DEPARTMENT OF
LANDSCAPE
ARCHITECTURE
COLLEGE OF BUILT ENVIRONMENTS
WINTER 2020

DESIGN
STUDIO

UNIVERSITY of WASHINGTON

tahoma audubon society

BIRDS & CLIMATE CHANGE



Studio Team

BIRDS + CLIMATE CHANGE STUDIO

Design + Research Team



















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Studio Leadership



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Burke Museum Ornithology Collection



INTRODUCTION + OVERVIEW

Birds + Climate Change Studio

INTRODUCTION + OVERVIEW





Overview

As climate change becomes an increasing challenge there is still opportunity and hope for ensuring resiliency for our birds and the natural world. National Audubon's Climate report suggests about 2/3 of the birds in peril can be helped by acting now.This provides hope and a pathway for action.

The Birds + Climate Change Studio worked in partnership with the Tahoma Audubon Society at their small wetland park site in the South Puget Sound region, Adriana Hess Audubon Center. We tasked students with a series of questions. How can design balance the intersection of habitat specific solutions and urban public space? How might the Audubon Society create bird habitat while still ensuring the safety of park visitors? How can we creatively incorporate traditional park elements with natural habitat spaces and stormwater management?

This document attempts to capture the outcomes of these studio investigations across scales, from regional to small fabricated prototypes. The studio worked as groups and individually to develop innovative and creative design solutions to these issues and more.

> **"Birds are early responders to climate change and can be important indicators of large-scale ongoing and future ecological change. [The Audubon Society] found that 54% of Washington's 296 bird species are vulnerable to climate change across seasons."[1]**

As part of their mission to protect birds and their habitat, the Audubon Society recommends policies and conservation practices that protect, enhance, and expand the places birds need. The field of landscape architecture has the potential skills and knowledge to both participate in and lead these efforts.

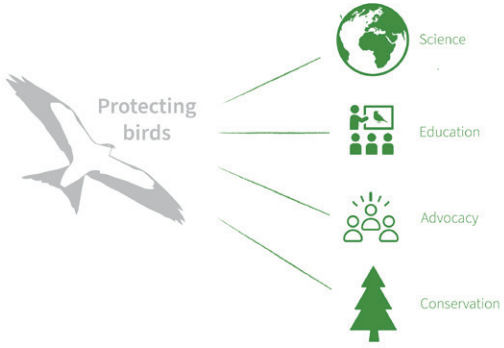
This studio was split into three components: research & mapping, site scale design, and bird habitat prototype fabrication. The research and mapping work developed in small teams became a framing lens for site scale concept design. This supported students to make design decisions at the site scale that hold potential for broader climate change impacts.

1 National Audubon Society. 2014. Audubon's Birds and Climate Change Report: A Primer for Practitioners. National Audubon Society, New York. Contributors: Gary Langham, Justin Schuetz, Candan Soykan, Chad Wilsey, Tom Auer, Geoff LeBaron, Connie Sanchez, Trish Distler. Version 1.2.

Audubon Society Background

NATIONAL

Founded in **1905** | Almost **500 chapters** across the United States



Source: National Audubon Society



CORE DESIGN SITE - BLUE / CONTEXT STUDY AREA - WHITE

Studio Objectives

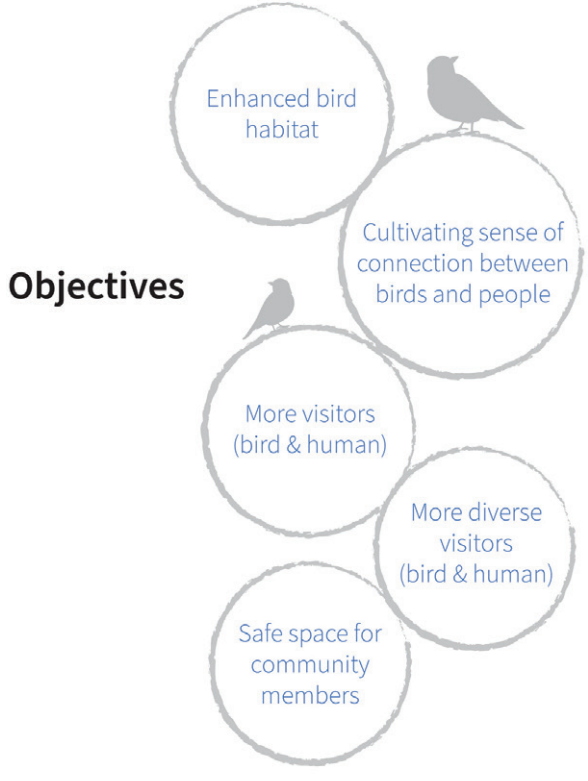
- Deep investigation into people and place. There is no such thing as a general audience, every public is specific, every place is unique.
- Personal reflection to allow for a self-aware design processes with collaborators and guests.
- Expand graphic thinking and communication at all stages of the process, not as a final product, as a mantra.
- Ability to digest critical input and integrate feedback into studio deliverables.
- Attention to detail and craft in fabrication
- Incorporation of multiple programs including habitat, flood attenuation, environmental education, and recreation.
- Develop studio work that demonstrates technical, theoretical, ecological and spatial competencies.

Tahoma Audubon Society

STUDIO PARTNERSHIP

Founded in **1969** | **288 members** across Pierce County | Typical member is **40+ years of age**





Site Program

ADRIANA HESS WETLAND PARK

1. Parking
2. Office
3. Lending Library
4. Bird Feeders
5. Education Shelter
6. Pond/Future Rain Garden
7. Native Plant “Nursery”
8. Stormwater Retention



Adriana Hess Wetland Park

Adriana Hess Wetland Park is a small pocket of wilderness located in the City of University Place that sits just adjacent to a wetland site. This space is also home to the Tahoma Audubon Society Center. Tahoma Audubon Society advocates for the protection of wildlife and promotes conservation through education and activities that enrich its member’s experiences in and with the natural world.



SITE ANALYSIS + EXISTING CONTIDTIONS

History Narrative

UNIVERSITY PLACE

mid-1800s





The land that has now been developed into Chambers Bay Golf Course was being used for industry. Over the years it was used by the lumber industry, as a railroad center, and a gravel mine before being reinvented as the world class golf course it is today.





early 1800s

Pierce County was home to the Nisqually, Steilacoom, Squaxin, Puyallup, and Muckleshoot Indians.

The area was chosen as a location for the University of Puget Sound, at the time named Puget Sound University. The school purchased 420 acres for the campus, but financial difficulties in 1893 forced them to forfeit the land prior to establishing a campus and the university never made the move. However, the area continued to be known as University Place.



1890s

mid-1900s

Through the mid-1900s, University Place became home to thousands of couples looking for the ideal place to raise their families.



1994



Proponents established almost eight square miles of unincorporated Pierce County into the City of University Place. Since then, the Council, City staff, and community have poured hundreds of thousands of hours into making University Place what it is today, a great place to live, work, and play.

iMAGINE University Place 2045

2045

In 2020, the City of U.P. will celebrate its 25th anniversary since its official incorporation in 1995.

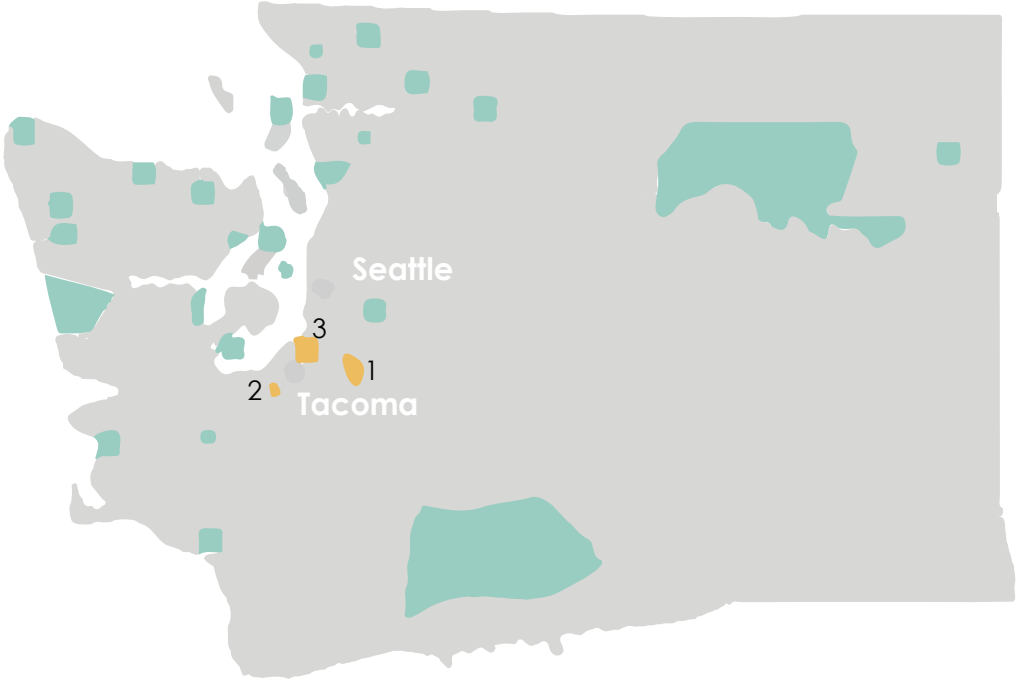
As we approach the milestone of entering our second 25 years, it makes sense to re-examine our vision for the City of U.P.

What do we want the City of University Place to look like during its second 25 years?

Source:http://www.cityofup.com/government/history

Native American Tribes

AROUND UNIVERSITY PLACE



Major groups or tribes of local Native Americans include near University Place is the Nisqually, Muckleshoot and puyallup tribes. They evolved complex cultural, social, and economic structures, which the invasion of non-Indian settlers in the mid-1800s almost erased, but which continue today as the tribes struggle for their survival, respect, and renewal.

1



2



Nisqually Indian Tribe

3

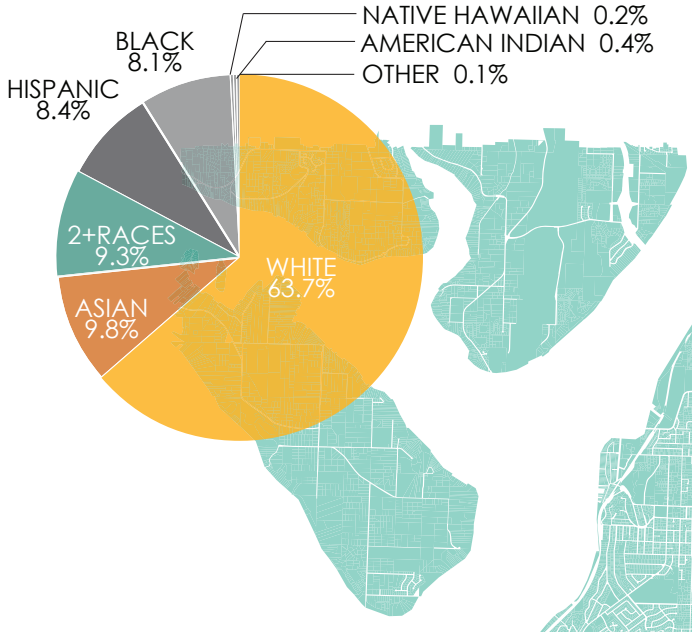


Puyallup Tribe

Source: http://nie.seattletimes.com/wp-content/uploads/sites/12/2016/10/WIGA_10-16-16_8PageTab_final.pdfl

Demographics

UNIVERSITY PLACE



MOST COMMON INDUSTRIES

2.Educational services 11.4%

1.Health care13.0%

3.Public administration 6.3%

6.Professional, scientific, technical services 5.2%

5.Finance & insurance 5.8%

7.Construction 4.9%

4.Public administration 6.3%

Population: **33,401** in 2017

Population density: **3,983** people per square mile

FEMALES:17164

MALES:16237

Population change since 2000: **+11.6%**

EMPLOYED 94.9%

5.1% UNEMPLOYED

HIGHSCHOOL 57.7%

3.7% LESS THAN HIGH SCHOOL

24.8% BACHELOR'S

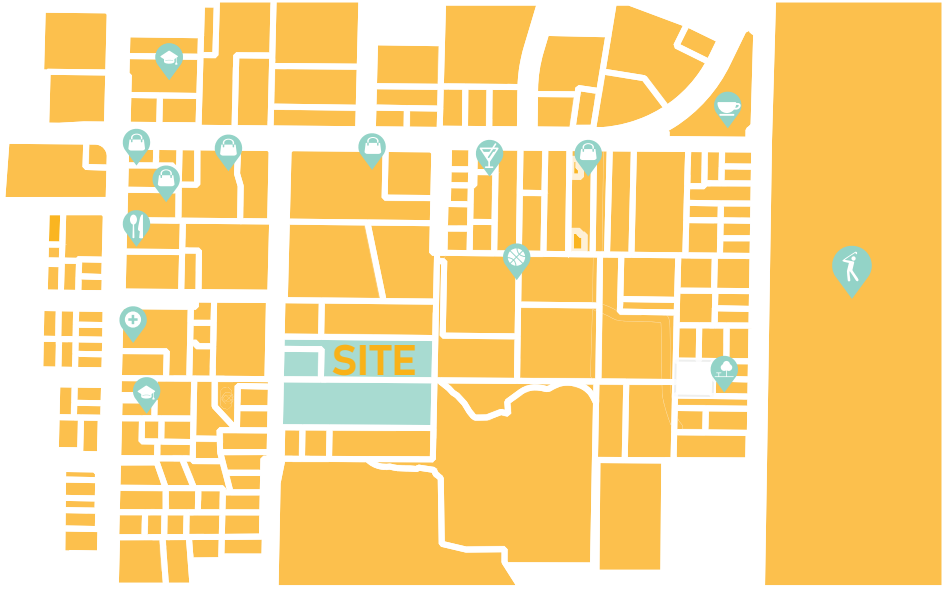
13.8% GRADUATE+

employment education

Source: http://www.city-data.com/city/University-Place-Washington.html

Demographics

NEIGHBOURHOOD



Amenities

- Golf Club
- Hospice Care
- Sports Center
- Starbucks
- Park
- Commercials
- Preschool
- Bar

Education

Tacoma Community College
1.6miles;5min's drive

University of Washington Tacoma
5miles;15min's drive

Median Age



Neighbourhood
University Place

Household type



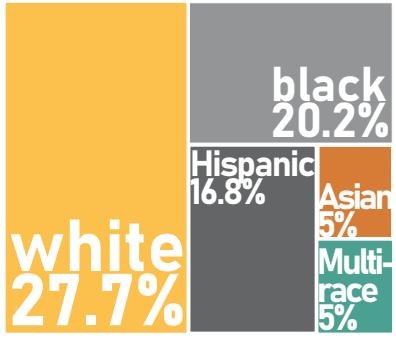
Median household income



Unemployed

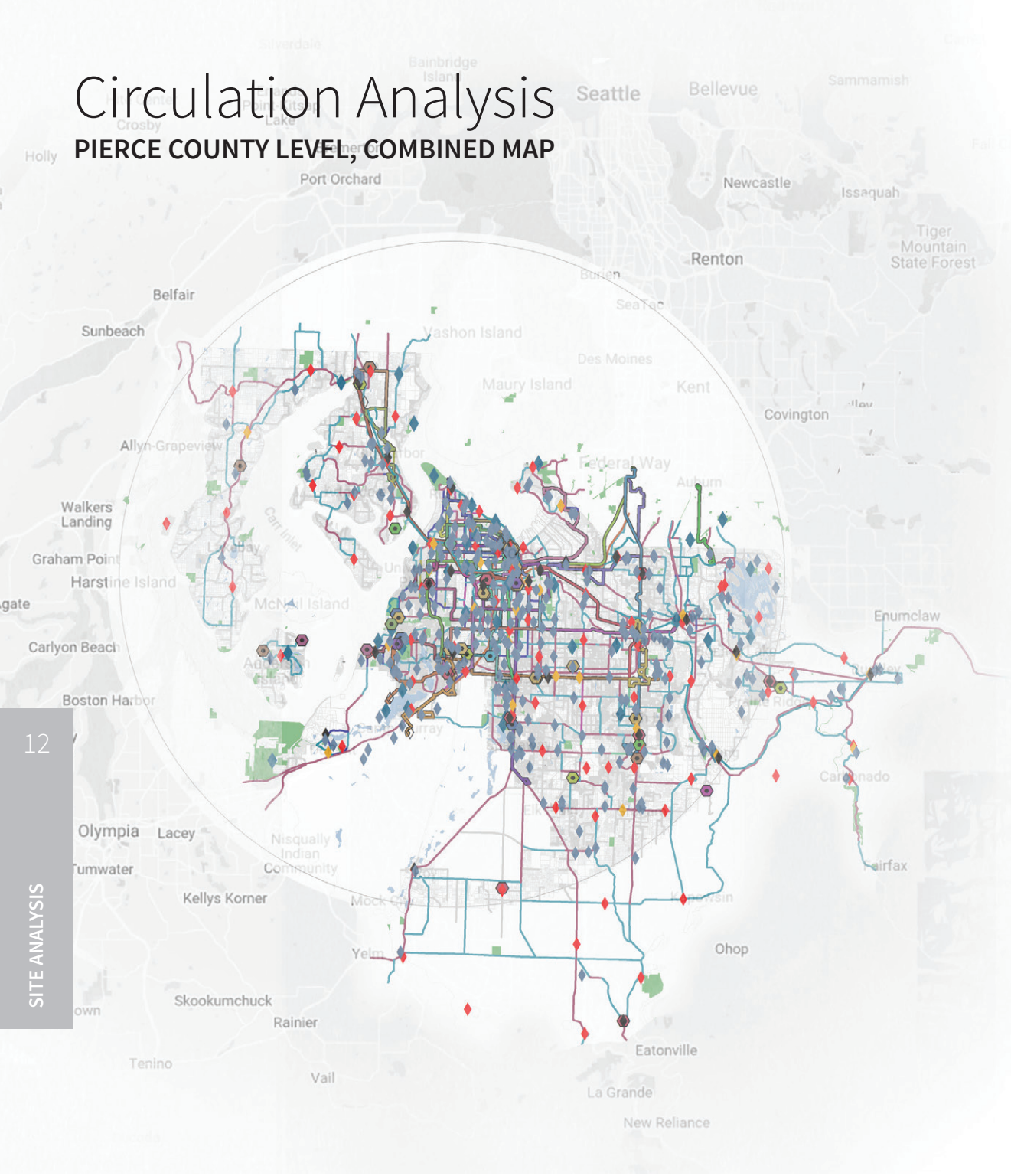


Races



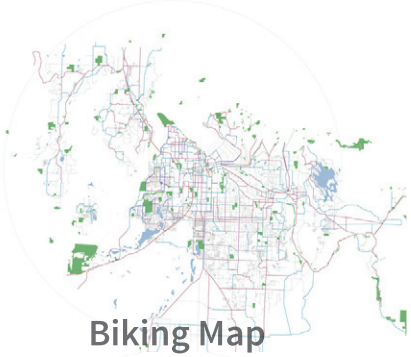
Circulation Analysis

PIERCE COUNTY LEVEL, COMBINED MAP

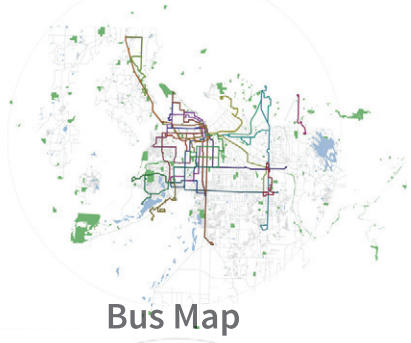




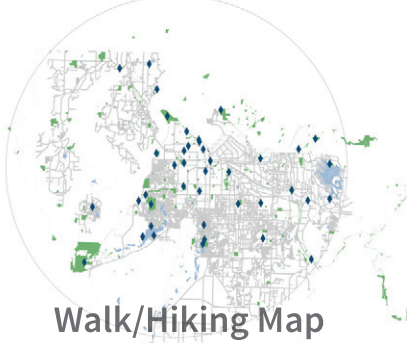
Facility Map



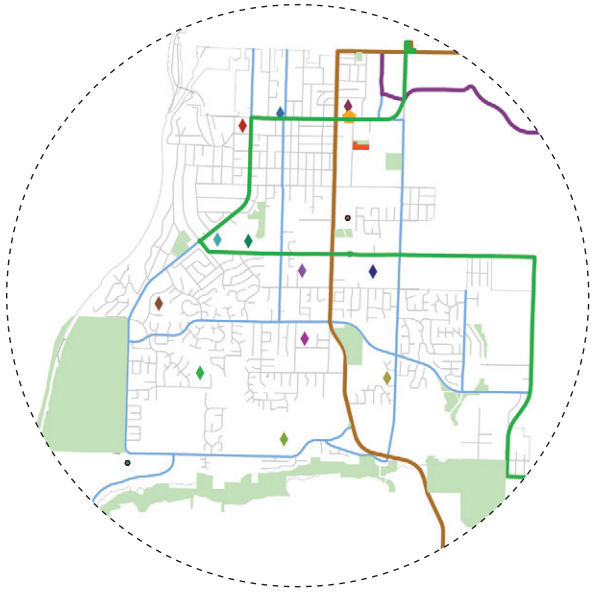
Biking Map



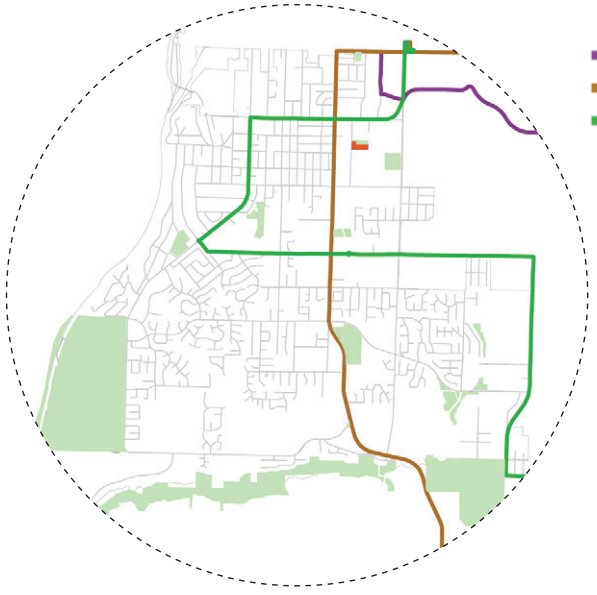
Bus Map



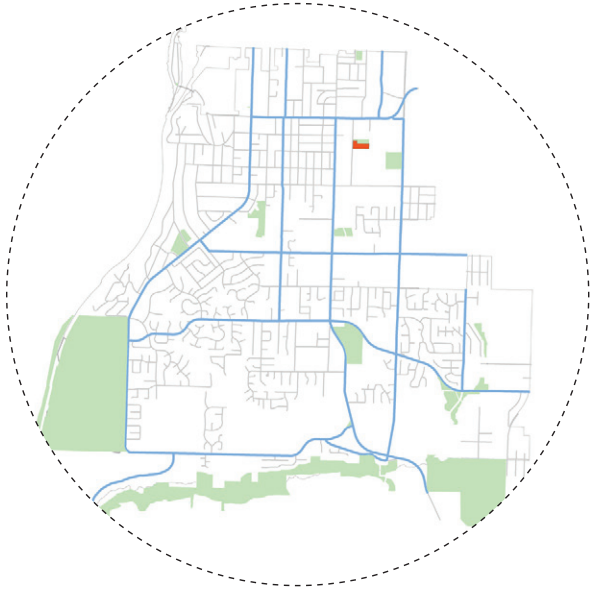
Walk/Hiking Map



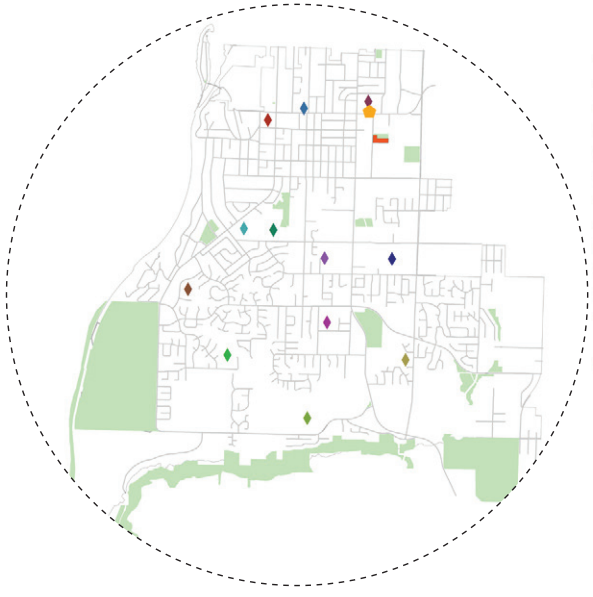
On Site Combined Map



On Site BUs Map



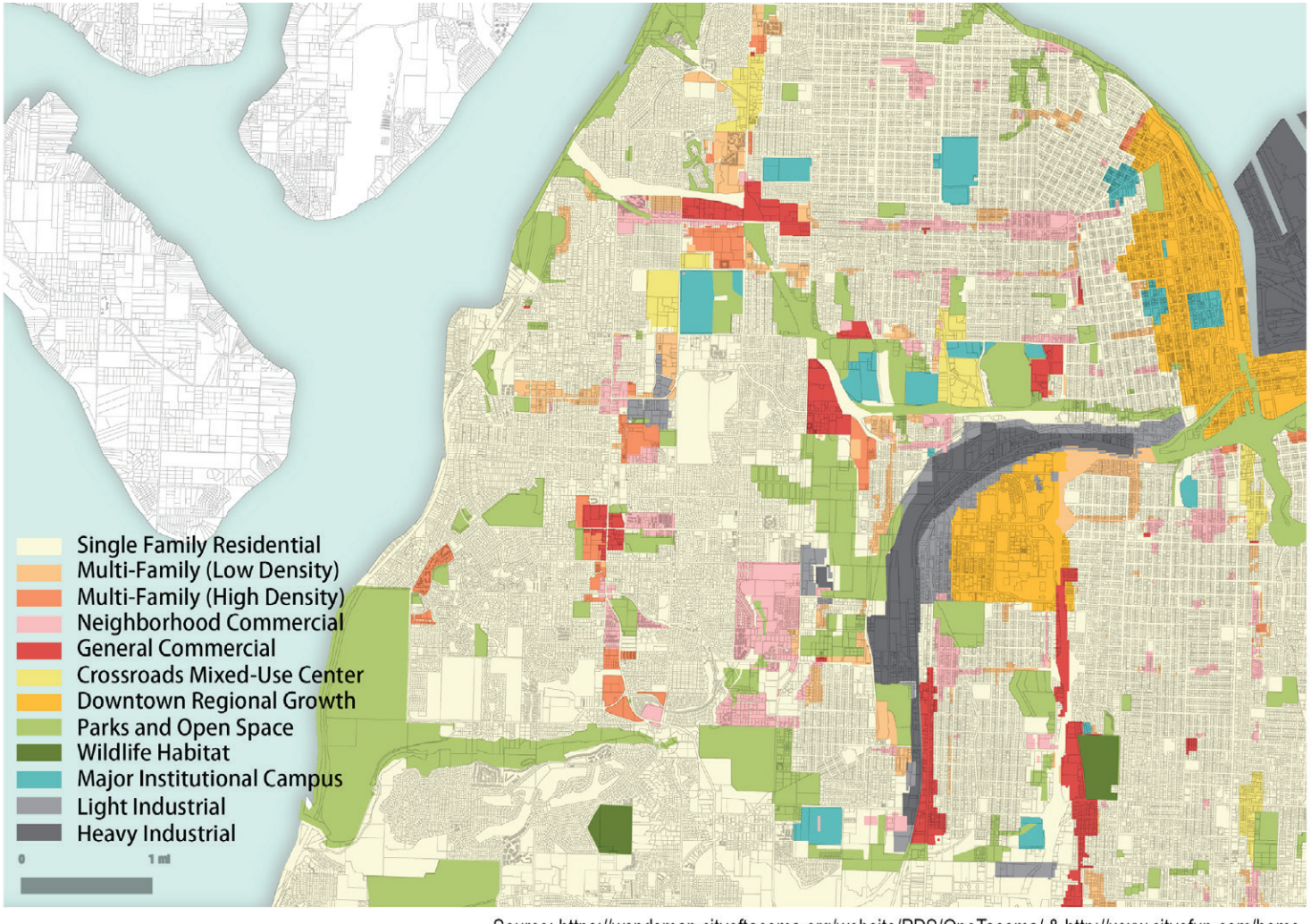
On Site Biking Map



On Site Education Map

Land Use

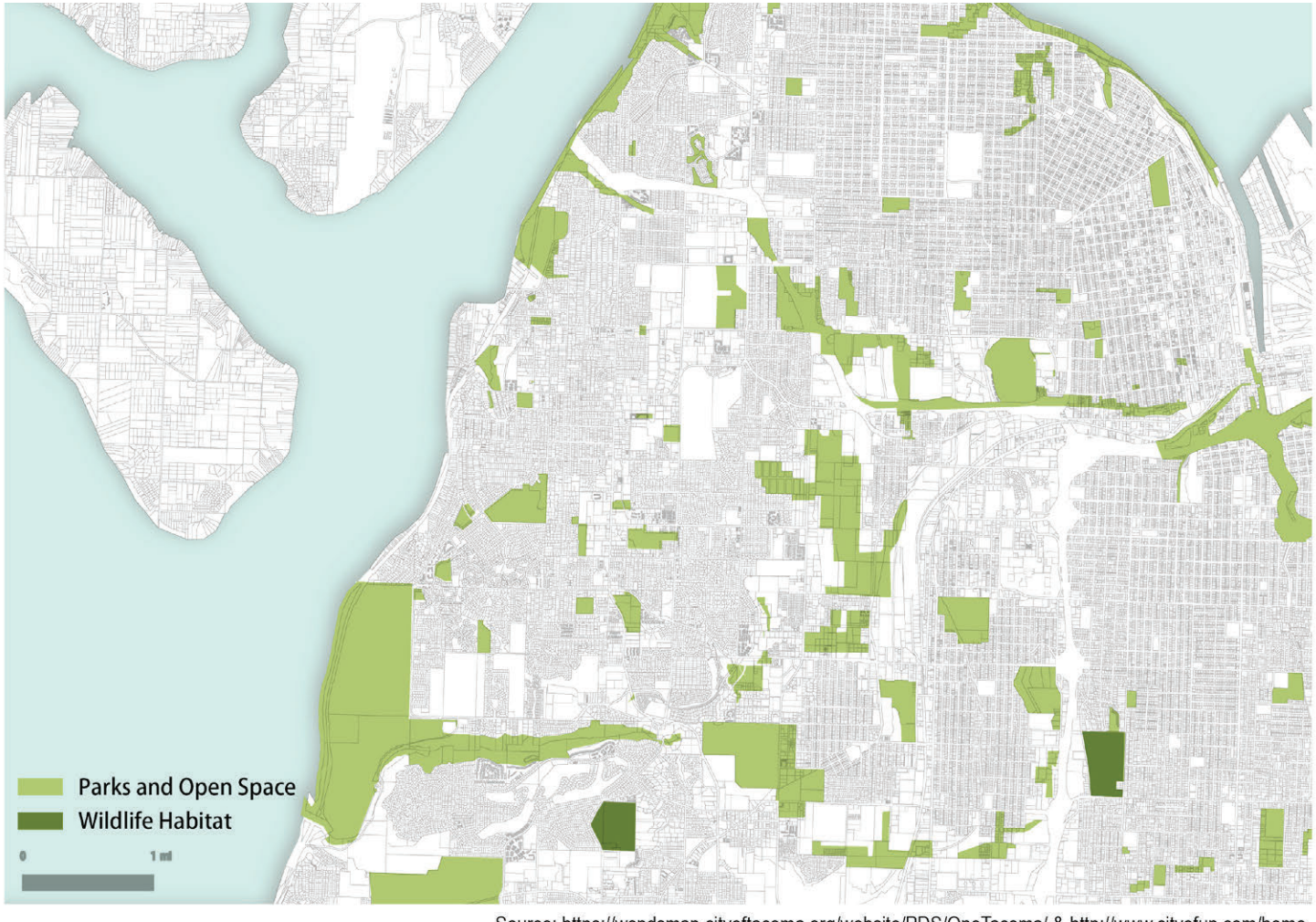
REGIONAL SCALE



Source: https://wspdsmap.cityoftacoma.org/website/PDS/OneTacoma/ & http://www.cityofup.com/home

Green Infrastructure

REGIONAL SCALE



Source: https://wspdsmap.cityoftacoma.org/website/PDS/OneTacoma/ & http://www.cityofup.com/home

Regional Ecology

PUGET SLOUGH ECOREGION

University place is a city with water front access. It is a part of the **Puget Trough Ecoregion**, which runs along the Puget Sound. The Puget Trough Ecoregion is characterized by the rich biodiversity of the Puget Sound estuary, salmon linking the nutrient cycles of fresh and saltwater and a terestrial system characterized by grasslands and oak woodland species.

Wetlands

University Place includes both freshwater and saltwater wetlands, serving diverse wetland ecologies. For the most part, the shorelines of University Place are officially designated as *Estuarine, intertidal, sand, partly enclosed, eulittoral*.

Terrestrial

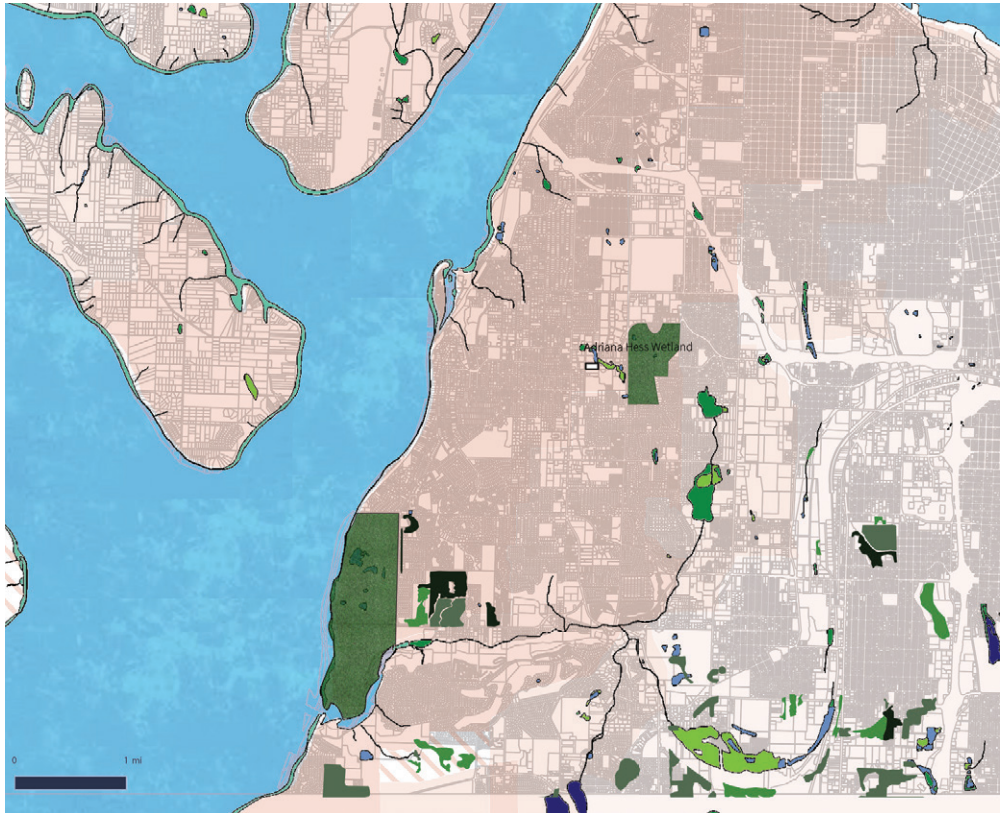
The terrestrial ecosystem designations of University place include oak dominated ecologies and mixed oak/conifer forests. Areas with native vegetation are sparse and fragmented.

Golf Courses and Urbanization

There are two large golf courses in University Place, as well as low density urban settlement. The dominant landscape typology of University Place is constructed by and for people.

Ecological Contaminants

The Washington State Department of Ecology predicts over 100 ppm of arsenic contamination in a large coastal swath of University Place. The contamination is the result of the Asarco Company which smelted copper in Tacoma, contaminating the sound with arsenic and lead for over 100 years. The resulting contaminated soils may pose a risk to various species.



