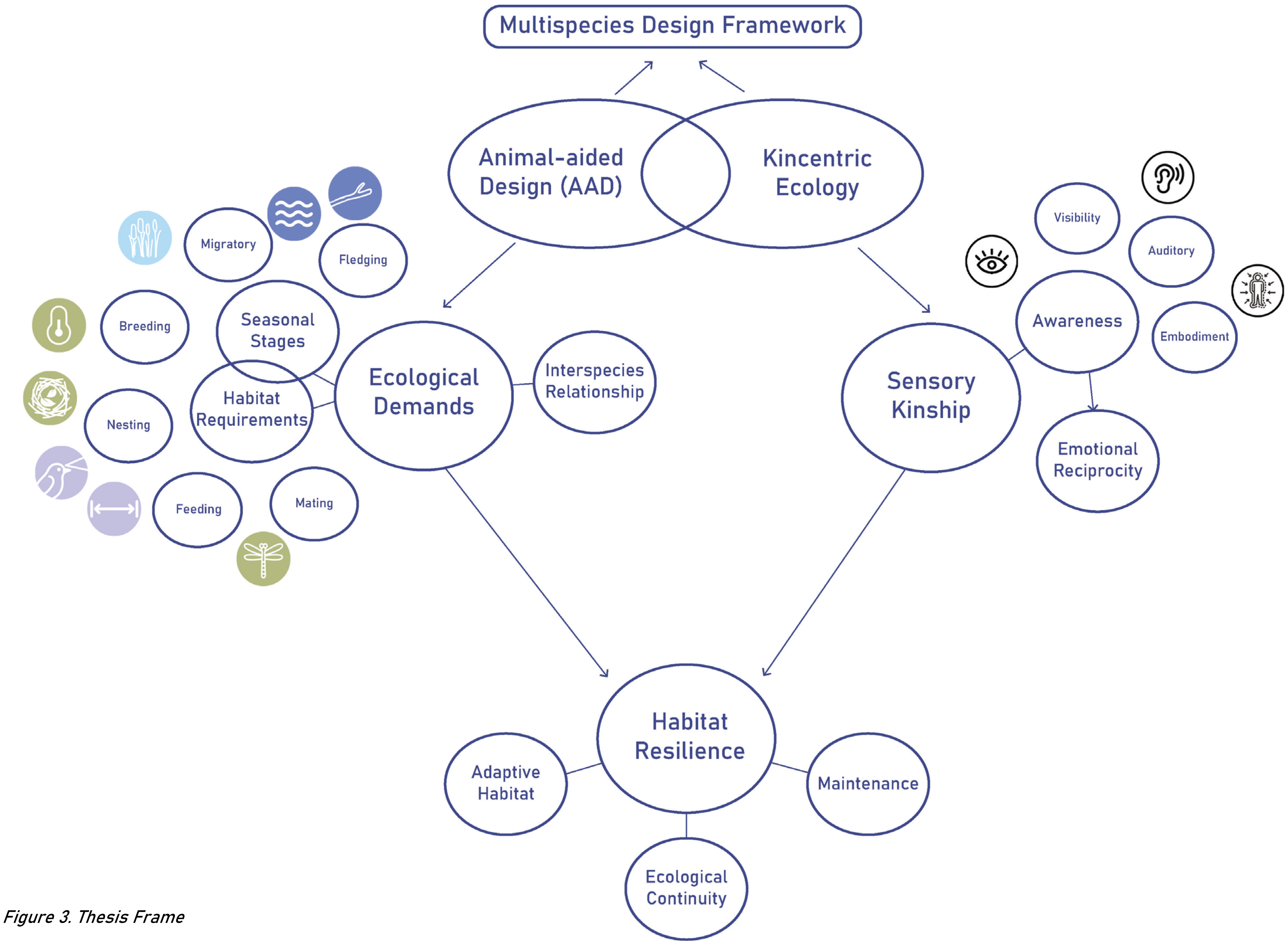
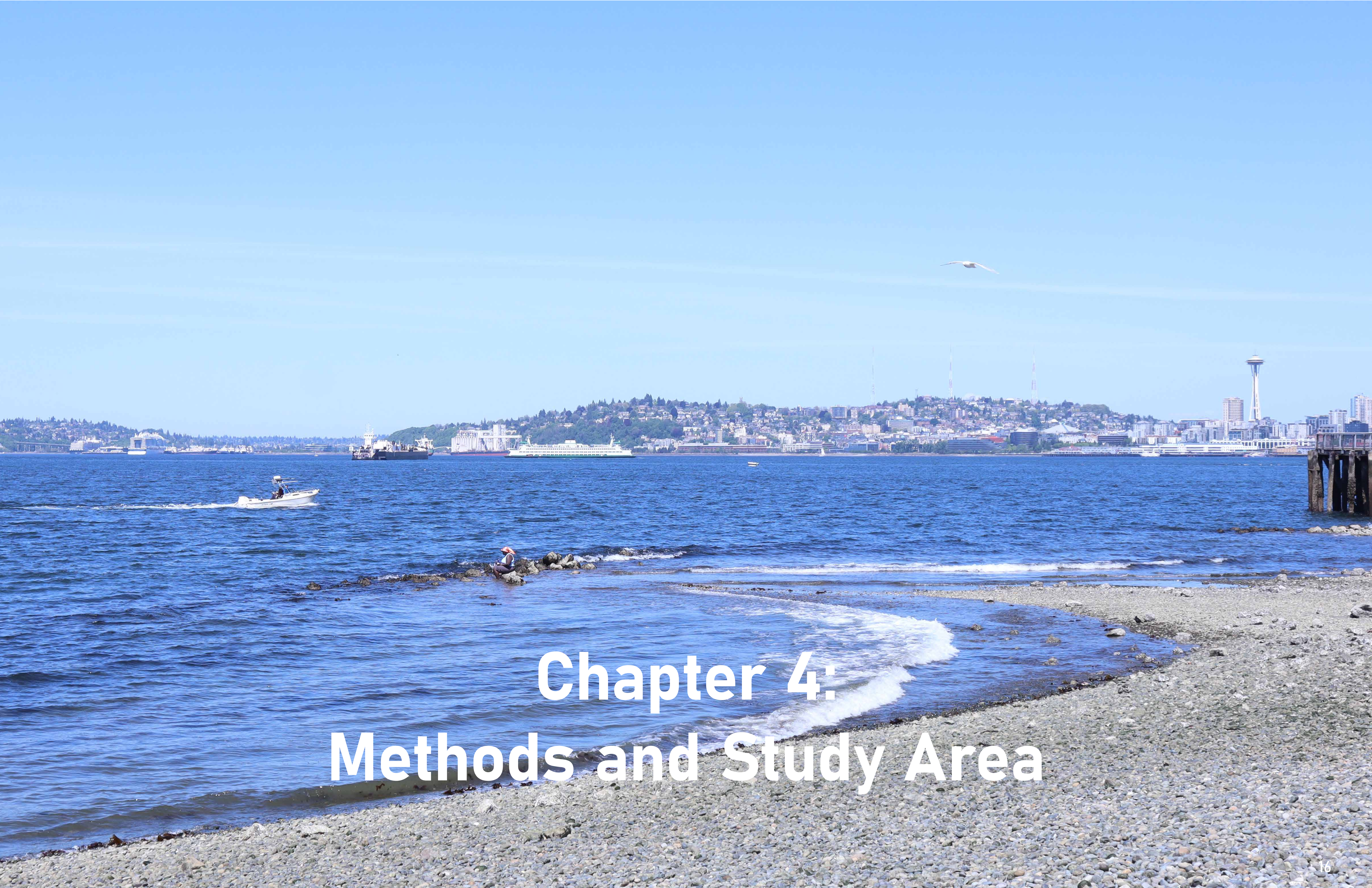


Figure 3. Thesis Frame



Chapter 4: Methods and Study Area

4.1 Western Purple Martin Conditions

Purple Martins (Progne subis arboricola) nest in groups that require multiple structures spaced across an open site. According to the Purple Martin Conservation Association, the species includes three subspecies whose ecological niches differ slightly: the Eastern Purple Martin (P. s. subis), the Desert Purple Martin (P. s. hesperia), and the Western Purple Martin (P. s. arboricola). Related research has also identified three primary nesting ecotypes: upland forest sites using natural snags, artificial nests in inland open-water locations, and coastal areas. Martins might move among these ecotypes, and inland populations likely serve as sources from which individuals disperse to upland and coastal breeding sites (Sherman and Hagar, 2021).

Except for the Desert subspecies, artificial nests created and maintained by humans have become one of the most significant components of their habitat systems in North America over the past century. Even though some Western populations, especially in California, still nest in natural snags (dead trees), the Western subspecies would face serious threats of extinction without sustained human intervention. According to Sherman's (2024) research in the upland forests of the Pacific Northwest, the utilization of natural snags of the Western subspecies is limited by post-disturbance landscapes. Historically, wildfires played an important role in creating their habitat. By clearing the understory and producing standing dead trees, fire opened up flight space and left snags in which woodpeckers excavated cavities. As secondary cavity nesters, Purple Martins' nesting process depended on this process. Decades of fire suppression and timber-harvest practices have disrupted this cycle and reduced the supply of available snags. These practices include, for example, snag removal and salvage logging for safety. Martins also require considerable distance from forest edges as a buffer for flight corridors and predator defense. To sum up, these factors drove major population declines of the Western subspecies in the 1960s and 1970s (Sherman and Hagar, 2021). This history explains why the species now relies on artificial nests, and why an inactive site such as Jack Block Park calls for design intervention rather than simply being left to recover on its own.