Sources

https://en.wikipedia.org/wiki/University_Place,_Washington, https://ecos.fws.gov/ecp0/reports/species-by-current-range-county?fips=53053, https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Cleanup-sites/Toxic-cleanup-sites/Tacoma-smelter, http://www.piercecountyweedboard.org/index.php/noxious-weeds/noxious-weeds-2, http://www.landscope.org/washington/natural_geography/ecoregions/puget_trough/, https://erma.noaa.gov/northwest/erma.html#/layers=1+7585&x=-122.58495&y=47.21727&z=12.4&panel=layer, https://www2.golfadvisor.com/courses/16343-chambers-bay/?page=3, https://travelingthepnw.com/2015/04/30/kobayashi-park-a-hidden-gem/, ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Shoreline-coastal-planning/State-approved-Shoreline-Master-Programs/Pierce-County, https://www.sfestuary.org/estuary-news-pearls-spring-run-gene/

Terrestrial Ecology

OAK AND CONIFER CANOPY



Garry Oak
Quercus garryana



Cooper's Hawk
Accipiter cooperii



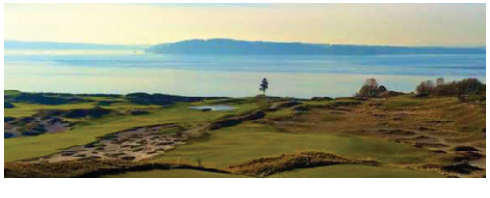
Douglas Fir
Pseudotsuga menziesii

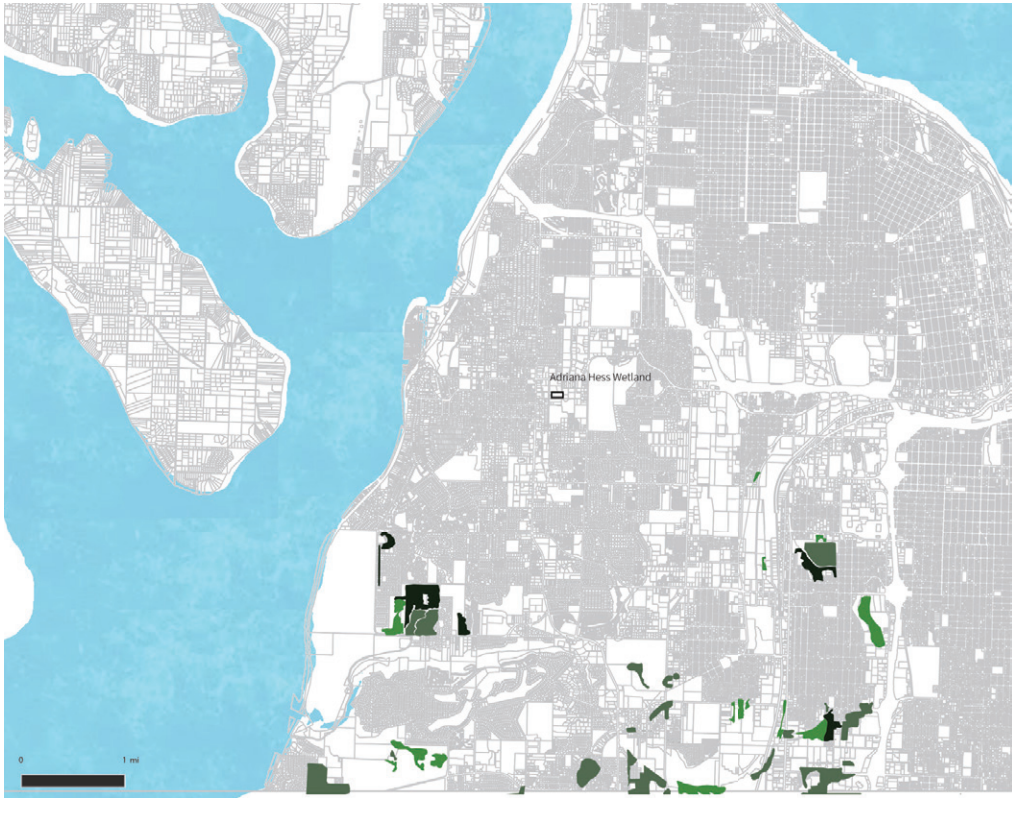
Ecosystem Map Key

Wetland Designations
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater and Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake

Terrestrial Designations
- Scattered Oak Canopy
- Urban Oak Canopy
- Oak-Dominant Forest or Woodland
- Oak-Conifer Forest or Woodland

Tacoma Smelter Plume
Contamination Arsenic ppm
- Over 100 ppm
- 40.1 ppm to 100 ppm
- 20 ppm to 40 ppm
- Under 20 ppm





Vegetation

ARCHETYPAL PLANTS OF THE WETLANDS, WOODLANDS AND CANOPY

Invasives Plants



Blackberry



Holly

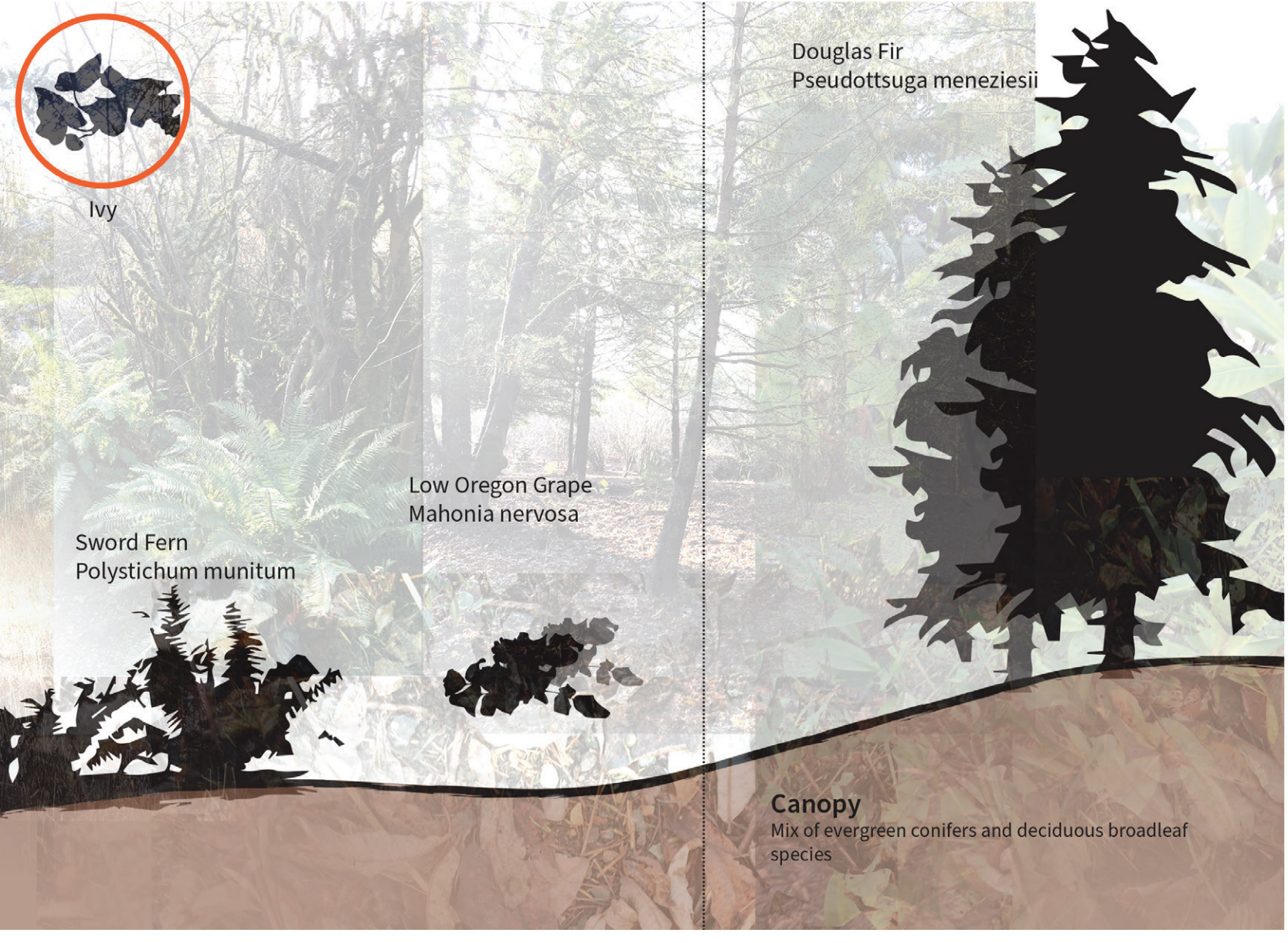
Wetland
Perennial flowering plants

Cattail
Typha

Douglas Spirea
Spirea douglasii

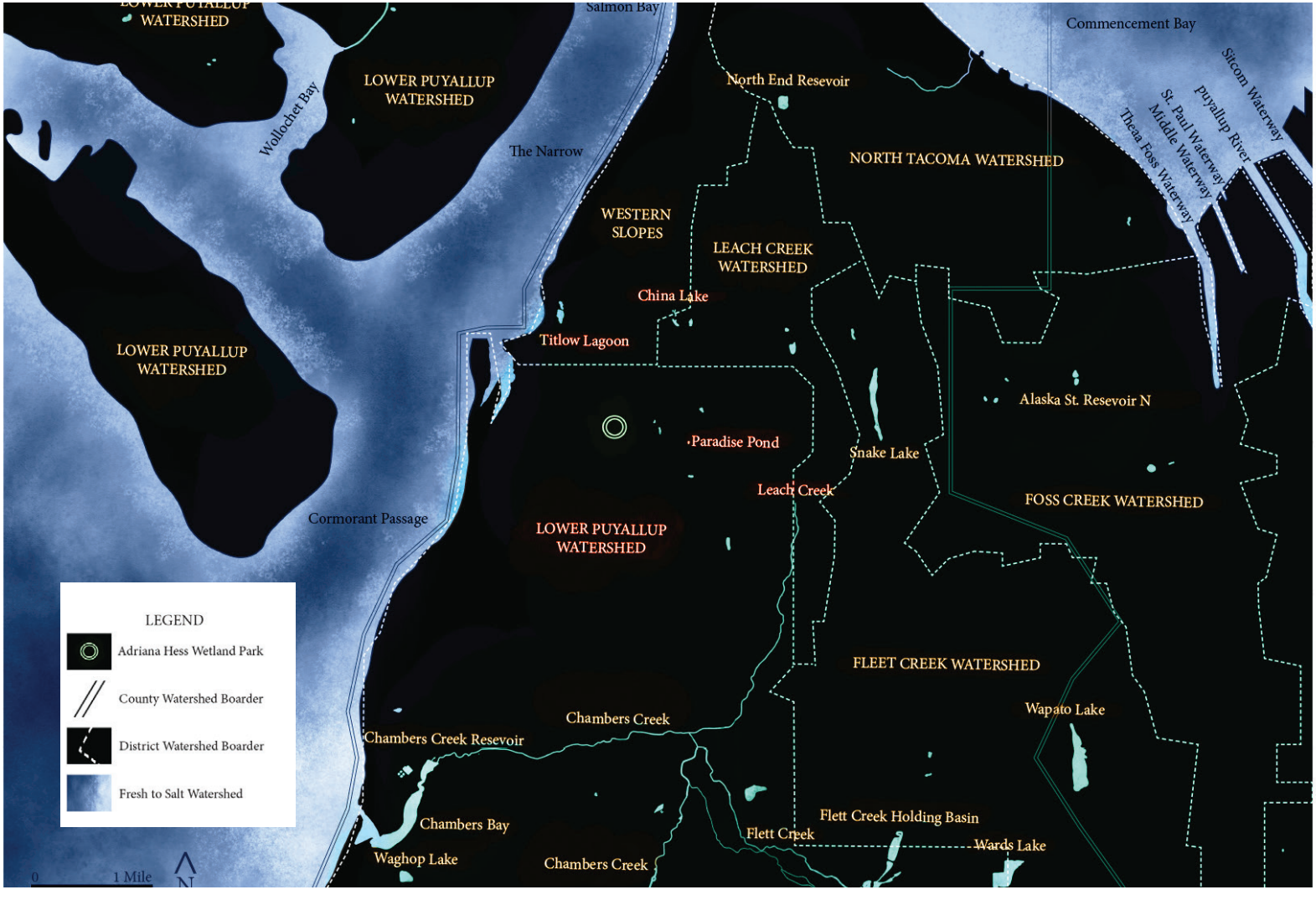
Woodland Understory
Evergroon ferns and fruit bearing woody perennials

Salmonberry
Symphoricarpos albus


Ivy
Douglas Fir
Pseudottsuga meneziesii
Low Oregon Grape
Mahonia nervosa
Sword Fern
Polystichum munitum
Canopy
Mix of evergreen conifers and deciduous broadleaf species

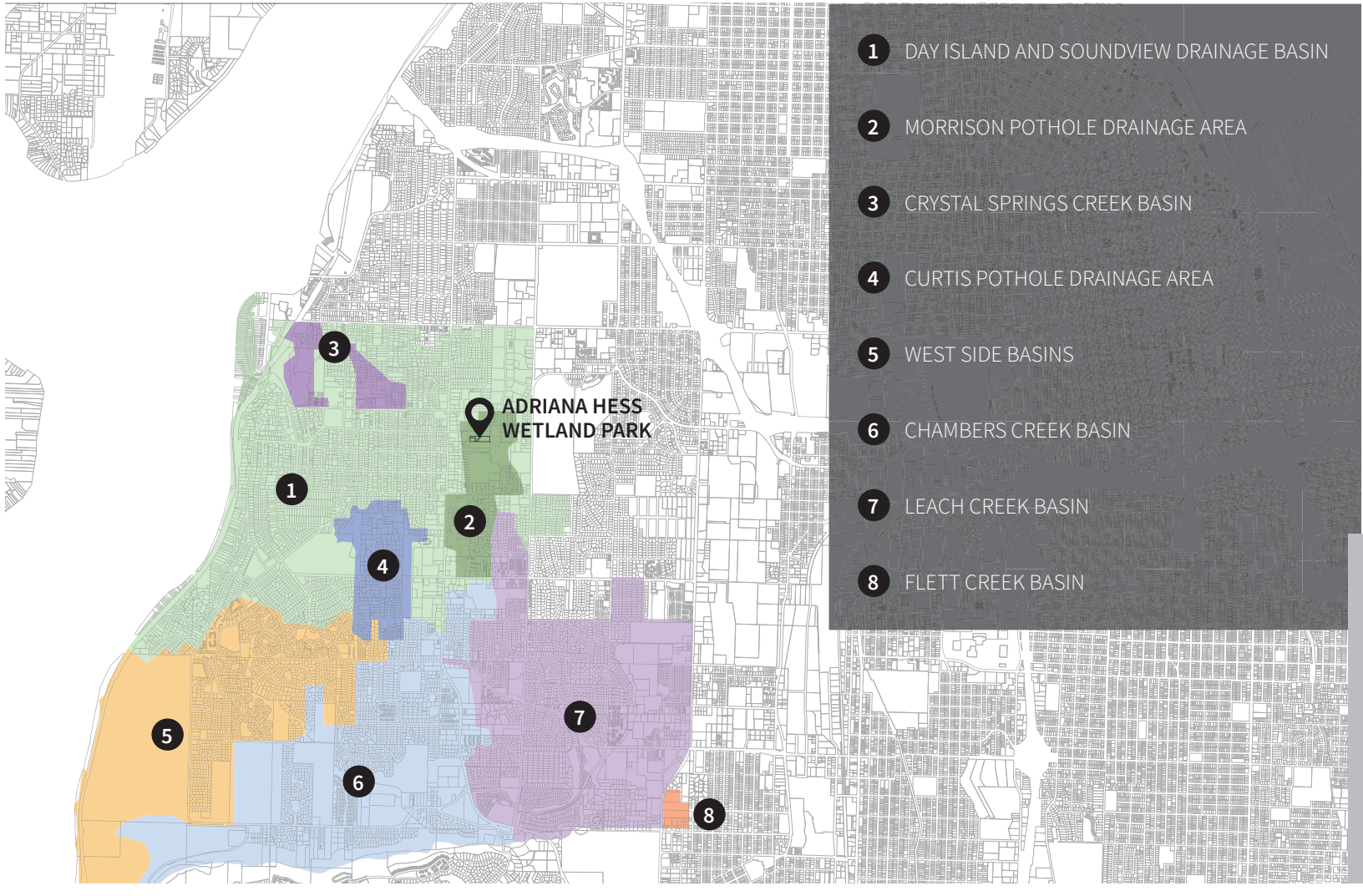
Stormwater

WATERSHED / REGIONAL SCALE



Stormwater

NEIGHBORHOOD SCALE



Stormwater

SITE SCALE

Treating Stormwater In A Wetland

Undeground pipes send stormwater from the surrounding basin directly into Morrison Wetland. Stormwater is likely the primary source of water for the Morrison Wetland; no natural inputs are known.

During flood events, the wetland will overflow into the watershed to the west, and eventually to the Puget Sound.

The adjacent detention pond to the south of the park fills seasonally, and is piped directly to the wetland as well. During high flows, the beehive catchbasin directly to the west of the wetland actively and visibly runs above ground, creating an ephemeral stream.



AT THE EAST END OF THE DETENTION POND LOOKING WEST AFTER MAJOR CONSECUTIVE RAIN EVENTS

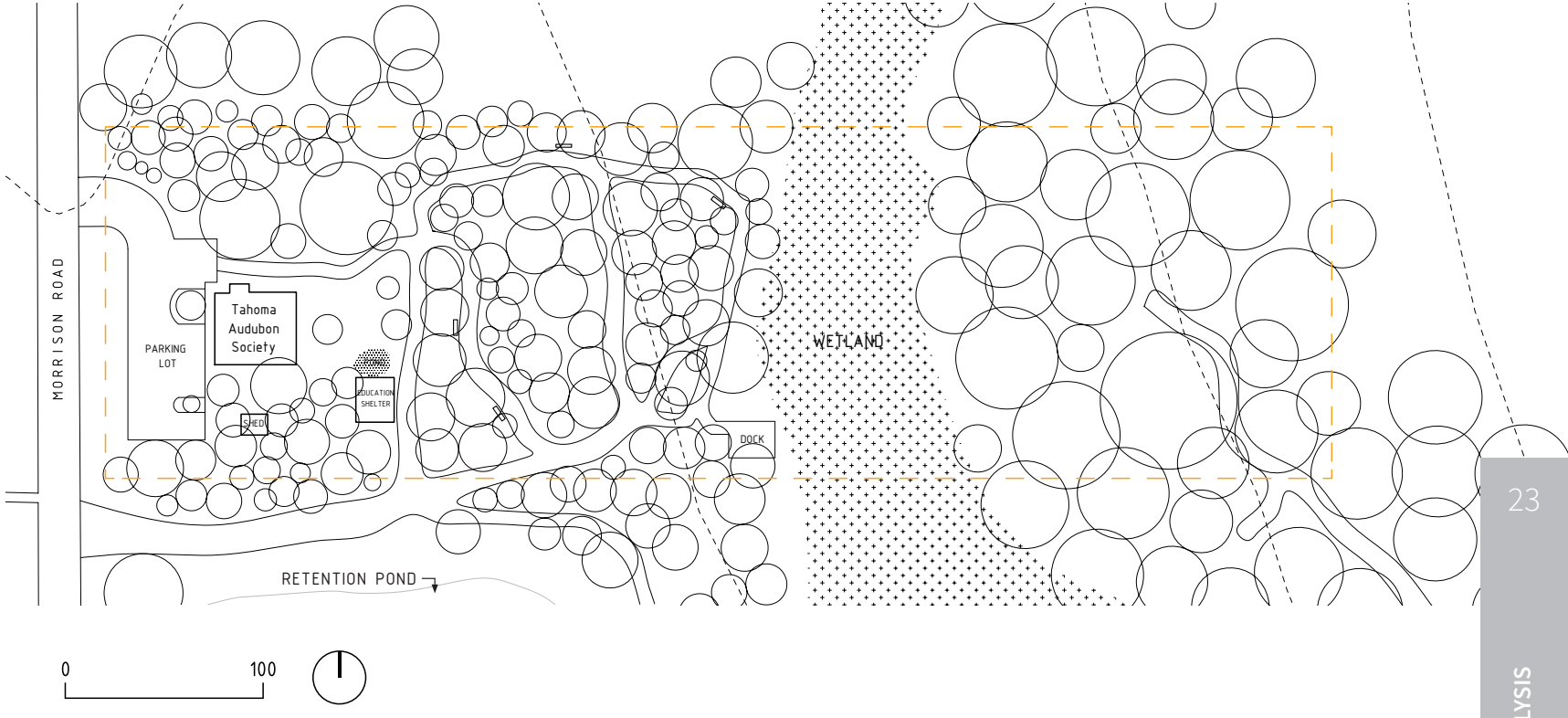


BEEHIVE CATCH BASIN AT THE WESTERN EDGE OF THE WETLAND



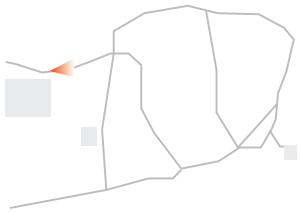
Site

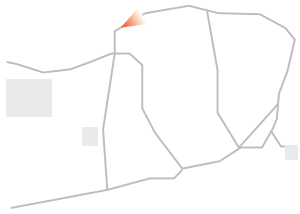
EXISTING CONDITIONS PLAN



Site Photos



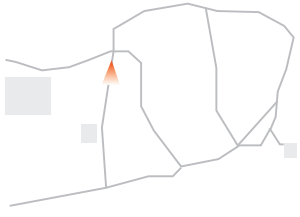


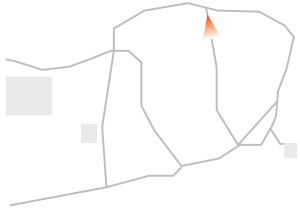


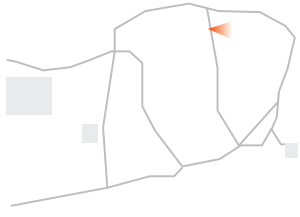










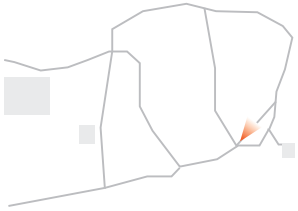


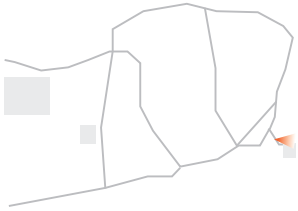


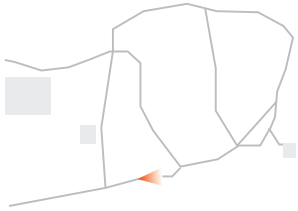




© Danielle Dolbow



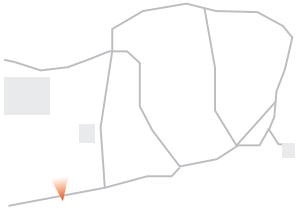


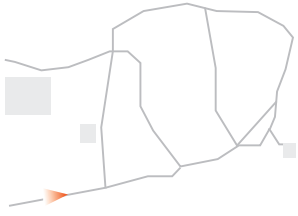


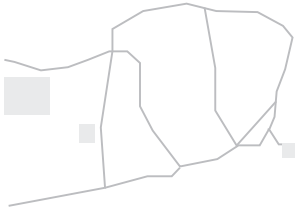


















© Danielle Dolbow



BIRDS ARE AF

DESIGN FOCUS: WATER

FFECTED BY CLIMATE CHANGE.

WHAT IS THE RELATIONSHIP BETWEEN CLIMATE CHANGE, BIRDS, AND WATER?

Whether living in the forest, the city, on the coast, or, in the case of our site, in a wetland, birds need water to survive. However, with the increasing threat of climate change has come an increase in water issues. Water quality and quantity are being affected and changing in ways that are negatively impacting birds and their habitats. According to a climate report led by the Puyallup Tribe of Indians, "...lower summer precipitation combined with warmer summer temperatures will stress streamside vegetation and worsen summer low flows in urban and rural streams, concentrating pollutants and increasing instream temperatures in the puget sound region. These conditions will strain aquatic species and increase the risk of harmful algal blooms, as well as worsen dissolved oxyhen levels and other parameters regulated under state surface water quality standards."

YUQING ZHANG | ZI'AN ZHENG | DANIELLE DOLBOW

BIRDS NEED WATER.



Source: https://www.pinterest.com/pin/426927239669402437/?lp=true



Current Pollution Issues

Point Source Pollution

- Oil Spills

Even small oil spills threaten wildlife and water quality, and the impact of a large spill can be catastrophic. Oil kills seabirds, fish and marine mammals and persists in the environment for years, even when the best possible cleanup technology is applied.

Nonpoint Source Pollution

- Polluted Stormwater Runoff

Polluted stormwater runoff is the number one toxic threat to Puget Sound. Rain washes chemicals, fertilizers, oil, auto fluids, and litter off roads and sidewalks directly into our waterways. Most stormwater systems do not go through any kind of treatment, and urban runoff can be so toxic that it kills fish in less than three hours.

- Agricultural Pollution
- Marine Debris

(Source: https://pugetsoundkeeper.org/pollution/)

POINT POLLUTION



NON-POINT POLLUTION





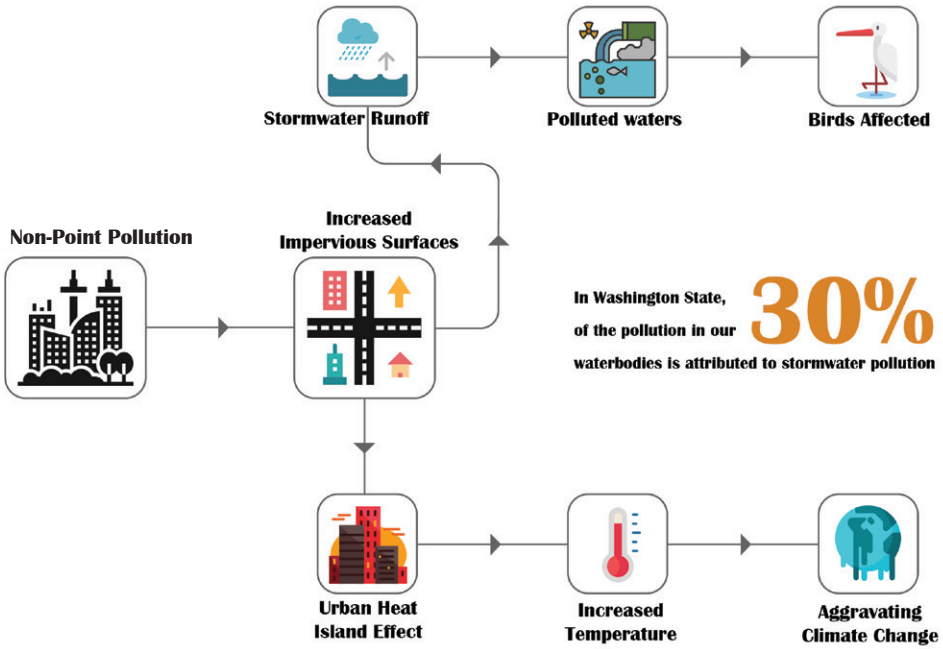


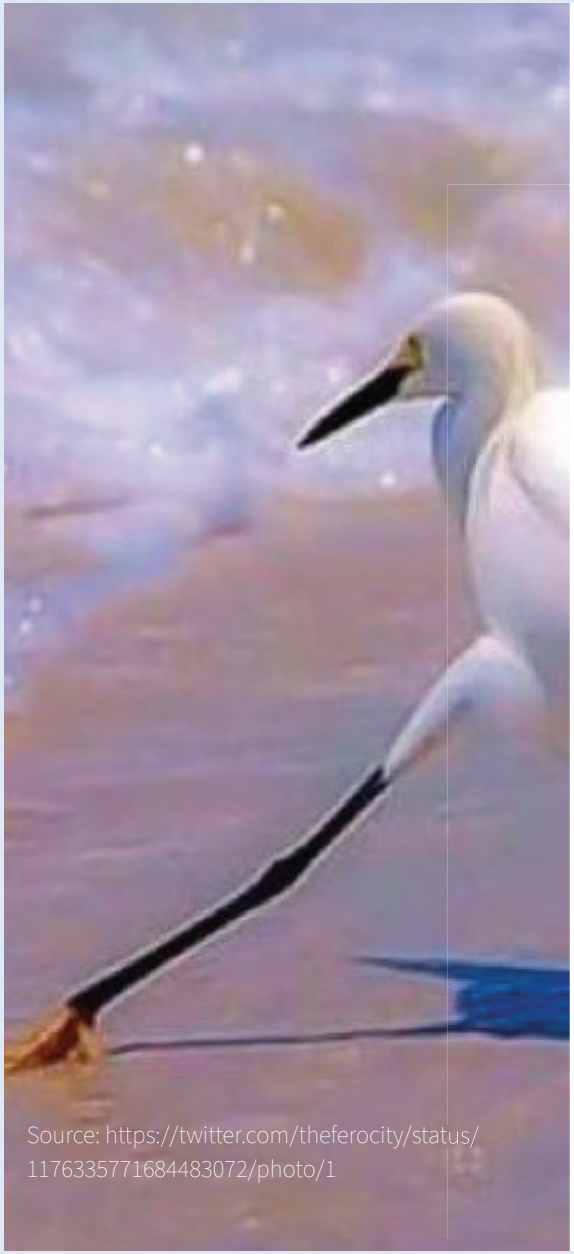


Source: http://www.city-data.com/city/University-Place-Washington.html

A.POLLUTION

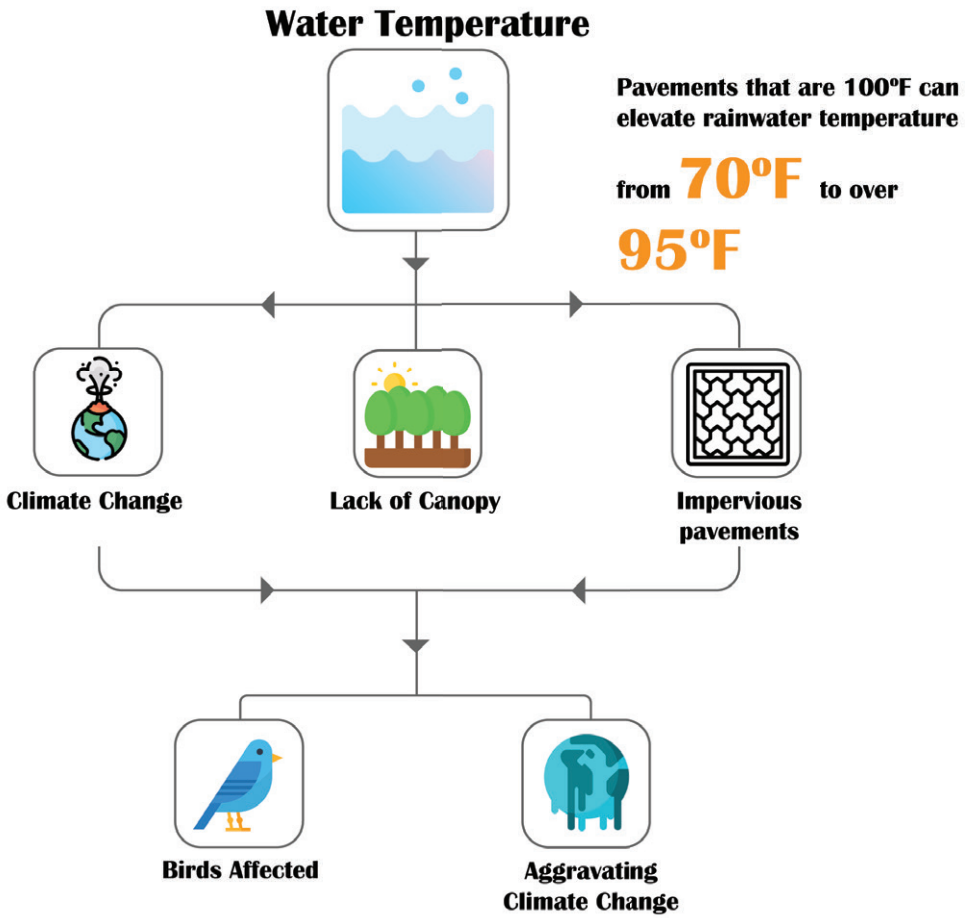
NON-POINT POLLUTION





Source: https://twitter.com/theferocity/status/1176335771684483072/photo/1

B. TEMPERATURE



WATER QUANTITY
A. AMOUNT

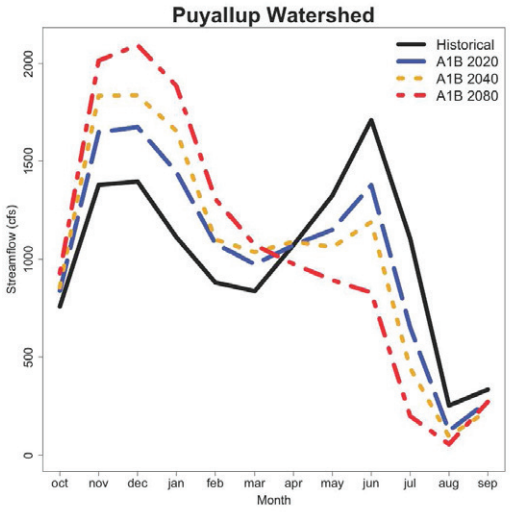
"SCIENTISTS PROJECT SLIGHT INCREASES IN WINTER, SPRING, AND FALL PRECIPITATION AND DECREASES IN SUMMER PRECIPITATION."

- PUYALLUP TRIBE OF INDIANS

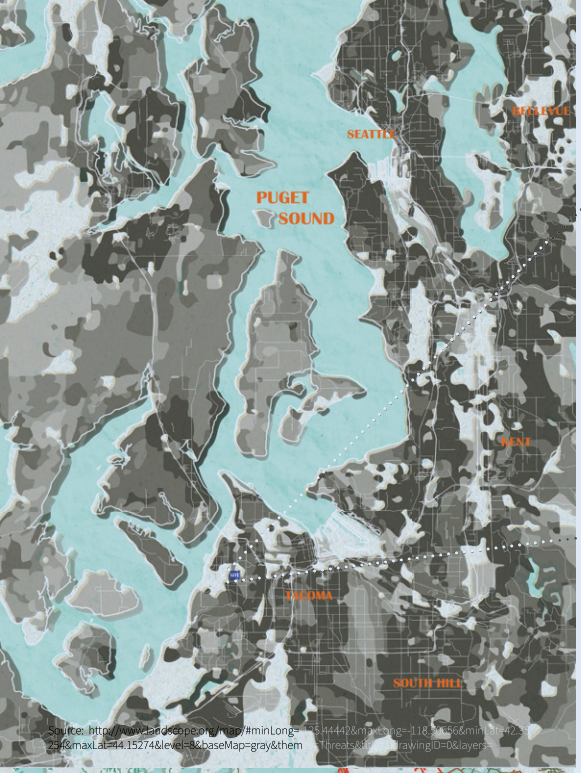
B. TIMING

"MORE PRECIPITATION WILL FALL AS RAIN DURING WINTER MONTHS, AND SNOW WILL MELT EARILER IN THE YEAR, RESULTING IN A SHORTER SNOW SEASON AND EARILER PEAK STREAMFLOW."

-PUYALLUP TRIBE OF INDIANS

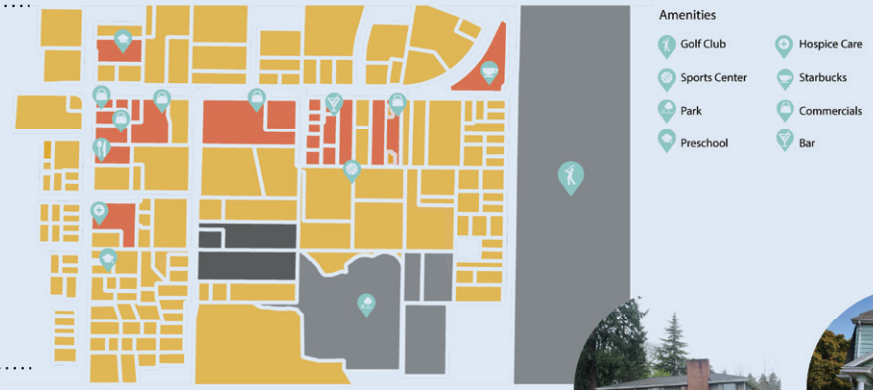


Source: UW Columbia Basin Climate Change Scenarios Project.



Source: http://www.landscope.org/map/#minLong=-125.44442&maxLong=-118.34656&minLat=42.35254&maxLat=44.15274&level=8&baseMap=gray&them=Threats&fitDrawingID=0&layers=

URBANIZATION LEADS TO MORE NON-POINT POLLUTION AND INCREASED TEMPERATURES.





Source: Photo by Yuqing Zhang

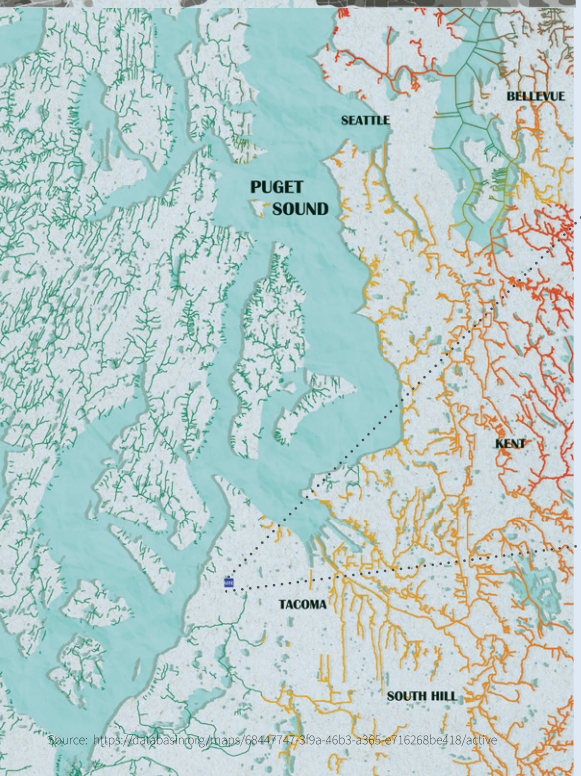


Source: from Coldwell Banker

Housing Development Intensity
units per square mile

Low <7.4

High >931.4



Source: https://databasin.org/maps/68447747-3f9a-46b3-a365-e716268be418/active

INCREASE IN WATER TEMPERATURE IMPACTS BIRDS.





Source: from induced.info



Source: from waba.org

Water Temperaures (13.1-24.4°C)

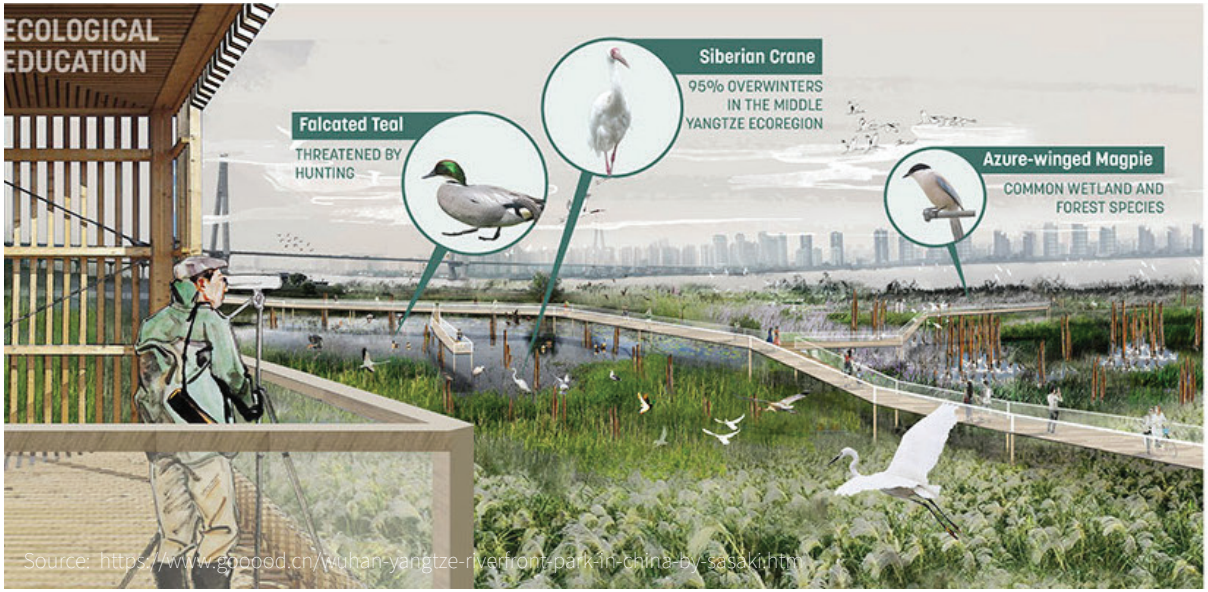
Waterbody

WHAT CAN WE DO?



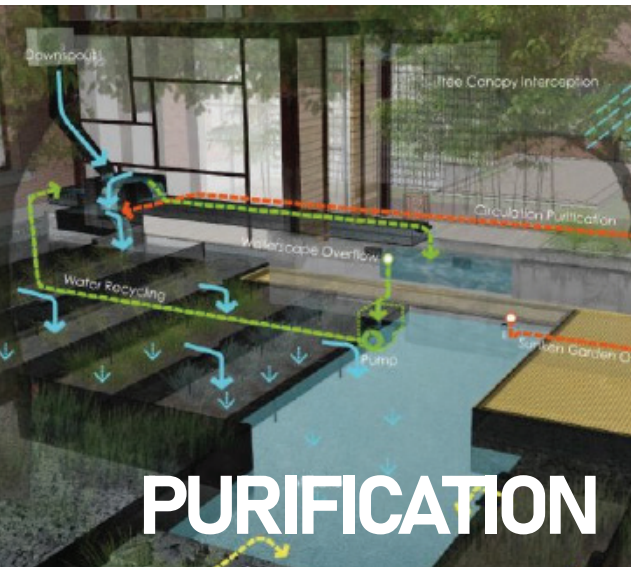
Source: https://www.gooood.cn/rain-garden-ups.htm

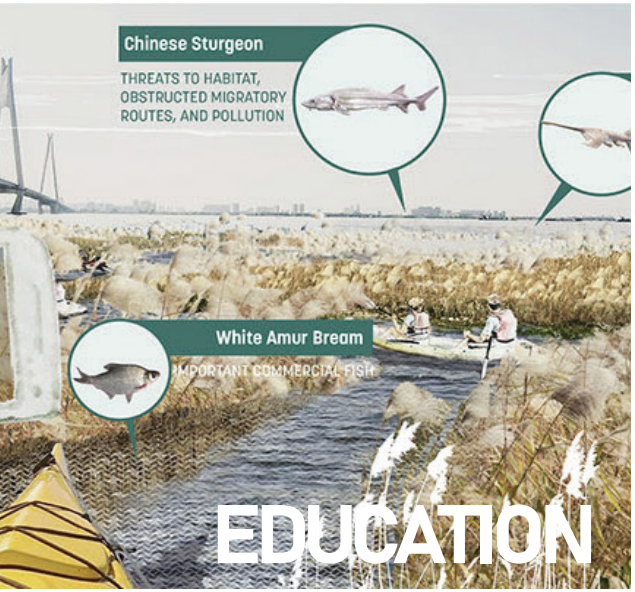


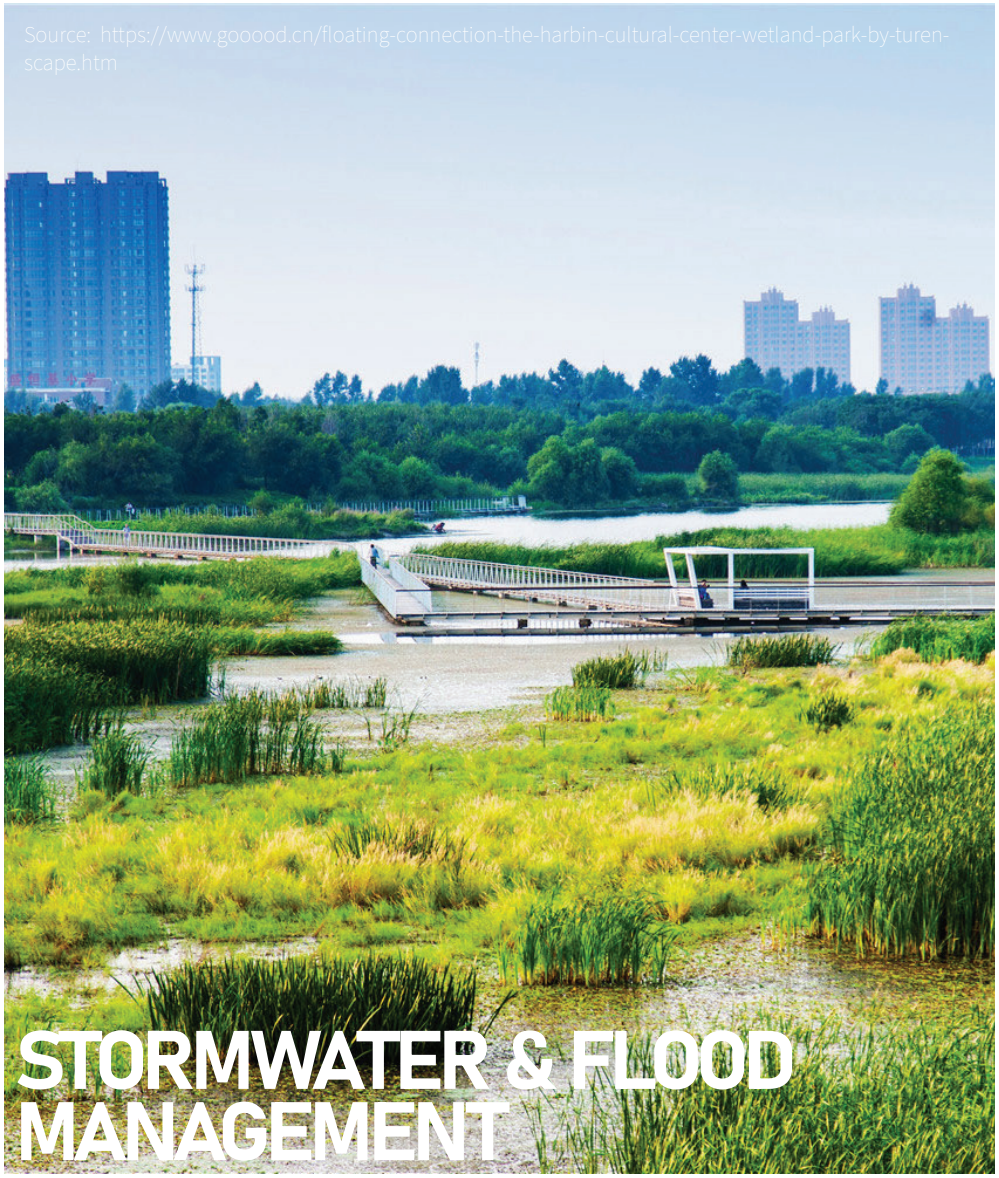


Source: https://www.gooood.cn/wuhan-yangtze-riverfront-park-in-china-by-sasaki.htm









Source: https://www.gooood.cn/floating-connection-the-harbin-cultural-center-wetland-park-by-turen-scape.htm

People-Birds-Water



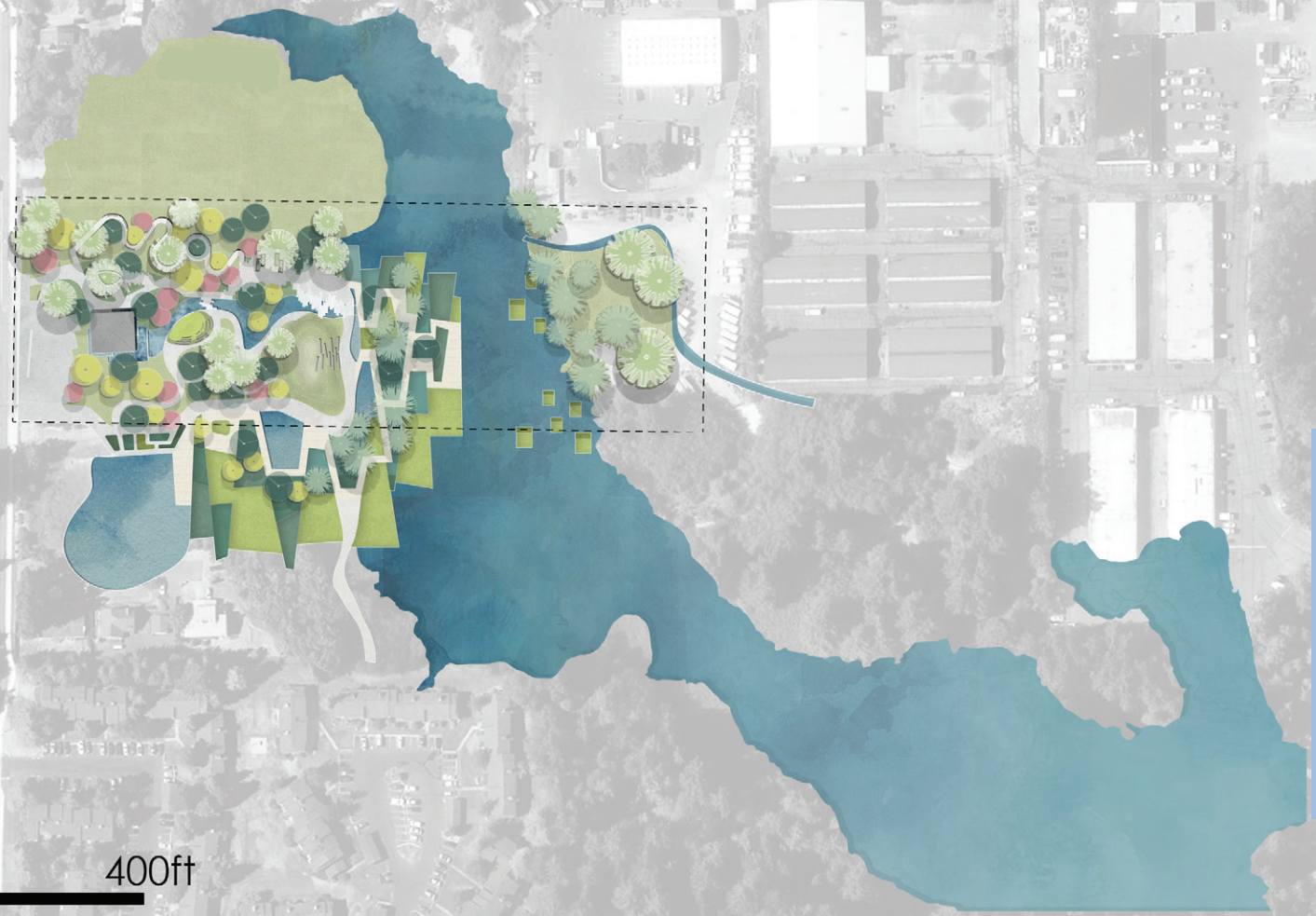
Concept

The concept of the design brings people, birds, and water together to create an environment that benefits all. Cleaning stormwater and adding interactive programming both serve to attract birds and people to the site.