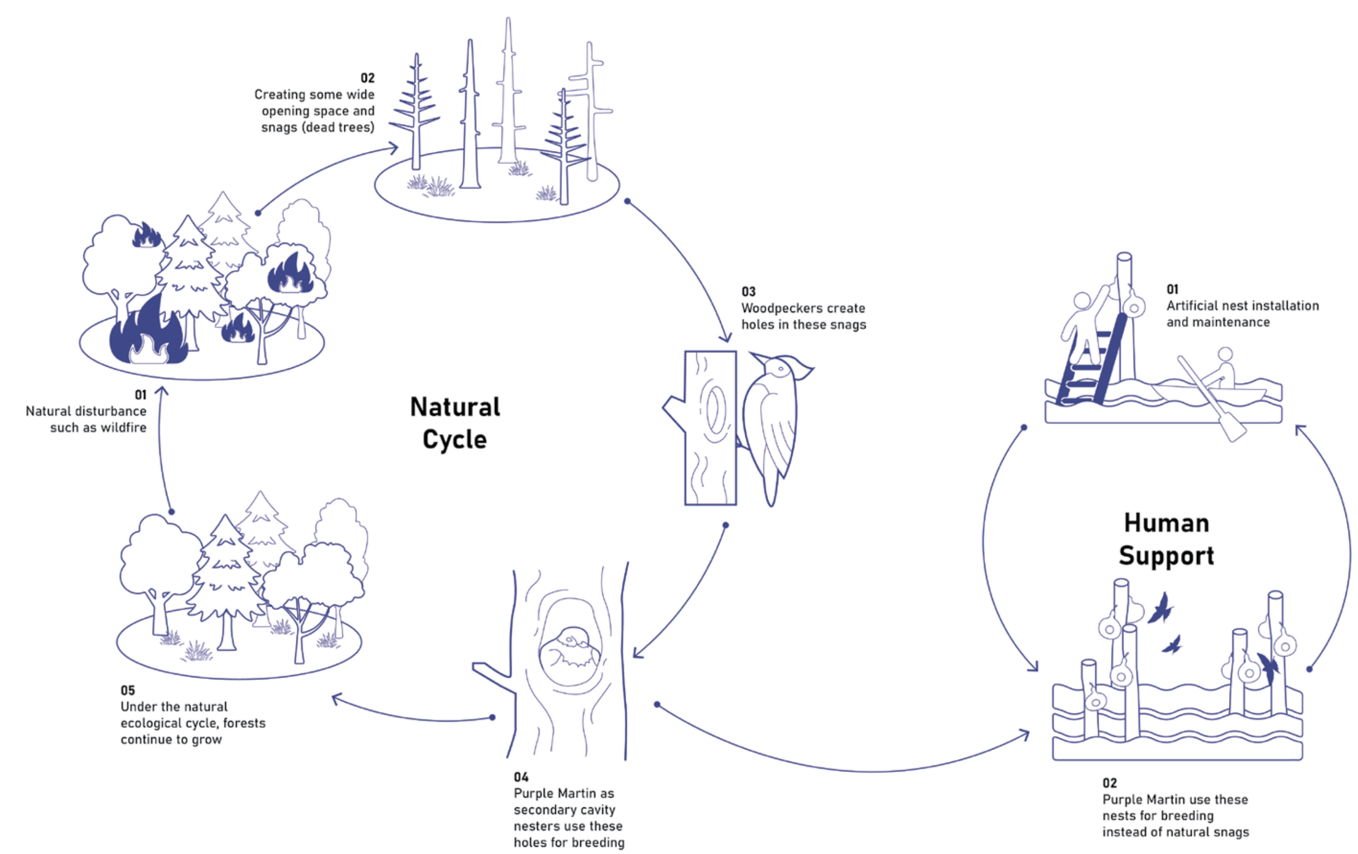


Figure 4. Why Purple Martin need artificial nests

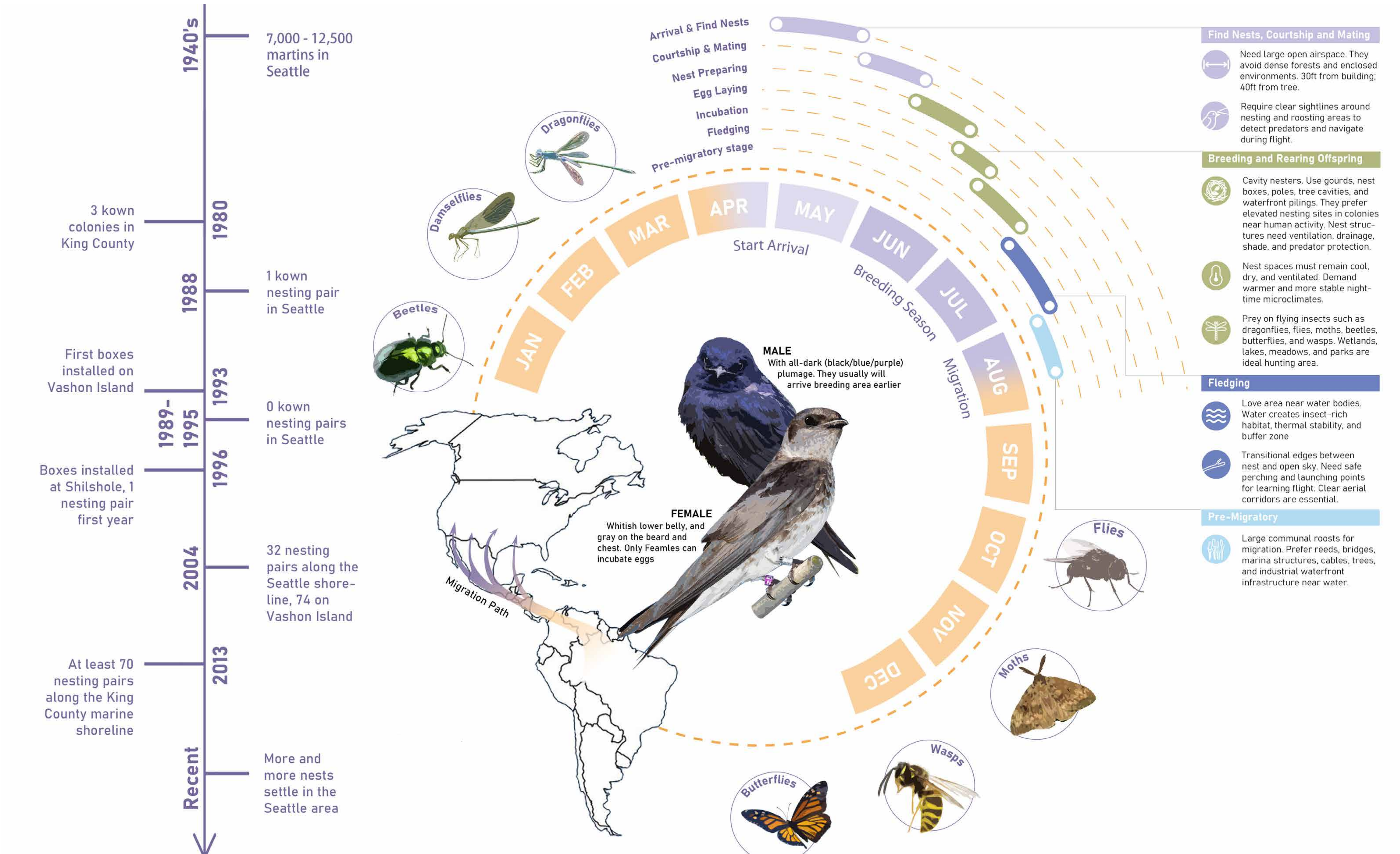


Figure 5. Purple Martin history in Seattle and species information

Figure 6. Interspecies diagram

4.2 Study Area and The Conservation Program

According to Power et al. (2014) and interviews with program volunteers (personal communication, 2026), approximately 7,000 - 12,500 Purple Martins lived in the King County area during the 1940s. However, their population declined sharply in the 1990s (Power et al., 2014). Kevin Li, a biologist and water-quality specialist at the King County Department of Natural Resources, first noticed this change. Determined to bring this beautiful species back to the area, he launched the program himself and focused on establishing artificial nest sites locally. He installed the first nest in 1996 and reached out to friends for help. Surprisingly, Purple Martins started appearing in the first year after installation. This early success encouraged and motivated the group to keep expanding and maintaining the nests year after year. Unfortunately, Li passed away in a scuba diving accident in 2006, but the rest of the group chose to carry on his work, and the program remains active to this day (Hubbell, 2022). The program runs entirely on a volunteer basis. However, it receives support from organizations such as the Washington Department of Fish and Wildlife, which provides vessels for offshore nest installation and maintenance. Over decades of dedication, the number of artificial nests has grown from around 20 in the 1990s to approximately 100 today. Volunteers prepare the nests ahead of the Purple Martin breeding season from March to April, and estimate that 50% to 80% of nests are occupied each season. The group continues to seek new nesting locations, and thanks to their ongoing efforts, Purple Martins have returned to King County, with their population increasing in recent years.

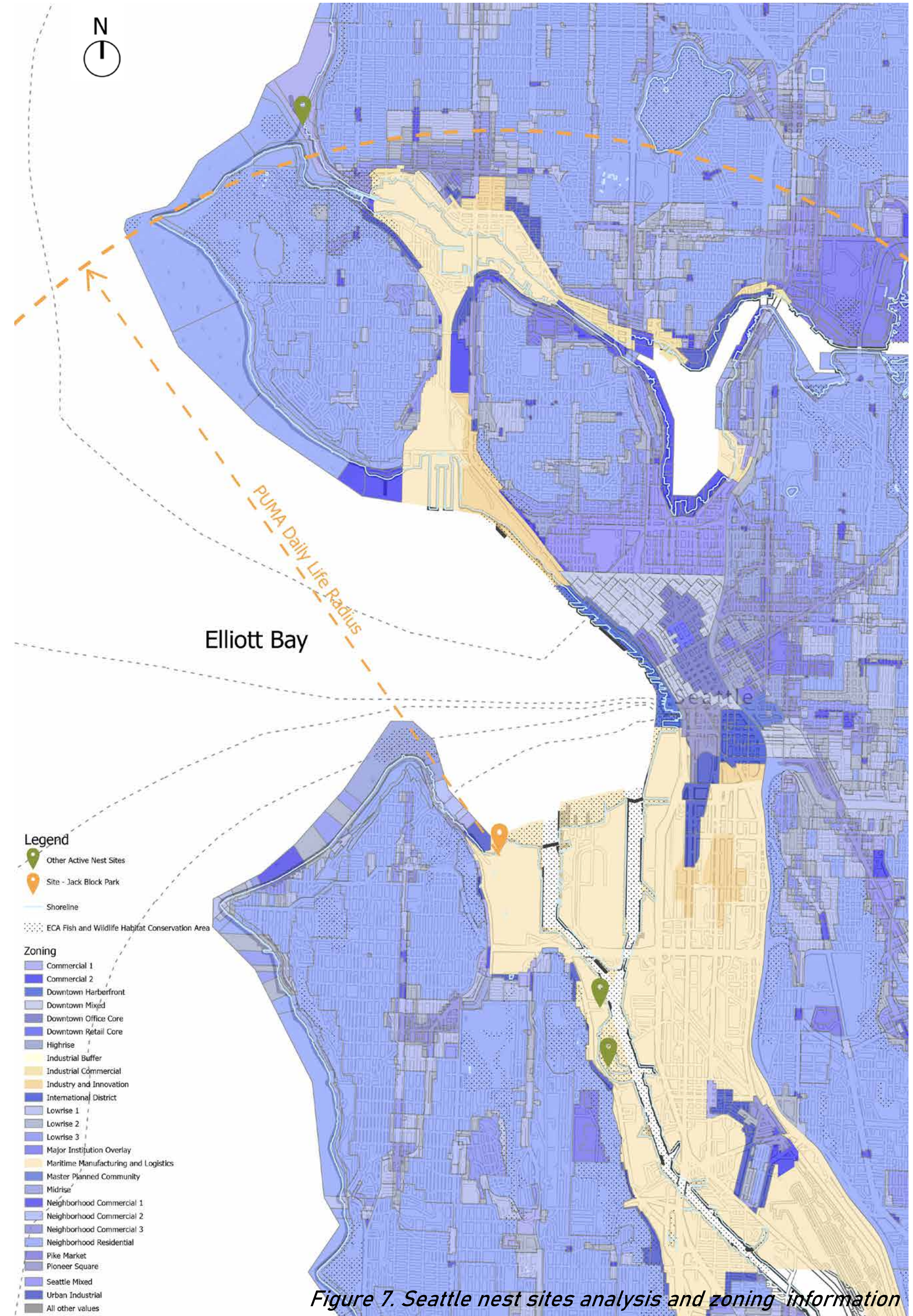


Figure 7. Seattle nest sites analysis and zoning information

This study focuses on four Western Purple Martin nesting sites established by the King County Purple Martin Conservation Program along the Seattle marine shoreline: Point Shilshole Beach, Terminal 105, Kellogg Island, and Jack Block Park. Site observations and interviews with program staff indicate that Jack Block Park no longer supports active nesting, while the other three sites remain active during the breeding season. This difference in outcome is the central opportunity the study works from: by comparing the conditions of the inactive site against those of the three active ones, the analysis can identify which habitat requirements Jack Block Park fails to meet, and the findings then inform the redesign developed in the following chapters.

Point Shilshole Beach

The first active nest was located in Point Shilshole Beach. It lies along Seaview Avenue NW in the Ballard neighborhood of northwest Seattle, south of Shilshole Bay Marina and near where Shilshole Bay meets Salmon Bay. Among the three active sites, it holds the largest and most concentrated cluster of nests, set on pilings out from the shore. Except at the lowest tides, the nests sit entirely over open water and cannot be reached on foot. The site also offers an expansive stretch of open airspace above the water, with distance from surrounding buildings.

This is the most urbanized area of the active sites and contains some similar features to Jack Block Park. It is surrounded by residential buildings and restaurants, with frequent human activity such as kayaking along the shoreline and picnicking or sunbathing on the beach. Despite the heavy human presence, the volunteers' report shows the colony still nests successfully here. This suggests that people nearby do not deter the species, as long as the nests stay over water and the flight paths stay open.
Field observation at this site included joining one volunteer maintenance session, which showed how labor-intensive these artificial nests are. The volunteers can only do this work on a specific date with the lowest tide, when the receding water exposes the walkable beach area to the pilings. They wade out to the pilings, raise a ladder, and climb up to remove each

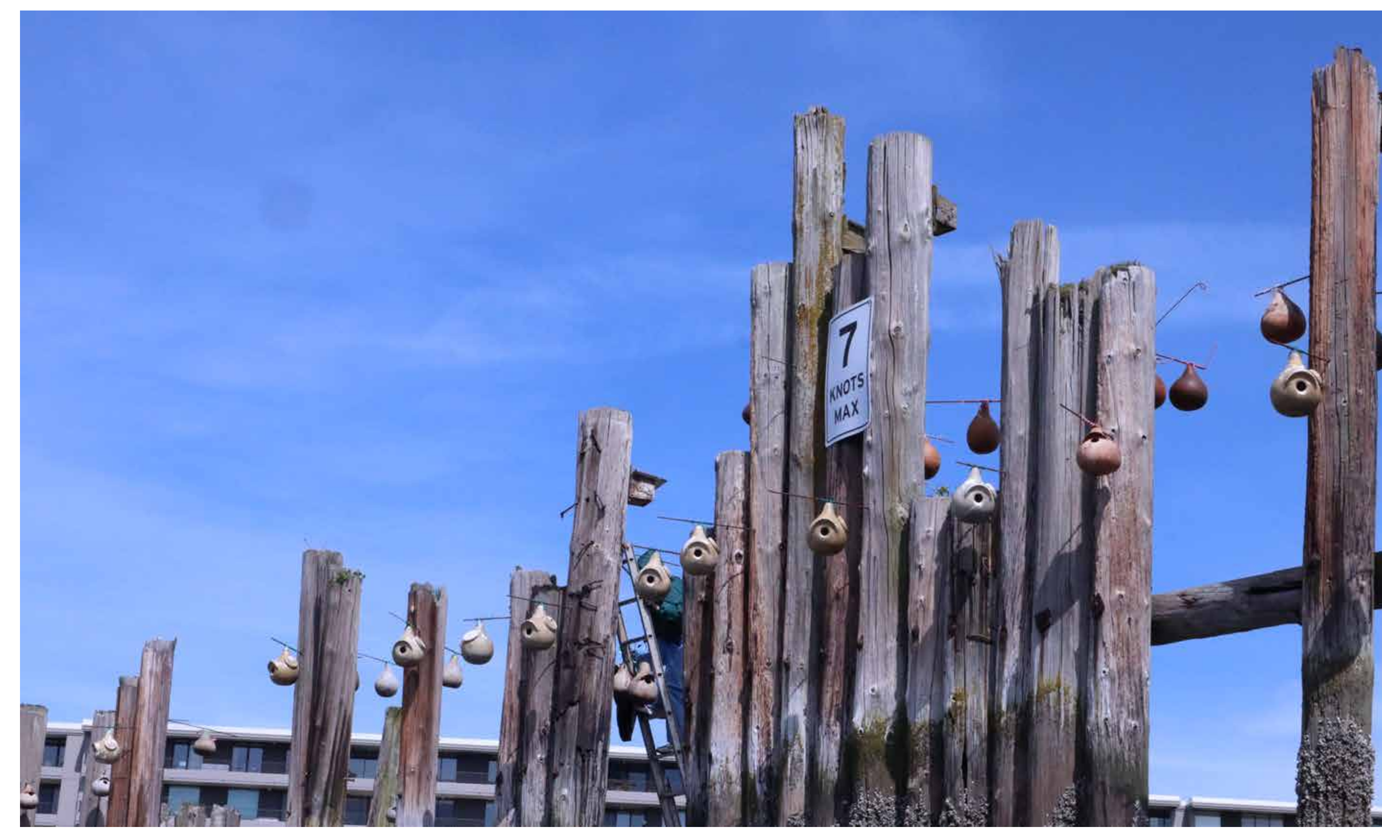


Figure 8. Point Shilshole Beach nest piling

gourd, then hand it to a second volunteer who cleans it at the water's edge. Cleaning clears out all of the previous season's material, including decayed twigs and debris, to prevent parasite proliferation that would threaten the nestlings. This step also requires careful personal protection. The volunteers need to wear gloves, long sleeves, rain gear, and a protective suit because of mites in the old nests. The volunteers also record any nestling carcasses that remain from the prior year. They then sort and log each gourd, noting which ones were occupied the previous season and which ones never did. Finally, after the recording, they hang the cleaned gourds back in their original positions to complete the site's annual maintenance.

Figure 9. Volunteers remove the old gourd nests

Figure 10. Classification of occupied/ not-occupied nests

Figure 11. Volunteer cleaning the gourd

Terminal 105

The second active nest is located at Terminal 105, now known as t̓uʔəlaltxʷ (toolalt) Village Park and Shoreline Habitat. It lies along West Marginal Way SW on the west bank of the Duwamish Waterway. The site is part of the Duwamish River Intertidal Habitat Restoration Project, a restoration effort that re-established intertidal and shoreline habitat in this heavily industrialized area of the estuary. Similar to the other active sites, the nests here are gourds hung on pilings over water, with the pilings spaced apart from one another and set some distance from the bank.

This is the most industrial site of the active nest areas. Although it functions as a small park, its entrance is fairly hidden, surrounded by industry and set some distance from the nearest residential area. As a result, human activity here is minimal. During the observation, there were rarely any people observed. The site also contains some older nest boxes alongside the gourds. Compared with Point Shilshole Beach, it makes for a much quieter observation setting. However, it remains unclear how the surrounding industry affects the site during active working hours.

Figure 12. Old nest box

Figure 13. Terminal 105 gourd nest colony

Figure 14. Nest piling in the water

Kellogg Island

The third active nest is located at Kellogg Island, a separate island within the həʔapus Village Park & Shoreline Habitat on the west bank of the Duwamish Waterway. Like Terminal 105, it sits among heavy industry, but the context serves a more balanced setting than either Terminal 105 or Point Shilshole Beach. The site has large areas of greenery and parkland along the bank side. Since it is close to a residential area, more people come here to walk or picnic. It provides a quiet and beautiful space, and the variety of other birds shown in the area suggests a successful habitat restoration site.

The nests follow the same approach as the other sites, with gourds on pilings placed along the island's west bank. There are a considerable number of them, and they are easy to observe directly from the park side of the bank. During the last observation in mid-May, some of the early-arriving Martins had already returned to the site.

In later correspondence, one of the volunteers offered a possible explanation for Jack Block Park's lack of appeal. The two sites are close to each other, and because Kellogg Island offers a larger colony space, and Purple Martins prefer to nest alongside a large colony, the birds tend to choose Kellogg Island over Jack Block Park (personal communication, 2026).

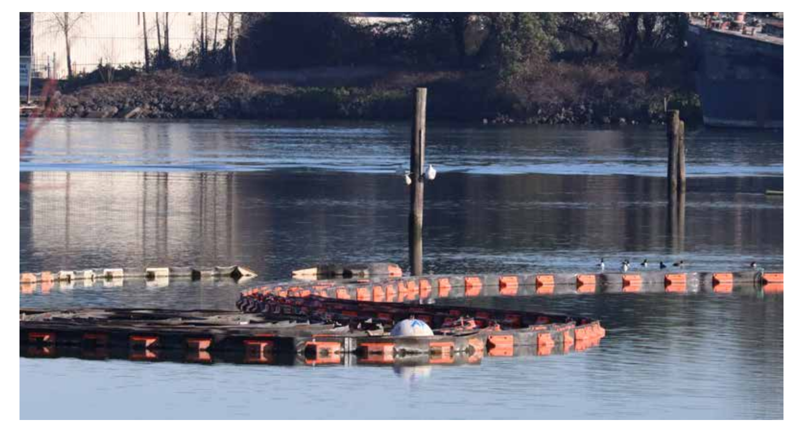


Figure 15. Nest piling near Kellogg Island

Figure 16. Industrial context of Kellogg Island

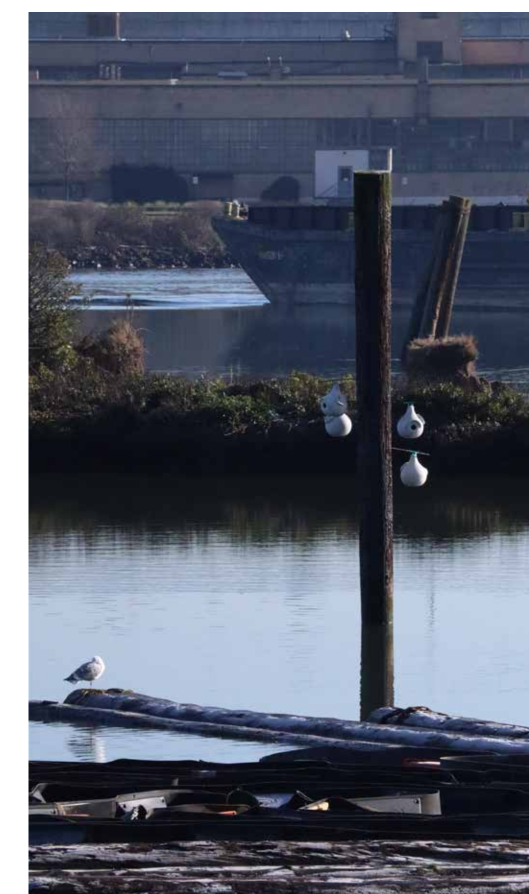


Figure 17. Gourd nest on the piling

4.3 Methods

Firstly for information collection, a qualitative interview with members of the King County Purple Martin Conservation Program is one of the significant methodologies. The program is small and volunteer-run, with a core group of roughly five to six people in the Seattle area. The interviews engaged four members of the program, including a representative from the Washington Department of Fish and Wildlife. Most interviews took the form of an online group meeting, organized around a prepared set of questions on the program's history, site and nest-box selection, maintenance practices, occupancy, and the species' behavior. One member could not attend the meeting and answered the same questions in writing by email (personal communication, 2026). These accounts inform the project in several ways, from the reasoning behind site and nest-box choices to the long-term maintenance practices that later shape the adaptive side of the design.

The second kind of information comes from field observation at the four sites. Equipment limits and site inaccessibility limited formal surveying and physical measurement. Therefore, close visual assessment and the volunteer maintenance session at Point Shilshole Beach provide more detailed information. These visits documented the condition of the nests and identified the features the sites share as well as the points where they diverge: the type of housing, its position on the pilings, its relationship to the water and the shore, and the surrounding open space. Observations of this kind establish the visible conditions of each site and render the active and inactive sites directly comparable.

Additional species-specific information comes from documentary and online database sources, including the report Purple Martins along the King County Marine Shoreline (Power et al., 2014), the Purple Martin Conservation Association's housing guidance, and related published and reference materials. These sources supply the quantitative habitat parameters, such as entrance dimensions, spacing, and clearance distances, that visual observation alone cannot provide. Because dedicated research on the Western subspecies remains limited, some parameters come from information on the species as a whole, then interpreted against site conditions and the volunteers' firsthand accounts.

4.4 Findings: Shared Ecological Demands of Active Sites

Comparative analysis of the three active sites reveals shared design features that align with Western Purple Martin habitat requirements. The most significant is overwater nest placement, with all gourds mounted on pilings in the water and spaced well apart. This configuration serves several ecological functions. First, proximity to water provides access to dragonflies. This is the biggest factor in the Martins' choice of site, a point that program staff confirmed directly (personal communication, 2026). Second, the water creates a physical barrier that limits human disturbance while still allowing visitors to observe the birds from adjacent park areas. Third, the overwater location provides the expansive open space the species needs. As aerial insectivores that spend most of their time in flight, these birds need unobstructed approaches for landing and takeoff. They also avoid sites crowded with trees or tall shrubs. The Purple Martin Conservation Association's housing guidance recommends specific placements for nest structures. They suggest a distance of at least 30 feet from human houses and 40 to 60 feet from trees (Purple Martin Conservation Association, n.d.). Additionally, sites located away from known raptor nests are most successful, since the birds avoid structures that predators use as perches. These raptors include eagles, merlins, and Cooper's and sharp-shinned hawks (personal communication, 2026).