Yuqing Zhang

Neighborhood Context

Neighborhood: The Tahoma Audbon Society is located at the Adriana Hess Wetland Park in University Place, Washington. The surrounding area is primarily residential and retail.



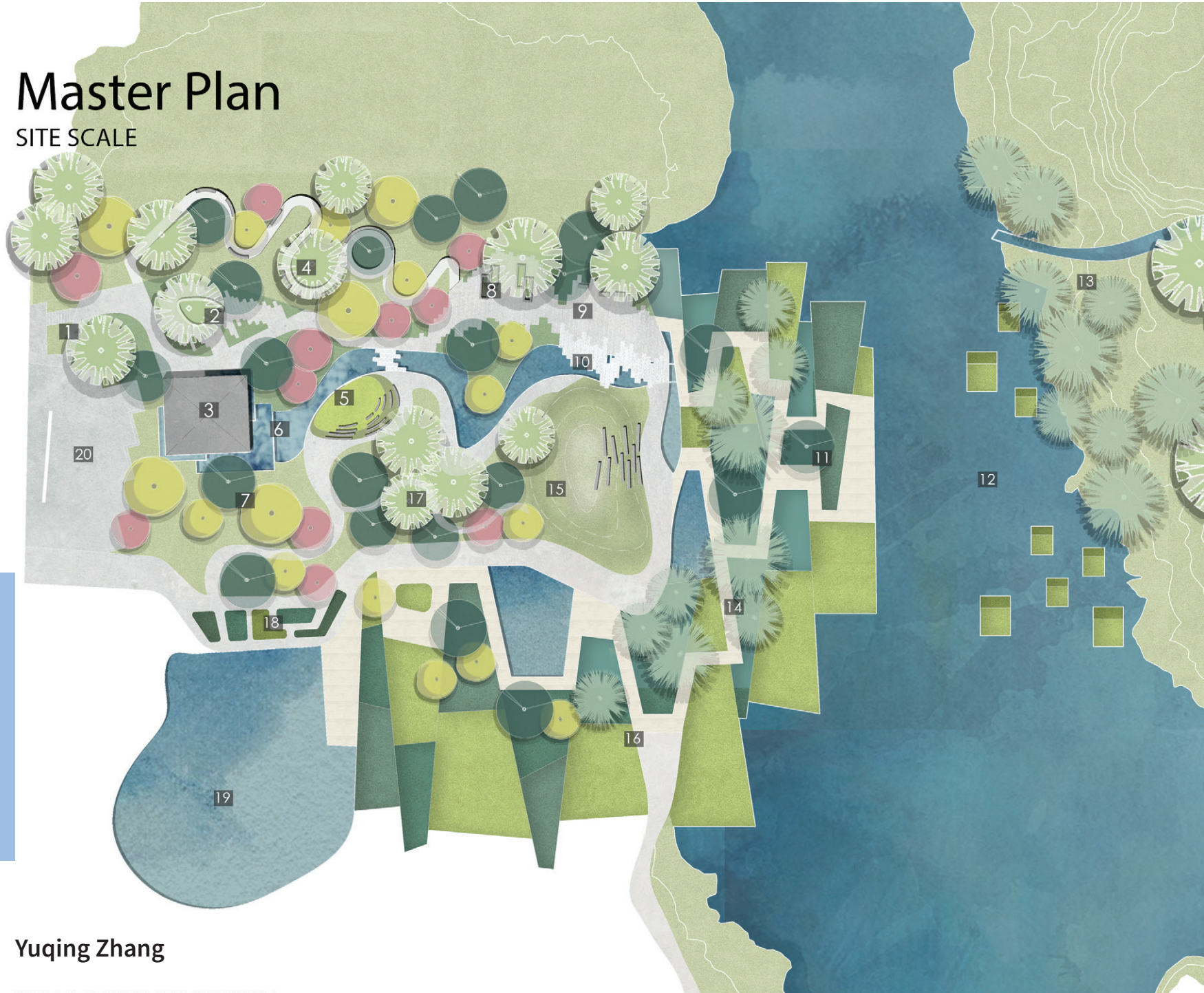
N

0 400ft

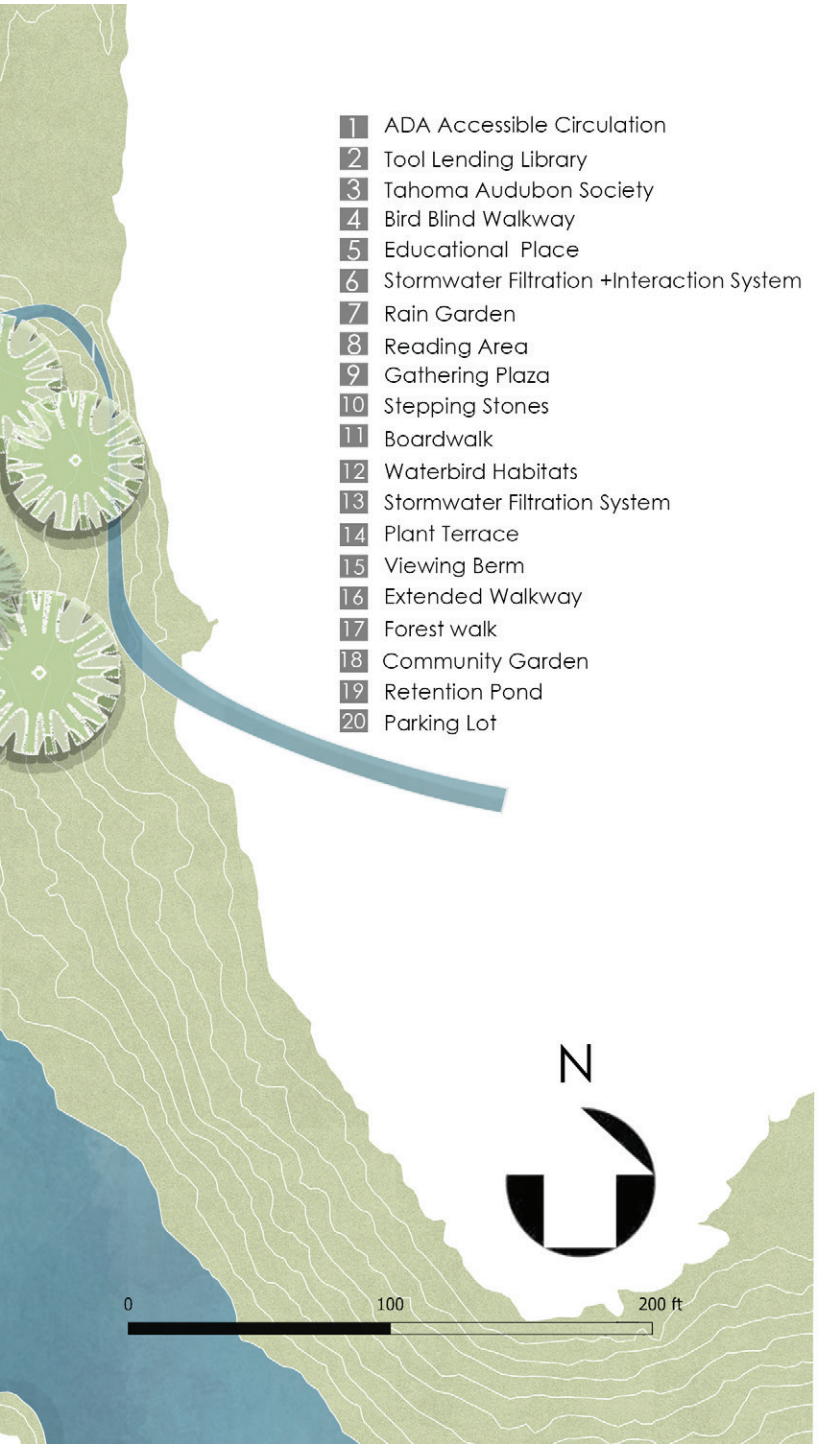
Yuqing Zhang

Master Plan

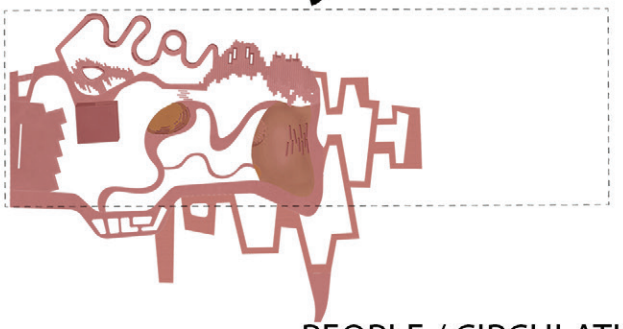
SITE SCALE



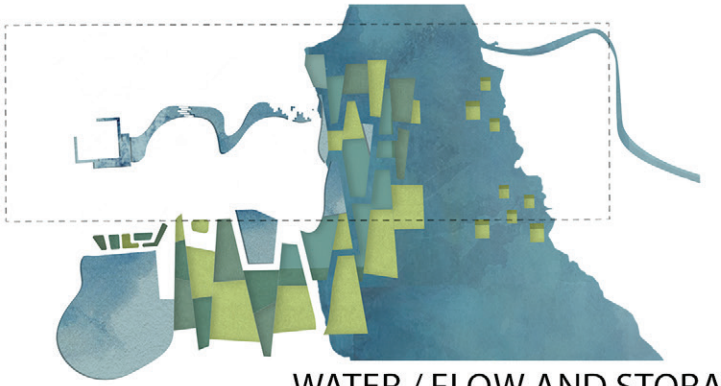
Yuqing Zhang



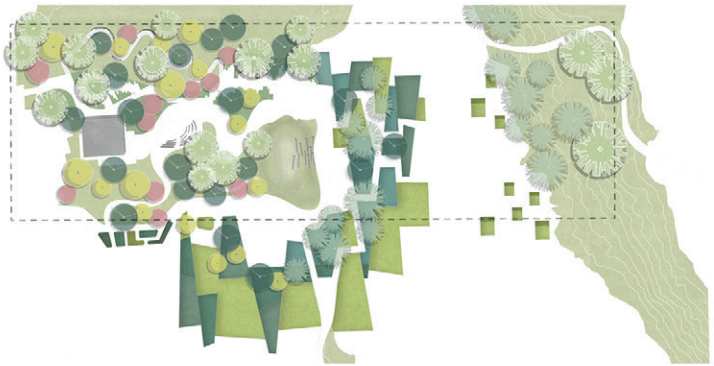
Plan Analysis



PEOPLE / CIRCULATION PATH SYSTEM



WATER / FLOW AND STORAGE SYSTEM



BIRDS / GREEN CANOPY SYSTEM

Yuqing Zhang

Bird



01

Hide People from Birds:

The elevated boardwalk allows people to walk through the forest. People can observe birds that are afraid of people through the bird blind.

02

Connect People with Birds:

The path along the water offers a great chance for people to interact with birds that are not afraid of people. They can also view the stormwater filtration process.

03

Separate People from Birds:

This setting is designed not only for protecting people from more aggressive birds, but also offers a chance for people to observe them in their habitat.



01

Yuqing Zhang





02



03

Yuqing Zhang

People :

Core programs

The design supports activities on the site that focus on people interacting with water, viewing birds, gathering, and relaxing.

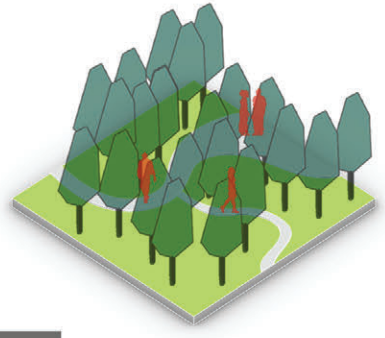




1 ADA ACCESSIBLE CIRCULATION



9 READING AREA

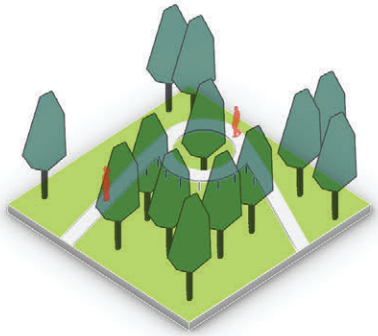


17 FOREST WALK

Yuqing Zhang



2 TOOL LENDIGN LIBRARY



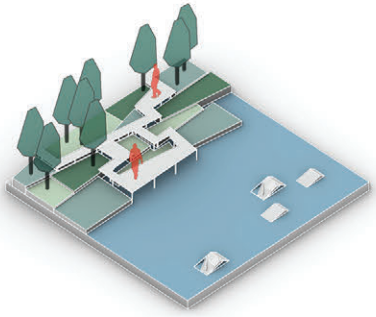
4 BIRD BLIND WALKWAY



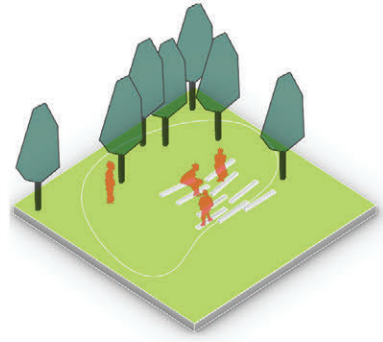
5 EDUCATIONAL PLACE



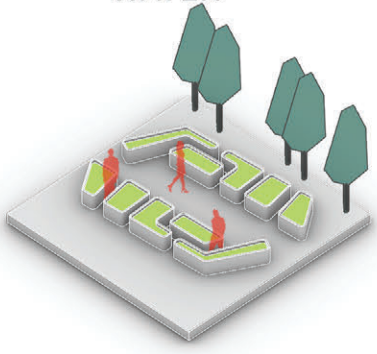
10 INTERACTION WITH WATER



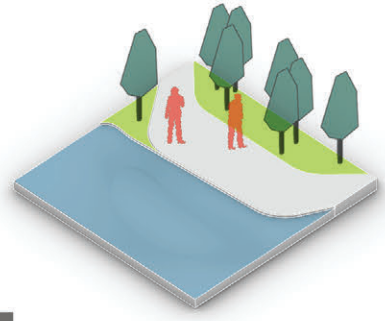
11 WATERFRONT BOARDWALK



15 VIEWING BERM



18 COMMUNITY GARDEN



19 RETENTION POND

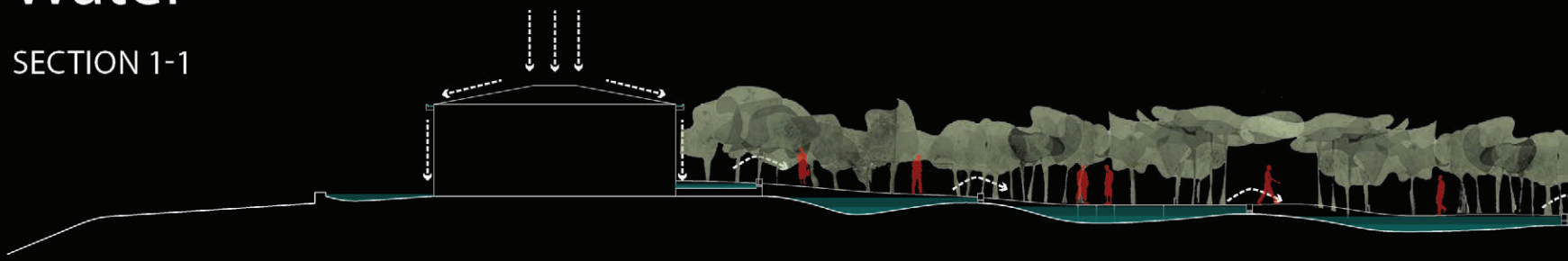


20 PARKING LOT

Yuqing Zhang

Water

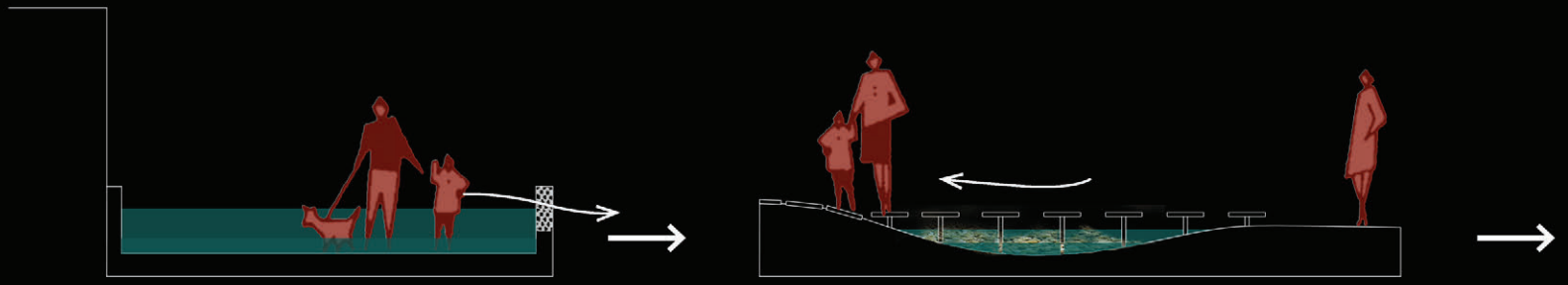
SECTION 1-1



SECTION 2-2



WATER PURIFICATION SYSTEM



Physical method: Net filtration

Physical method: Stone filtration

STEP1:
60% remaining pollutants



Filter Web

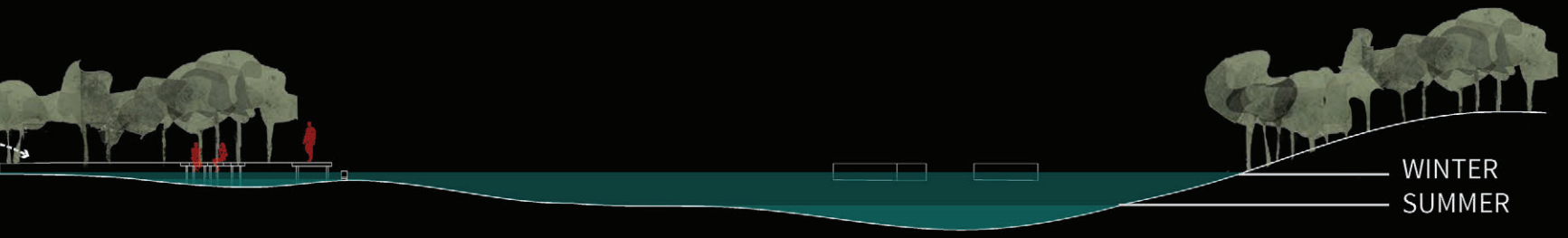
STEP2:
40% remaining pollutants



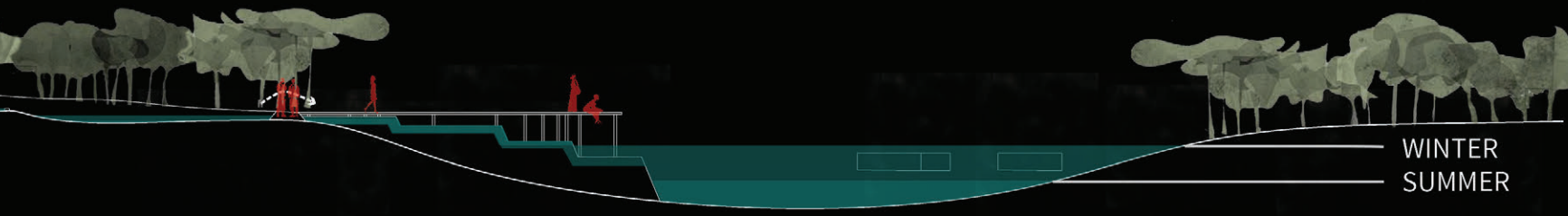
Gravel

Yuqing Zhang

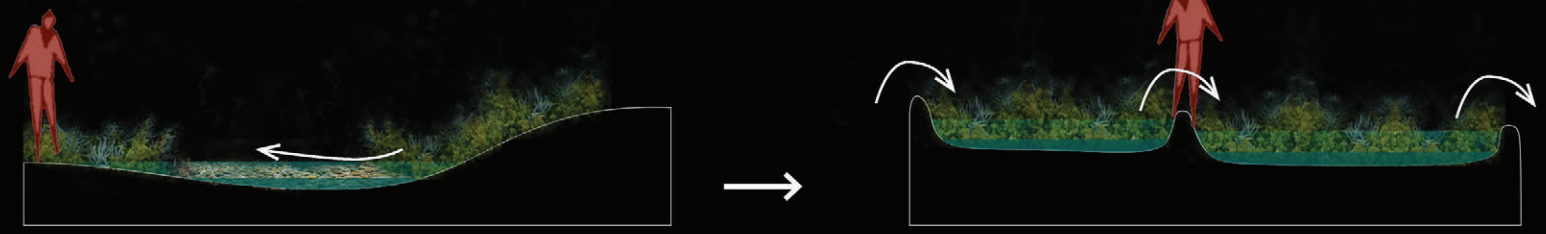
BIRDS & CLIMATE CHANGE STUDIO



Seasonal changes at the site



Seasonal changes at the site



biological method:

STEP3:

10% remaining pollutants



Douglas Spirea



Sparganium emersum

Aquaculture methods:

STEP4:

5% remaining pollutants



Typha latifolia

Yuqing Zhang

BIRDS & CLIMATE CHANGE STUDIO

Urban Refuge

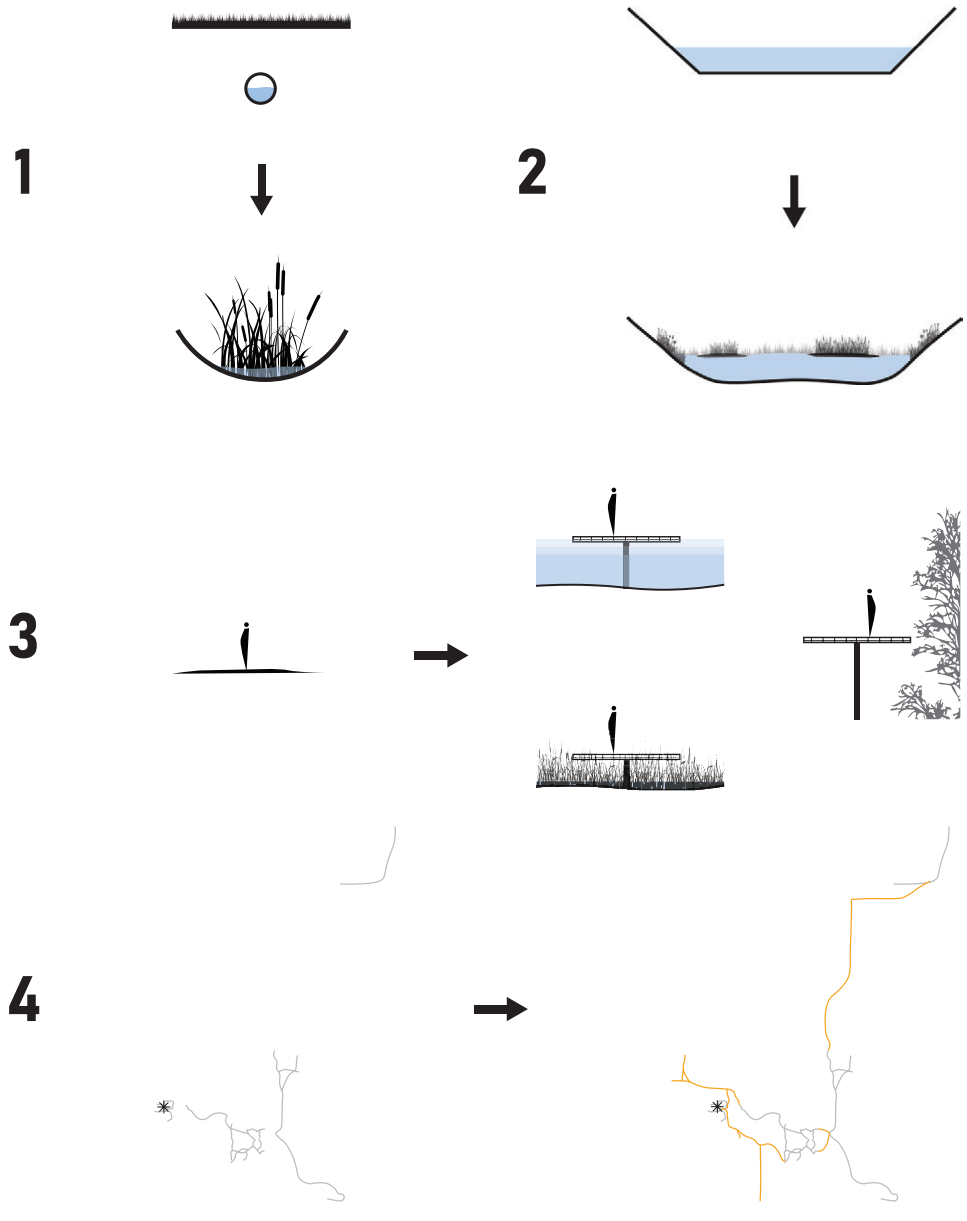
DANIELLE DOLBOW

As issues of water quality have arisen with the worsening of climate change, birds and their habitats are being threatened.

My design proposes solutions to help mitigate these impacts for birds, but also provides opprtunities for people to interact with these habitats looking at both the site scale and the potentials for a larger network.

In addition to the client goals, I explored four additional design goals through the for of concept diagrammig to help further guide my process. These are outlined as followed:

- **1. Expose** people to the water systems both natural and man-made that influence water habitat and impact climate change
- **2. Increase** biodiversity and wildlife habitats
- 3. **Interact.** Use various trail experiences to promote interaction with said habitats
- 4. **Connect.** Expand upon the existing network of trails to bring people to Adriana Hess Wetland Park and increase accessibility to nature



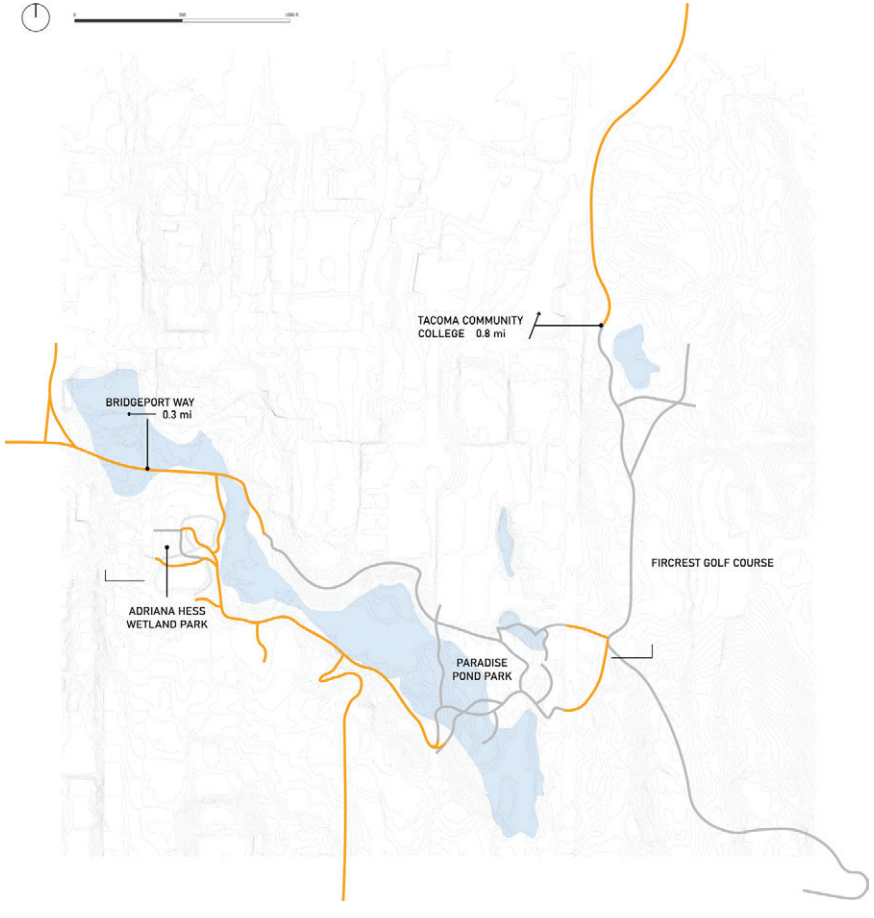
NETWORK POTENTIALS

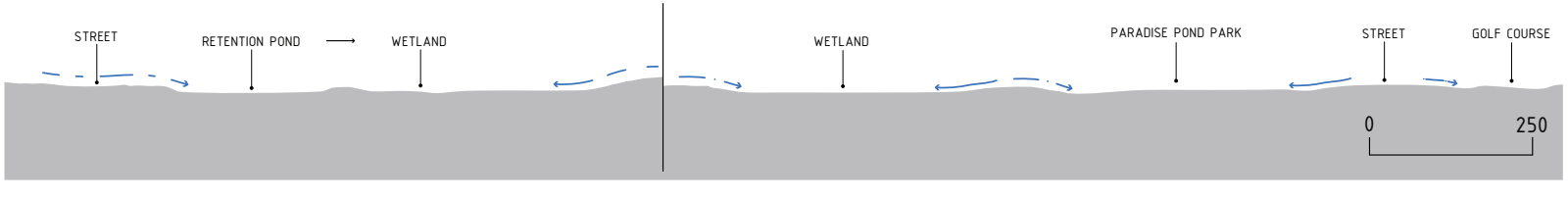
As expanding upon the existing trail system was on of the primary goals, I explored the important neighborhoods, developments, and green space that would influence the location of the new trails.

Additionally, as water was my primary focus, it was important to understand the conditions of the existing waterbodies and how they could impact the trail locations. Due to climate change more extreme fluctuations in water levels are occuring from summer to winter along with increased precipitation, therefore it was also important to look at the floodplain to see how an extreme situation might impact the area.

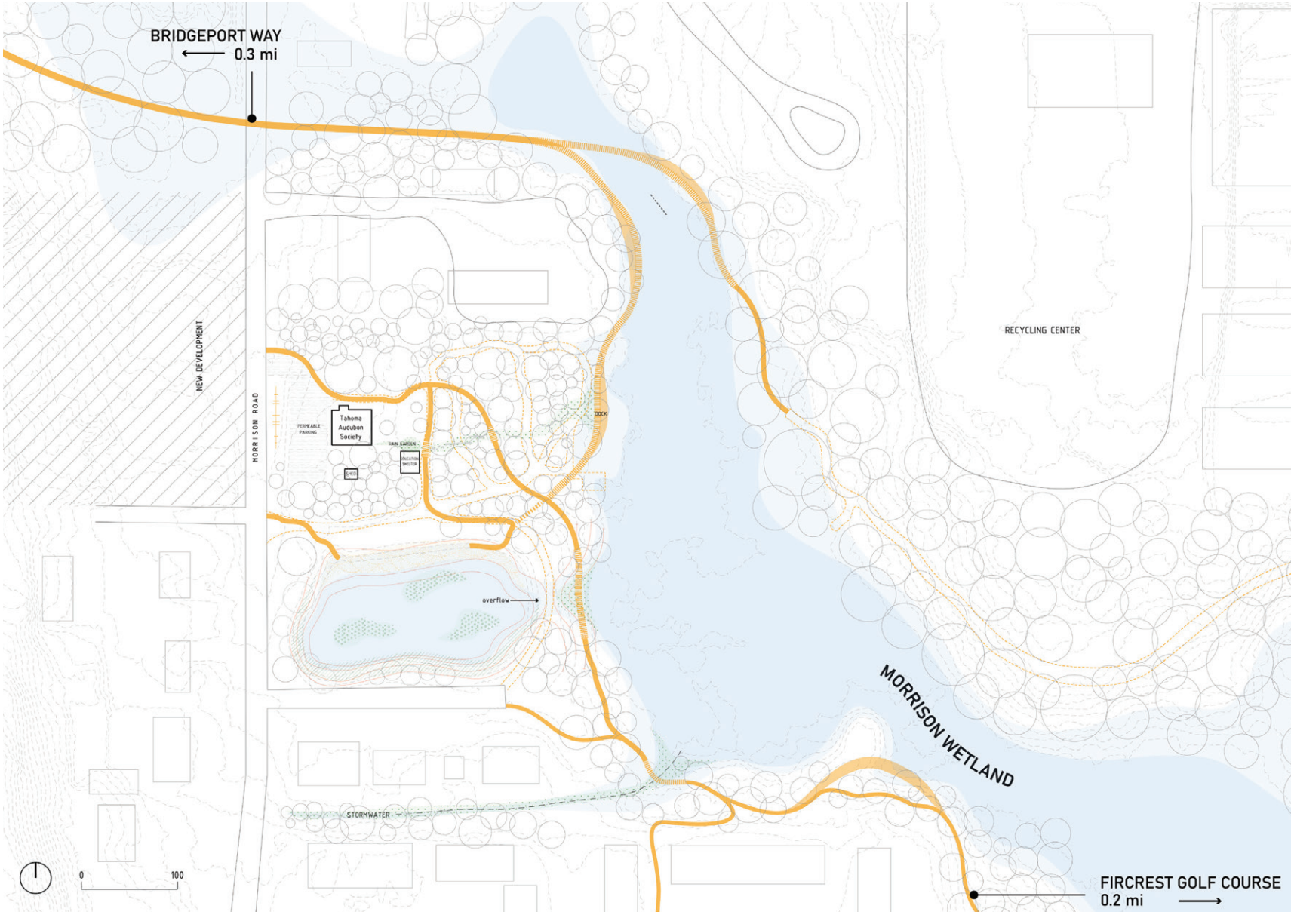
Shaded in blue on the circulation map to the right is the flood plain which is mostly contained within close proximity to Morrison Wetland.

Furthermore, I explored through diagramatic section the overall water flows of the larger context, highlighting where and how urban stormwater runoff would flow into the waterbodies.





Danielle Dolbow



Danielle Dolbow

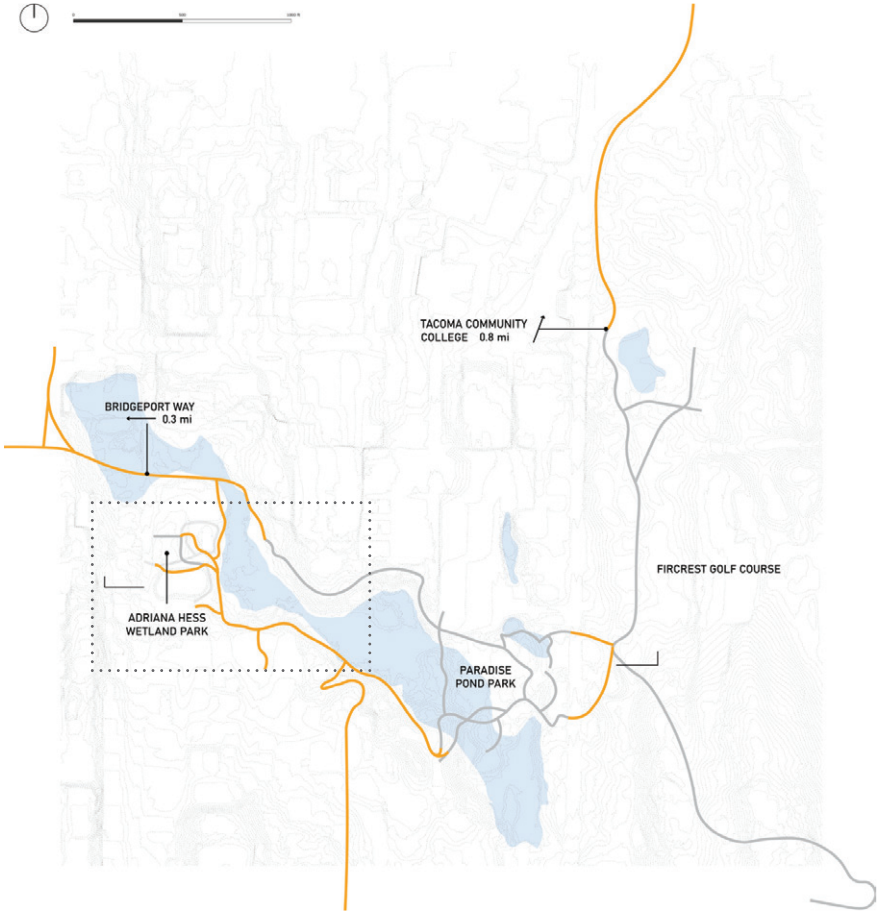
Site Plan

FOCUS AREA

Zooming into the area surrounding Adriana Hess Wetland Park, the existing trails were simplified in order to better align with the project goals by focusing on the experience of the trails over the quantity. Furthermore, in areas where trails were removed, an increase in vegetation will fill that void, densifying the woodland scape and enhancing the habitat.

LEGEND:

- on-site buildings
- off-site buildings
- existing topography
- proposed topography
- existing trails
- wetland
- floating wetland islands
- biofiltration
- proposed trails
- proposed elevated trails
- beach edge
- riparian edge
- permeable pavement
- entry sculpture
- rookery



PARADISE POND PARK →

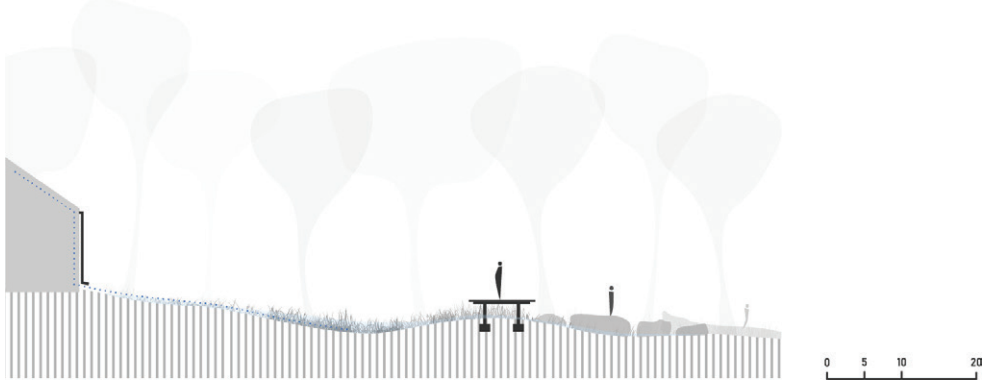
Danielle Dolbow

Sections and Details

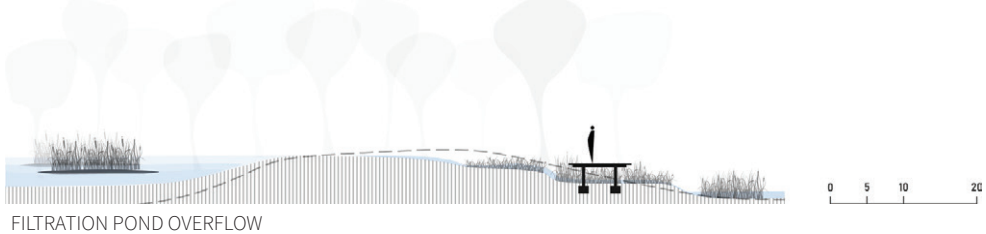
WETLAND ENTRY POINTS

Within this context, the trail intersects with three wetland entry points, each creating their own unique experience. On the site of the Tahoma Audubon Society, one originates from the location of what is currently a smaller pond but envisions this being converted into a rain garden that also collects roof water runoff from the building on site. On wetter days, water can overflow into the bioswale that runs down to the wetland through the woodland scape, while on dryer days this swale can become an element of play using large boulders and logs for climbing on.

The second entry point comes from what is now the retention pond. My design proposes to naturalize the currently engineered conditions of the form through manipulation of the grade and increased vegetative edges. Additionally, man-made biofiltration floating wetlands will be incorporated that will aid in filtering the stormwater and provide more habitat to the area. Overflow will then be directed to the wetland through a mildly stepped series of purifying plants.

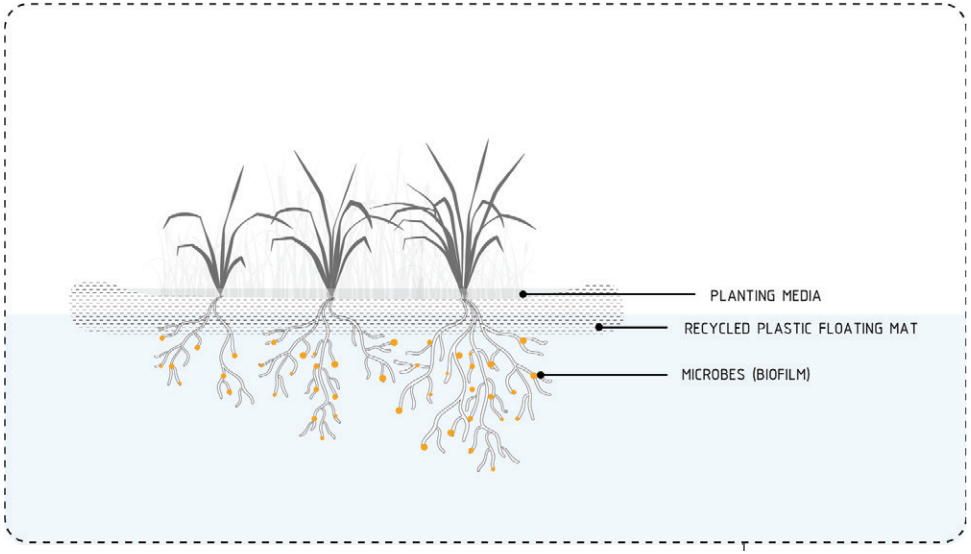


RAIN GARDEN TO SWALE

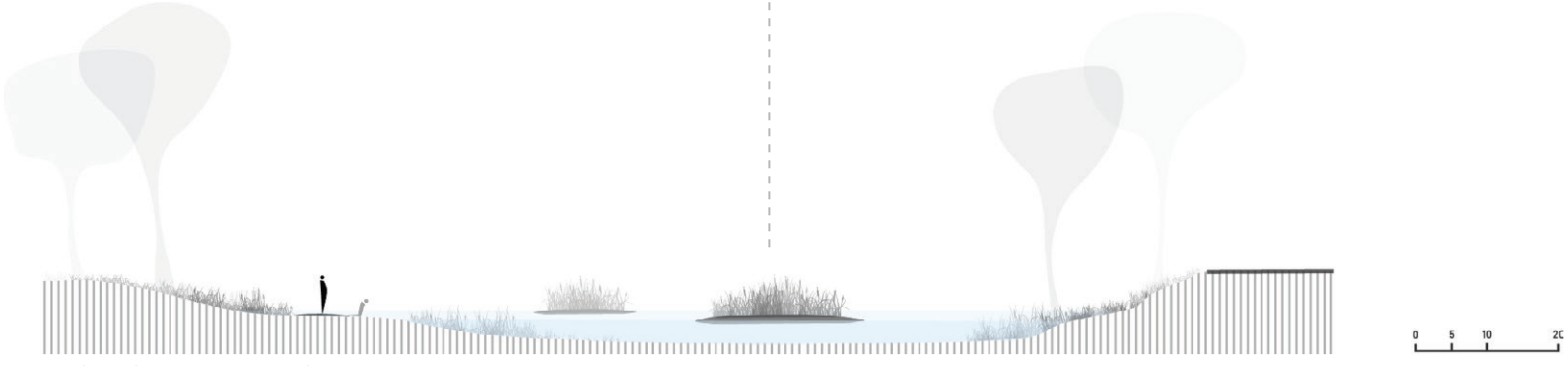


FILTRATION POND OVERFLOW

Danielle Dolbow

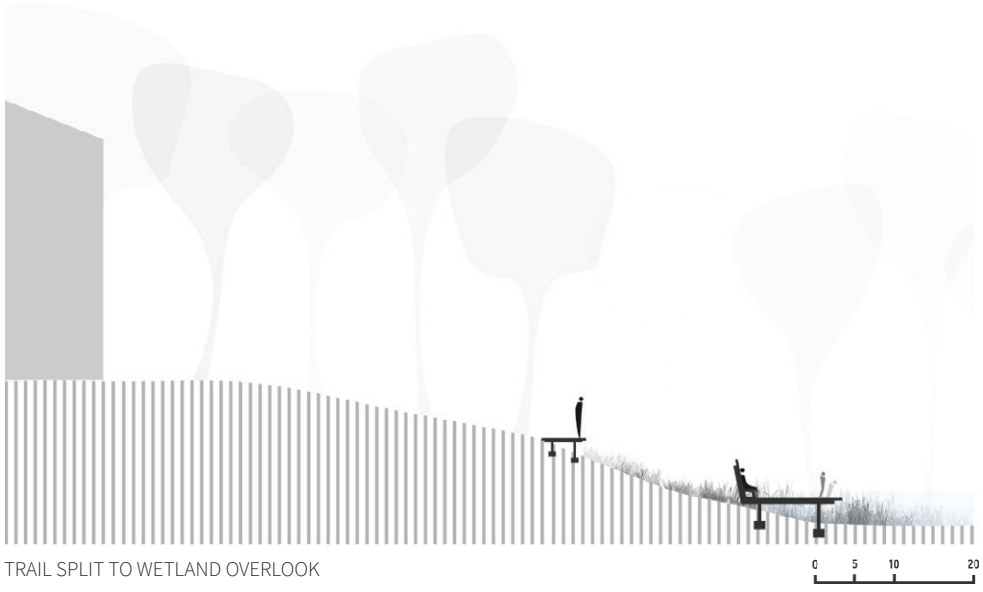






BEACH EDGE AND RIPARIAN EDGE

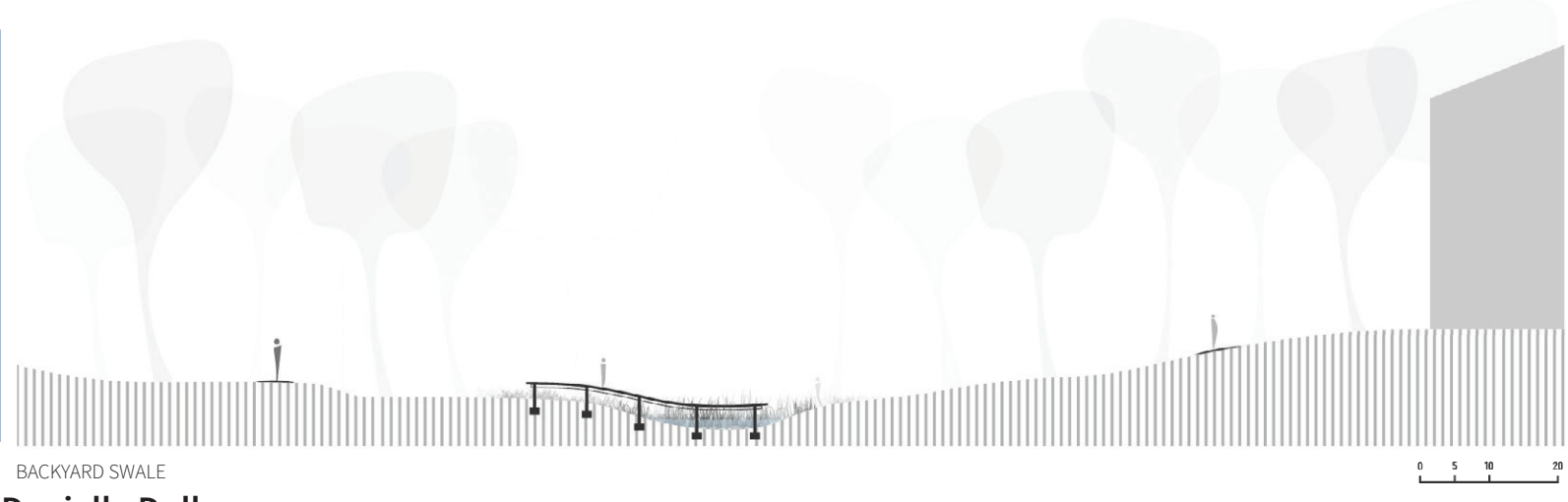
Danielle Dolbow



TRAIL SPLIT TO WETLAND OVERLOOK



The last entry point is the “backyard swale” (Bottom). This typology proposes daylighting the existing stormwater pipe, providing a low maintenance swale for runoff to filter gradually down to the wetland from both the street, the current stormwater main line, and the adjacent houses.

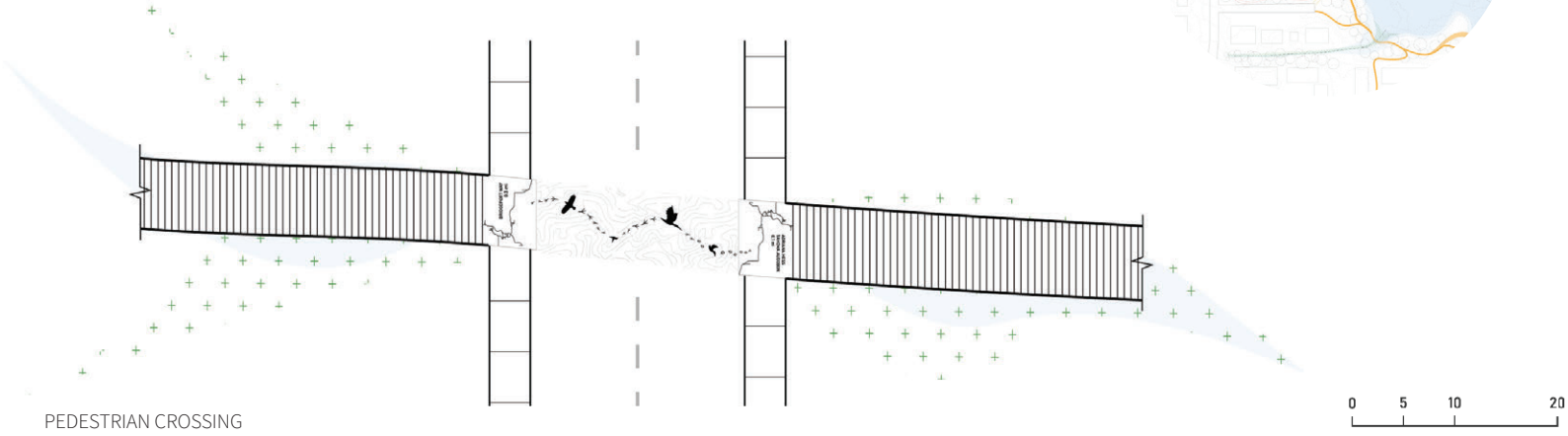


BACKYARD SWALE

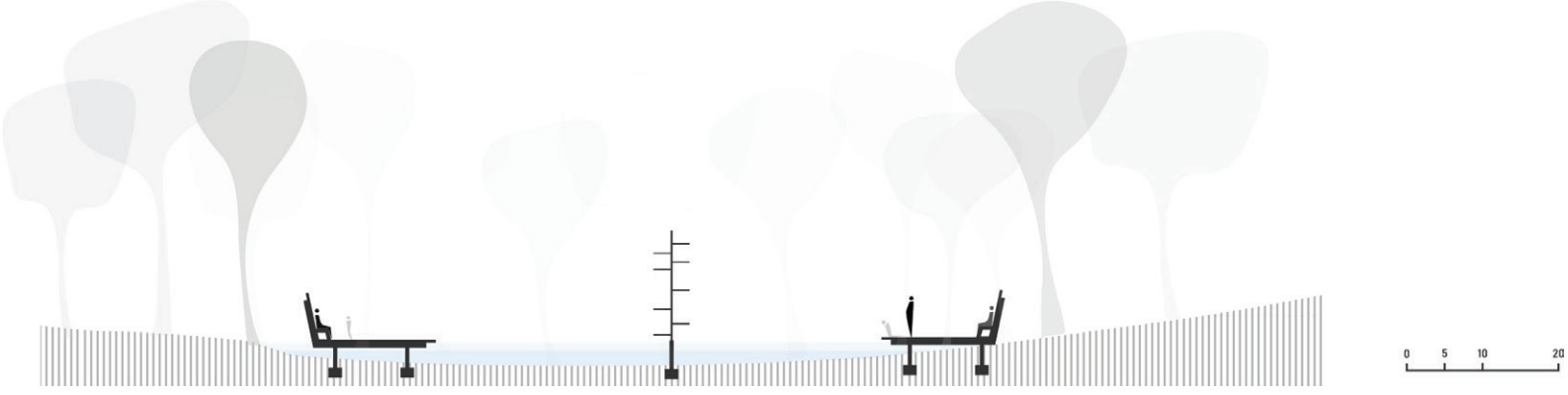
Additional section and plan explorations visualize how different points on the trail vary in elevation and experience. Some points promote a close interaction with the water and its fluctuating levels while others provide a more forest-like experience surrounded by dense groundcover vegetation and trees.

Simultaneously, my design explores ways in which to weave this natural oasis into the urban fabric in attractive and realistic ways. As illustrated in the street crossing plan, graphics and signage can be used to create intrigue, educate, and tell stories about the habitats in which visitors are to interact with.





PEDESTRIAN CROSSING



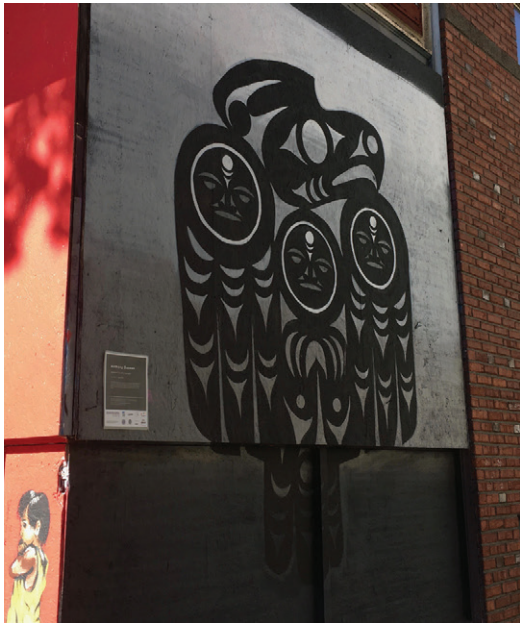
BOARDWALK AND ROOKERY

Danielle Dolbow

Narrative Experience

CREATING CULTURAL TIES

Lastly, in an effort to promote meaningful relationships between people and their surroundings, I propose a collaboration with an artists/artists of the Puyallup tribe and other members invested in this project. In various locations throughout the trail system, ancient bird legends of the tribe could be shared in a visual narrative format. The locations would depend on where one may come across the specific birds or birds of each story (i.e. great blue herons in the wetlands, ravens and wrens in the woods, etc.) This proposal would help further achieve the goals of the Audubon Society whilst linking the important history of the Puyallup tribe, and provide an opportunity for further relations. Pictured are the works of Anthony Duenas, a member of the Puyallup tribe. His work, located all around Tacoma, centers on contemporary interpretations of Northwest native mythology.





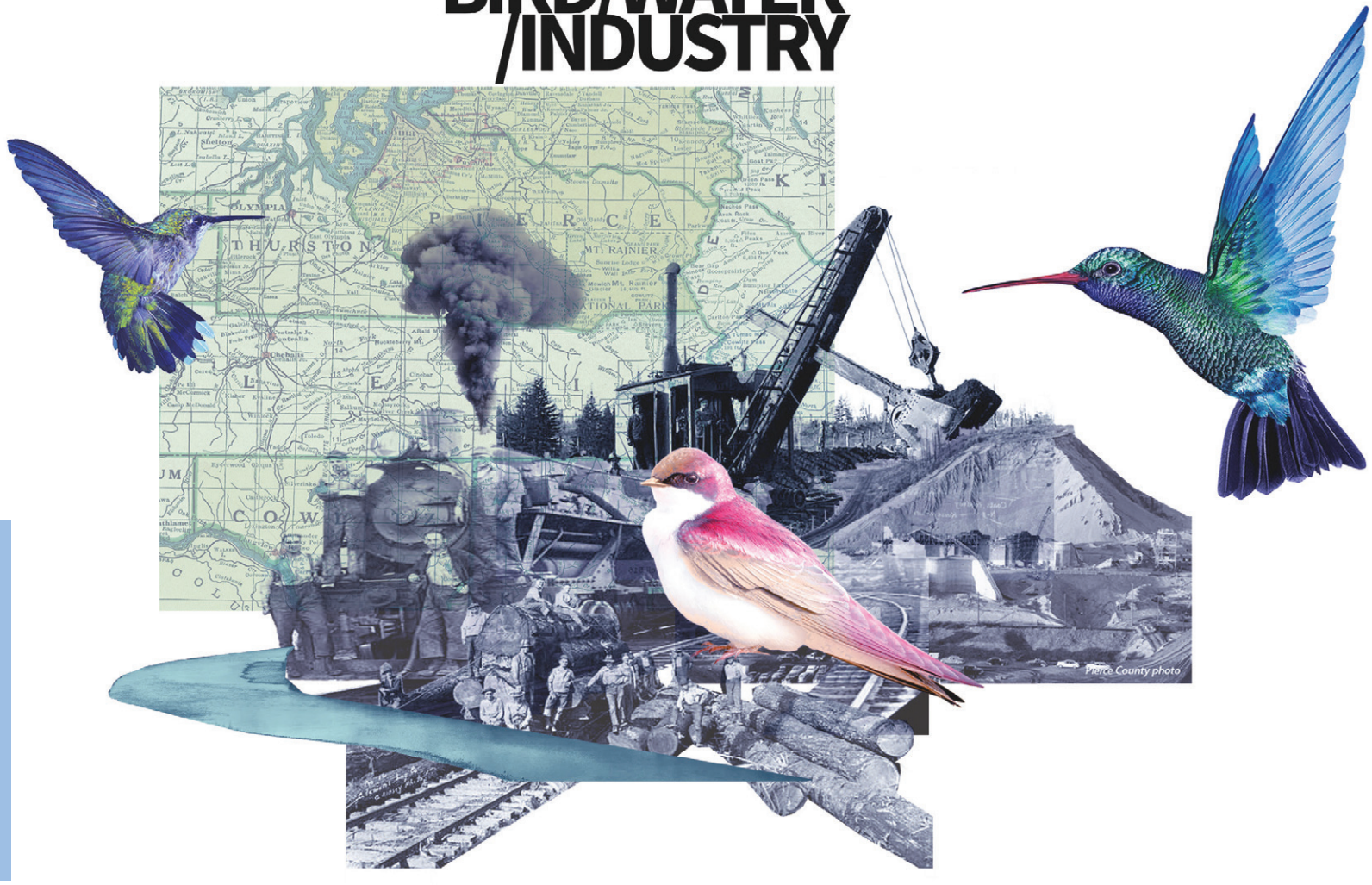


Danielle Dolbow



Danielle Dolbow

BIRD/WATER /INDUSTRY

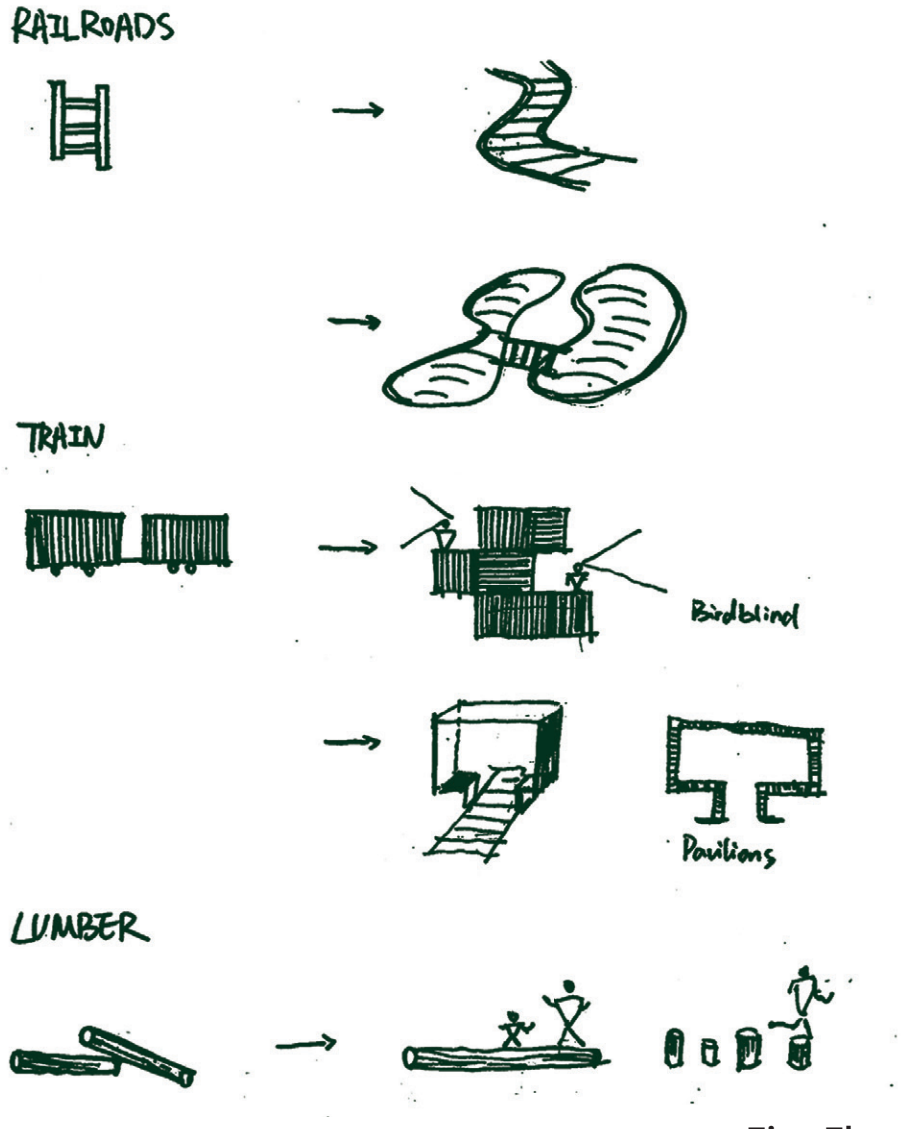


Zian Zheng

BIRDS & CLIMATE CHANGE STUDIO

Design Goals

CORE FOCUS / CONCEPT



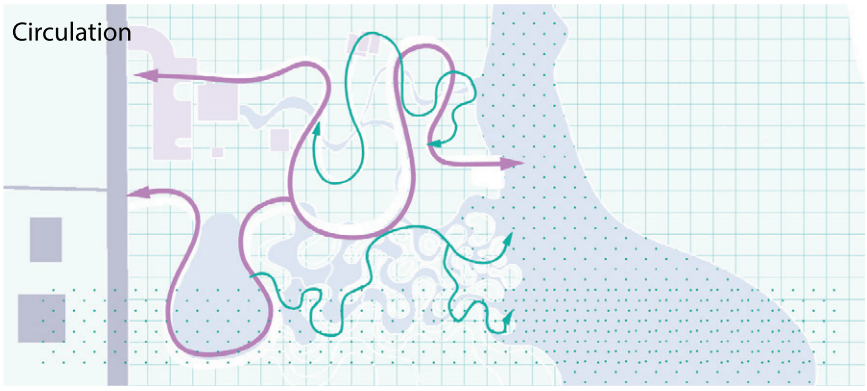
In landscape concept, I focus on water, at the same time use birds and industrial elements as the design features of the park.

The main concern of this project is to create participatory landscape by increasing interaction between human and water. The strategy is to involve visitors in the wetland and water system, in order to raise their awareness of environmental protection.

Also, I introduce the industrial history context of University Place, the railroads and lumbering, into the site. Even though it was just a short period during the rapid development process, the meaningful context has the value for memorizing.The striking contrast of industry and birds sets visitors thinking about the relationship between human and nature.

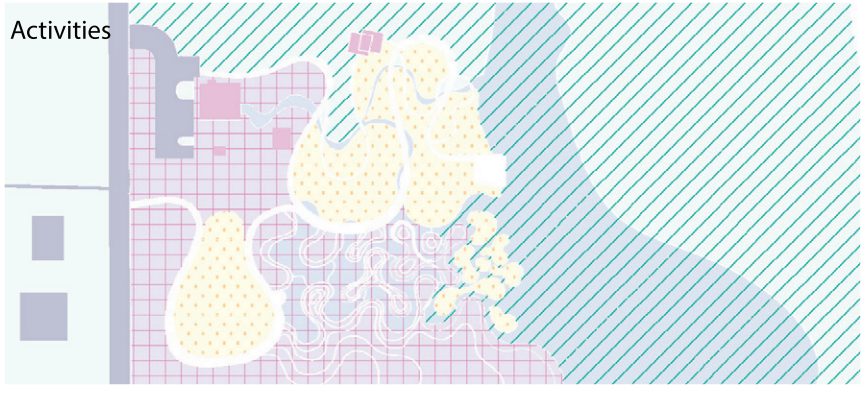
Zian Zheng

BIRDS & CLIMATE CHANGE STUDIO



Public

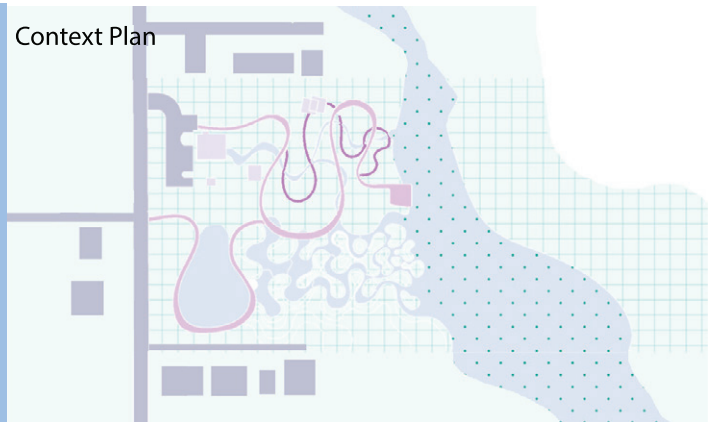
Private



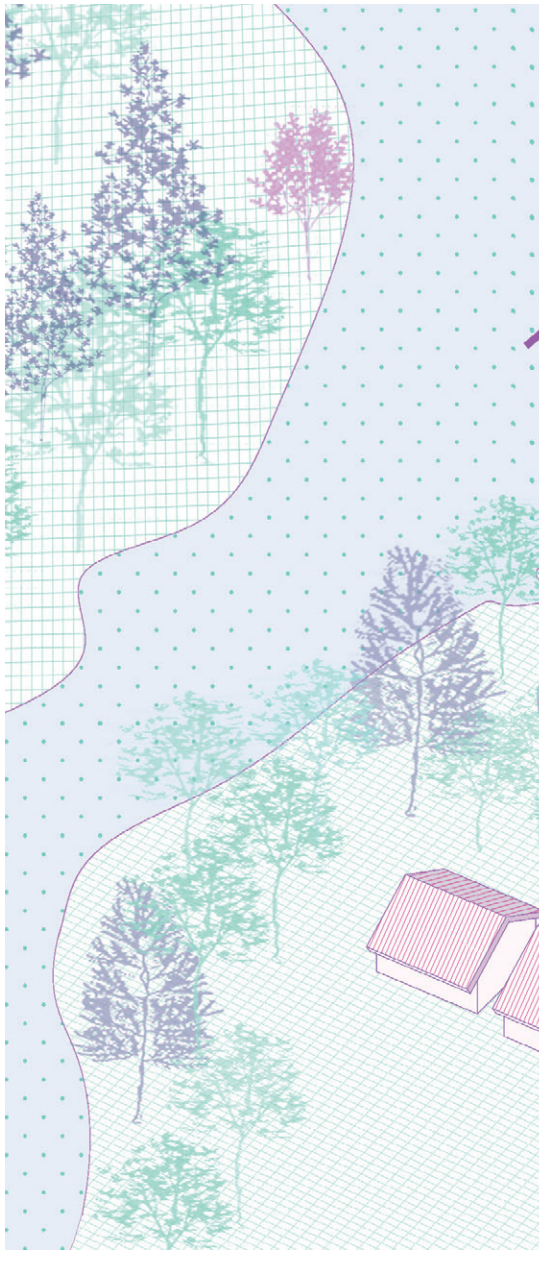
birds

birds+human

human



1.Parking Lot
2. Tahoma Audubon Society
3.Wood Taril
4.Education Shelter
5.Chatting Space
6. Footpath
7. Birdblind
8. Wood Dexk
9. Stormwater Filtration
10. Palyground
12. Retention Pond



Zian Zheng

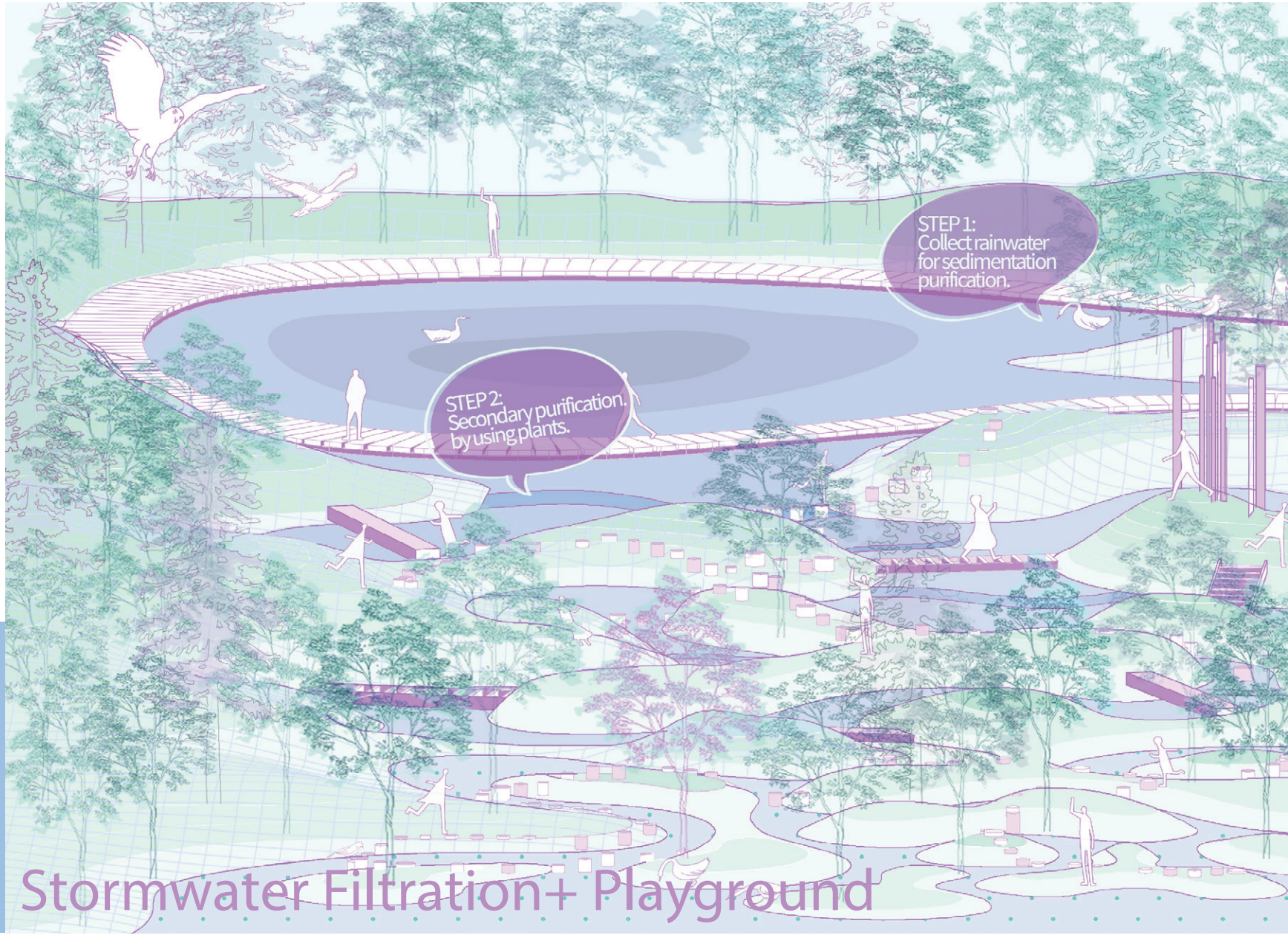
BIRDS & CLIMATE CHANGE STUDIO



Axon View

Zian Zheng

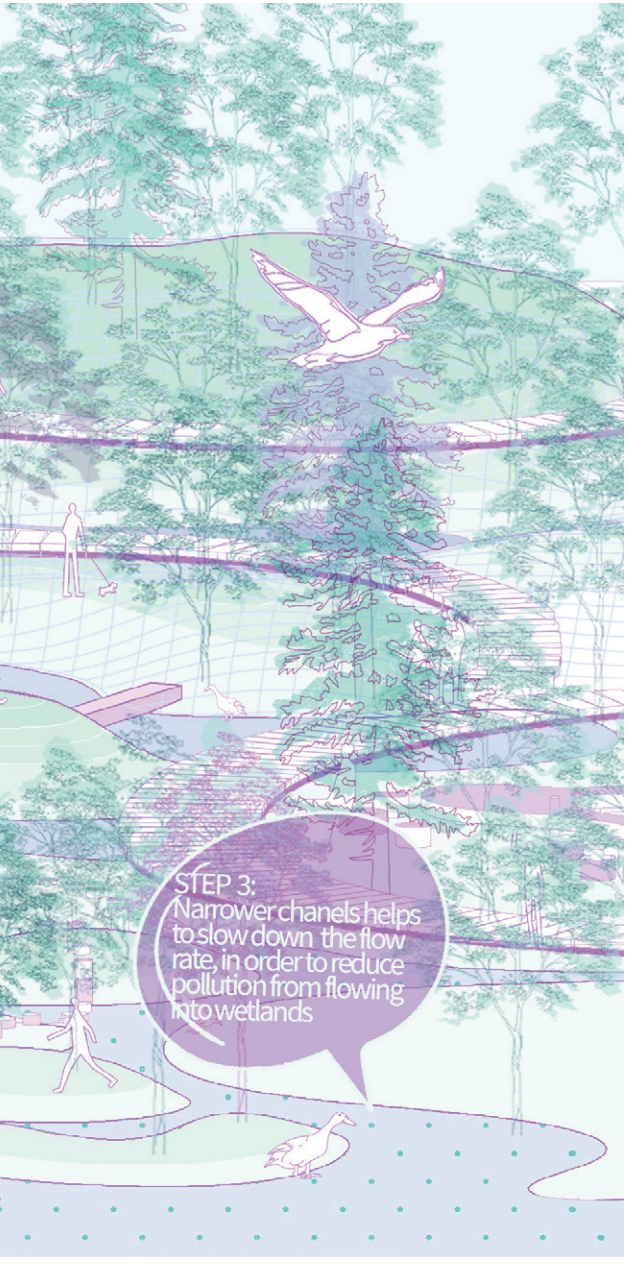
BIRDS & CLIMATE CHANGE STUDIO

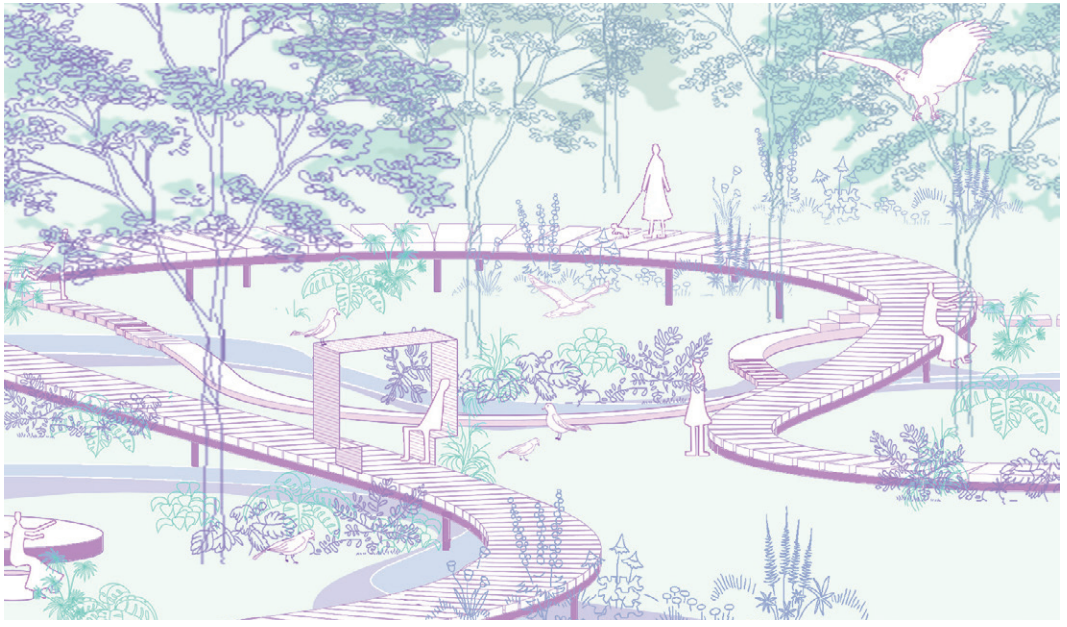


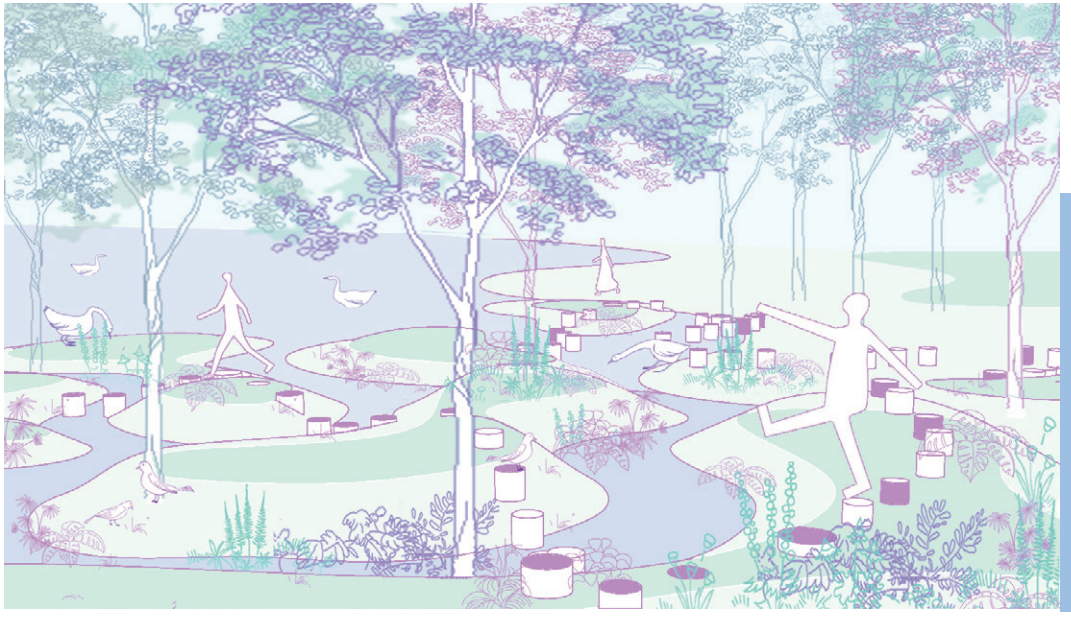
Stormwater Filtration+ Playground

Zian Zheng

BIRDS & CLIMATE CHANGE STUDIO





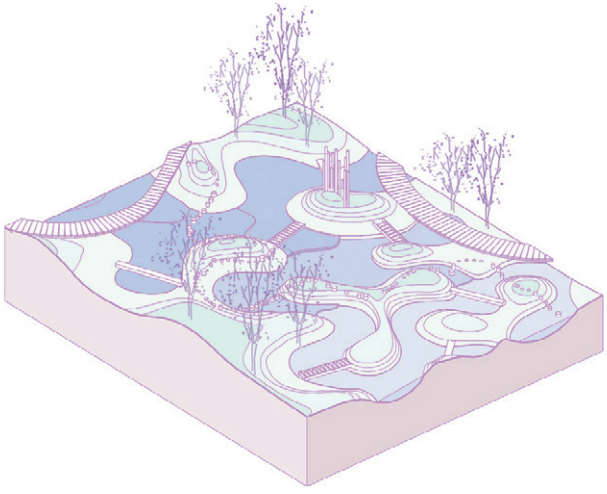


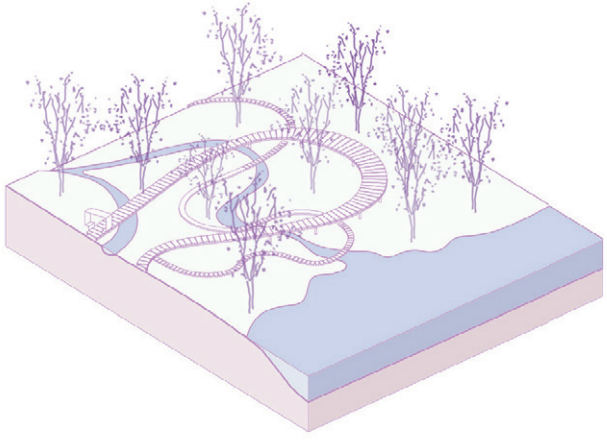
Zian Zheng

BIRDS & CLIMATE CHANGE STUDIO

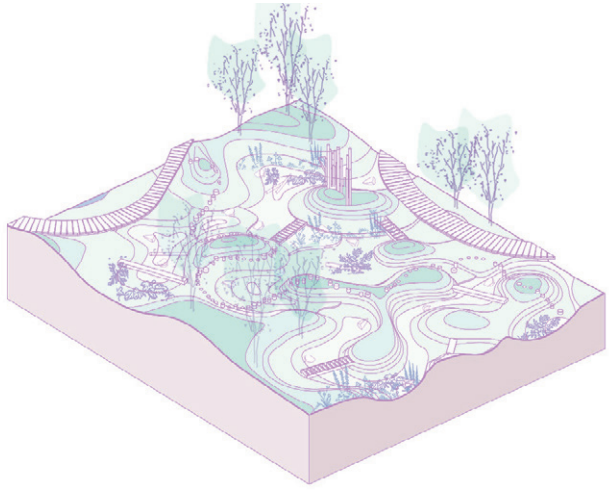
Climate Resilence

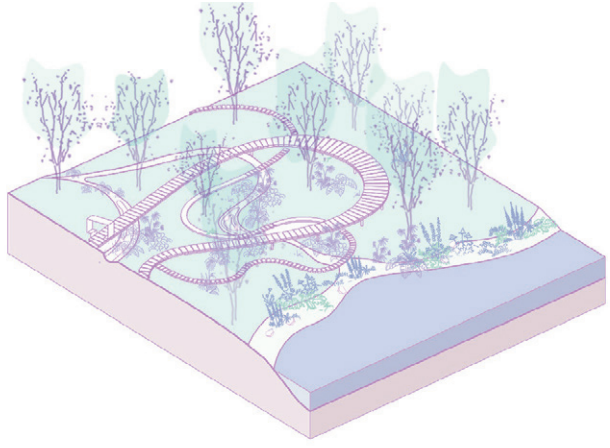
"WETTER WINTER"