The nest's success is not only about location but also nest design. All three active sites hang gourds around 10 to 20 feet above the water, which also keeps nest density within the range the Western Purple Martin prefers. The program has gradually moved from traditional nest boxes to gourd-style housing, and increasingly from natural to plastic gourds. Some volunteers mentioned (personal communication, 2026) that the early nest boxes tended to be occupied by house sparrows and starlings. There are some strategies to protect the Martins from competing species such as European Starlings (Sturnus vulgaris) and House Sparrows (Passer domesticus). The wobbly gourds are less attractive than rigid boxes to these competitors, which raises the occupancy rate for Purple Martins. Beyond the shape, the size of the entrance hole is another important part of the design. The volunteers (personal communication, 2026) mentioned that the Western subspecies has a larger body, so the birds prefer a bigger, round opening rather than the traditional half-circle one. They also keep the gourds without porches, because this feature can draw in other birds, and even predators. The nest walls need to be thick and block out light for the interior climate, because a transparent wall creates a greenhouse effect that can kill the nestlings. White paint and ventilation help lower the heat inside, and plastic or metal housing should add attic insulation. Martins also need elevated perch structures where they can rest, preen, watch for predators, and survey the colony (Purple Martin Conservation Association, n.d.). The species can also nest in natural cavities, and they even prefer the natural habitats rather than artificial ones (Midpeninsula Regional Open Space District, n.d.).

As colonial nesters, Purple Martins prefer sites where multiple nest structures sit with adequate spacing between them. They need large open spaces or areas near water that provide clear flight corridors for foraging and approaching nest sites (personal communication, 2026). These shared requirements point to the key principles of successful habitat design: ensuring access to open space, safe nest structures, and regular maintenance, regardless of whether the site relies on natural snags or artificial gourds.

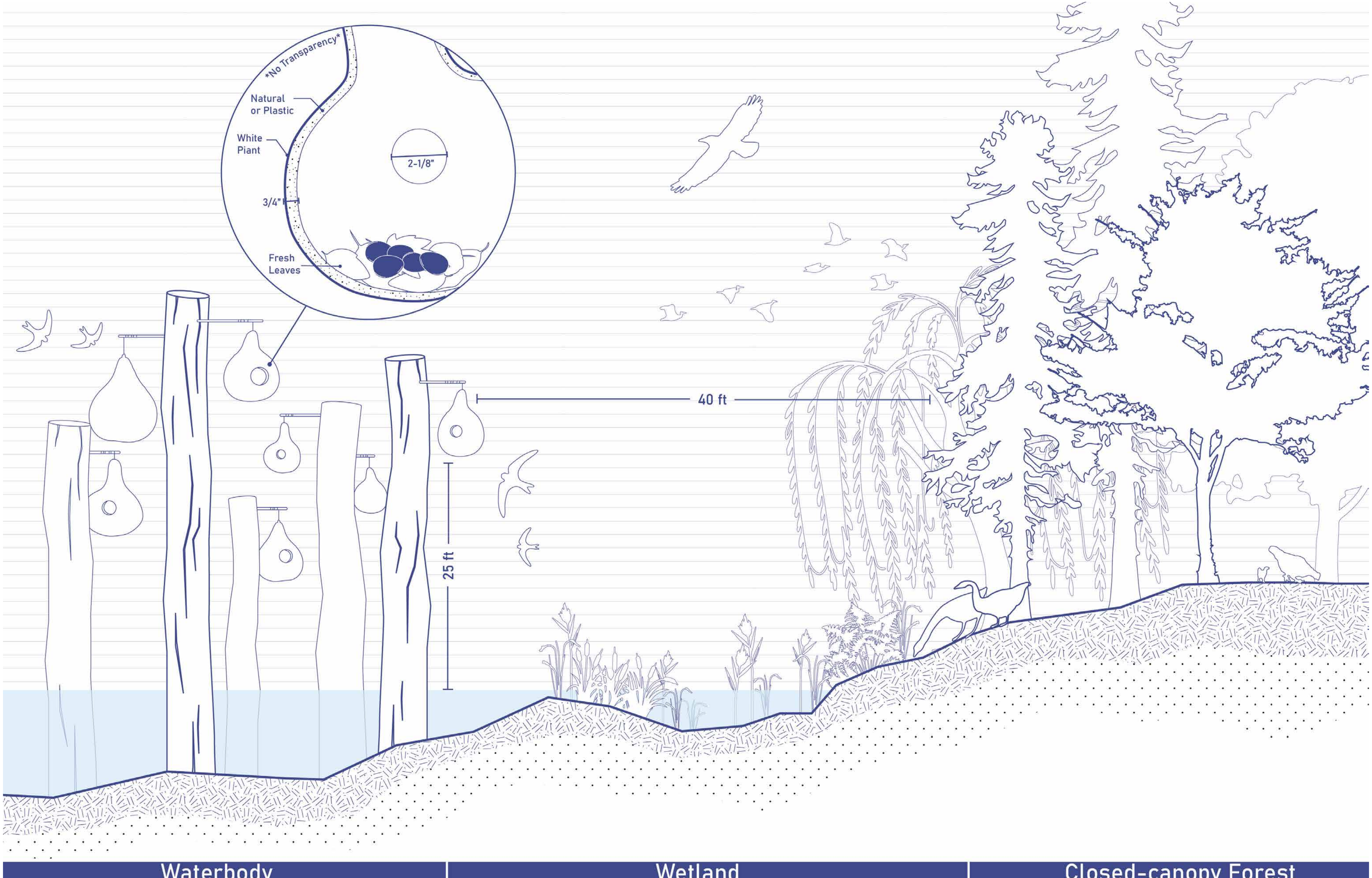


Figure 18. Purple Martin nest demands parameters

Chapter 5: Site Analysis and Design Studies

5.1 History of Jack Block Park

Jack Block Park is located on a site with an industrial history. In the early 1900s, a wood-treating plant and a shipyard operated here, and the creosote from the wood treatment heavily contaminated the ground (Port of Seattle, n.d.). The U.S. Environmental Protection Agency designated the area a Superfund site in 1994, and ownership of the land moved to the Port of Seattle for remediation and redevelopment as part of the Terminal 5 project. Originally named Terminal 5 Park, the park opened in 1998 and was dedicated in 2001 in memory of former Port Commissioner Jack Block (Port of Seattle, n.d.).

HBB Landscape Architecture (n.d.) designed the area and turned it into a park, providing public-access improvements, buffer plantings, and shoreline habitat design. The cleanup effort included removing contaminated mud and wood pilings and capping roughly 58 acres of sediment (Port of Seattle, n.d.). After years of cleanup, the park's beach opened to the public in 2011 ("Beach Access Opening Celebration," 2011). Today, the park functions as a popular waterfront destination with a beautiful view of the Seattle skyline. Its barrier-free trail connects to the Alki Beach Trail and the Duwamish/Green River Trail (HBB Landscape Architecture, n.d.), and it has become a popular activity space for the surrounding neighborhood.

Figure 19. Industrial context of Jack Block Park

5.2 Site Conditions and Failure Analysis

Compared to the other three sites, Jack Block Park has the most visitors. This brings more opportunities to foster the kinship between Purple Martins and humans. Across three site visits, the park stayed consistently busy. The park provides a suitable area for multiple activities such as walking, fishing, dog-walking, or skateboarding, and the accessible trail allows older people to enjoy the area. With the accessible beach, some visitors carried kayaks and paddleboards down to use there. In general, the park serves as an important and successful outdoor space of the surrounding neighborhood. Meanwhile, with the abundance of vegetation, it also supports a great range of non-human species

However, the site is no longer supporting active nesting for the Purple Martin. The observation and site analysis suggest several reasons for this. The first potential reason concerns both the location and the present condition of the pier that holds the suspended gourds. As its wooden structure aged, the pier closed in 2020 over safety concerns (Port of Seattle, n.d.). This closure made the cleaning or maintenance of the nests a problem. The eastern side of the pier is also close to dense trees. With the growth of vegetation over the years, it potentially blocks the flight paths that Purple Martins require.

Secondly, analyzing the ecological strata and vegetation diversity across the site shows a shortage of habitats capable of supplying the prey that Purple Martins need. Dragonflies, for instance, rely on wetlands and reed beds for breeding. The range of plant species likewise fails to establish a reasonably complete food chain. This lack of a diverse food web at the site might bring less attraction to the Purple Martin.

Finally, unlike the other three locations, this park never offered piling structures with gourds over the water. The surroundings were affected by industrial pollution, and creosote clings to the wooden pilings. These conditions may explain why this kind of structure was never built on the site. However, the site still contains enormous potential for bringing the connection with non-human species. Therefore, this research wishes to use design as a proposal to relieve the failure and bring Purple Martin's attention back to this place.

Figure 20. Pier closure bulletin

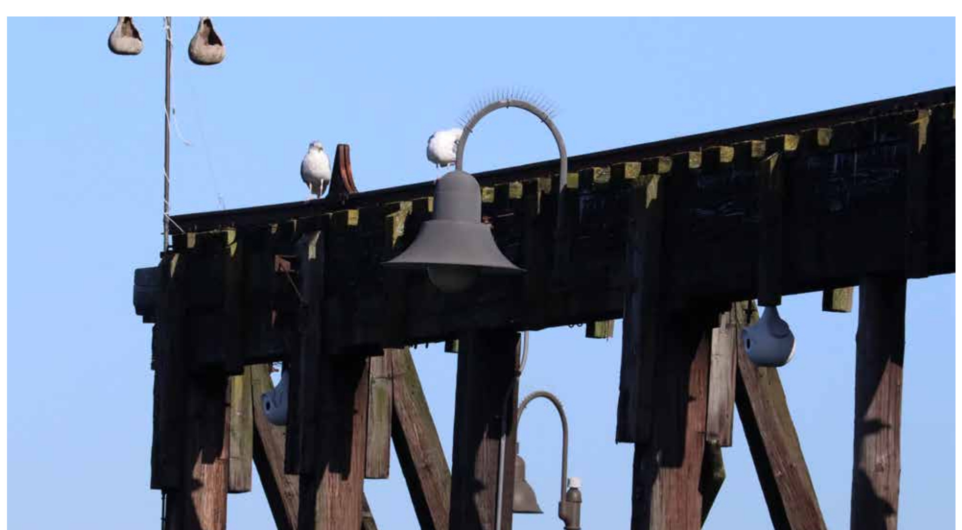


Figure 21. Old unused gourd nests on pier

5.3 Redesign Strategy

Following the site analysis, the design chose the open beach area at the center of the park as the section for redesign. This decision adheres to the principle of minimal disturbance to the original site, since the area has few trees. It also meets the basic needs of the Purple Martin, such as being adjacent to water and having a large open space that keeps an unobstructed flight path. The original wooden pier is already slated for removal, which the government is planning through research. The design therefore considers reusing the material and demolishing the pier to make room for the redesigned area layout.

The overall design approach sticks to the two dimensions of ecological requirements and sensory kinship. It offers six specific strategies: the sound mirror pavilion, the roost pavilion, the observation stair, the nest colony, the buffer area, and the ecological layers. These strategies will interweave and reinforce one another to create a space where people and martins can coexist and make a connection with each other.