"DRIER SUMMER"

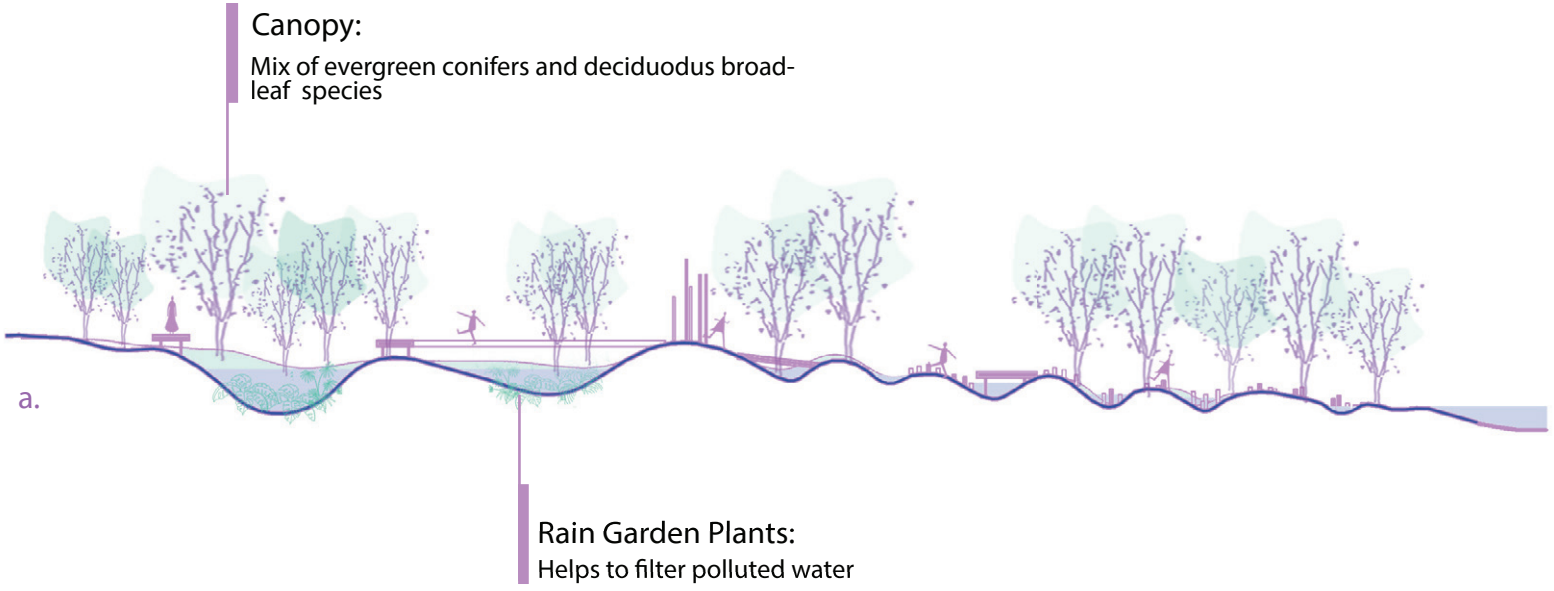


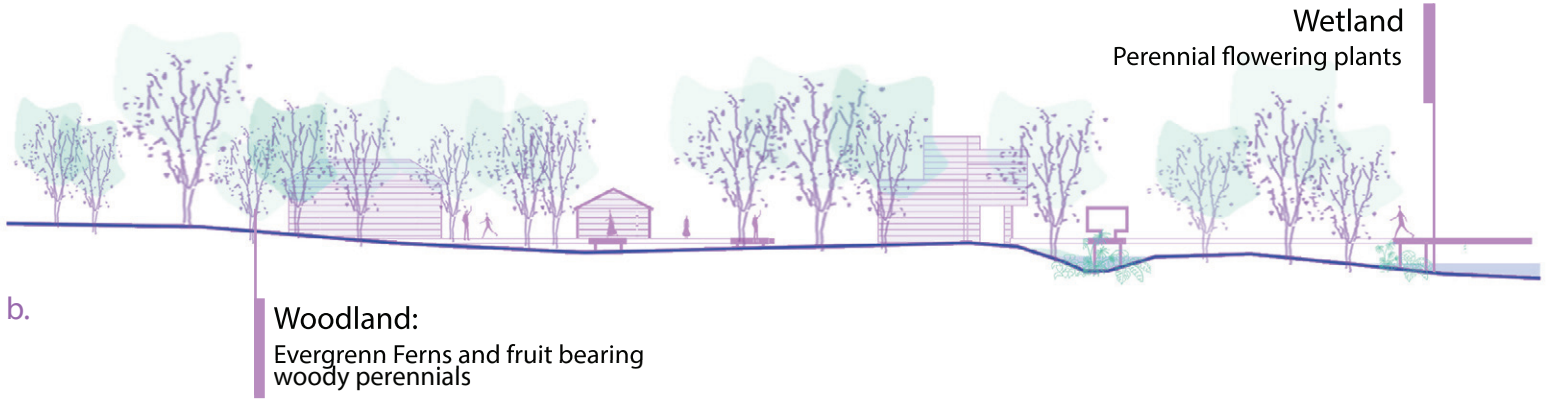


Zian Zheng

BIRDS & CLIMATE CHANGE STUDIO

Sections





Zian Zheng

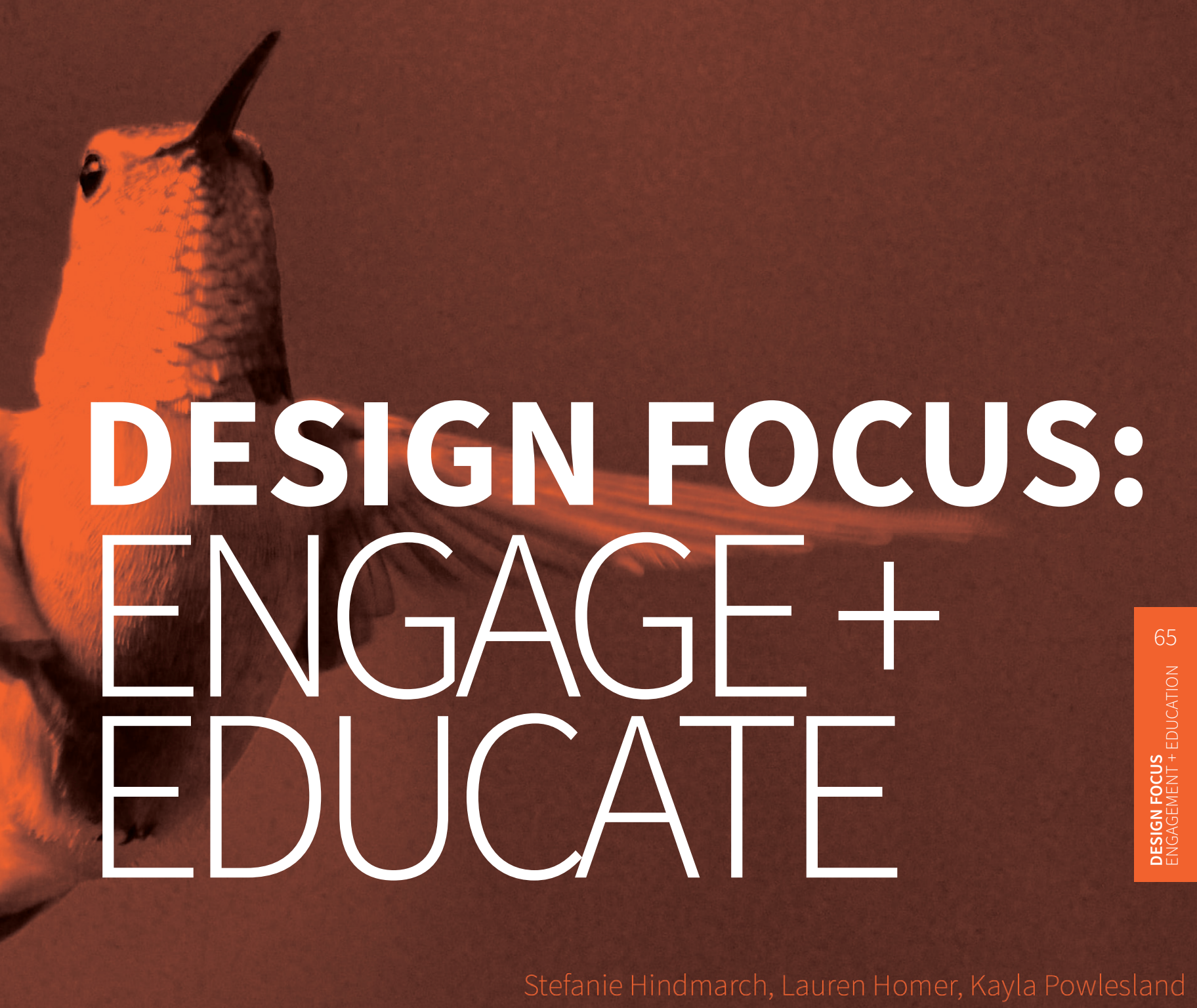
BIRDS & CLIMATE CHANGE STUDIO

Moments of Wonder

Inspiring **people** to protect **birds**



o by Bryan Hanson on Unsplash



DESIGN FOCUS: ENGAGE + EDUCATE

Stefanie Hindmarch, Lauren Homer, Kayla Powlesland

Birds are on the decline. The future is now.

EXTINCTION IS FOREVER

Bird Demographics

Over 100 species call Adriana Hess home. 55% of those 100 species are migratory birds that use Adriana Hess as a resting stop, migration corridor and breeding ground. 45% of those 100 species are year round species that can be found throught the year at our site. Today 28 these species are currently recognized as threatened or endanged of becoming extinct.

Today, National

The International Union for Conservation of Nature (IUCN) Red List places three of the species found on our site as threatened. Species categorized as threatened are "considered to be facing a risk of extinction in the wild" (World Wildlife Fund). The Rufous Hummingbird, Evening Grosbeak, and Olive-sided Flycatcher (pictured left to right) found at the site, are listed as threatened.

Today, Washington State

The Washington State Endangered Species List categorizes 8 species as threatened on our site. This includes a variety of songbirds, migratory birds, aquatic and apex species. The Rufous Hummingbird, Evening Grosbeak, Vaux's Swift, Merlin, Caspian Turn, Great Blue Heron, Pileated Woodpecker, and the Olive-sided Flycatcher are all threatened.

Tomorrow

Washington Audubon gathered current data and projected current declining rates with climate change into the future. The species listed are predicted to be threatened in the very near future. 14 of the species on our site are predicted to be threatened. 2 of these species will be endanged or will be extinct: the Olive-sided Flycatcher and Vaux's Swift. The Hammond's Flycatcher, Willow Flycatcher, Pacific-slope Flycatcher, Hooded Merganser, Band-tailed Pigeon, Vaux's Swift, Rufous Hummingbird, Western Glaucous-winged Gull, Caspian Tern, Cooper's Hawk, Bald Eagle, Red-breasted Sapsucker, and Merlin are all threatened.

The Future

Created by the Washington Audubon, the report "WA Survival By Degrees" looks at how climate change will affect the birds of Washington State.

29 species are threatened by climate change.

19 species face extinction.


Photo from Wikimedia Commons

“Climate change is an existential threat to birds and people.” - National Audubon Society

TODAY

NATIONAL IUCN RED LIST



TODAY

STATE ENDANGERED SPECIES LIST



TOMORROW

REGIONAL NEAR FUTURE, AUDUBON WASHINGTON VULNERABLE BIRDS LIST



THE FUTURE

WA STATE SURVIVAL BY DEGREES

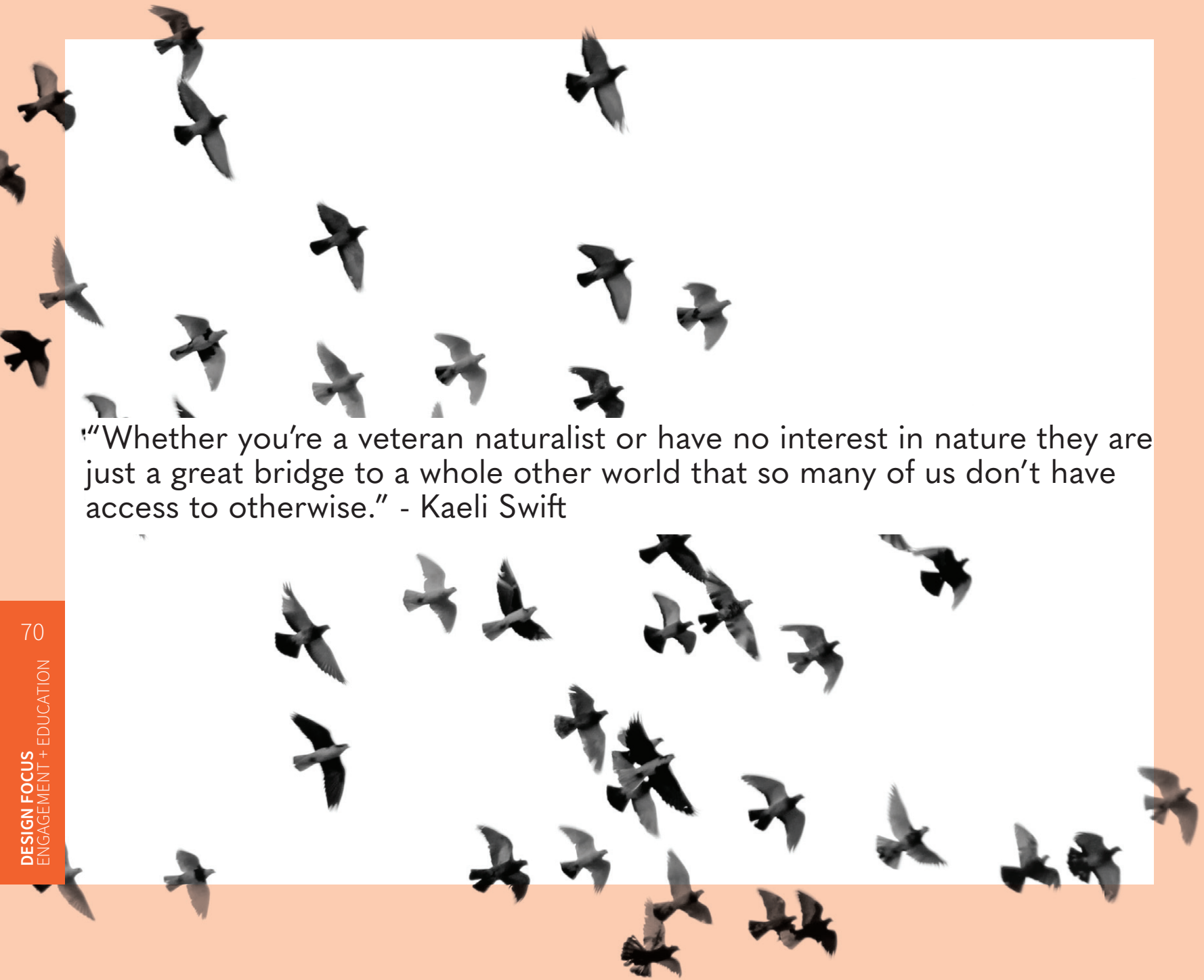
29 SPECIES THREATENED BY CLIMATE CHANGE.
19 SPECIES FACE EXTINCTION.



Photo from National Audubon Society

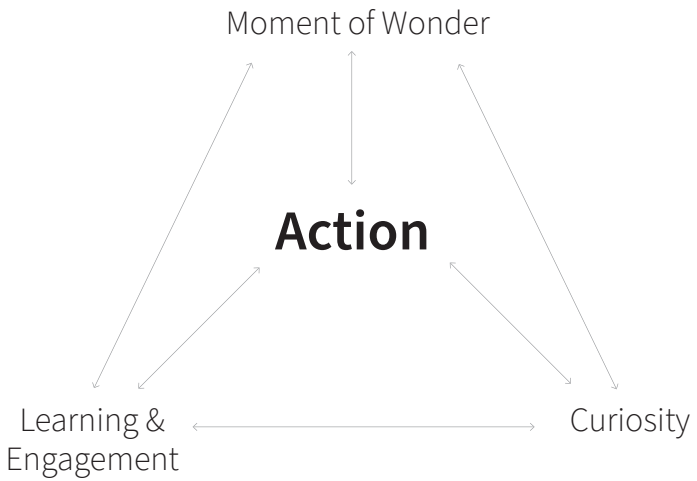
But, there is hope

The Audubon Society found that if we are able to limit global warming to 1.5°C, 150 species will **no longer be at risk of extinction** due to climate change



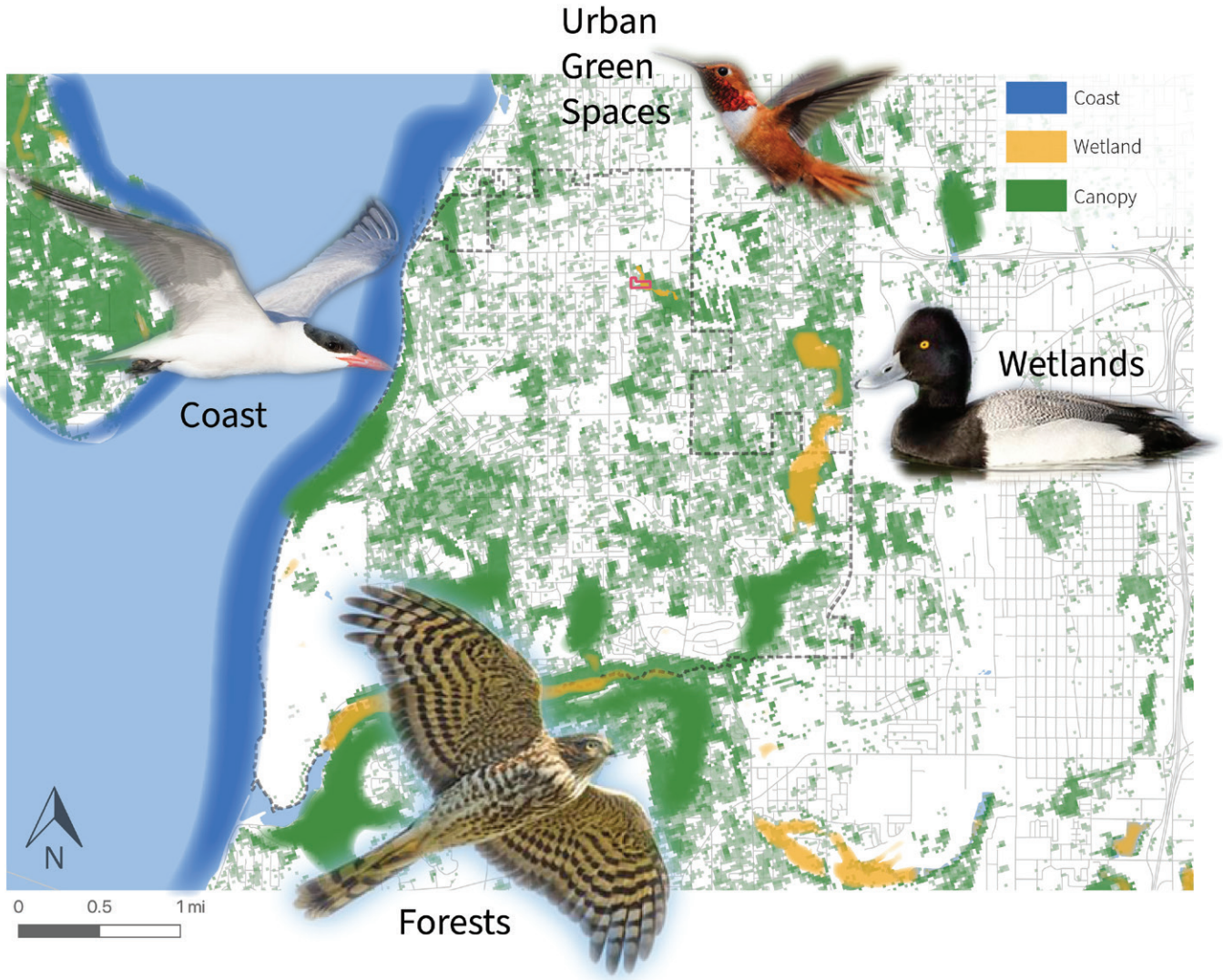
"Whether you're a veteran naturalist or have no interest in nature they are just a great bridge to a whole other world that so many of us don't have access to otherwise." - Kaeli Swift

Photo from Unsplash


Moment of Wonder
Action
Learning &
Engagement
Curiosity


Birds are intriguing
How can we magnify natural curiosity and use it to inspire action?

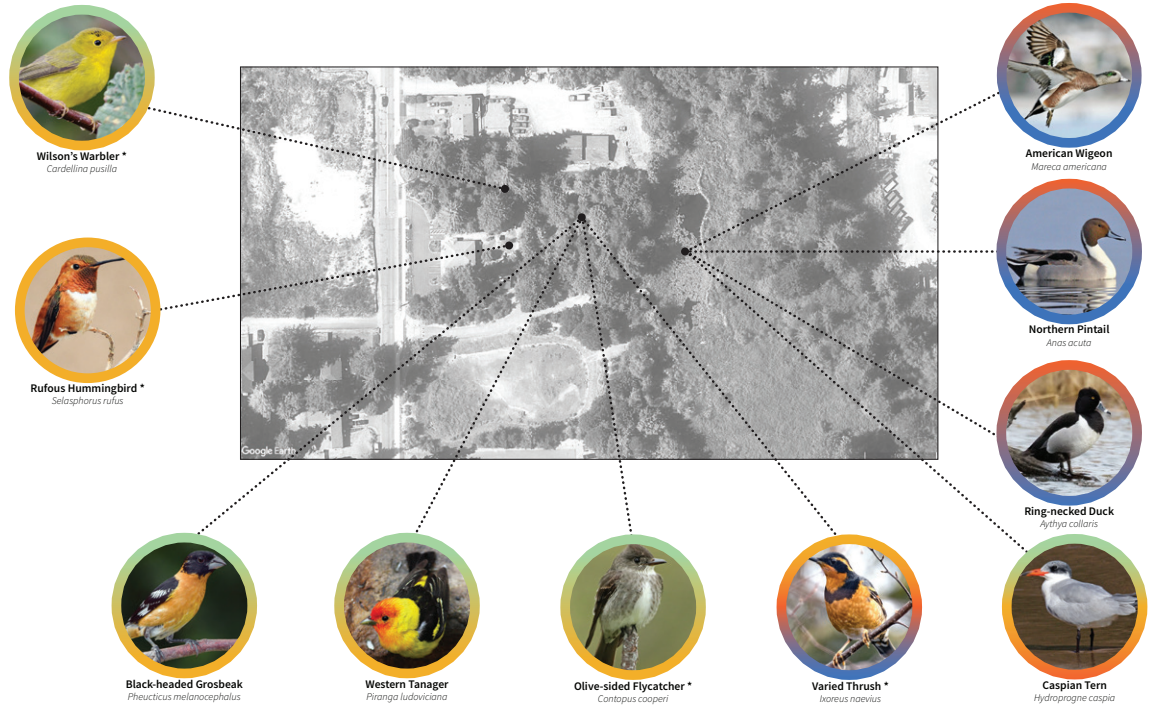
Where might you catch a glimpse?



Data from Washington State and Pierce County, bird images from All About Birds

When might you have this moment?

SEASONAL MIGRATORY BIRDS AT ADRIANA HESS



* Species in decline

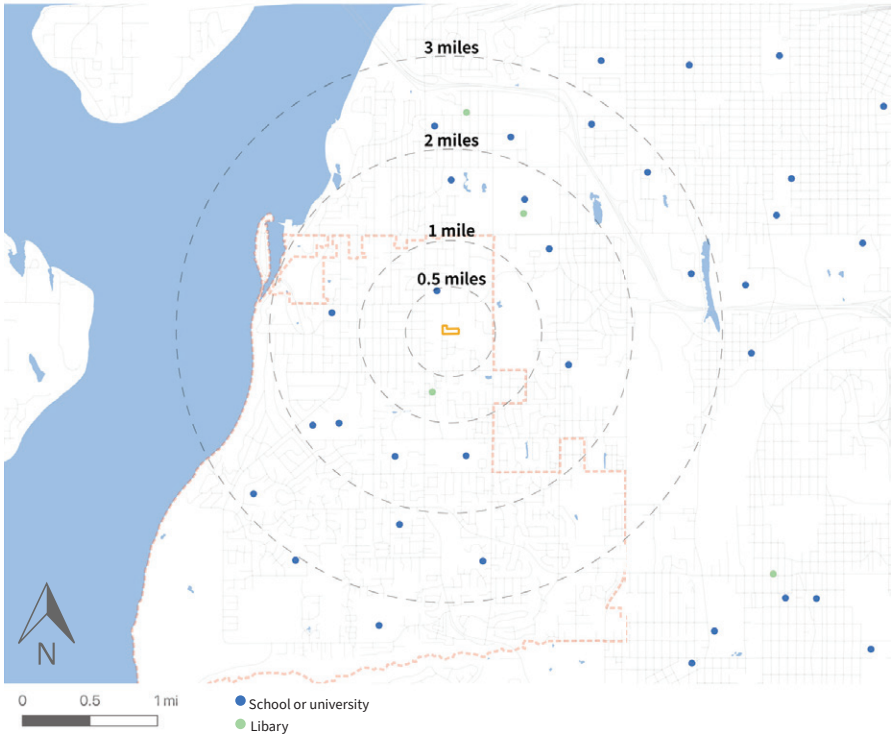
Who is our audience?

33,740 residents in University Place

876,764 residents in Pierce County

47% of households in University Place have children

There are more than **20 educational institutions** within 3 miles of Adriana Hess Wetland Park



Data from Pierce County

Importance of Adriana Hess Wetland Park

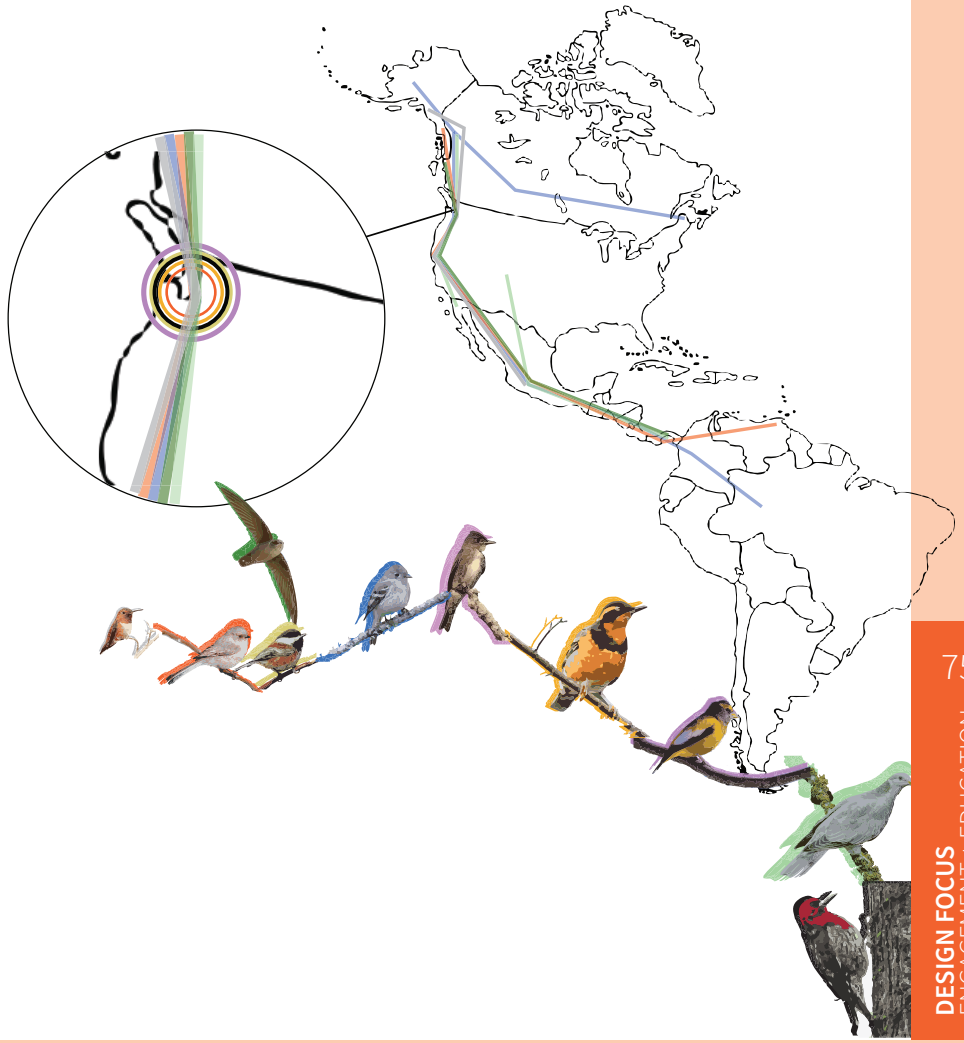
OUR HOPE

A Link on the Great Migration

On our site, over 50% of the species are migratory. Some travel the distance of the entire Northern and Southern hemispheres annually. This distance requires a great amount of endurance. Birds need stops along their route for food and rest. Adriana Hess is along one of the the busiest migration routes. Our site is essential to their success.

Climate Change

The effects of climate change are predicted to affect these migration patterns. Climate change will change much of the natural habitat these bird require. With continuing development of their habitat, sites like Adriana Hess hold even more importance. Our site can act as a buffer to climate change and continue to offer a home to many birds.



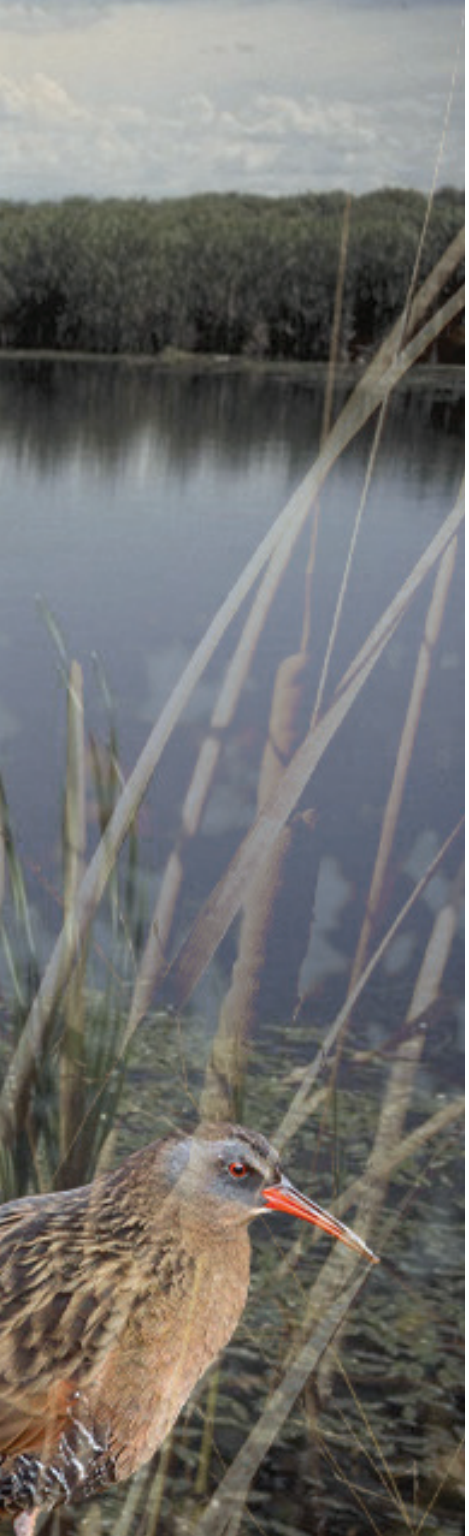
Site Design

STATEMENT + INTENT

Statement

This site design focuses on experiential learning and fostering a sense of wonder about birds by creating oppotunity for unexpexted, contemplative moments of discovery at Adriana Hess Wetland, in addition to accomodating and expanding Tahoma Audobon Society's capacity for structured education and outreach.

Lauren Homer



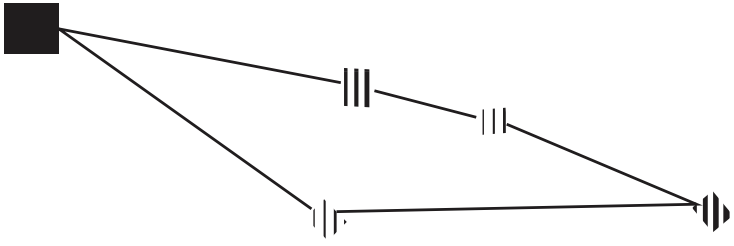
Design Goals

- Inspire action to proctect birds from climate change effects by fostering wonder and emotional investment of visitors
- Educate users about birds and climate change
- Create a “draw” at Adriana Hess Wetland to engage the local community in the site
- Increase habitat diversity on site, attracting more bird species
- Improve habitat opportunity of existing detention pond space while preserving stormwater management capacity

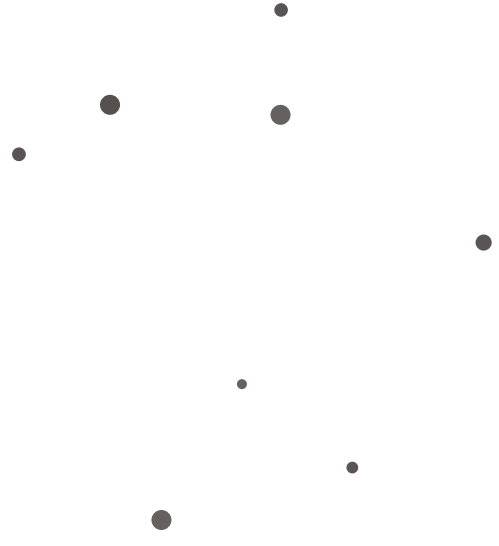
Lauren Homer

Site Design
CONCEPTUAL FRAMEWORK

Design strategy focuses on a primary network of “bird blind classrooms,” gathering spaces for community bird walks, workshops, and Tahoma Audobon educational activites. A secondary network of “secret” bird blinds and points of interest, which are remote, visually obscured, or only accessible seasonally provide opportunity for contemplative, unstructured moments of discovery.