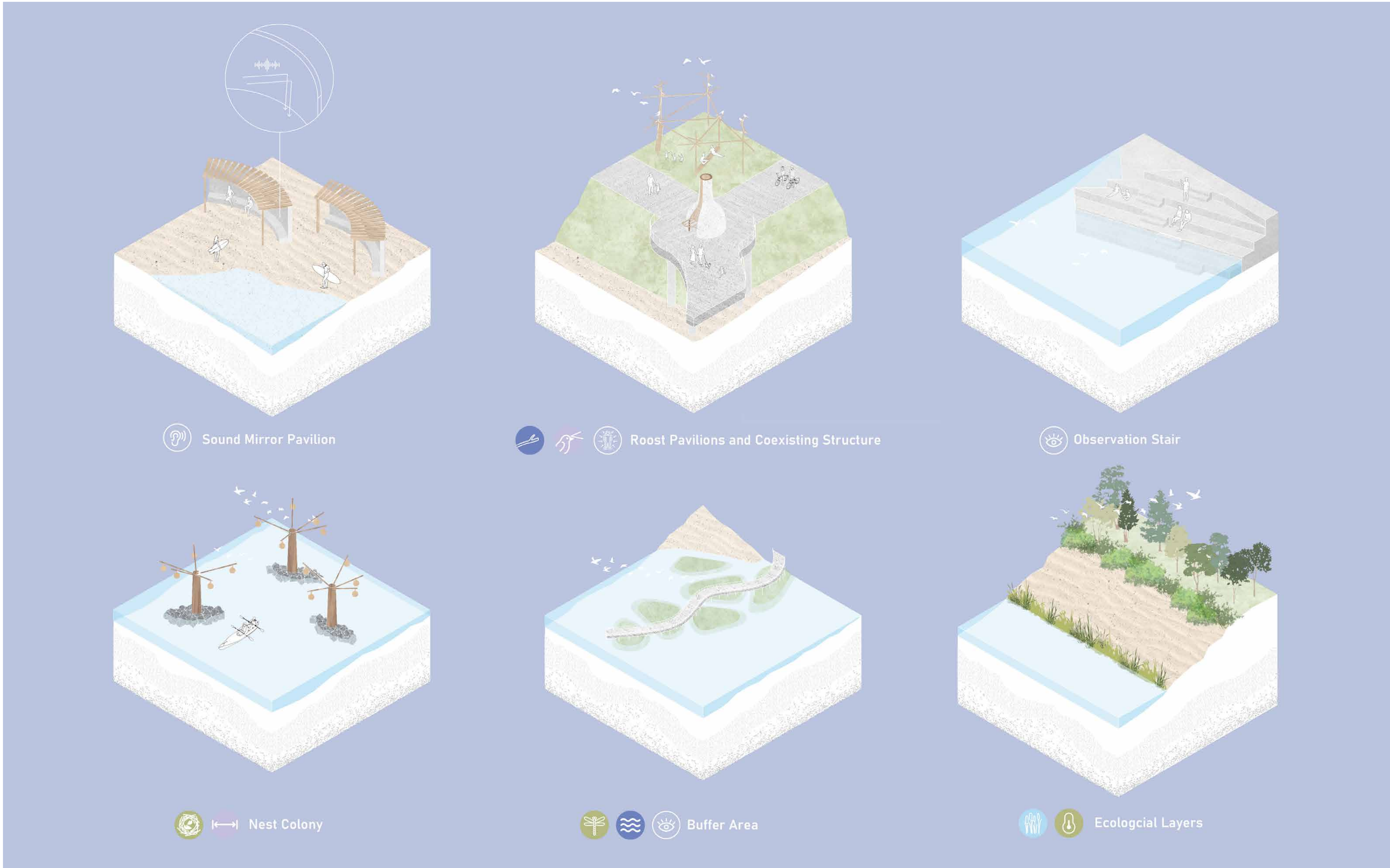


Figure 22. Design strategies

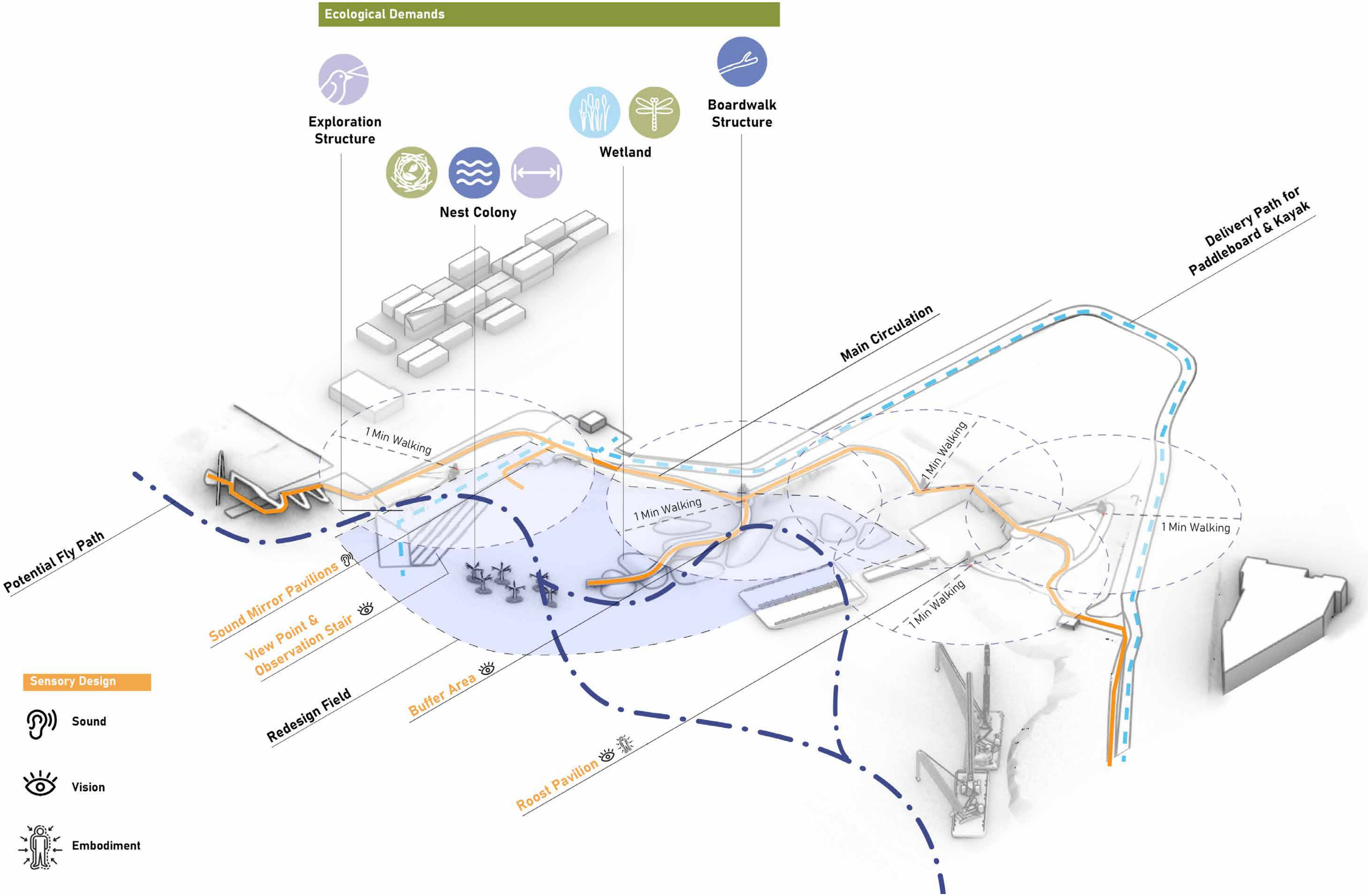


Figure 23. Masterplan

5.3.1 Ecological Strategies

Closest to the shore, the redesign places a buffer area that combines a boardwalk and a wetland. The wetland provides the most ecological importance, since it rebuilds the layer that the site lacks most. The wetland supplies a habitat for dragonflies, which form the Purple Martin's primary prey web. It also screens the nesting area from the adjacent industrial zone and filters water. The boardwalk hanging over it gives people a place to approach the martins at a moderate distance without entering their space, while giving the martins a structure to rest on at times. The buffer area meets both the observation connection of humans and an ecological purpose at the same time.

Furthermore, the design sets a nest colony over the water. Its spacing matches the distances that the Purple Martin prefers and provides different layers of habitats. The base uses rock to prevent creosote and other pollutants from gathering as they would on a wooden piling. The rock also offers shelter for fish, shrimp, and other underwater life. The middle part reuses snags collected from the beach and the surrounding area to provide a natural nesting option for the martins. The top adopts timber salvaged from the demolished pier and shapes it into branch-like supports for hanging gourds. These upper parts can be detached from the structure for easier cleaning and maintenance. The design intends the nest as a middle ground between the natural and the artificial. It keeps the familiar gourd while reintroducing the snag, so it can gradually guide the Purple Martin to choose nesting in natural cavities. Because the colony stands above the water, people who kayak or paddleboard nearby can also observe the birds at close range.

Beyond these two strategies, the third strategy spreads across the whole site through planting. The analysis showed that the park particularly lacks wetland and riparian shrub layers that would make a continuous ecology, so the plant design adds to the diversity of native vegetation species across these zones. Even though the Purple Martin does not use these plants directly, the richer planting sustains the insects it depends on, and it raises the overall biodiversity of the site as well.