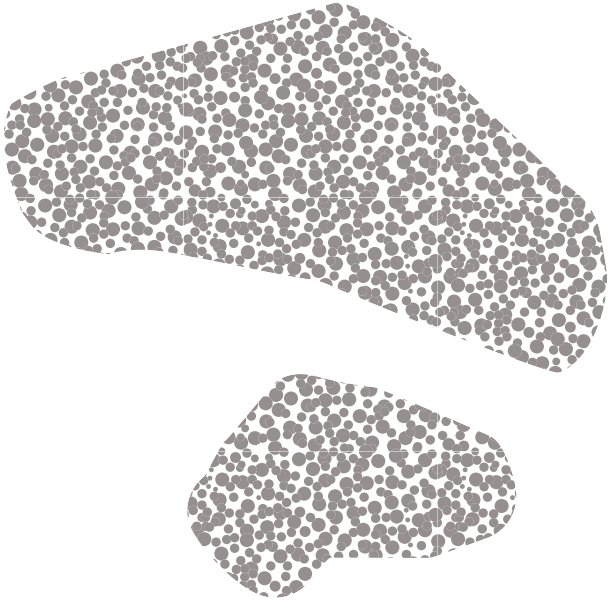


Primary Network

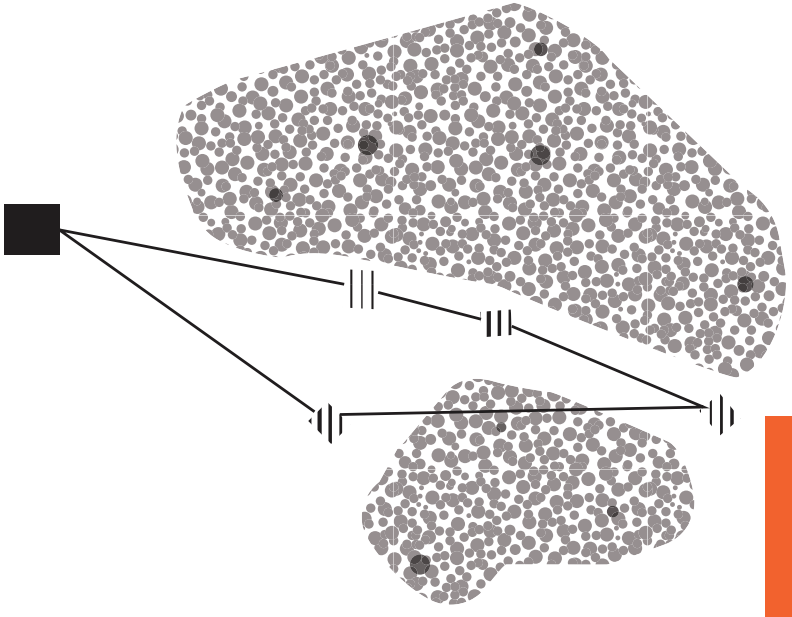


Secondary Sites

Lauren Homer

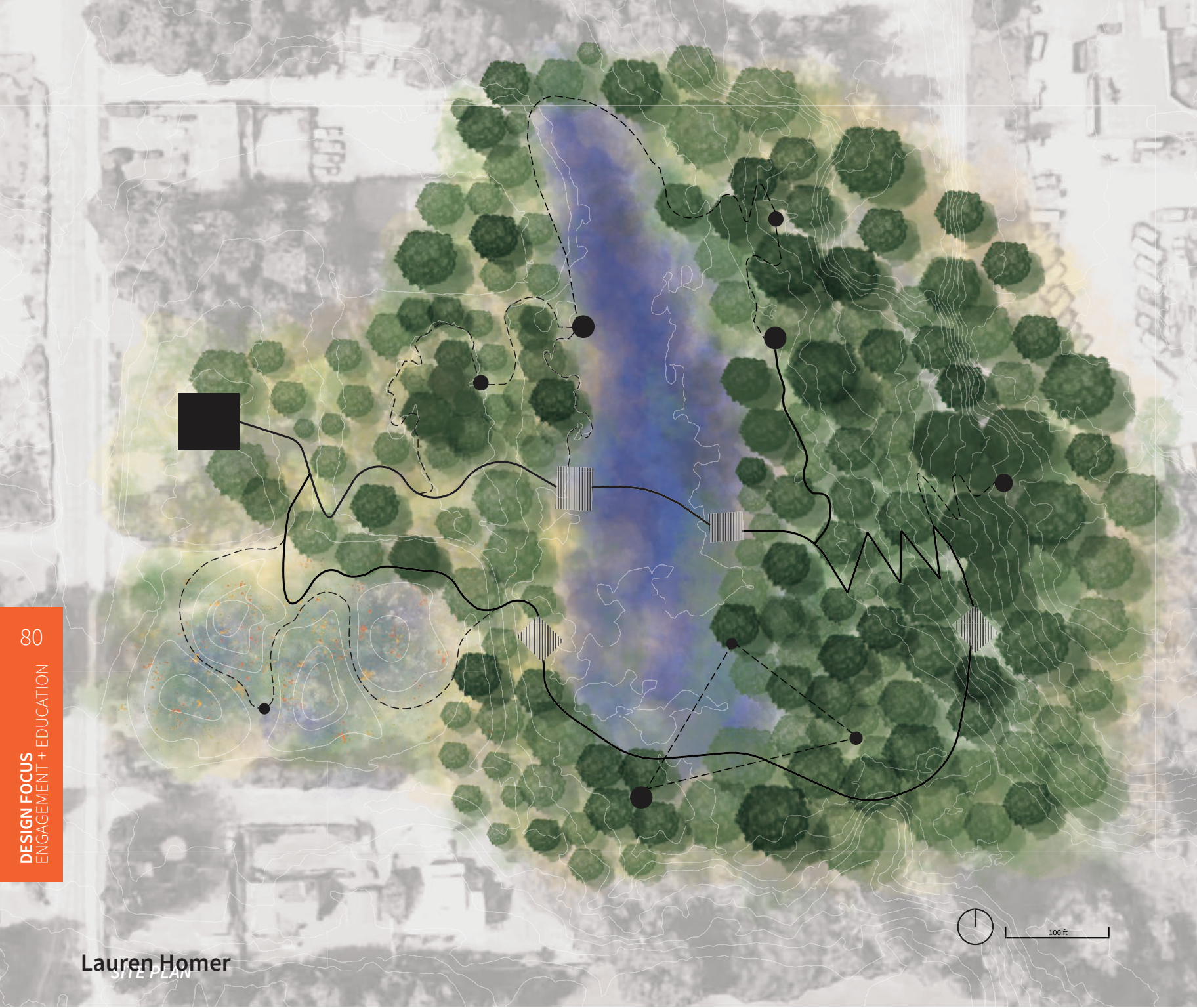


Obscuring Strategies



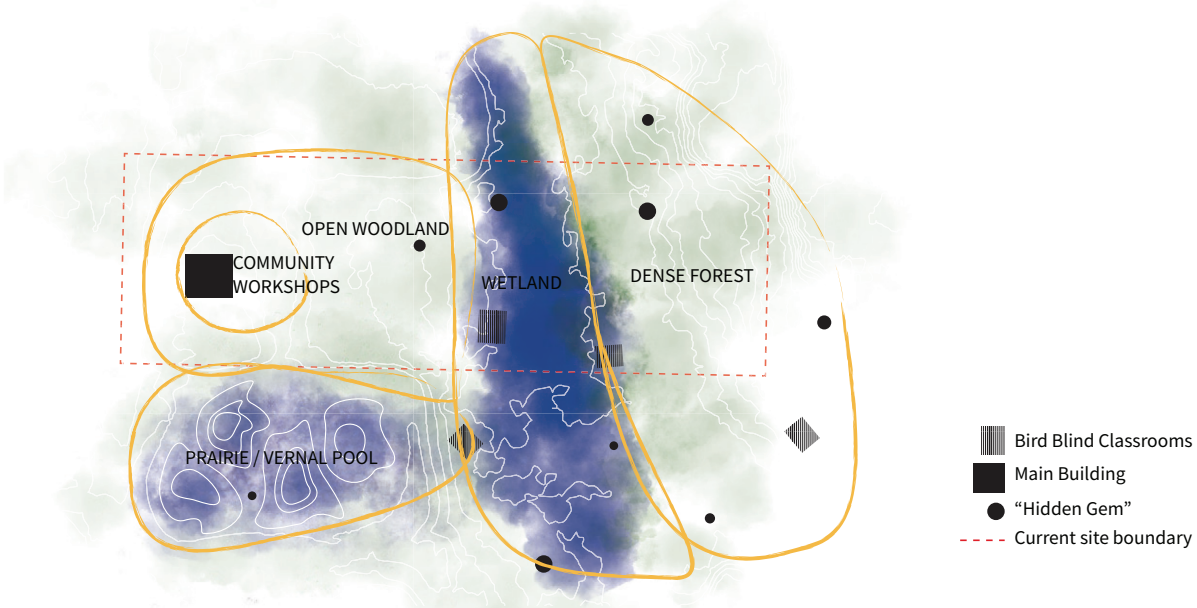
Design Concept

Lauren Homer

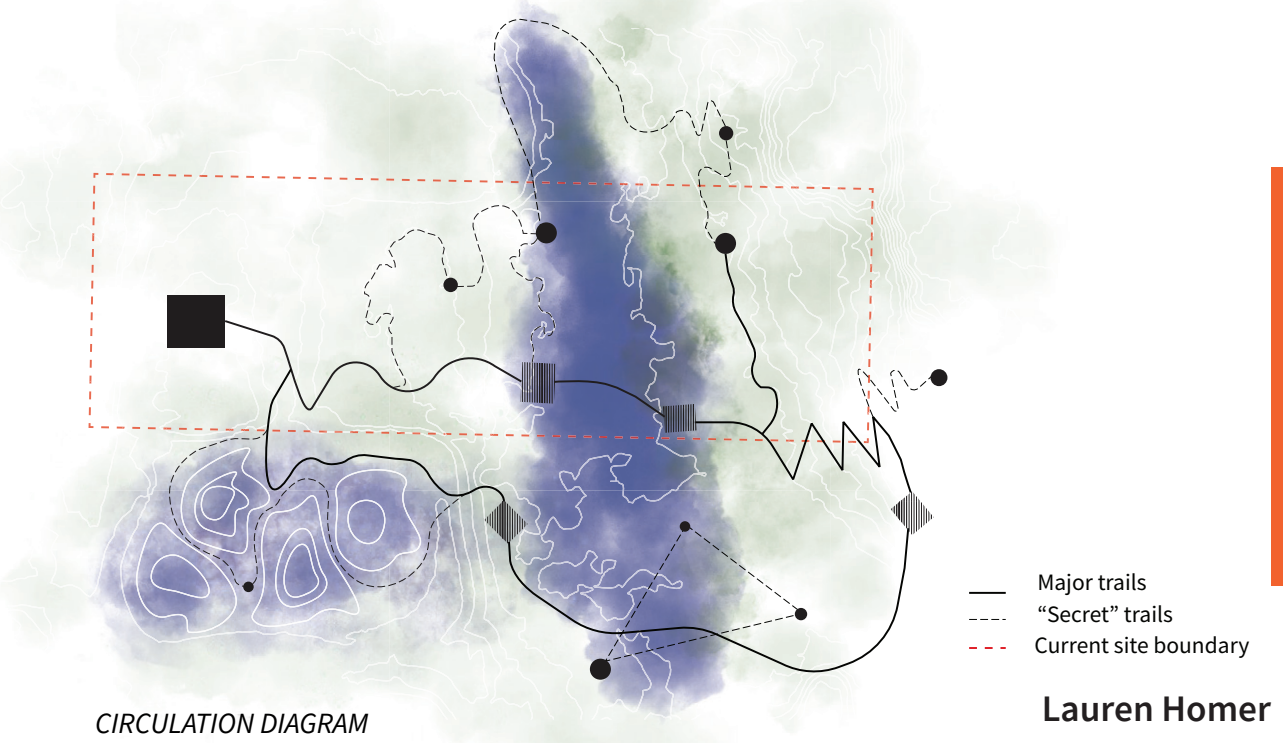


Lauren Homer

SITE PLAN



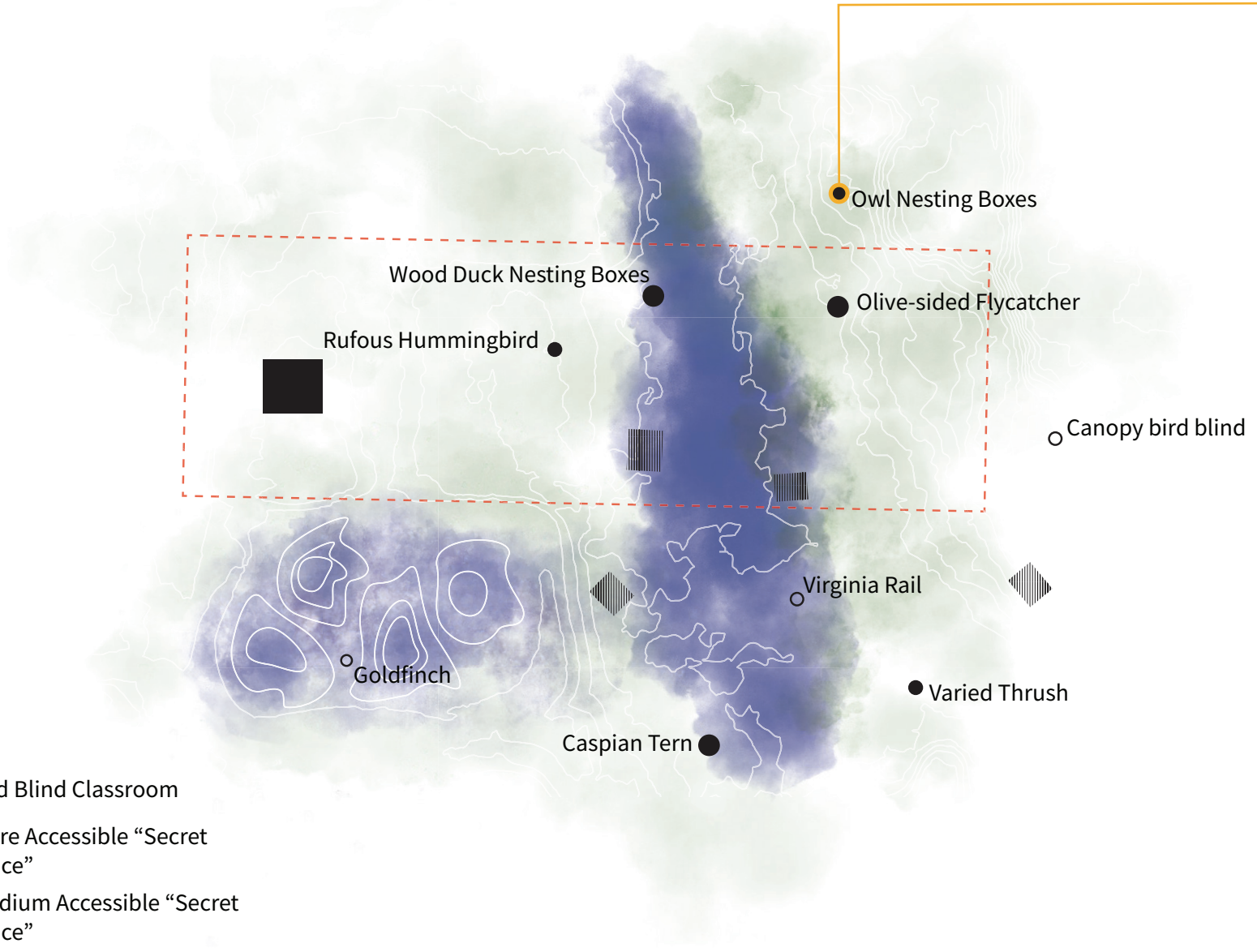
PROGRAM DIAGRAM



CIRCULATION DIAGRAM

Lauren Homer

Each “secret” place is located to provide an opportunity to connect with a different target species, depending on their unique habitat, diet, or nesting requirements. Some are more easily discoverable, and others may require more careful attention or luck.



Bird Blind Classroom

More Accessible “Secret Place”

Medium Accessible “Secret Place”

Least Accessible or Seasonally Restricted “Secret Place”

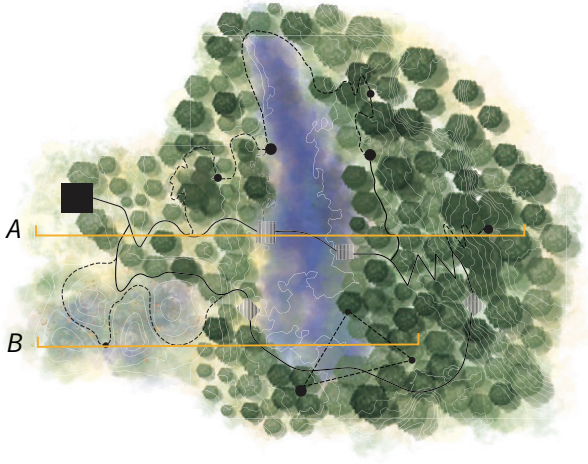
POINTS OF INTEREST DIAGRAM

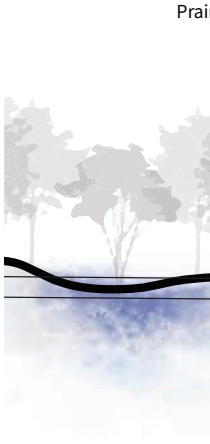


OWL NESTING BOX BLIND

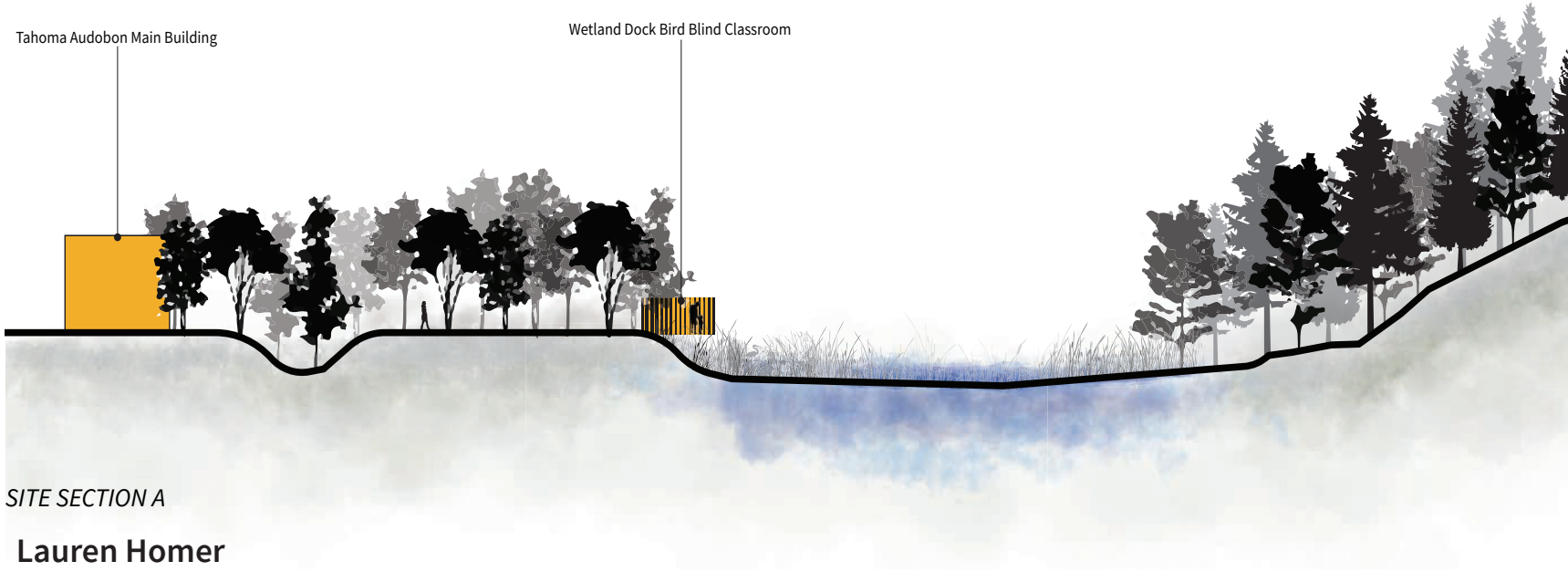
Site Design

SITE SECTION



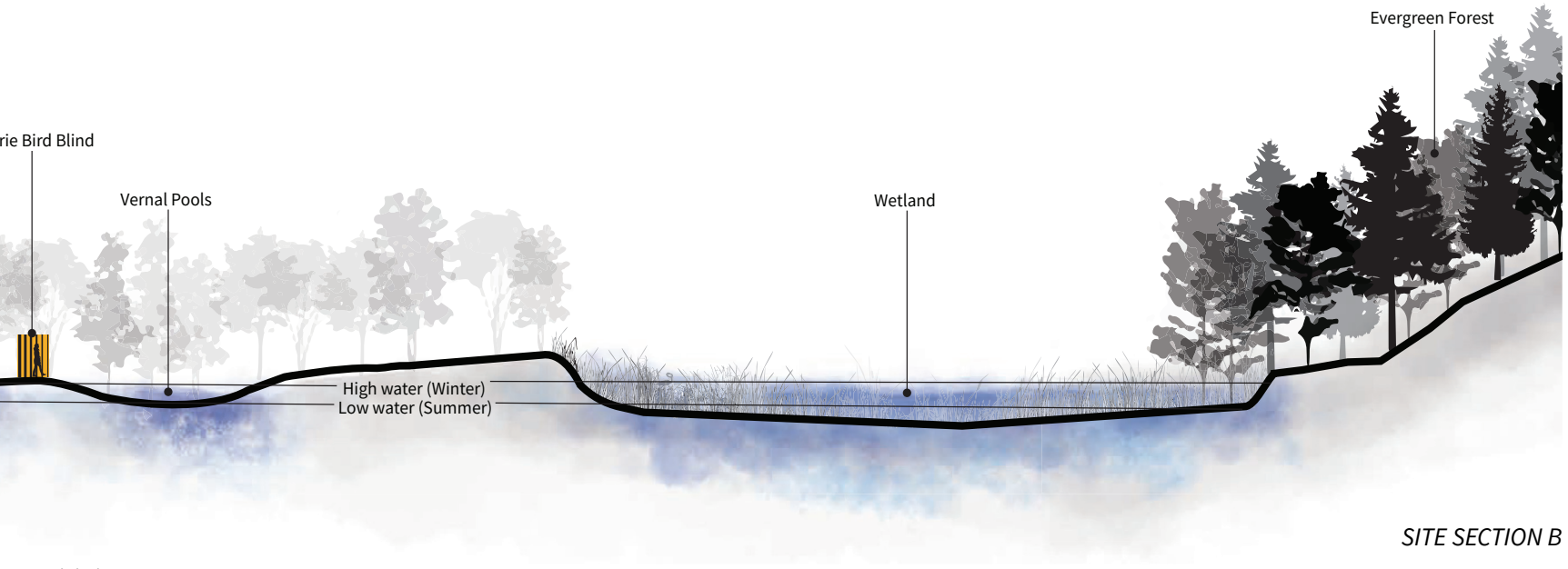


The gentle slope of the mature evergreen forest habitat provides an ideal space for the canopy bird blind, allowing visitors a “bird’s eye view” through the forest and over the wetland.



SITE SECTION A

Lauren Homer

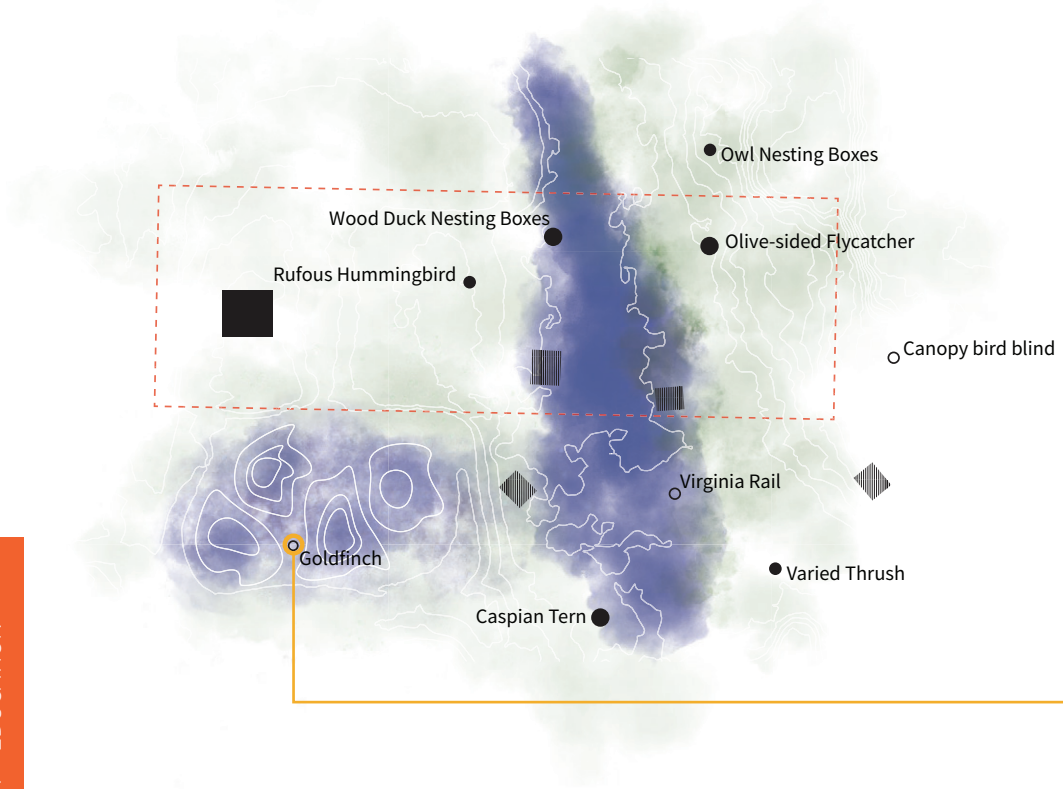


SITE SECTION B



The prairie/vernal pool habitat maintains the existing stormwater management capacity of the site, while enriching habitiat for birds by adding prairie space, the most threatened habitat type in Washington. Due to the seasonal wetland condition, the prairie bird blind is only accessible during drier months.

Lauren Homer





PRAIRIE BIRD BLIND

Lauren Homer



Lauren Homer



University Place Bird Corridor

Recommendations for connecting habitat and inspiring curiosity



Stefanie Hindmarch



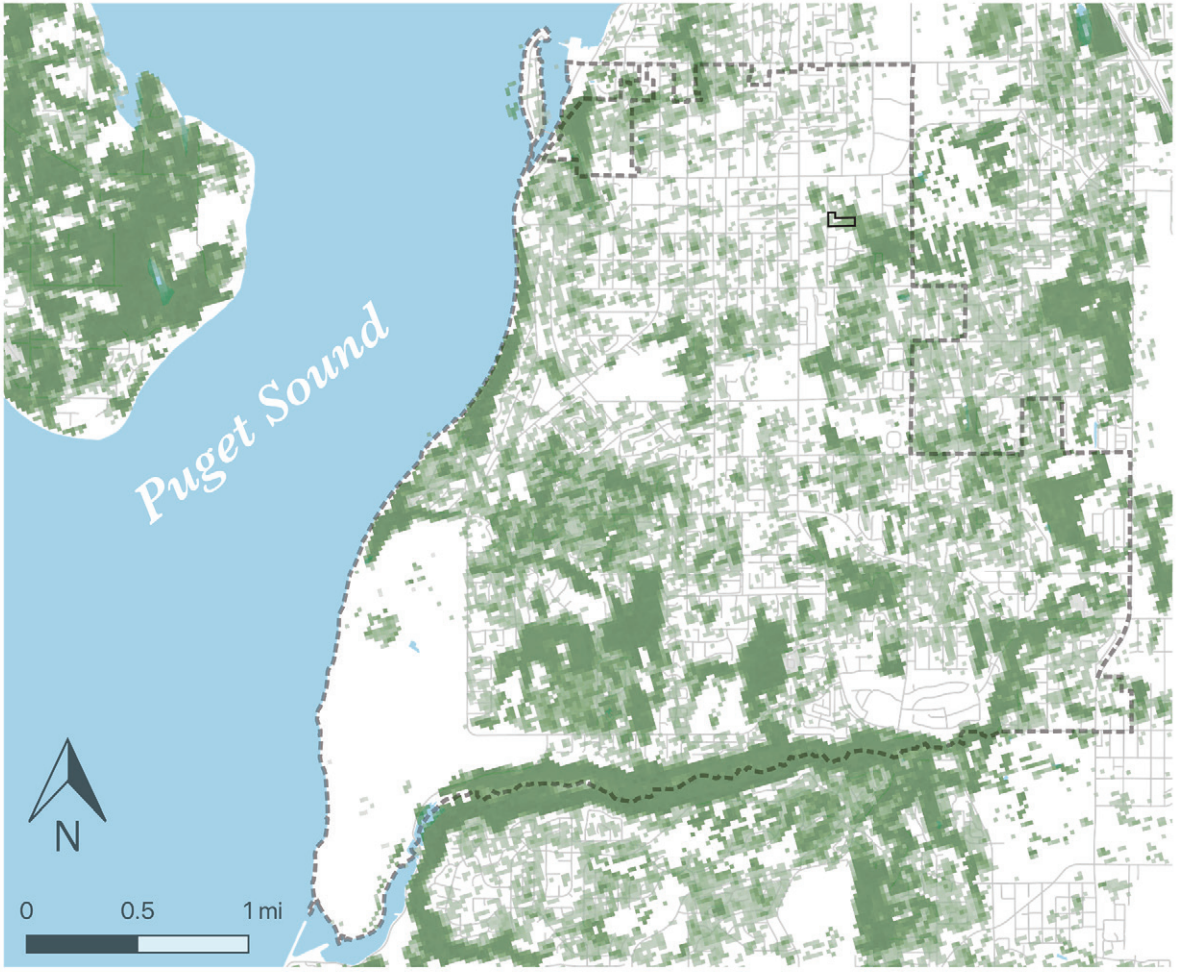
University Place is not only home to a variety of resident birds, but also falls along the Pacific Flyway, a key migratory pathway for hundreds of bird species.

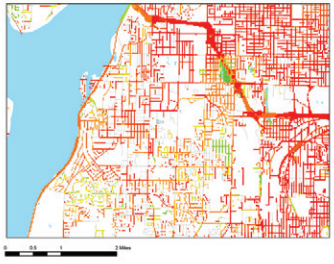
Stefanie Hindmarch

Canopy Cover

IDENTIFYING HABITAT GAPS IN UNIVERSITY PLACE

Canopy cover in University Place is not equally distributed. Though some areas in the south and west parts of the city have dense canopy cover, many parts of the city, especially in the northeast, lack robust canopy cover, creating a difficult obstacle for the safe movement of birds.



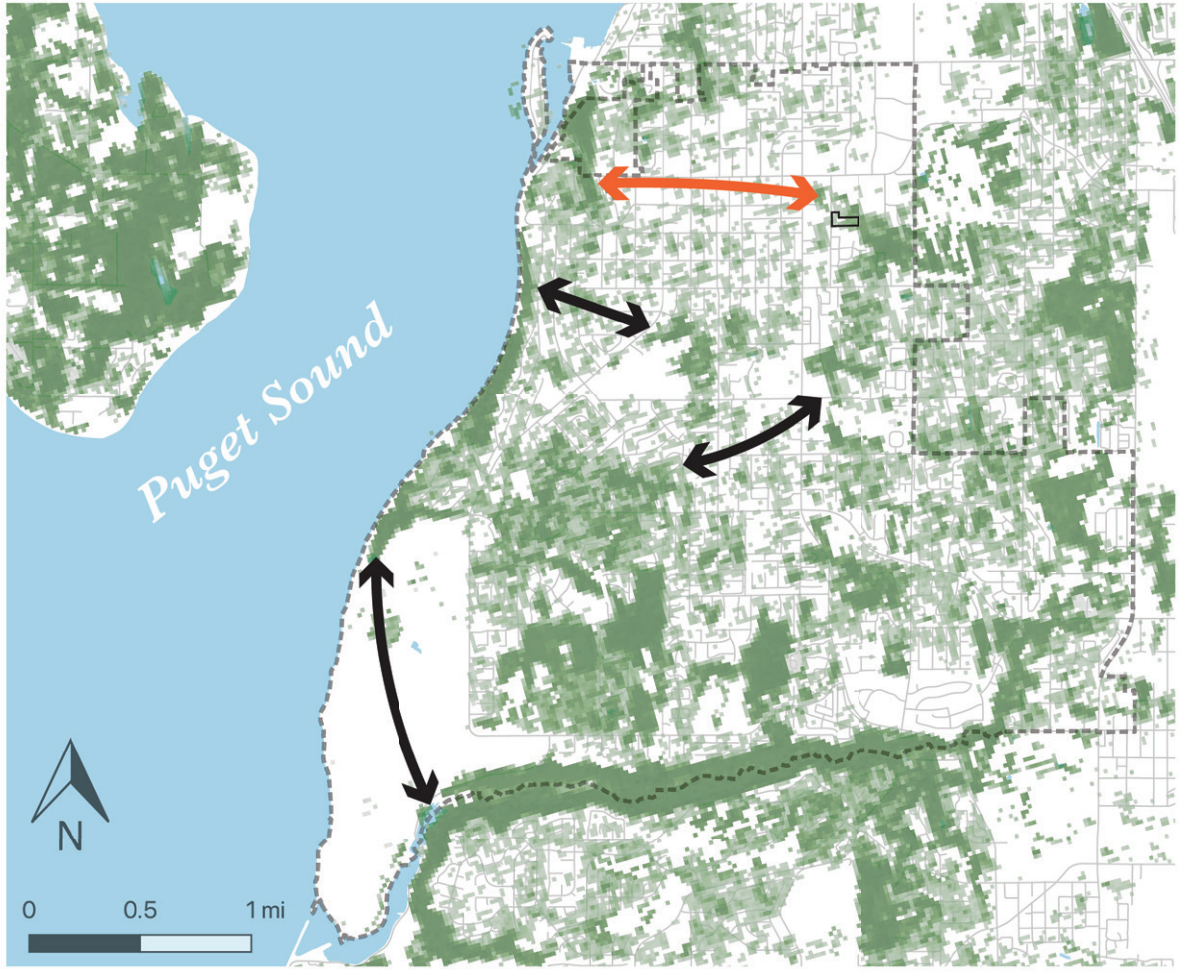


Geospatial analysis reveals which streets have the least amounts of canopy cover.

Stefanie Hindmarch

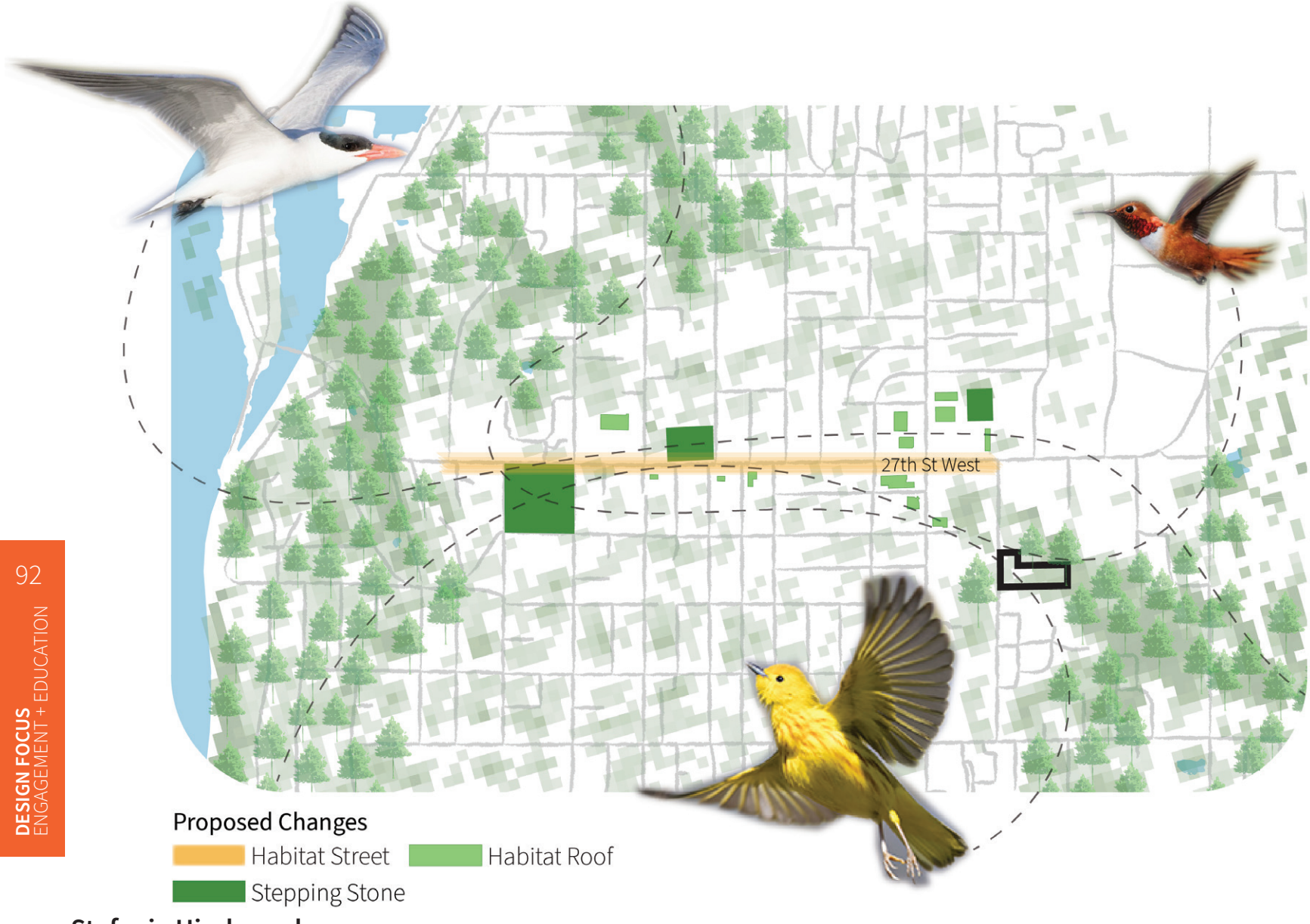
East-west canopy corridors are especially lacking.

27th St West, north of Adriana Hess Wetland Park, is a good fit for additional habitat considerations due to its existing right-of-way width, sidewalks, and location.



Stefanie Hindmarch

Proposed Habitat Corridor



Stefanie Hindmarch

Photos from All About Birds, GIS data from Washington State and Pierce County

Stepping Stones



Stepping stones are community-oriented institutions, such as religious institutions and schools, that have abundant outdoor space and already serve local residents. These institutions also promote education, whether through formal classes, events, or after-school activities.

A stepping stone includes native plants that provide year-round food and shelter for birds, and can be a place for interactive projects that support habitat and/or facilitate learning.

Habitat Roofs



Habitat roofs are already-constructed flat roofs that can be planted with bird-friendly plants. These roofs create a place for birds to rest and feed safely away from people in an urban area.

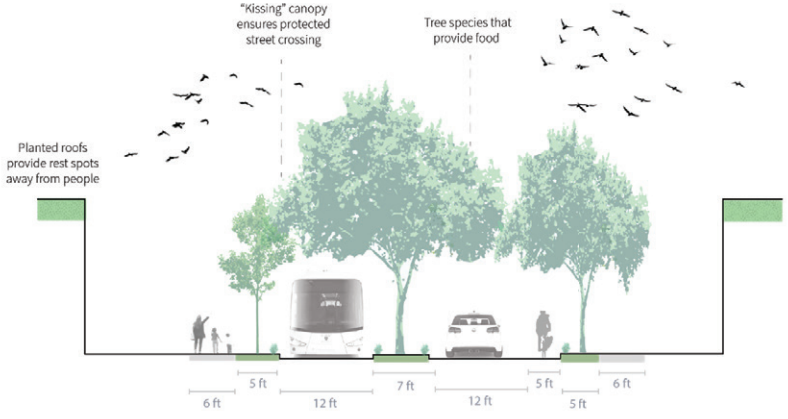
Stefanie Hindmarch

Photos from Better Homes and Gardens, Barron Park Elementary School, Birds and Blooms, 123RF, Biodiversity in Schools, Guide Patterns, ASLA, US Green Technology, Habitat Gardens, Urban Strong, Grand Rapids Magazine

Habitat Street



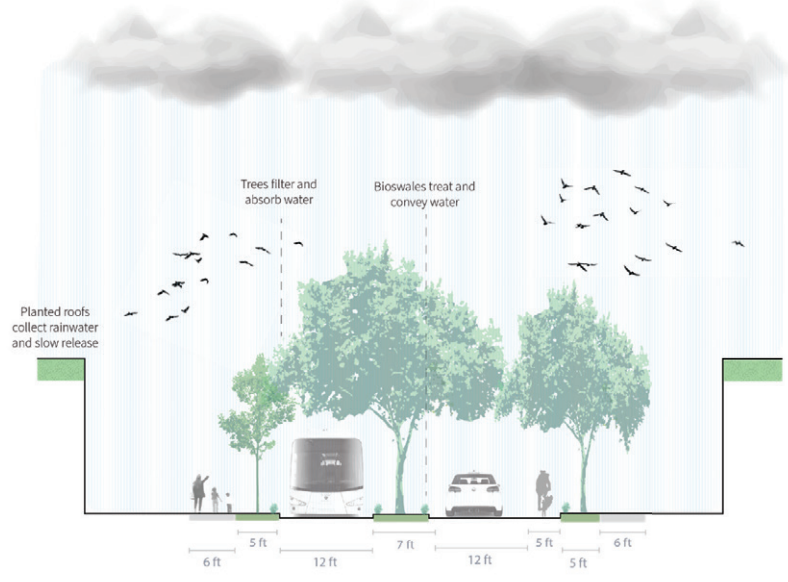
Current Conditions



Proposed

Currently, 27th St West has some existing small street trees, sidewalks, one car traffic lane in each direction, a shared turn lane, and a bicycle lane on one side.

Proposed changes include creating a median to provide space for large trees and bioswales while maintaining the existing bike lane and two-way traffic. These changes benefit birds and create positive impacts for stormwater management.



Stefanie Hindmarch

Approved Street Trees

&

Provide Food for Birds

&

Visually Appealing for People



Adirondeck Crabapple
(Malus Adirondack)



Oregon Oak
(Quercus garryana)



Golden Raindrops Crabapple
(Malus transitoria)



Vine Maple
(Acer circinatum)



Pagoda Dogwood
(Cornus alternifolia)



'June Snow' Giant Dogwood
(Cornus controversa)

Street trees are carefully selected to create food for birds, appeal to people, and meet street tree best practices.

Stefanie Hindmarch

Photos from Great Plant Picks, information from Seattle Approved Street Tree List 2015 and National Audubon Society

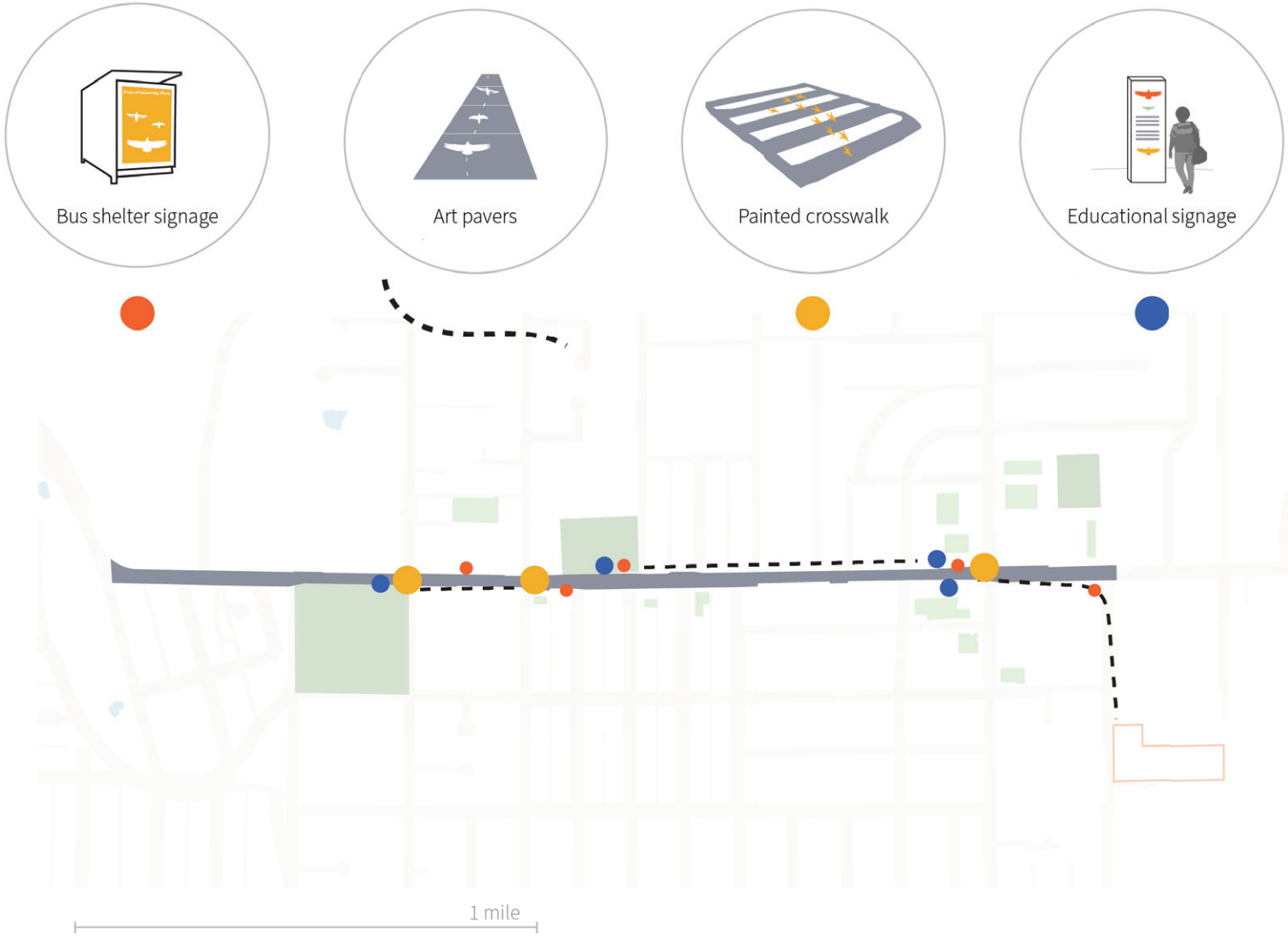
Median Placement



Stefanie Hindmarch

To avoid traffic disruptions and associated concerns, medians are designed to leave room for turn lanes at key intersections.