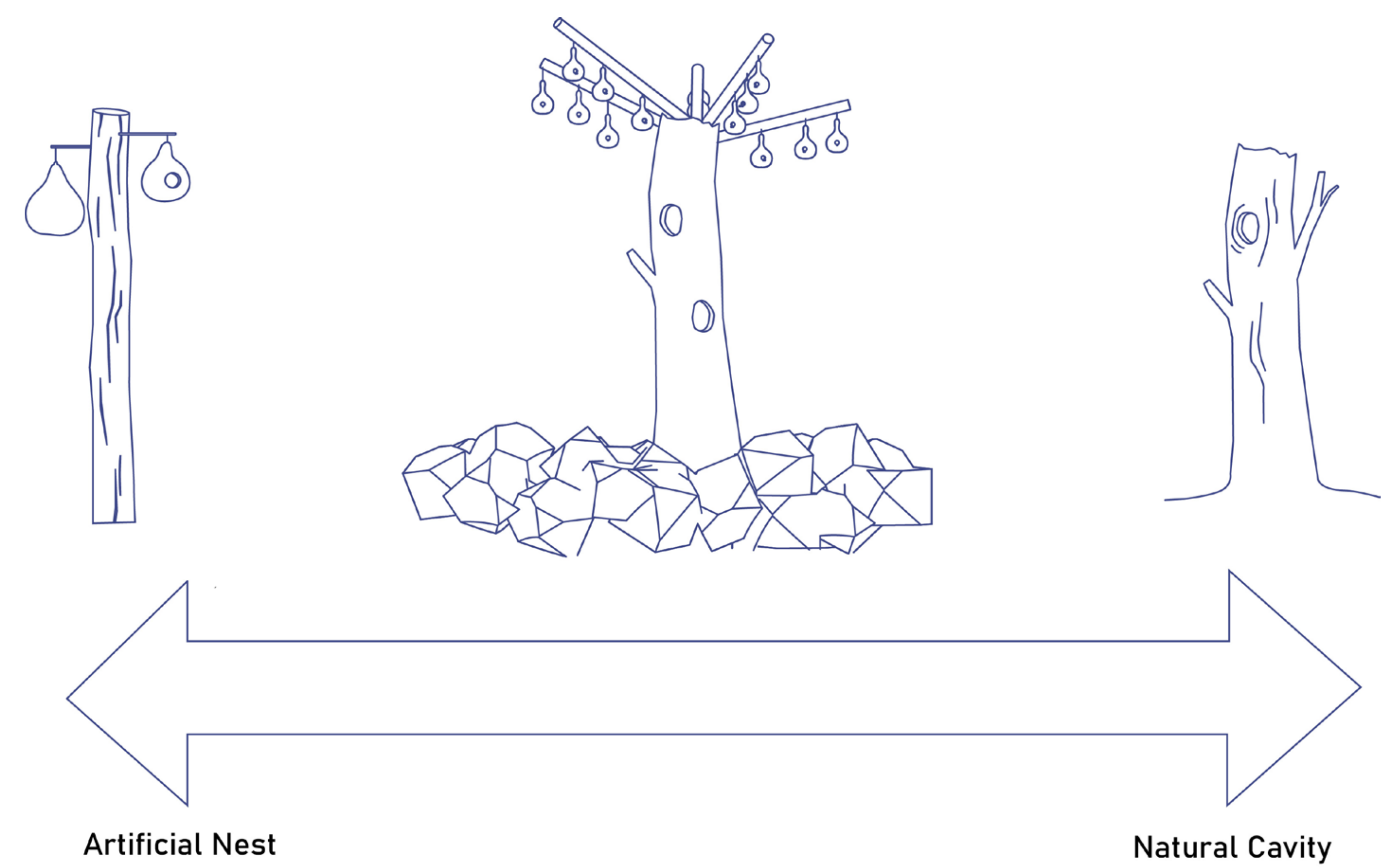


Figure 24. Nest design concept

Figure 25. Nest colony

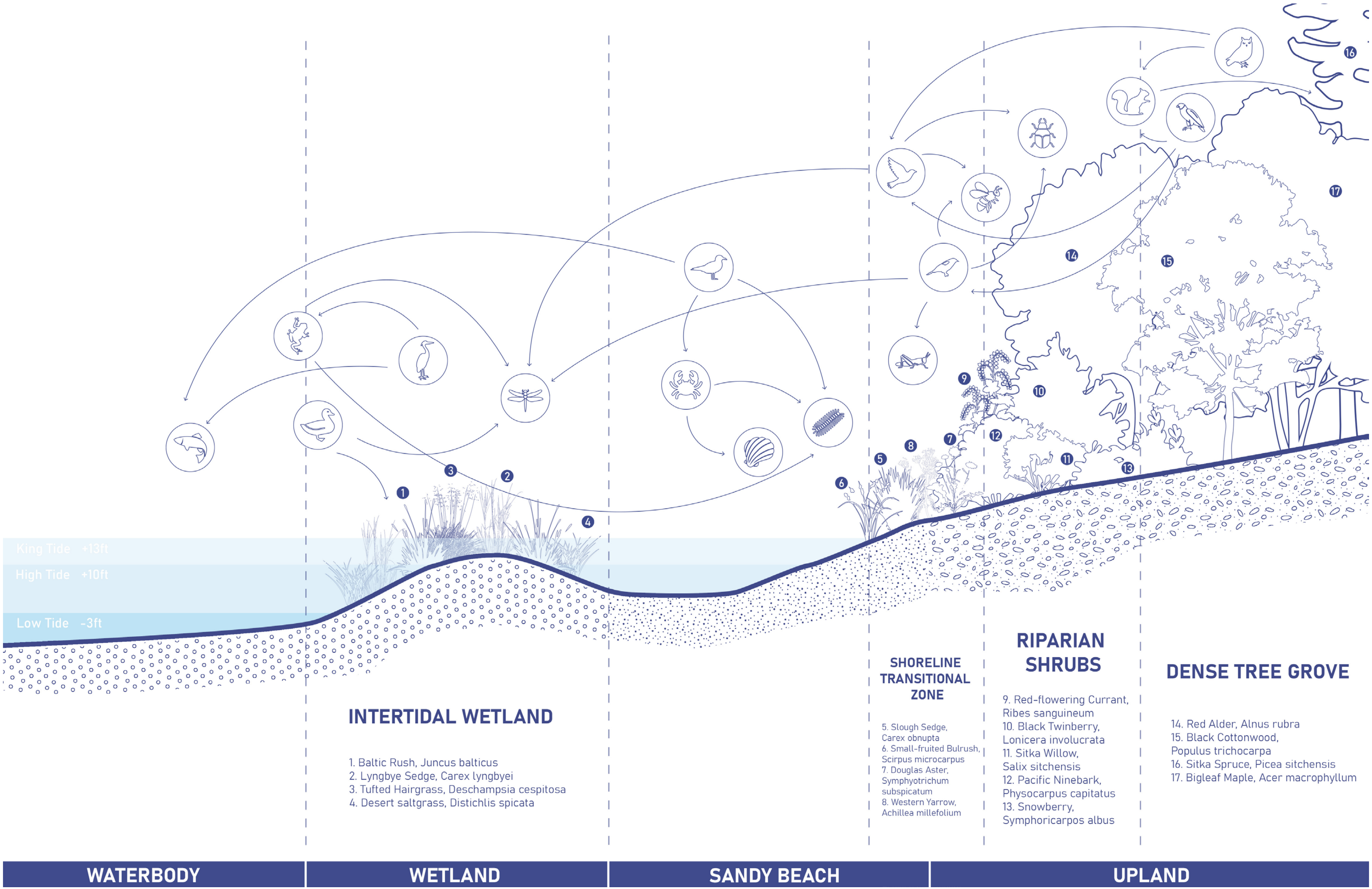


Figure 26. Ecological layers and multispecies support

5.3.2 Sensory Strategies

The other three strategies turn to sensory kinship and create ways for people to notice, observe, and make a connection with the Purple Martin. Sound is easily ignored by us in daily life. It usually serves as a background rather than catching attention as sight does. However, sound is important to birds in their lives, and their calls usually contain numerous pieces of information for communication. The Purple Martin's call is also more distinctive than the calls of many other birds, which makes them easier to recognize. Based on this feature, a sound mirror pavilion is designed with curved walls for reflecting and amplifying those sounds. It also works as a shelter for resting and encourages people to hear and feel the calls of the martins more clearly. In this sense, the pavilion does more than amplify sound. The Purple Martin's call is the bird's own active signal, and the pavilion turns that signal into something that attracts people's attention and starts to follow.

For better observation of martins, except for the boardwalk and observation stairs by the bank, a coexisting structure tries to provide vertical space that serves both birds and people. Depending on the research, Purple Martins need elevated structures to observe their surroundings. Additionally, the perch-shaped structure and cables will be easier for any bird species to grab and rest on. The design considers this need with a structure of poles and cables that gives the birds a high, open place to perch and survey the area. Martins can also stop and gather as they arrive before breeding and before migration. On the ground level, the structure provides both bench structures for stability and an area for people to have some rest. This structure creates two layers in the vertical direction to make the connection between humans and birds without disturbing each other. Rather than framing the martin as a distant spectacle, it places people within the same space the birds use to perch, gather, and survey before migration. Human presence and bird presence become part of one shared site.

Another structure, the roost pavilion, mainly provides an embodied experience for humans. The design of the pavilion form is inspired by the shape of a gourd, and the round opening at its top imitates the entrance of a nest. A visitor enters the space, lies in the hammock inside, and looks up through the opening at the sky and at any birds that may pass overhead. The hammock adds a gentle swaying motion. Because the pavilion is semi-open, visitors can also feel the wind moving through the structure. These sensations approximate the sense of what a bird might feel in flight, and they bring the visitor briefly into the species' own experience of the place. This embodied register works differently from sight or sound. Instead of observing, the visitor is briefly invited into the Martins' sensory world. The relationship it builds is one of imaginative identification: a felt, bodily approximation of how the site might be inhabited from a non-human point of view. However, the pavilion does not make visitors truly become birds. It is a human projection of that experience, shaped by human bodies and human imagination. The strategy provides an approach of unsettling the assumption that the site is organized solely around human perception.