Placemaking and Education



Stefanie Hindmarch

Signage and art help form an identity for the corridor and create opportunities for learning.

Adriana Hess Avian Botanical Park

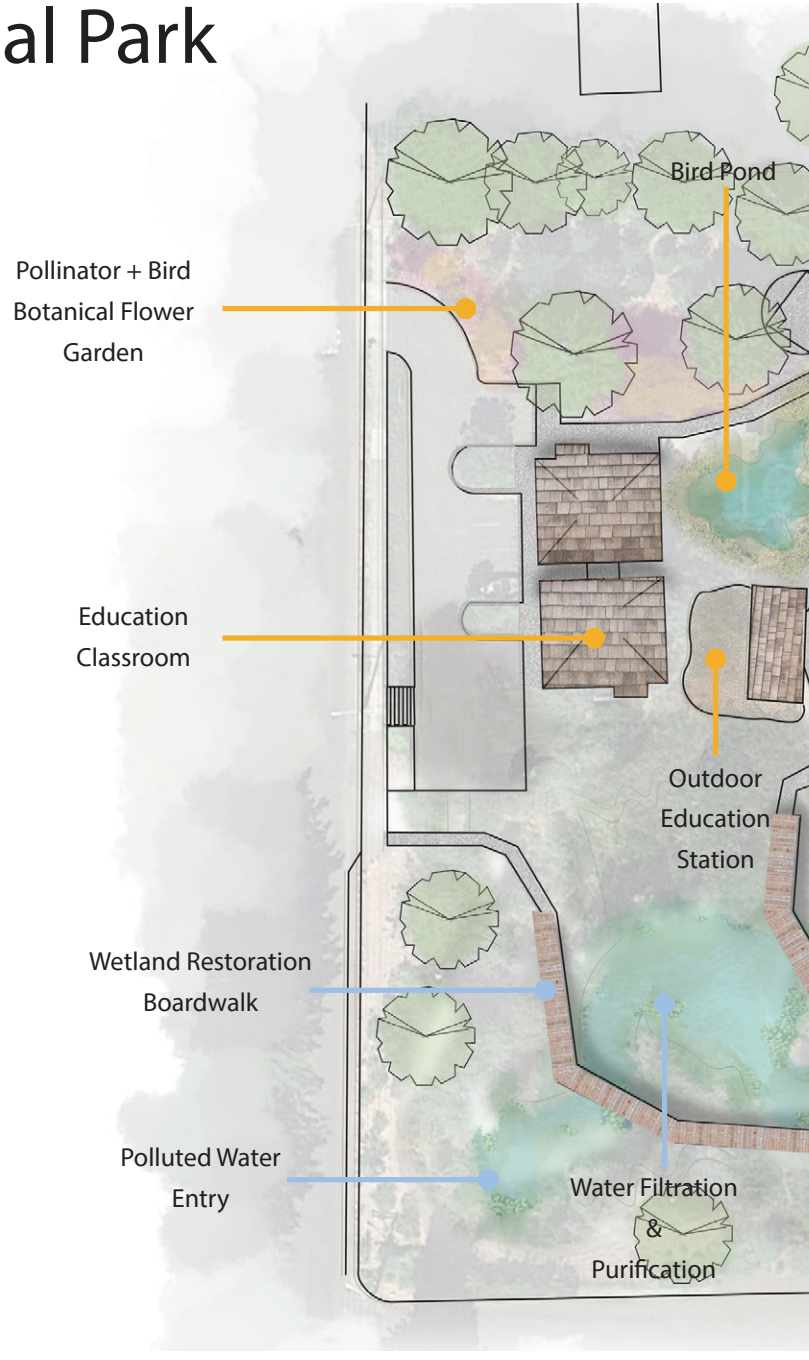
DISCOVER BIRD + BOTANICAL WONDER

All users are able to enjoy Adriana Hess Avian Botanical Park. The site's design and circulation is designed around inclusiveness for all. There is something for everyone to do while discovering the beauty that birds have to offer.

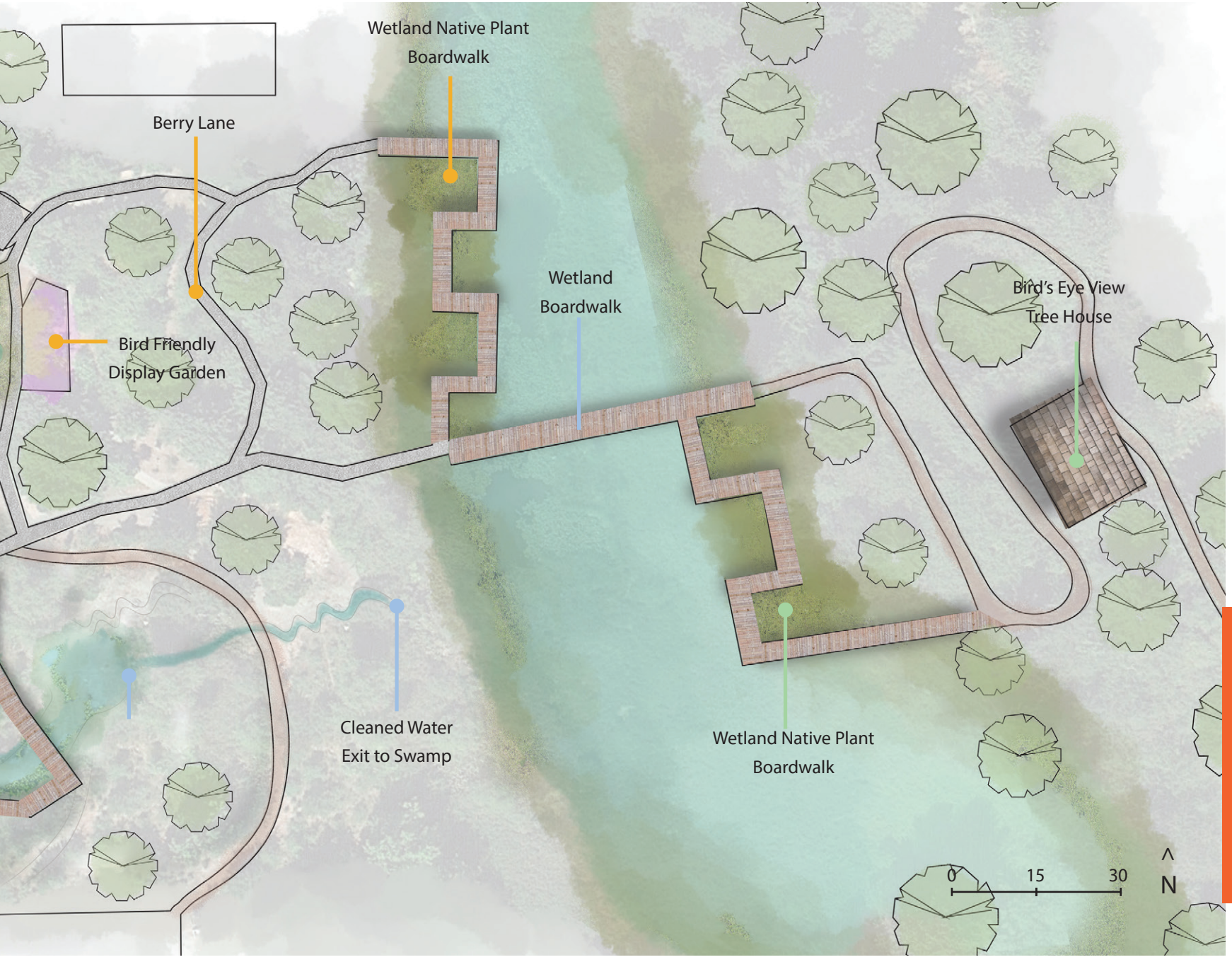
The design is sectioned into three areas. Each one is specialized for a specific audience. The NW section, the "Flora + Fauna Trail" is designed toward children and elders. When going to a park, children have a limited attention span. This section of the site offers an education classroom, outdoor education station where voluneers can give talks or crafts, several display gardens, and many areas that hold special plants that attract birds. The elderly are also able to enjoy this area with their grandchildren with a paved permiable path way that makes walking with a cane or wheelchair easy.

To the SW of the site is the "Wetland Boardwalk". This trail takes you through the heart of Adriana Hess's Wetlands. Here guests are able to learn about how water run-off is treated on our site before it enters into the wetland. These water treatment ponds bring many species of birds to our site, making this area the perfect place for bird lover.

Continueing along the "Wetland Boardwalk" path to the east of the site takes you across the wetland and into the "Forest Adventures Hike. If your feeling up to it, take the hike up through the native temperate coniferous forest to the "Bird's Eye View Treehouse". Here you can take a rest while your kids participate in volunteer led activities. Take in the view of the whole park and its beautiful birds that call Adriana Hess home.



Kayla Powlesland



Kayla Powlesland

Experience What's to Discover

SUBTITLE

FLORA + FAUNA TRAIL

Berries, Gardens, and Habitat! There is a lot to learn and explore on this ADA interactive education trail. Learn how you can help support a habitat for birds in your own backyard with native and non-native plants. All plants on the Flora + Fauna Trail are safe for birds + children.

WETLAND BOARDWALK

Take the boardwalk! Learn about how water is treated on the site and why its so important to the birds that call this park home.

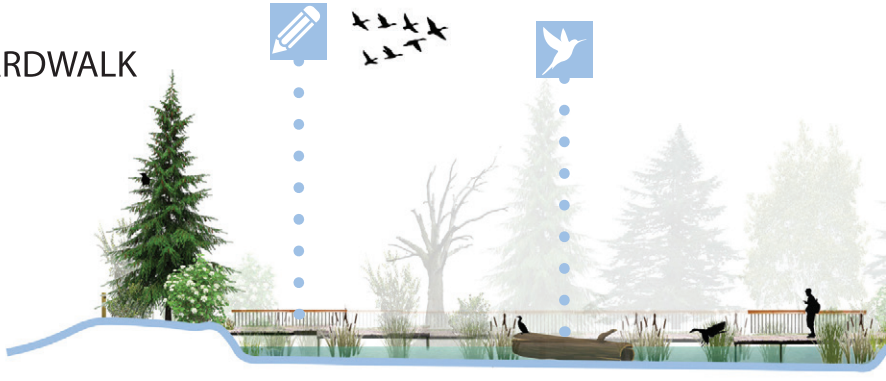
FOREST ADVENTURE TRAIL

Let's go on an adventure! Up for a hike? Then the Forest Adventure Hike is for you. Guests can hike from the Wetland Boardwalk up to the Bird's Eye View Treehouse. At the Treehouse you will be able to see a view of the entire Wetland Park and all its wonderful avian friends.

FLORA + FAUNA TRAIL



WETLAND BOARDWALK



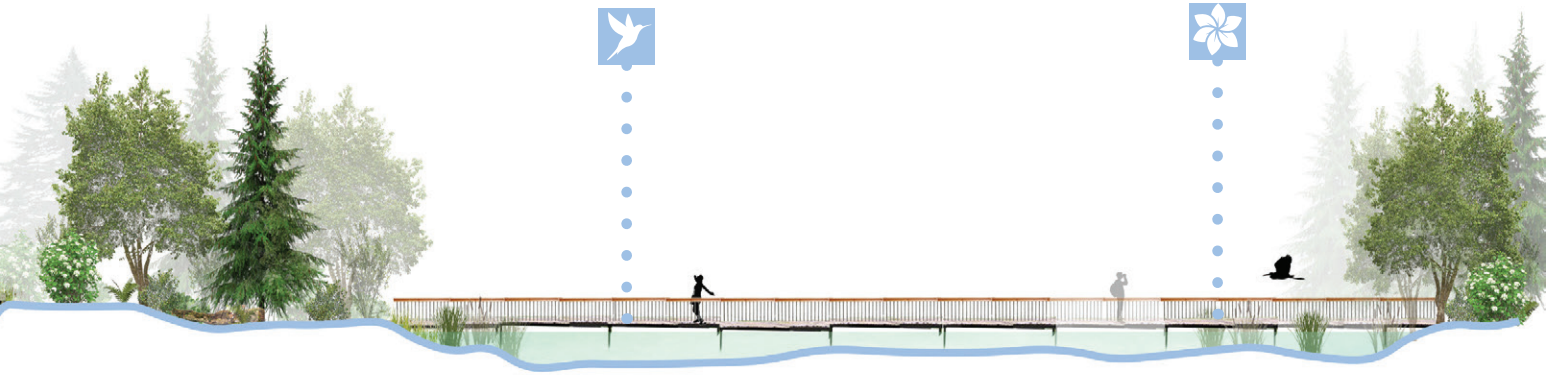
FOREST ADVANTURE TRAIL





Kayla Powlesland







- Botanical Display
- Education Station
- Resting Area
- Wildlife Viewing

Kayla Powlesland

Planting palette

FOR BIRDS + PEOPLE

Providing for birds

There are many different species of plants that will attract birds. Knowing these species helps to attract birds to your garden. At Adriana Hess, one of the primary goals is to teach people about the connection between flora and avian species. People can learn how easy it is to attract birds to their yards and the importance of habitat.

Plants Selected

The plants selected for Adriana Hess are very specific to the users as well as the species of the park. For example, we want the education area to attract and provide for the birds but also be safe for children that may not be able to distinguish between an edible and toxic berry. By carefully researching each plant, we can place them in the appropriate place in the park.

Bird + Botanical Collection

Some of the avian species found at Adriana Hess and the plants that support them.

Douglas fir . . . . . Woodpecker
Hemlock . . . . . Chickadee
Vine maple . . . . . Nuthatch
Pacific crab apple . . . Varied Thrush
Cascara . . . . . Mourning Dove
Service Berry . . . . . Cedar Waxwing
Twinberry . . . . . Hummingbird
Red-flowering currant . Spotted Towhee



Kayla Powlesland











Kayla Powlesland





DESIGN FOCUS: HABITAT

edges, boundaries, porosity, movement

HOW CAN WE TRANSGRESS CARTESIAN CONCELPTUALIZATIONS OF SPACE TO ANALYZE BIRD HABITAT?

For our mapping project, we explore the ways in which birds move and habitat zones fluctuate. We believe that traditional mapping and zoning belies the realities of birds' lives and needs. As climate change progresses, many more species will exist outside the zones of traditional or historic forms of mapping.

We created a series of gifs which have been broken down into a series of snapshots for the purpose of this booklet. The first map l **bird habitat at Adrian Hess Wetland Park**, and the ways in which different zones and habitat typologies bleed into each other.

We then chose three bird species, the great horned owl, rufous hummingbird, and sharp-shinned hawk, to map across scales. Thi resulted in three sets of maps: the first depicts their larger **migrator patterns** and species abundance throughout the western hemisphere second set looks at regional threats to these species as a result of **climate change**, the third set of maps looks at **bird sightings** over time city of University Place.

These mappings help us to grapple with the complexity of designing for highly mobile, often migratory, species.

LIANG | ALICIA | CLAUDIA

On Site Habitat

BIRDS EYE VIEW OF ADRIANA HESS WETLAND PARK

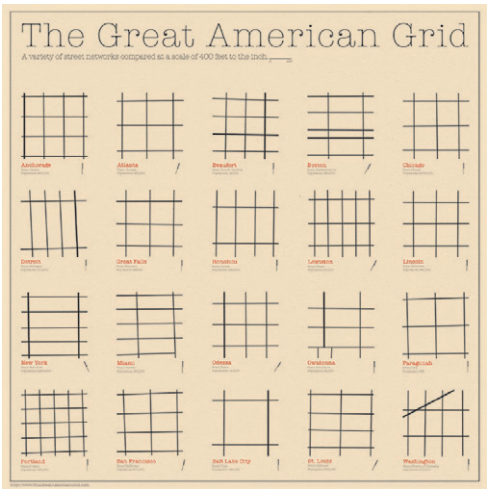
Our site ostensibly has four major habitat types: woodland, grassland, wetland and scrubland. When you imagine it through they eyes of a birds, however, these habitat typologies bleed into each other. Perhaps more importantly, these habitat zones extend beyond the legal boundary to the site in all directions.




anopy
Wetland

Cartesian Conceptualizations of Space

“THE GRID” VERSUS THE REALITIES OF MAPPING ECOLOGICAL SYSTEMS



The Grid

In America, the development of the grid was a means by which to simplify or “rationalize” the landscape through spatially reorganizing the world to fit geometrical regularity.

Imposing this mathematical order on the landscape had a profound impact on the environmental history of American cities.

Source: https://www.thegreatamericangrid.com/

Ecological Mapping

Imposing a grid on a landscape is intrinsically at odds with the “natural” landscape, including elements like:

- Topography
- Hydrology
- Habitat
- Ecosystems

Cartesian grids do not respond to dynamic areas of urban wilderness, thereby compromising or destroying habitat directly by reducing available habitat, or indirectly, by creating the conditions to enable climate change.

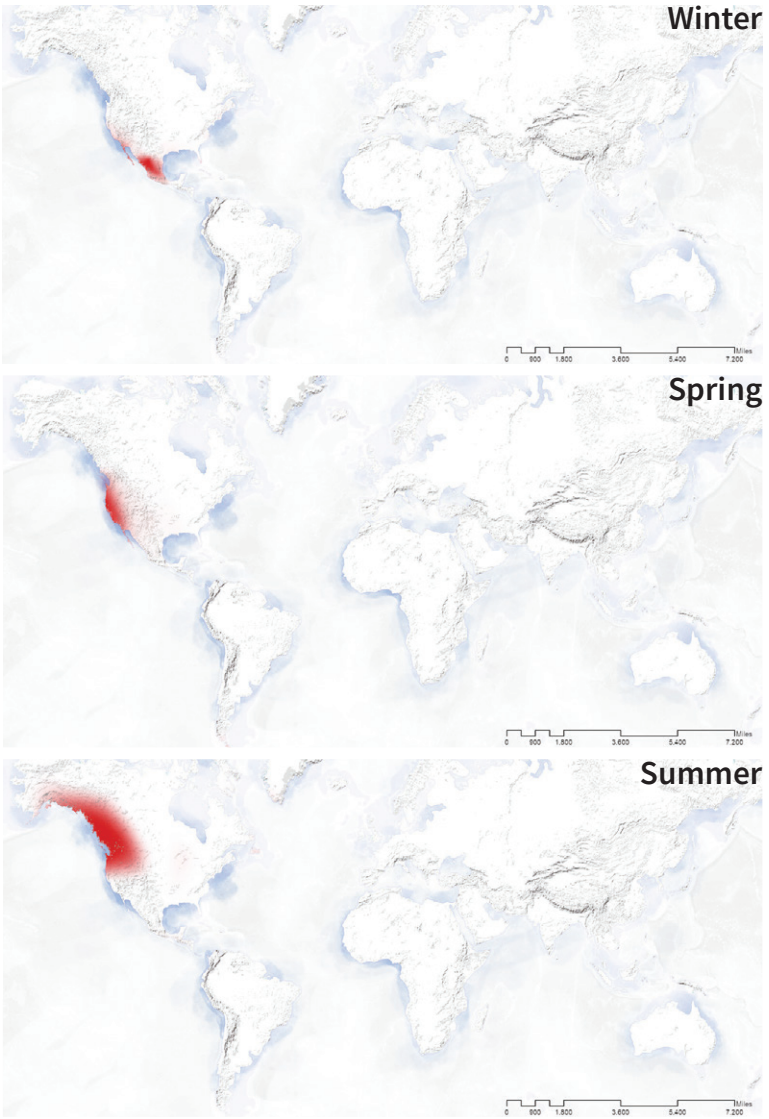


Rufous Hummingbird

GLOBAL ABUNDANCE AND MIGRATION

Rufous Hummingbirds migrate along the Pacific Coast of North America. They cover large distances for such small birds, and rarely reside in one area for very long. Many migratory birds, like the Rufous Hummingbird require suitable habitat across a wide range on a seasonal rather than persistent basis.





Sources:

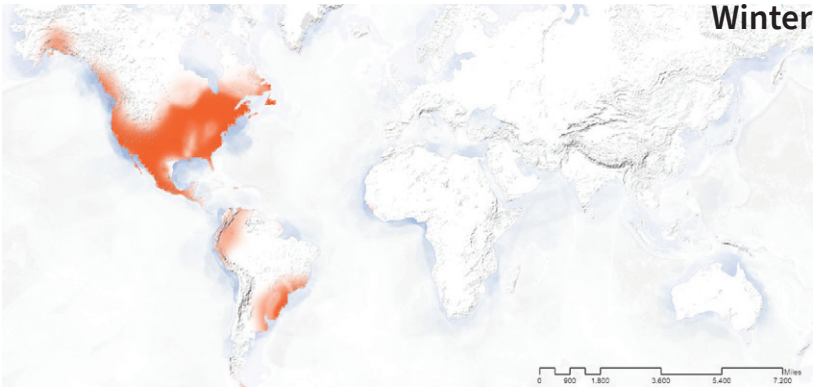
Migration and species info: allaboutbirds.org, https://ebird.org/science/status-and-trends Base map: GIS

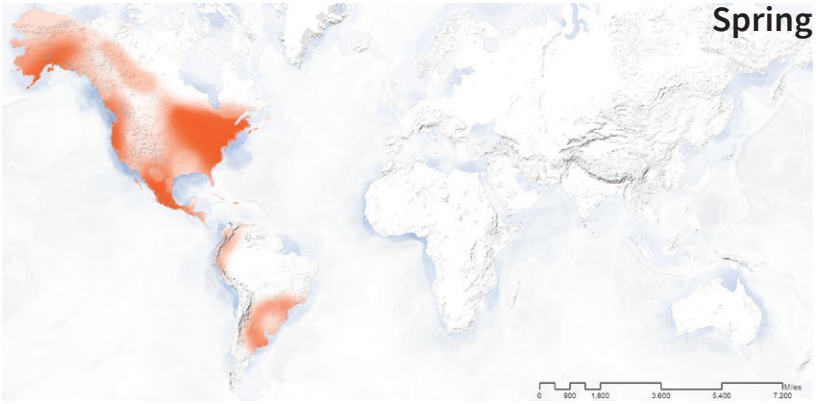
Sharp-shinned Hawk

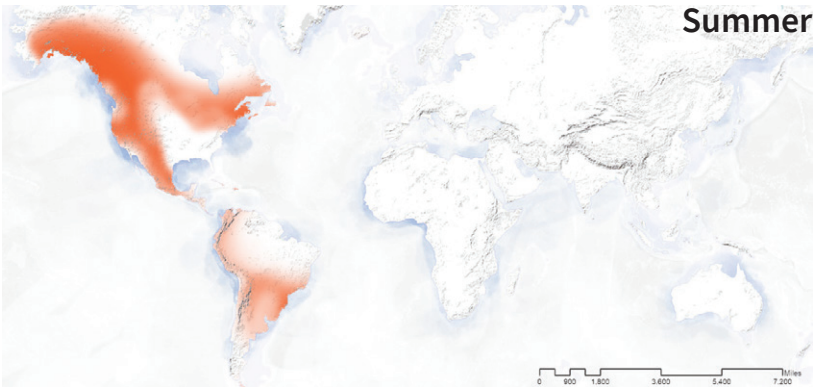
GLOBAL ABUNDANCE AND MIGRATION

Sharp-shinned Hawks live in both North and South America. Their migratory path takes them across borders which are perilous for human travelers. They are most often seen in the fall and winter as they migrate south.









Sources:

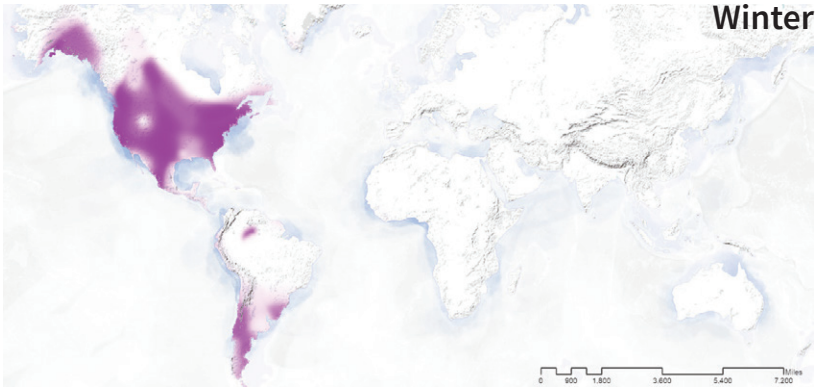
Migration and species info: allaboutbirds.org, https://ebird.org/science/status-and-trends Base map: GIS

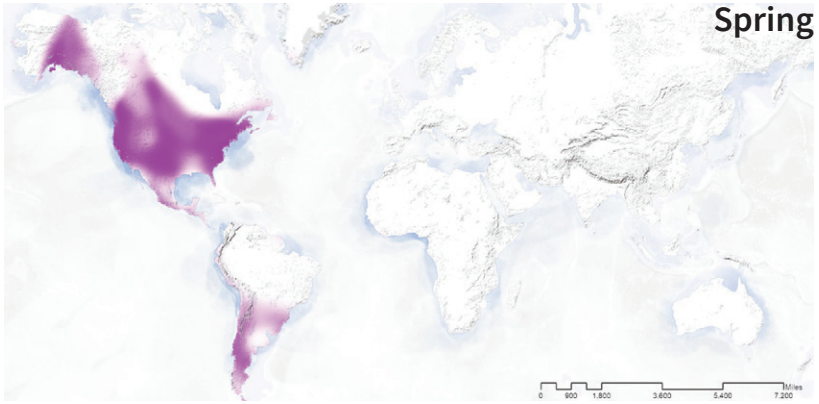
Great Horned Owl

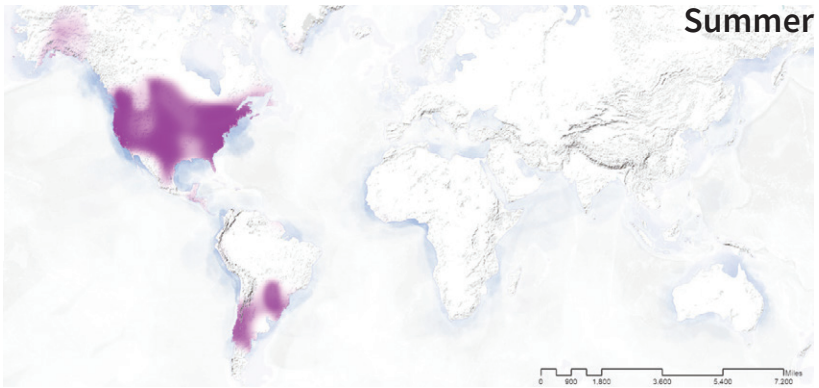
GLOBAL ABUNDANCE AND MIGRATION

Even though the Great Horned Owl is non-migratory, the species abundance shifts from season to season. This shows us the complex temporal factors that need to be accounted for in creating habitat for even non-migratory birds.









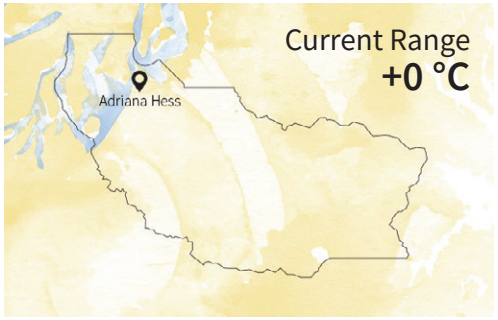
Sources:

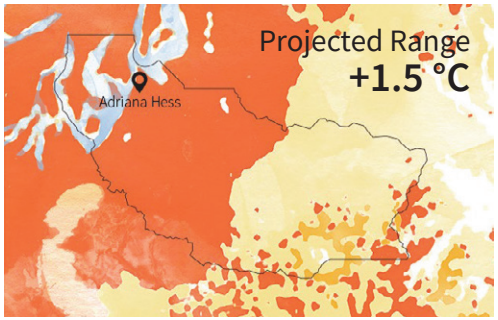
Migration and species info: allaboutbirds.org, https://ebird.org/science/status-and-trends Base map: GIS

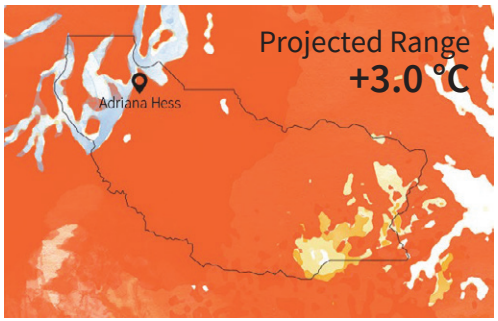
Habitat Across Pierce County

RUFOUS HUMMINGBIRD

Still widespread and very common, but surveys show continuing declines in numbers during recent decades. Because it relies on finding the right conditions in so many different habitats at just the right seasons during the year, it could be especially vulnerable to the effects of climate change.







stable habitat range
worsening habitat range
habitat range lost

Habitat Types

woodland
woodland edge
riparian
wetland freshwater
wetland brackish
grassland
built

Habitat Vulnerability

stable — moderate — high

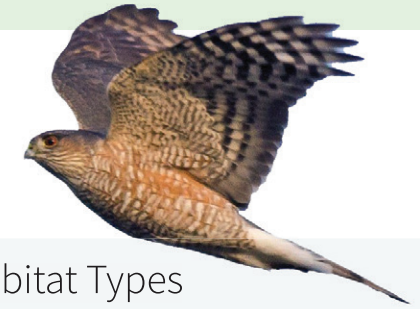
Climate Threats

fire weather
spring heat waves
drought
sea level rise
urbanization

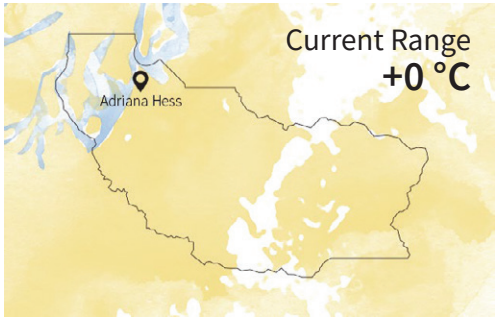


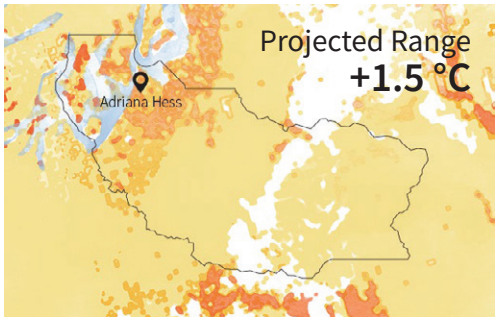
Habitat Across Pierce County

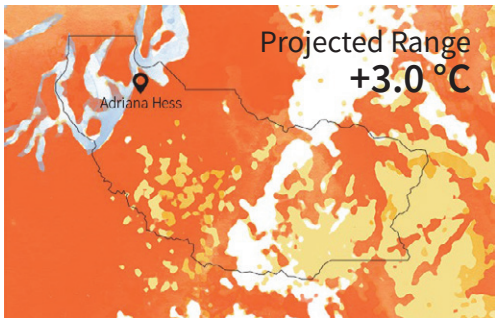
SHARP-SHINNED HAWK



Numbers dropped in mid-20th century, possibly as a result of DDT and other pesticides in the food chain, then recovered somewhat through early 1980s. Since that time, counts of migrants in the east have shown significant declines again.







stable habitat range

worsening habitat range

habitat range lost

Habitat Types

woodland

woodland edge

riparian

wetland freshwater

wetland brackish

grassland

built

Habitat Vulnerability

stable — moderate — high

Climate Threats

fire weather

spring heat waves

drought

sea level rise

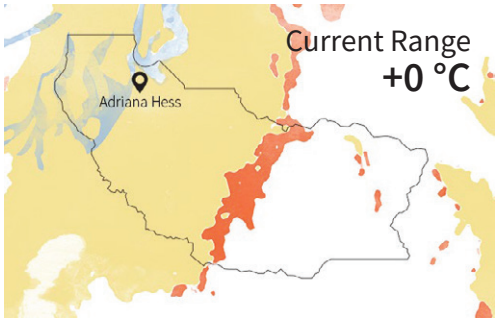
urbanization

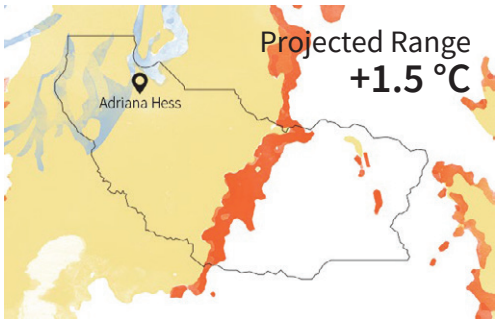
Habitat Across Pierce County

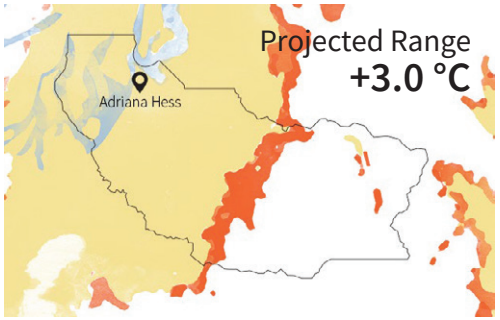
GREAT HORNED OWL

Widespread and common, numbers apparently holding up well in most areas.