Figure 27. Coexisting structure

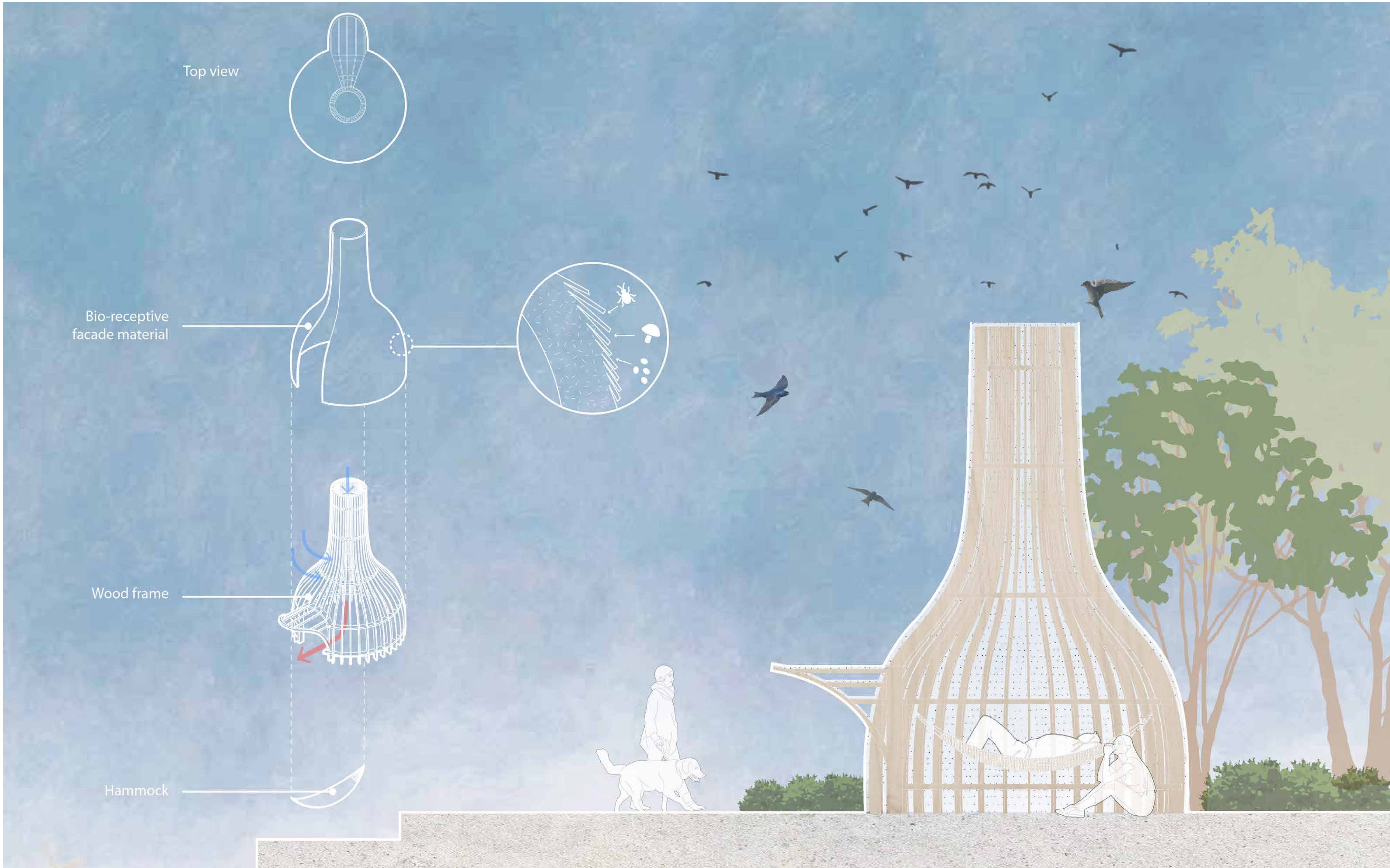


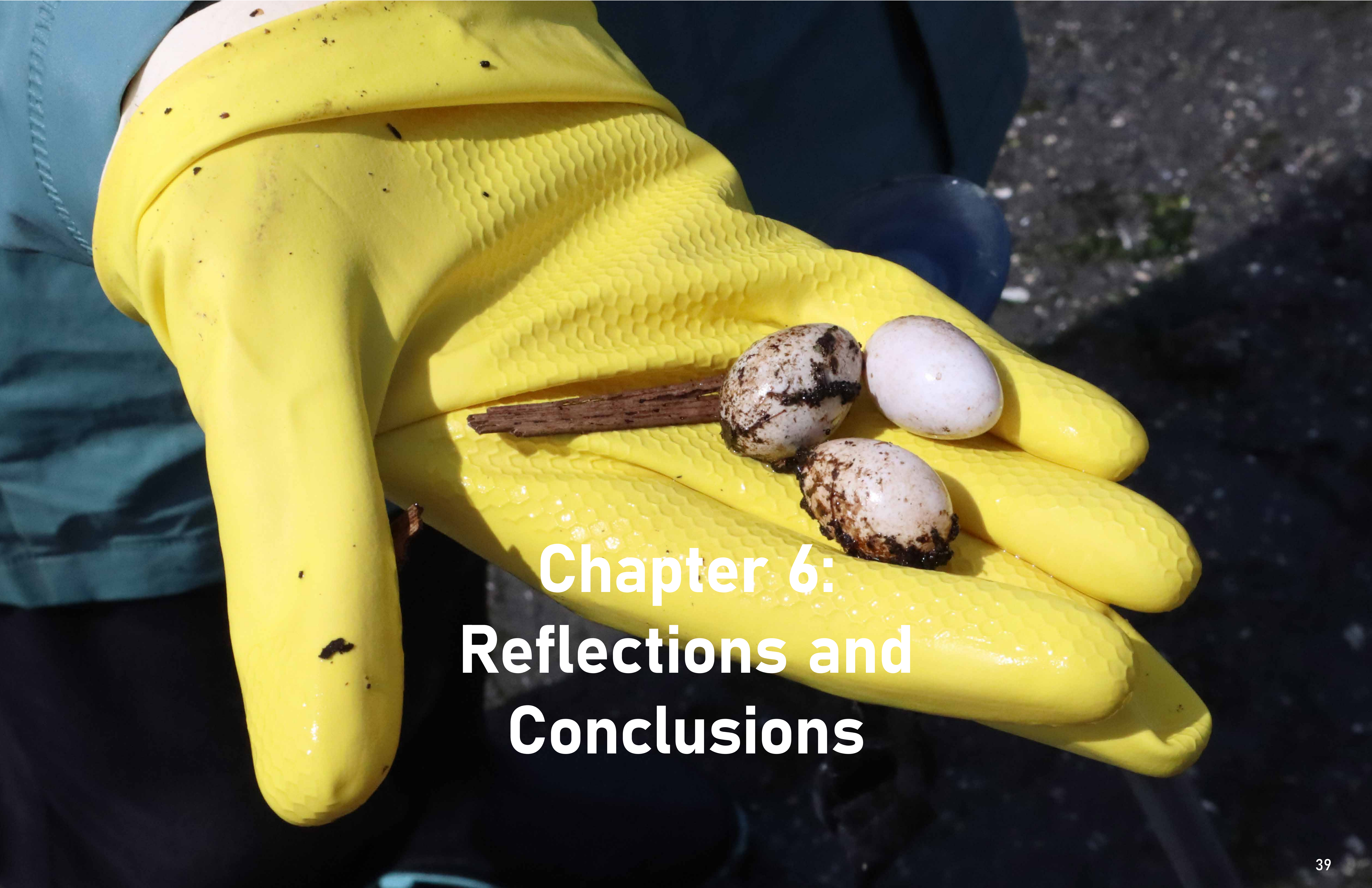
Figure 28. Roost Pavilion

5.4 Evaluation

Resilience describes a projected future rather than a present state. In addition, the Western Purple Martin is present only seasonally and the design is not built. For these reasons, this evaluation proceeds through cross-site comparison and framework-based criteria rather than direct observation. The three layers, Ecological Demands, Sensory Kinship, and Habitat Resilience, offer evidence of decreasing certainty, and the assessment treats each accordingly.
For the Ecological demands, depending on the parameters provided from the three active sites in Chapter 4.4, the design meets the Western Purple Martin's core nesting requirements. The nest colony places gourds over water at the spacing and height the species prefers, on a rock base that avoids the creosote problem identified at the original pier. The open beach location keeps flight corridors clear and maintains distance from trees, satisfying the clearance the species needs. The buffer wetland directly rebuilds the dragonfly prey web, whose absence is identified as one of the site's central failures. Of the three layers, this is the one the design most concretely satisfies.
For the Sensory Kinship, since the design is unbuilt and the birds are seasonal, it cannot be verified within the scope of the study. What the evaluation can establish is that each sensory strategy works through a distinct perceptual register. The sound mirror pavilion works through hearing, the coexisting structure through sight and co-presence, and the roost pavilion through embodied experience. It can also establish that these strategies differ from the mitigation and habitat-provision precedents reviewed in Chapter 2.6. Rather than being only organized around human usage, they are organized around the bird's active signals. Whether this perceptible presence deepens into a lasting sense of obligation is a projection the design can support but not guarantee.

For Habitat Resilience, because resilience is a projected future, it is assessed through the three criteria set out in Chapter 3: adaptive capacity, ecological continuity, and maintenance sustainability. The design builds in adaptive capacity through the snag–gourd hybrid colony, which retains the familiar artificial gourd while reintroducing natural snags as a gradual path back toward natural-cavity nesting. It supports ecological continuity through the wetland and expanded native planting, which reconnects the food web and raises site-wide biodiversity rather than serving the martin alone. Its maintenance sustainability rests on reused pier timber and detachable upper gourds that ease the labor-intensive cleaning the volunteers described. Additionally, the willingness of people to sustain that care is itself a condition of resilience, and this willingness is cultivated by Sensory Kinship. The relational layer is therefore not separate from the resilient habitat but one of the things that keeps it alive.

However, habitat resilience is the most speculative of the three layers. The design embeds the conditions for it, but whether the Western Purple Martin will ever resume nesting in natural snags, and whether the site's ecology can sustain itself without continued human care, are outcomes this thesis can prepare for but not demonstrate. Resilience here names a direction the design works toward rather than a state it achieves.



Chapter 6: Reflections and Conclusions

6.1 Intentions and Outcomes

The ecological dimension was the part I came to understand most closely. The Western subspecies is specific enough that even the online data is limited, so the material I gathered was never complete. However, this information-gathering process also impacted a lot. Talking with the volunteers and watching the birds at the sites gave me a fuller sense of the species, and through that growing familiarity, I began to feel the kinship the framework describes. Ecological and relational aspects always overlap with each other in this research. It also provides the evidence for the thesis: attention to a species' needs can become the beginning of kinship.

The relational kinship dimension was more challenging. From my own experience, kinship begins with small acts of observation, and I believe the design can support it in some aspects. However, from observation to a lasting sense of responsibility for a non-human species cannot be secured through design. The design strategies in the research provide a bridge for the connection between Western Purple Martins and humans.

The resilience dimension raised the questions I found hardest to genuinely figure out. If the volunteer program's small group can no longer continue, where does the future of the species lie? Similar to the volunteers, I hope the Western Purple Martin can one day return to natural nesting, but how could this future be really achieved, only with the effort of design? And if humans were absent altogether, could a species that has come to depend on us survive? The difficulty traces back to people, since it was human impact that removed the habitat and the snags the birds rely on. This leaves an open question the design cannot resolve on its own: whether people should now intervene to help an ecosystem recover the resilience that people first took from it.

6.2 The Difficulty of a Non-Human Perspective

The chosen methods shaped what this thesis could answer, and the hardest limit appeared in the act of designing itself. Reaching a genuinely non-human perspective is difficult. As a human designer, I found the hardest part to be imagining how a bird actually lives and understanding its true needs. It remains an open question how designers can truly speak for those who cannot speak, without imposing our own assumptions onto them.

A second limit traces back to the designer's own training. The process revealed how hard it is to turn the habits of a prior education toward a design that must move beyond the human center. This thesis is, in part, an honest account of where that effort met its limits, and the attempt still taught me a great deal about understanding a non-human species as closely as possible.

6.3 Contributions

Within these limits, the thesis makes several contributions. First, it develops a two-pillar framework that joins Animal-Aided Design with Kincentric Ecology, addressing the gap identified in Chapter 2.7. Second, it tests this framework on a real inactive site, Jack

Block Park, rather than leaving it as a theory. Third, and most central to the framework, it connects Sensory Kinship to Habitat Resilience as a single chain: the attentiveness that forms when people notice the birds is what sustains the human care their survival now depends on.

Although many questions remain, the value of the research lies in moving beyond what the design proposes and the importance of multispecies design thinking. As more designers, researchers, and members of the public begin to ask why a non-human perspective matters, that question itself reshapes how people understand their responsibilities toward other species and brings more participants into the effort. This thesis is one small part of that larger conversation, and it argues, above all, that such inquiry should continue rather than stop. To move design beyond its human center is not a problem to be solved once, but a direction the field must keep pursuing.

6.4 Future Directions

This thesis reached only part of what its subject asks, and the gaps it leaves mark out what should come next. Considering the research's time constraints, there are still several questions that remain open.

The first is whether the martins will actually return; only building the design and monitoring it across seasons could show whether the reading of the birds' needs holds up. A second concerns colony size and competition. Because Purple Martins prefer to join larger colonies, the volunteers suspected that nearby Kellogg Island draws birds away from Jack Block Park. This assumption raises a difficult question: whether a site can ever attract martins while sitting in the range of a bigger, established colony around. A third is how sensory kinship might be measured at all, since this study cannot confirm that a relationship forms. A fourth is the continuity of care: the program rests on a small, aging group of volunteers, so the assumption that public attention will convert into lasting stewardship has not been proven. A fifth concerns the framework's transferability beyond this single species and site. The framework depends heavily on the Western Purple Martin's particular reliance on human-built and human-maintained nests. For species that do not rely on ongoing human care, the framework would need to be adapted rather than applied directly. The approach may translate most readily to other synanthropic species whose habitats are already sustained through human intervention.

The question of scale extends further since this thesis operates at the scale of a single site. Habitat resilience for a migratory species ultimately depends on a network of breeding sites, migratory stopovers, and overwintering grounds, each shaped by different pressures. Whether the site-scale strategies developed here could inform a larger, networked approach to multispecies design remains an important direction for future work.

6.5 Closing

This thesis began by asking how design changes when a species is treated as kin and collaborator. After designing for the Western Purple Martin, the question seems harder, and more worth asking, than it did at the start. To invite a species as kin asks the designer to imagine from a non-human perspective, and the limits of that effort surfaced at every stage. What this thesis offers is a beginning rather than a conclusion; many questions remain for future study, but the attempt is still worth making. The design does not promise that the martins will return, yet it prepares the conditions for their return and makes their presence something people can notice. Ultimately, we are not above nature but one part of it, sharing this earth with species like the Western Purple Martin. Only by respecting them, and by recognizing the entanglement that binds our lives to theirs, can we truly achieve a coexistence in the future.

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Appendix - Interview Transcript

"Purple Martins Along the King County Marine Shoreline: Citizen Conservation Efforts" program people interview
Interviewee: Jean Power, Carl Bevis, Kimberle Stark, Christopher Anderson (WA Dept. of Fish and Wildlife)
Year: 2026

I. About the Program

1. Program Origin and Motivation

Q:What motivated the creation of this program?
A:
- There were thousands of Martins in the area in the 1960s, but they seemed to disappear in the 1990s. Around 30 years ago, one of Jean's colleagues, Kevin Li, who was a birder and an environmentalist, felt sad about this disappearance in the King County area. He started to build the nests in Seattle for the purple martin and invited Jean to volunteer for help. Surprisingly, Martins started to show up in these new houses in the first year of the program, and it was really encouraging. However, Kevin passed away in a scuba diving accident around five years later. The rest people felt they should continue this program, so they have kept maintaining these artificial nests until today. Around 10 years ago, Jean fragged Carl, her husband, into the program as well. Since most work is on top of water, it is not that easy to do. Chris and WDFW also started helping them out with their boat because these volunteers do not have their own boat. They still continue doing the monitoring and maintenance of these nests; they have around 5-6 people in the core group of volunteers for the Seattle area.
- 20 nests in the 90s and have around 100 nests right now, volunteers need to prepare nests before March to April. around 50%-80% nests will be used in the breeding season. These people also keep trying to add more locations for the nests.
- They're such a great watchable wildlife species because their call is really recognizable.

Q:What core goals or issues was the program intended to address?
A:
- To restore Purple Martins to King County by providing suitable nesting habitat, especially enough nests.
- To compensate for the loss of natural cavities and snag habitat in urban environments.
- To prevent native species from being displaced or lost due to competition with non-native cavity nesters such as European starlings and house sparrows.

2. Participation and Involvement

Q: Why did you decide to participate in this program?
A:
- Kim was friends with Kevin and helped him get gourds

ready and do site maintenance. Kevin's love of martins was infectious, and it was easy to get sucked in and want to help this species.
- Participation continued because the work felt meaningful, successful, and rewarding, especially when Martins occupied the nests in the first year.
- After the original organizer passed away, volunteers felt a responsibility to continue the program.

Q: What role do you play in it?
A:
- The program is entirely volunteer-run.
- Roles include preparing gourds, installing and removing nests, cleaning and maintaining housing, monitoring nesting activity, and coordinating logistics such as tides, weather, and boats.
- Some volunteers provide boats and technical support through Washington Department of Fish and Wildlife (WDFW).
- When Kevin was alive, Kim was one of the several people who helped him get gourds ready and would help put them up. After he died in 2006, Jean Power, her husband Carl and Kim took over maintenance of the existing PUMA sites and have expanded sites. Along with Jean and Carl (and a couple others), Kim purchases natural and plastic gourds, gets them ready, and then clean gourds out from the prior nesting season and replaces them with clean gourds.
- Kim also helps with looking for new locations and does monitoring during the nesting season to see how they're doing.

3. Continuity and Development

Q: Is the program still ongoing?
A:
- Yes. The program has been operating continuously for over 30 years.
- It has expanded from approximately 20 gourds and boxes in the 1990s to over 100 housing units today.

Q: If so, are there any changes to the nest, especially the design, since then?
A:
- The program has gradually shifted from traditional nest boxes to gourd-style housing.
- Plastic gourds are increasingly favored over natural gourds due to durability, ease of cleaning, standardized entrance size, ventilation options, and access ports.
- Nest locations have expanded from pilings over water to some experimental shore-based and non-water sites (e.g., Expedia site), which have shown unexpected success.
- Initially, Kevin put up mostly boxes but it turns out the early boxes were attractive for house sparrows and starlings. Since then, the design of the opening has changed and the preference shifted to natural or plastic gourds as the sparrows and starlings don't like them (I think it's the swinging). In our experience, we've found that 'porches' attract predators and other birds and the opening needs to be larger than what is used in other parts of the

country. Our west coast PUMA subspecies are larger than east coast and other populations and need larger entrance holes. WA PUMA also don't seem to like the starling-resistent oval openings and prefer round openings (probably as they're larger).

II. About Purple Martins

4. Habitat and Nesting Preferences

Q: What are the Purple Martin's preferences regarding nesting materials and site conditions?
A:
- Purple Martins prefer open areas with clear flight paths, consistent with their life history as aerial insectivores.
- They favor sites near water, where insect prey is abundant, and where nests are safer from predators.
- In western Washington, they show a strong affinity for human-provided nesting structures, including gourds and pilings.
- WA PUMA really prefer to nest over water or very close to it. They also don't like areas with a lot of trees or tall shrubs and sites that have a clear flight path. Covered the nesting materials preference above the entrance holes.
- safer over water, and more food/prey near water features (prey, especially dragonflies, isthe biggest factor in their choice)
- They thought Washington Martin was only using the house in the water, but they tried some new areas, such as Expedia properties, martins seems to use them. So it is quite a new area to them.

Q:Are there specific environmental conditions in Seattle that influence these preferences (e.g., wooden stake in the water)?
A:
- Seattle's shoreline and over-water pilings provide ideal edge habitat and prey availability.
- Limited snag habitat in urban areas pushes Martins toward artificial nests.
- Urban competition from non-native cavity nesters requires careful nest design (e.g., entrance size) to exclude non-target species.
- Pilings! Pilings in the water are really good for PUMA since they like to nest over water. Areas away from known raptor nests (eagles, merlin, Cooper's, and sharp-shinned hawks) are best.

5. Maintenance and Management

Q: How frequently do the nests require maintenance?
A: Nests are cleaned and checked annually, typically every spring before Martins return from migration.

Q: How manageable is the maintenance process in practice? Can you show any process, especially how to clean the nest?
A:
- Maintenance is labor-intensive and highly dependent on

tides, weather, daylight, and access.
- Some sites require ladders at low tide; others require boats at high tide.
- The process can take many hours or multiple days and requires coordinated teams.
- Most of the fieldwork takes place in April, when nesting sites are prepared before the Purple Martins return from South America. Some sites must be accessed during low tide, so that the pilings supporting the gourds are exposed and can be reached with ladders for maintenance and replacement. Other water-access sites require high tide and calm weather, since they are reached by small boat. Preparation work, including cleaning and repairing gourds, occurs mainly in February and March. After installation and maintenance in April, the sites are monitored through the breeding season until late August or early September, when the chicks have fledged and the birds begin gathering before migration. Planning and coordination continue during the fall and winter.
- Changing nests needs lots of manual effort, need few hours or even a few days.
- To people: The most convenient system consists of a metal pole and rack structure that holds multiple nesting gourds, typically installed into a ground socket for stability and easy removal. It includes a pulley mechanism, allowing stewards to lower the rack to inspect, clean, or maintain the gourds without dismantling the entire structure.

Q: Can you show any process, especially how to clean the nest?
A:
- No formal videos or documentation exist locally.
- Cleaning typically involves removing old nesting material and swapping dirty gourds with clean ones.
- Plastic gourds allow easier access through side ports or removable caps.

Q: Could design interventions help improve or simplify long-term maintenance?
A:
- Pulley-based rack systems and modular gourd assemblies are considered the most manageable designs.
- Systems that allow lowering nests from the ground significantly reduce effort and risk.
- Durable materials and standardized components reduce long-term labor demands.
- Locations that don’t require boat access would help, and being able to take down gourds at the end of the season would prolong the life of the gourds. Rack systems or other designs that allow gourds/boxes to be raised or lowered would also help greatly.

6. Challenges

Q: What are the main challenges associated with supporting Purple Martins in this context? Physical and political
A:
- Dependence on continuous human stewardship; if

volunteers "age out" or move away, sites may fail.
- Removal of creosote pilings due to environmental regulations threatens existing nesting sites (impacts to salmon). If these polluted piling need to be removed, how to provide infrastructure for these over/ near water nests?
- High competition from non-native cavity nesters in urban areas.
- Lack of legal screening when nest sites are removed because Purple Martins were removed from priority habitat species lists in 2018.
- It's expensive to buy gourds and rack systems and sometimes a challenge to secure a boat for sites that are only accessible by boat. It's also been a challenge with state agencies (WDNR in particular) that have an effort to remove creosote pilings but don't have a requirement to put up alternative nesting structures. Many potential nest sites are located on Port of Seattle, or other city, property and that poses a challenge.
- The birds love nests in the water, but it's intense to manage it

7. Relationship to Built Structures

Q: How do Purple Martins respond to adjacent buildings or structures? Do you have your personal opinion about that? If applicable.
A:
- Martins readily use human-made structures, including pilings, gourds, nest boxes, and even buildings.
- They tolerate highly urban environments if nesting and foraging conditions are met.
- Human-provided structures are currently essential for maintaining the population in Washington.
- However, this reliance also makes the species vulnerable to sudden habitat loss through development or infrastructure removal.

Q: In your view, how does the nearby architecture affect their behavior or nesting success?
A:
- Structures near open water and insect-rich environments increase nesting success.
- Removal of structures without screening can immediately eliminate local populations.
- PUMA don't seem to be bothered by people and it's really if there's an open spot that gives a clear flight path and buildings that aren't used by raptors (predators) as perches.

8. Ecological Role and Human Perception

Q: What ecological roles do Purple Martins play in this area? They are aerial insectivores, consuming large insects such as dragonflies.
A:
- They serve as highly visible, "watchable" urban wildlife, creating opportunities for public engagement.
- Is there any opportunity we can build a kinship with them?

- Their visibility and reliance on human stewardship make them ideal ambassadors for multispecies urban coexistence.
- Volunteer stewardship fosters direct human–nonhuman relationships.
- Is there a reason why educational signs seem not to be included on the site?
- Sites are owned by multiple entities, requiring permission for signage.
- Outreach efforts have been limited by funding, coordination, and discontinued conferences.
- Signage is planned but not yet fully implemented.

9. Seasonality and Subspecies Specificity

Q: As a migratory species, are there seasonal considerations that need to be addressed in nest design or maintenance?
A:
- All major maintenance must occur before spring arrival (March–April).
- Nests must remain undisturbed during breeding season.
- By late August or early September, fledging is complete and birds prepare for migration.
- the main factor is to have cleaned nests available by the time the first scouts arrive in late April/early May. It would also be very helpful to be able to take them down at the end of the season, which isn't a viable option at most of our sites.

Q: Are there specific needs or behaviors associated with the western subspecies of Purple Martins that should be considered?
A:
- Western Purple Martins still use natural cavities in parts of their southern range (e.g., California).
- In Washington, the subspecies is more dependent on artificial nests due to habitat loss.
- The population is small, colonial, and vulnerable to aggregation loss.
- Larger entrance holes and sites that are over or near water.

III. About Nest Design

10. Nest Typology

Q: Why was the gourd-style nest chosen over other housing types?
A:
- The gourd was used by indigenous people for around 1000 years to attract swallows; it is more like a tradition.
- Gourds deter non-target species better than standard nest boxes.
- They are less attractive to starlings and house sparrows in urban settings.
- For the material, usually there are natural ones and plastic ones. Plastic ones are easier to clean and more durable. Natural gourds can only be used for 2-3 seasons,

but plastic ones can be used for years. Natural gourds will be harder to create some convenient checking holes comparing with plastic ones. Seems no preference for PM of these materials, but Jean mentioned she prefers the natural gourd because they are in different shapes. (seems people's preferences more impact on material choice, but they have both in most sites)

Q:What about other nest styles? Are they unsuitable for this subspecies or regional context?
A:
- Traditional nest boxes in Seattle often became "house sparrow and starling factories."
- Some experimental or artistic nest designs exist but are not widely tested or adopted.

11. Design Intent and Performance

Q: Were the nests designed for specific functional or ecological purposes?
A:
- Entrance size and form are designed to exclude non-native competitors.
- Placement prioritizes open flight paths, safety, and prey availability.

Q: Which design elements have proven successful, and which have not?
A:
- Plastic gourds with standardized entrances.
- Ventilated caps for air circulation.
- Side access ports for monitoring and maintenance.
- Standard nest boxes in dense urban areas.
- Housing that cannot be regularly maintained.

12. Design Limitations and Issues

Q: Have any problems emerged with the existing nest design?
A:
- Natural gourds degrade after several seasons.
- Over-water placement increases maintenance difficulty and risk.
- Structural instability of old pilings can cause nest loss.

Q: If so, what aspects would you consider improving or redesigning?
A:
- More durable, modular systems that reduce dependence on pilings.
- Designs that simplify cleaning and monitoring.
- Integration of nest structures with long-term infrastructure planning and mitigation.

Additional infomation:
- Reason why the pdf not keep updating: made for the Salish Sea conference, but sadly the conference has not been held since the last time online meeting. So didn't get the opportunity to update. If it started again might update some recent info

- For the labels: they tried some, but most site is not owned by them, so they need negotiation with the owners to figure it out.
- It’s very promising that starting to see more people finding martins in some of these snag areas that, in some cases, have been looked for previously and not found
- They really wish these PM could return to natural nesting conditions
- The species is not currently state-listed as threatened or endangered but may warrant renewed management consideration due to its vulnerability, colonial nesting behavior, and dependence on limited habitat resources.