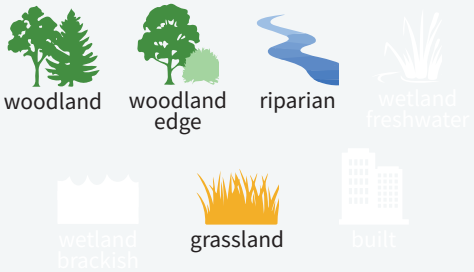


stable habitat range

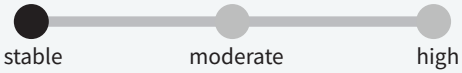
worsening habitat range

habitat range lost

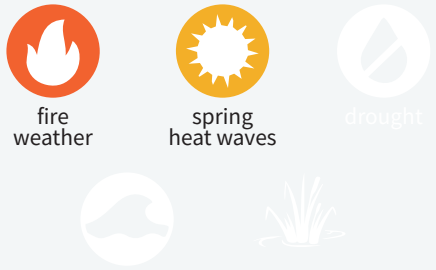
Habitat Types



Habitat Vulnerability



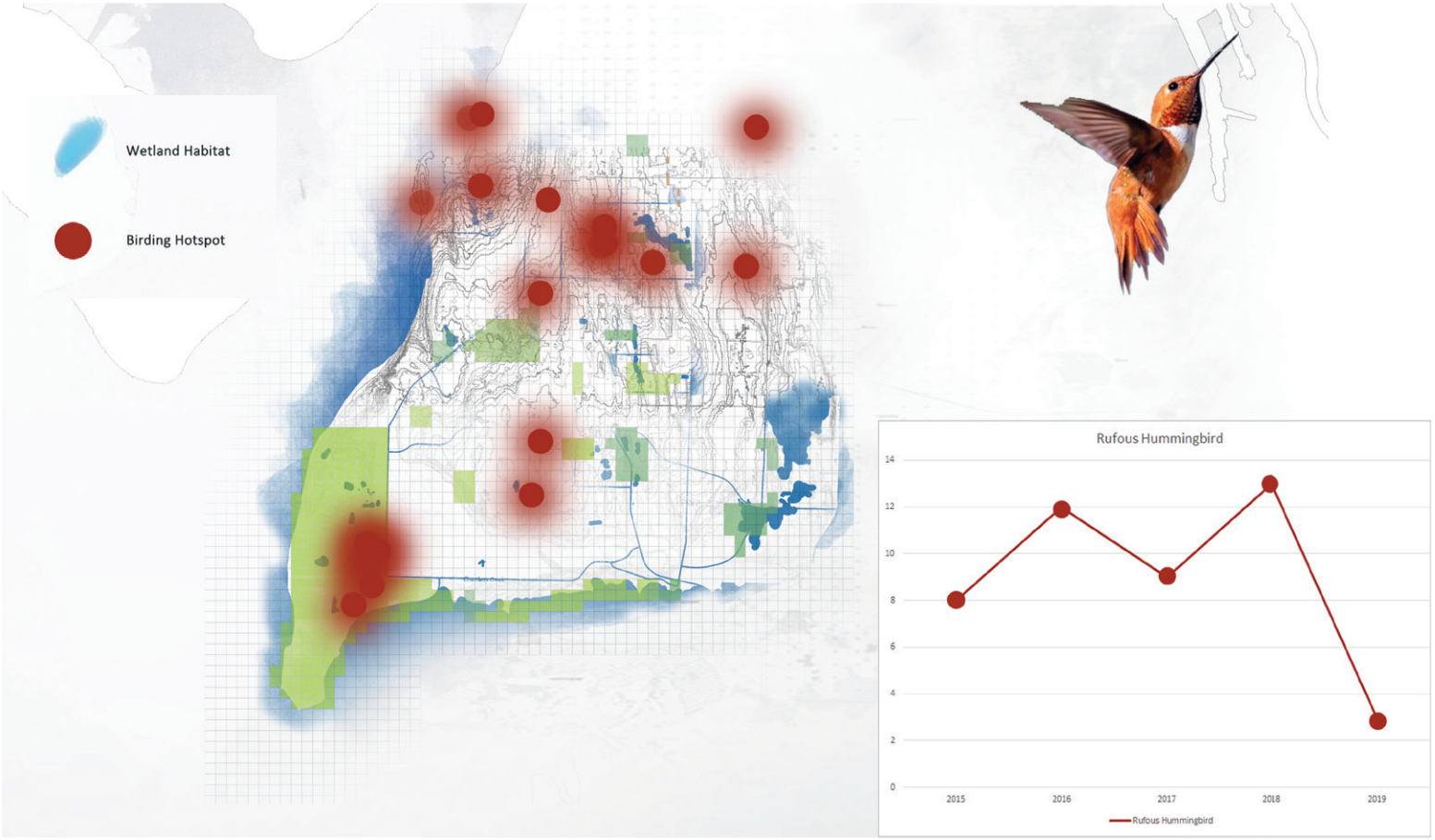
Climate Threats



Habitat & Bird Sightings Variation

HOW BIRDS MOVE AND THEIR SIGHTING NUMBERS THROUGH A 5-YEAR TIME FRAME

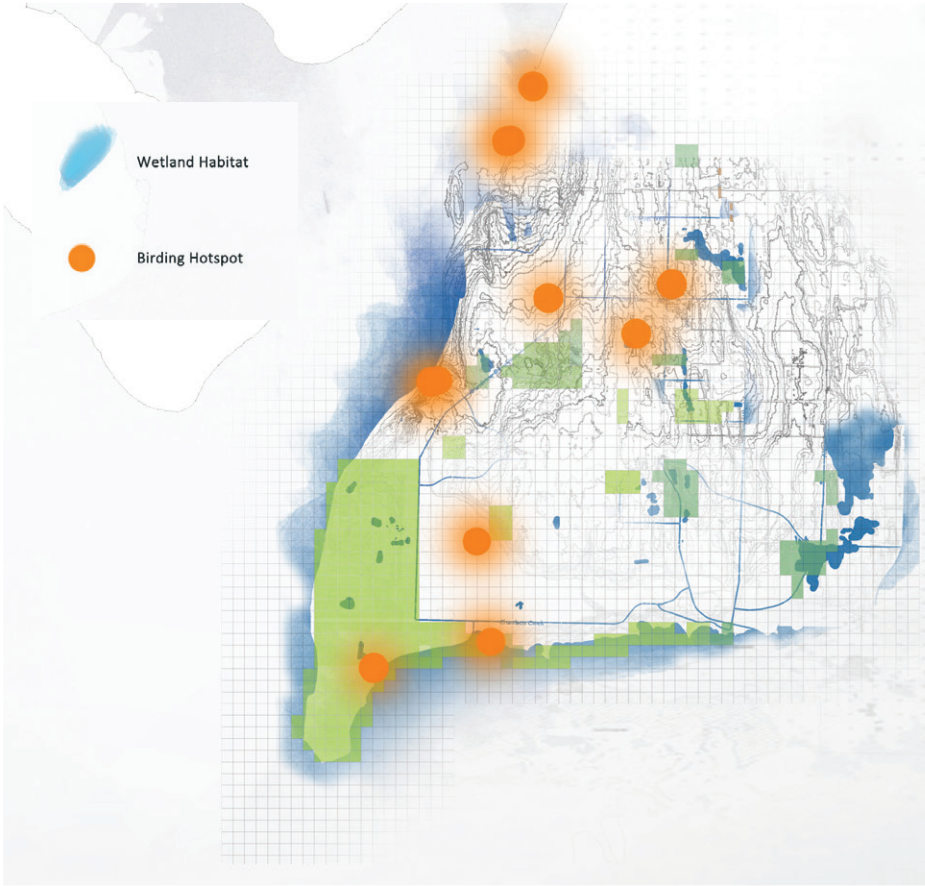
RUFOUS HUMMINGBIRD



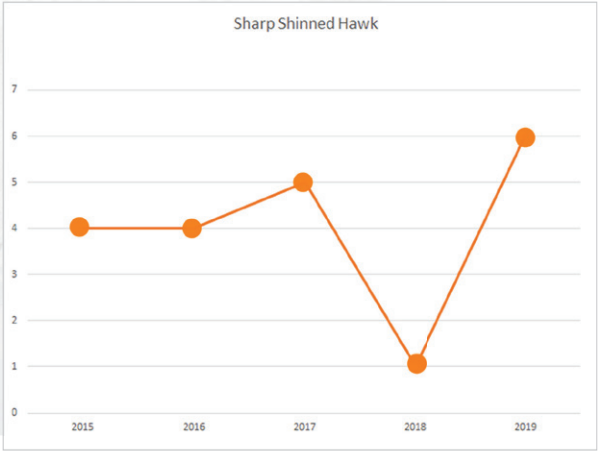
Habitat & Bird Sightings Variation

HOW BIRDS MOVE AND THEIR SIGHTING NUMBERS THROUGH A 5-YEAR TIME FRAME

SHARP SHINNED HAWK



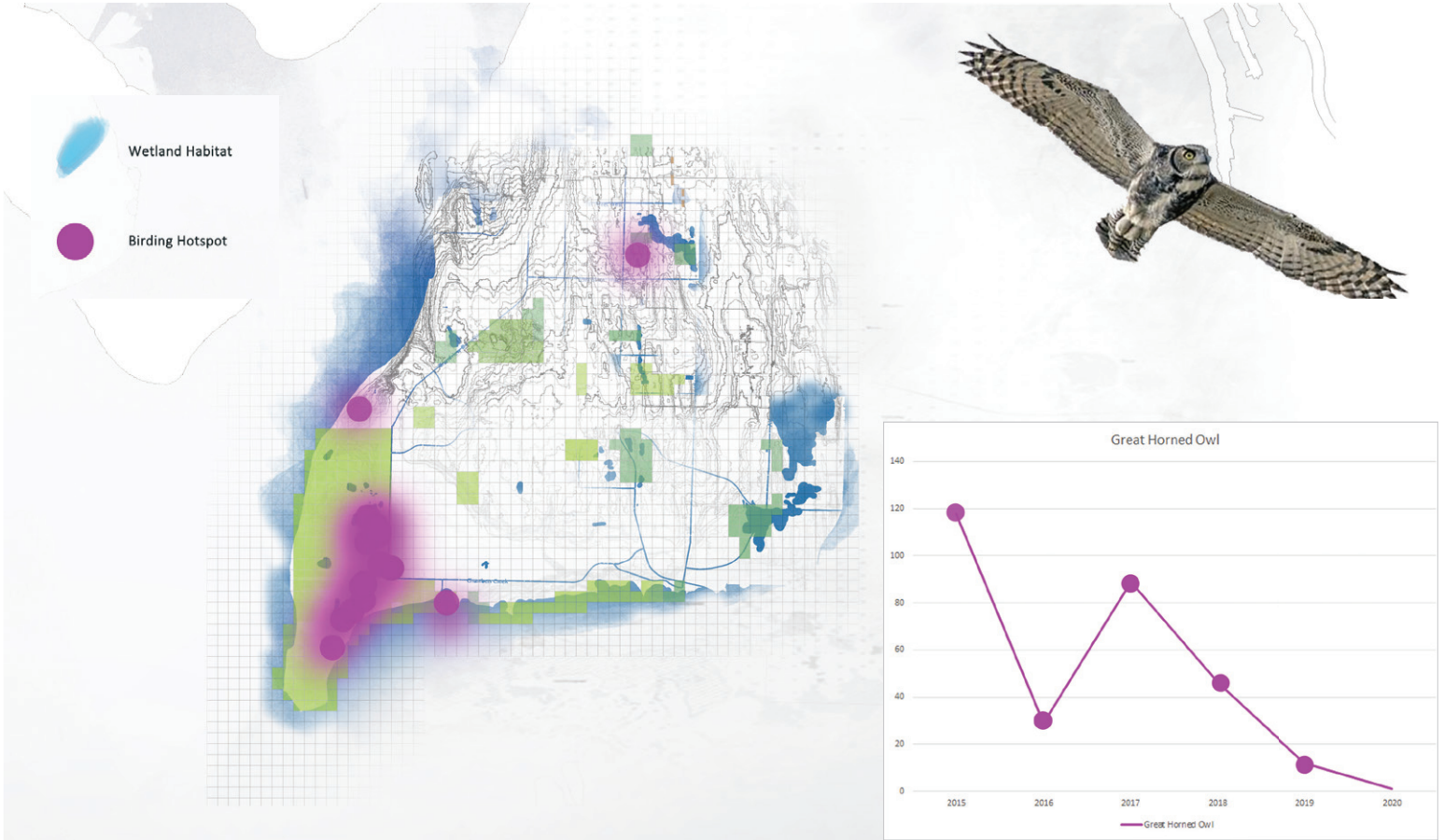




Habitat & Bird Sightings Variation

HOW BIRDS MOVE AND THEIR SIGHTING NUMBERS THROUGH A 5-YEAR TIME FRAME

GREAT HORNED OWL



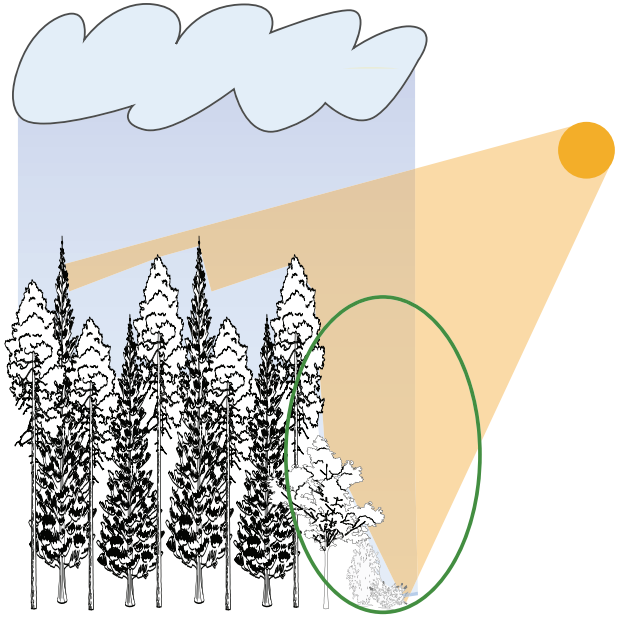
How do we use the higher levels of stormwater runoff predicted in the **future** to improve bird **habitat** and support biodiversity?



Claudia Sackett Hennum

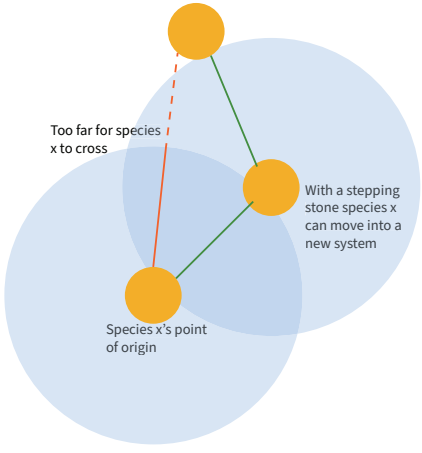
Island Edge

MAXIMIZING EDGES TO PROMOTE BIODIVERSITY, MANAGE WATER AND CREATE PROTECTED AREAS



Ecosystem edges provide a variety of **niche habitats** supporting **biodiversity**. In this example, there is more of a gradient of sun and rain at the edge of the forest than in the deep forest, allowing for a wider variety of species to thrive.

Island biogeography looks at **how species move** from one system to another, and how populations sustain themselves. In this diagram, species x cannot mack it directly from its point of origin to the farthest island, hovever, it can make it there by stopping over at a third island which is in the middle.



Adriana Hess Wetland Park exists in both a habitat island and an ecosystem edge. Drawing on these qualities of the site, I propose a design which uses islands and edges to facilitate habitat and biodiversity while also managing storm wate which is expected to increase with climate change.

Ecosystem Edge

Ecosystem edges are areas with high biodiversity. **Adriana Hess Wetland Park is full of such edge**s: between wetland and forest, between forest and grassland and between areas dominated by nature and those dominated by development.

Island Biogeography

Island Biogeography is a theory that helps us understand biodiversity in isolated regions. Originally studied in the context of remote islands, it has more recently been applied to fragmented landscapes, such as habitats fractured through urban development. **Adriana Hess and the wetland adjacent to it is a habitat island** in the midst of a rapidly developing area.

Wetland Edge Expansion

The increase in wetland edge allows for processing and retention of larger amounts of storm water. Islands that are inaccessible to humans during high water levels are well suited to birds; providing protected habitat.

Claudia Sackett Hennum

Section

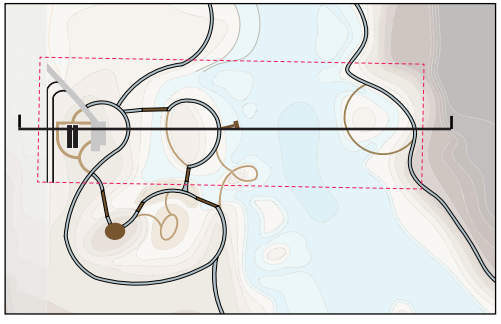
MOVING ACROSS ZONES

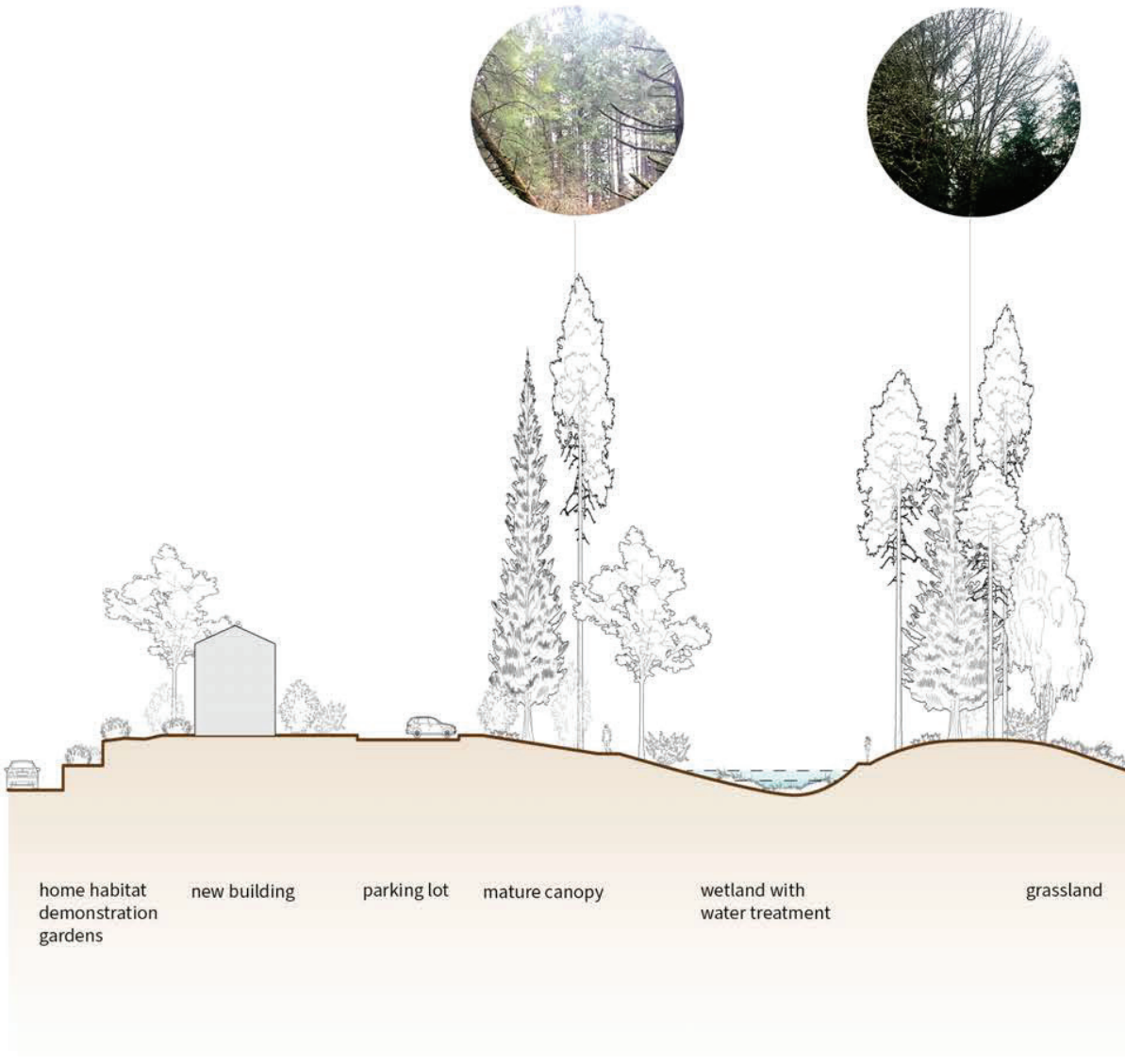
Island Edge uses changes in topography to create habitat niches and manage storm water runoff. A system of gently descending wetlands captures and cleans water as it moves onto the site before releasing it into the larger wetland which transects the site.

In different seasons, different portions of the canals are (de)saturated, allowing and preventing access to more remote islands.

In this design, there are terraces along the street. The attention to the street scape invites visitors in and offers an educational opportunity. Surrounding the new building are a series of demonstrating bird habitat gardens.

Moving through the site, visitors experience woodland canopy, grasslands, scrubland and a variety of wetlands, all designed to attract and support a variety of local and migratory birds.





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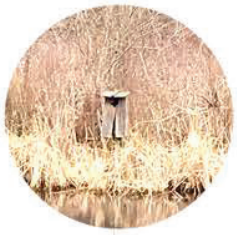

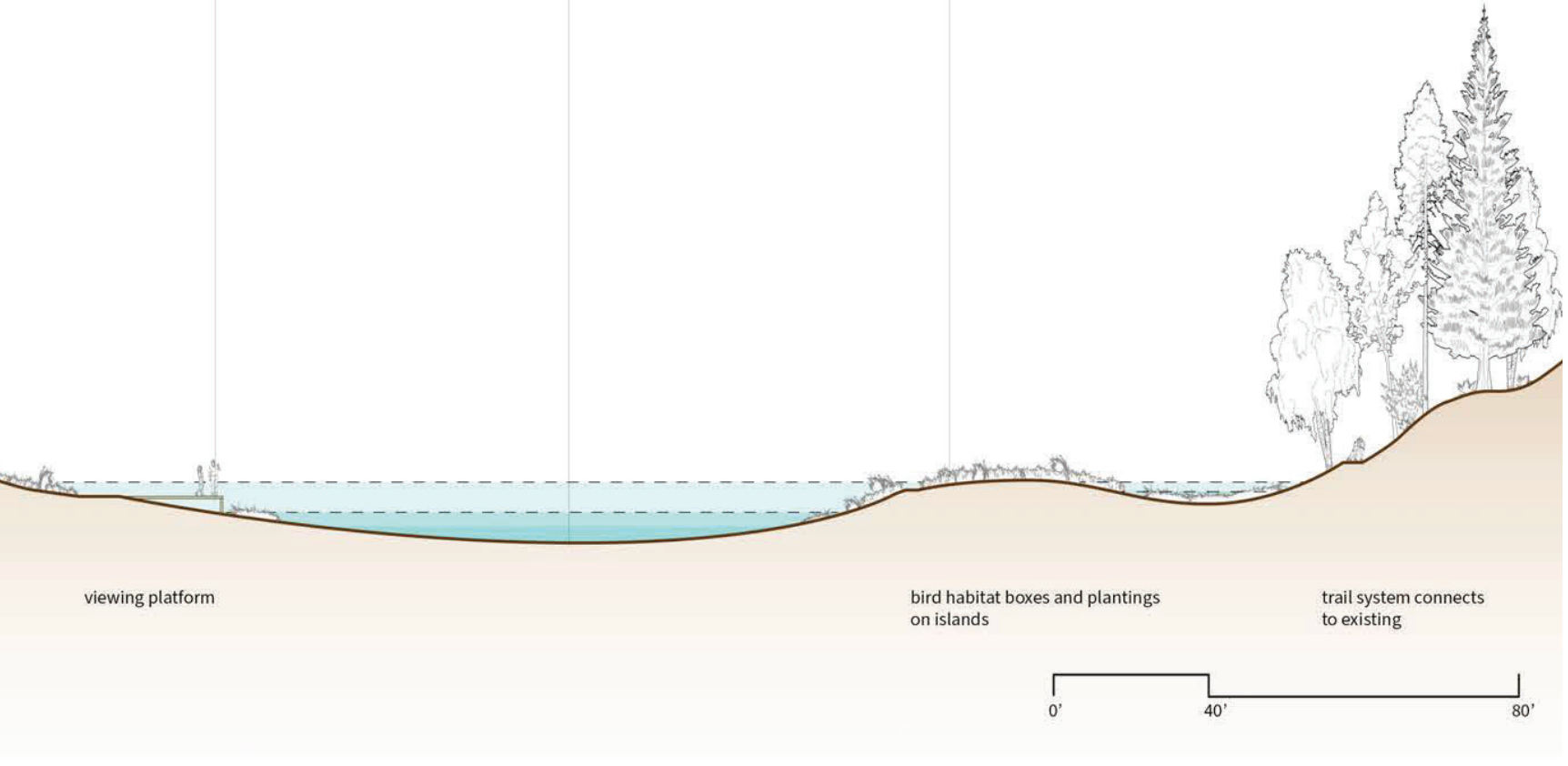

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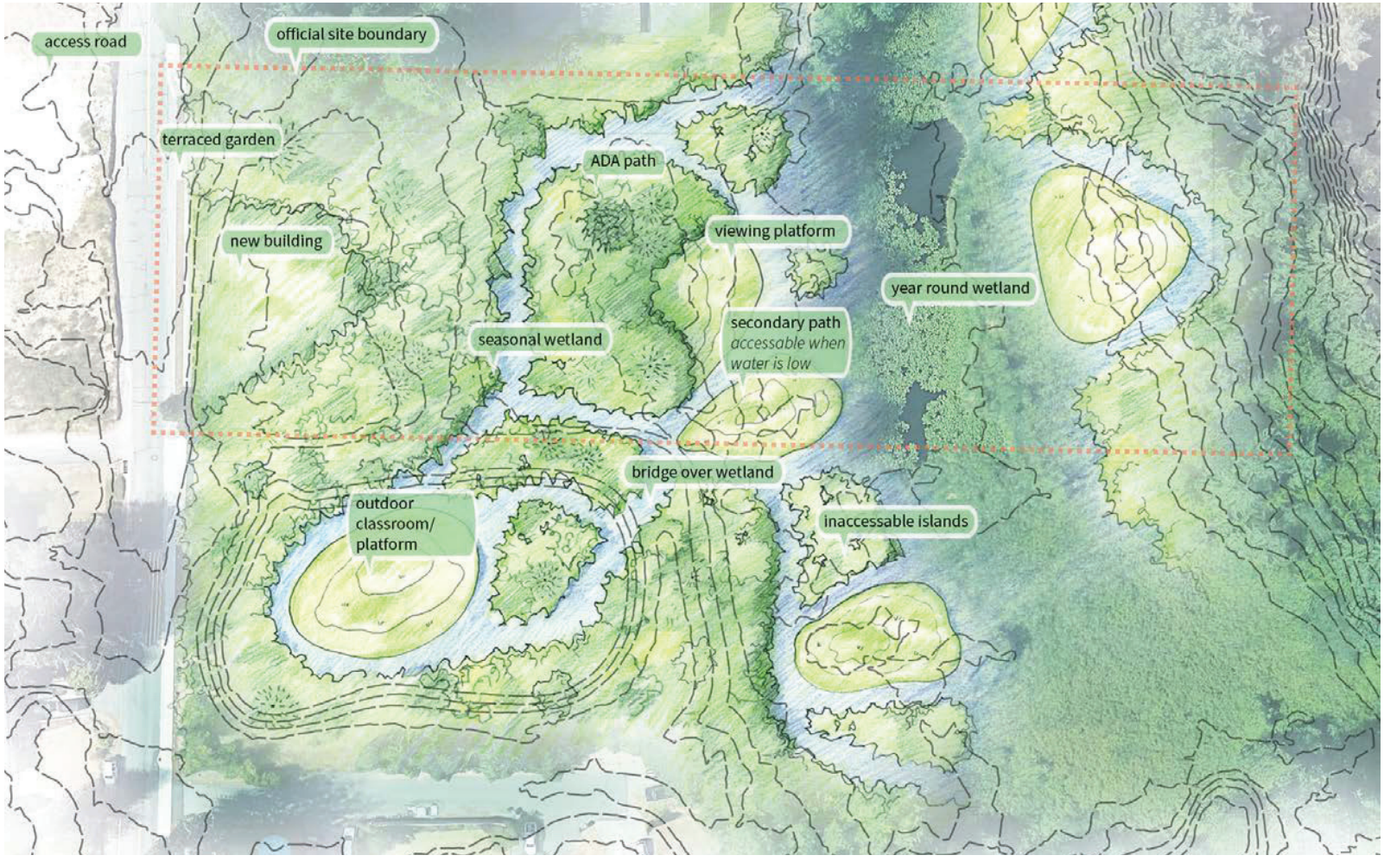
Site Plan

HABITAT ISLANDS FOR BIRD SANCTUARY AND WATER MANAGEMENT



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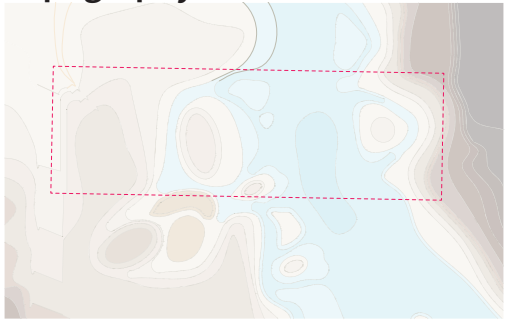
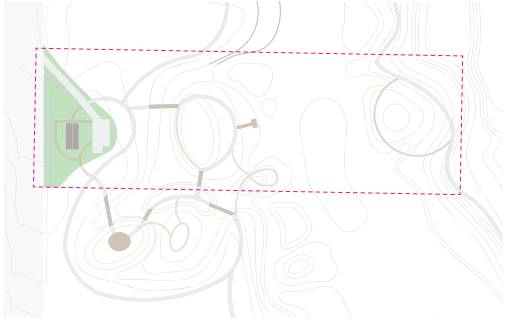
Habitat Types

Topography Gradient



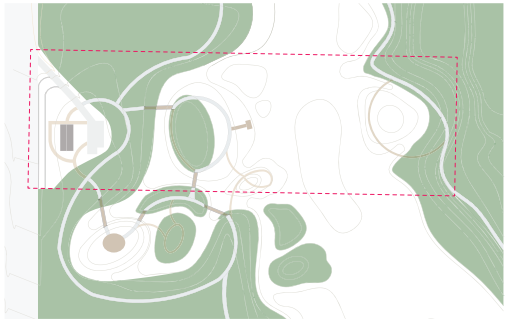
Demonstration Gardens



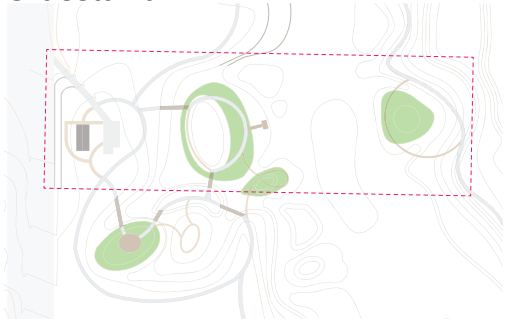
Several of the islands are inaccessible to humans and preserved for wildlife usage. Some islands are accessible only in the dry season when the water has been released.

Bird nesting habitat is supported on islands that are less accessible to humans, while bird friendly foraging plants are interspersed throughout the site.

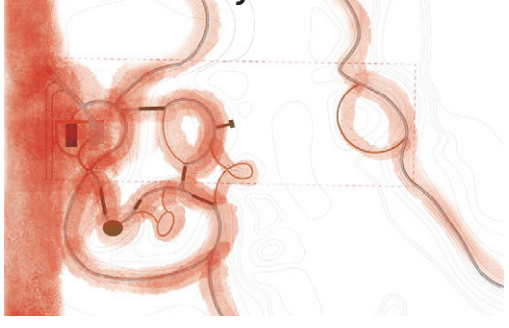
Woodland (Dense and Open)



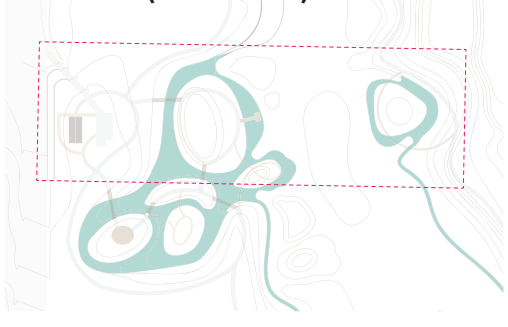
Grassland



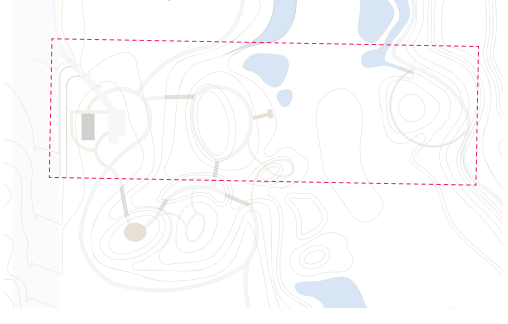
Circulation: Dry Season



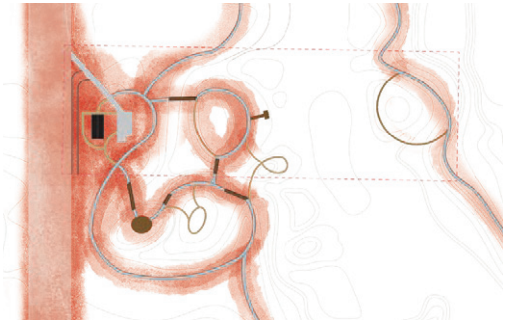
Wetland (Seasonal)



Scrubland/Wetfooted Forest



Circulation: Wet Season



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Immersion

LEARNING THROUGH OBSERVATION IN OUTDOOR CLASSROOM PLATFORM



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Encounter

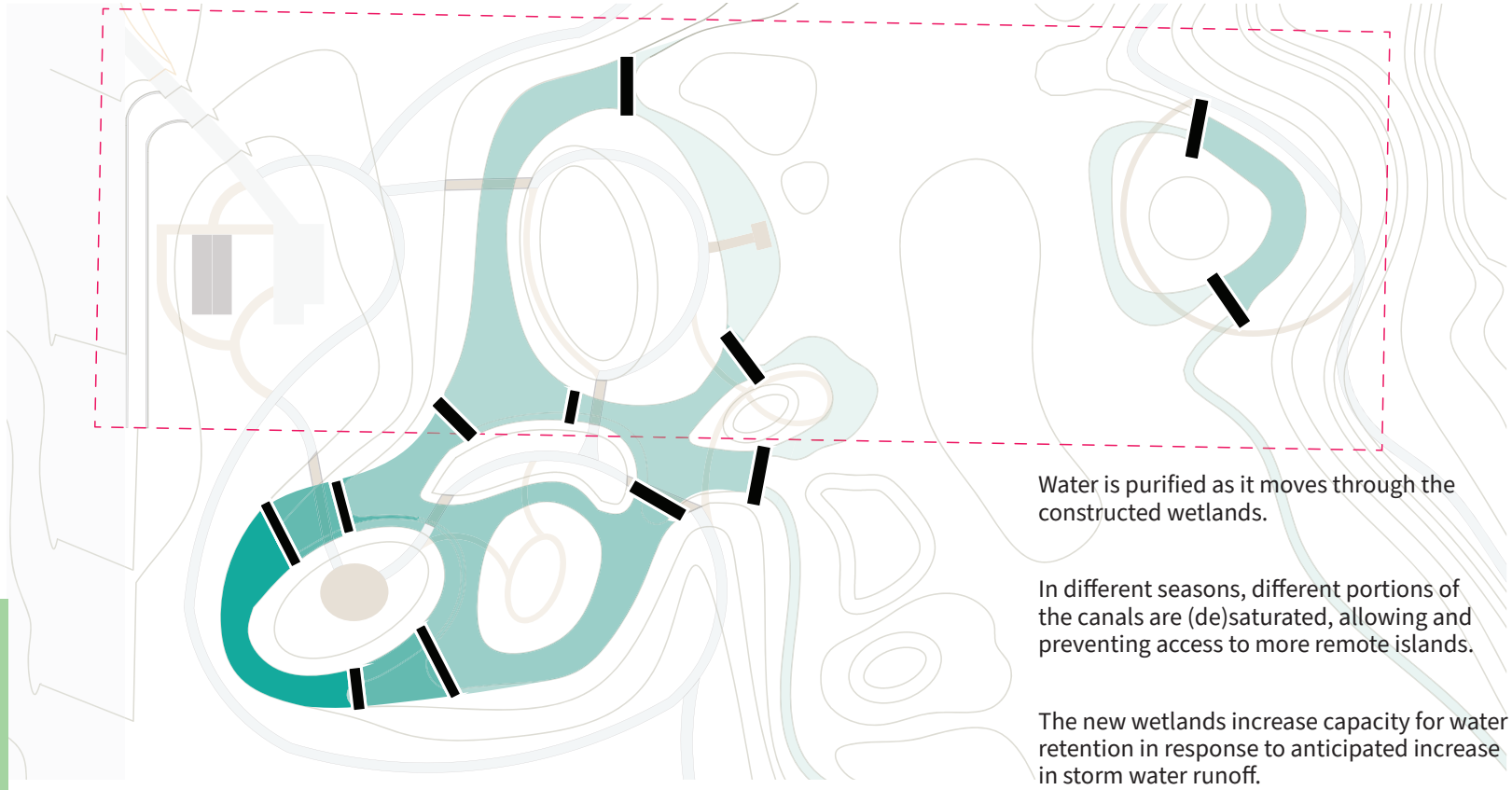
PASSING THROUGH WETLAND TO ACCESS HABITAT PRESERVES IN THE DRY SEASON



Claudia Sackett Hennum

Functional Wetland

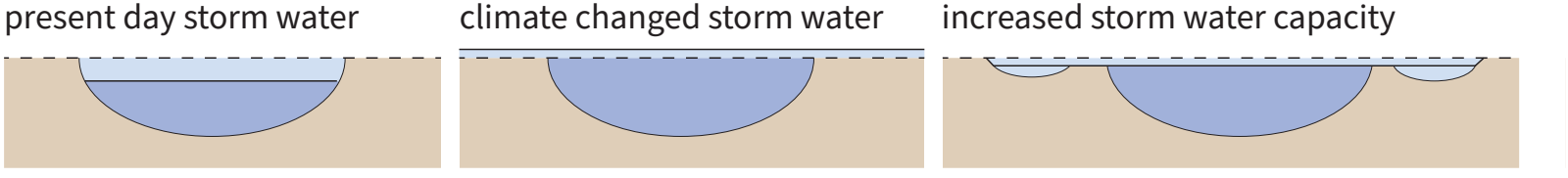
WEIRS ARE PLACED TO SLOW, SPREAD AND SINK WATER DURING THE WET SEASON.



Water is purified as it moves through the constructed wetlands.

In different seasons, different portions of the canals are (de)saturated, allowing and preventing access to more remote islands.

The new wetlands increase capacity for water retention in response to anticipated increase in storm water runoff.



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Seasonal Revelation

VISITORS OBSERVE FLUCTUATING WATER LEVELS THROUGHOUT THE SEASONS AND FROM YEAR TO YEAR



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Designing for Birds

IDENTIFYING USERS

Targeted Birds



Varied Thrush
Dense Forest
Year-round resident



Pine Siskin
Open Woodland
Year-round Resident



Wilson's Warbler
Scrub-land
Summer Visitor

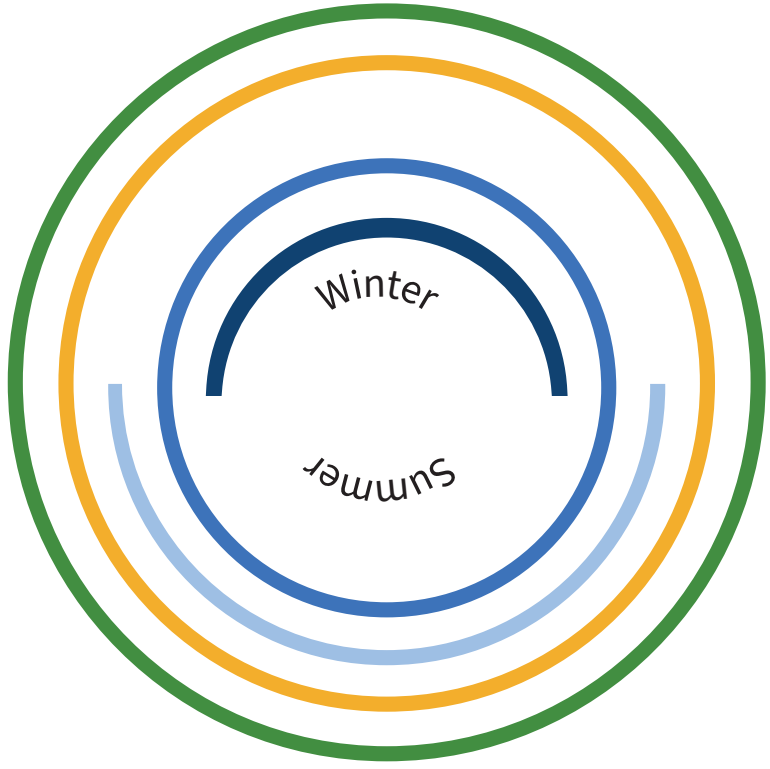


Virginia Rail
Wetland
Year-round Resident



Bufflehead
Deep Wetland/Pond
Winter Visitor

Seasonal Presence of Targeted Birds at Adriana Hess



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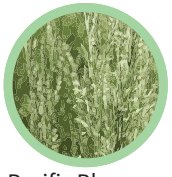
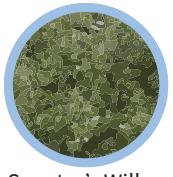
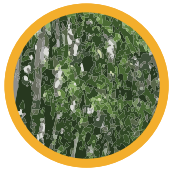
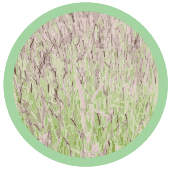
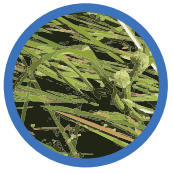
Planting Design

BUILDING HABITAT

Habitat Types

Dense Forest	Open Woodland	Grassland	Scrub Land	Wetland
 Douglas Fir	 Big Leaf Maple	 Pacific Bluegrass	 Scouter's Willow	 Broad-leaf Cat Tail
 Sword Fern	 Cottonwood	 Meadow Barley	 Red Osier Dogwood	 Small Bur-Reed
 Evergreen Huckleberry	 Red Alder	 Riverbank Lupine	 Hardhack	 Sedge
 Salal	 Thimbleberry	 Eatan's Aster	 Salmonberry	 Rush

Target birds were selected from birds observed on site, cross-referenced with species already experiencing decline, and those expected to experience reduction of their range locally as a result of climate change.

Based on the selected birds, and their habitat needs, I identified five focus habitats. Four of those habitats are primary habitats for targeted species. I added in grasslands as they provide a variety of seeds which are essential to the diet of many birds.

Once I had identified the habitats, I looked for plants which fit within those habitat typology and are particularly beneficial for the targeted bird species.

Claudia Sackett Hennum

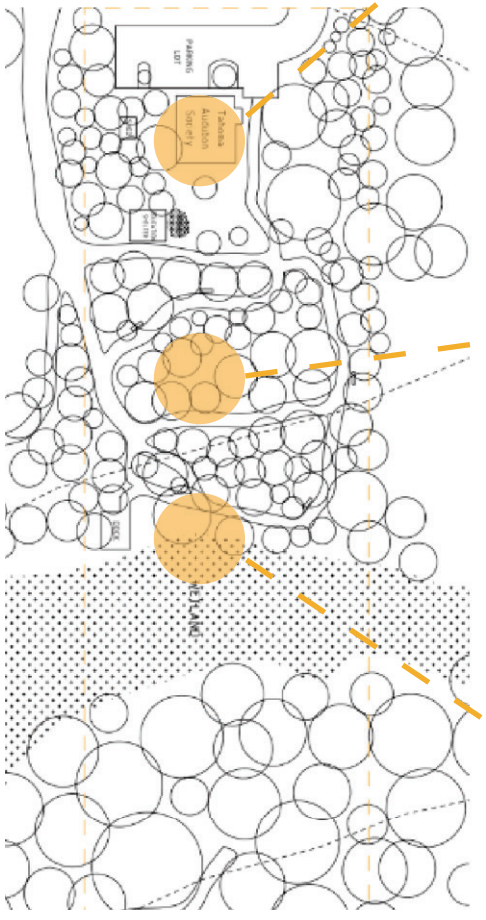
Immersive Habitat

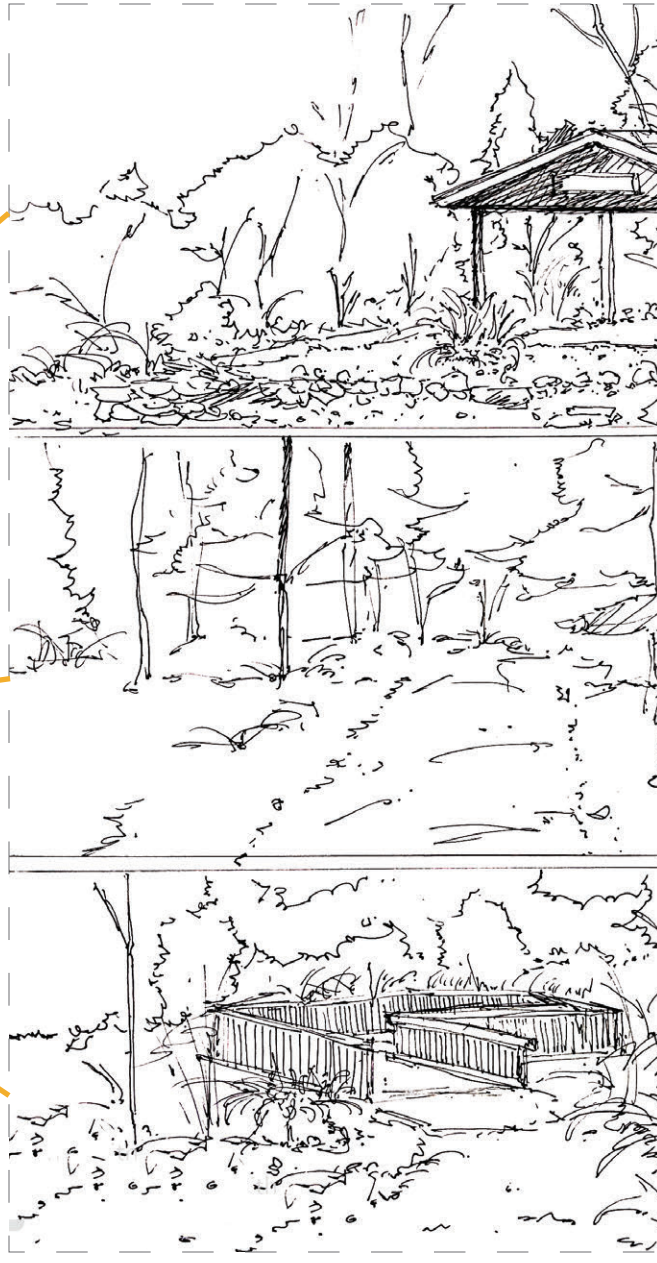
EDUCATIONAL HABITAT DESIGN THAT ENGAGE MULTI-LEVEL OBSERVATION OF BIRDS.

Habitats Identified

Types of Habitats in our site:

1. Woodland Understory & Edge
2. Shrubs
3. Grassland
4. Wetland
5. Riparian





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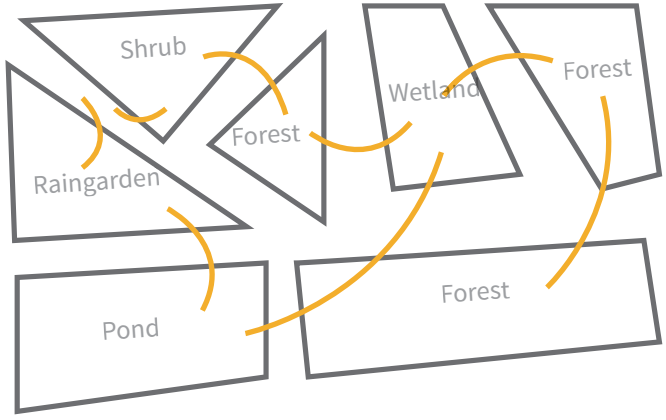
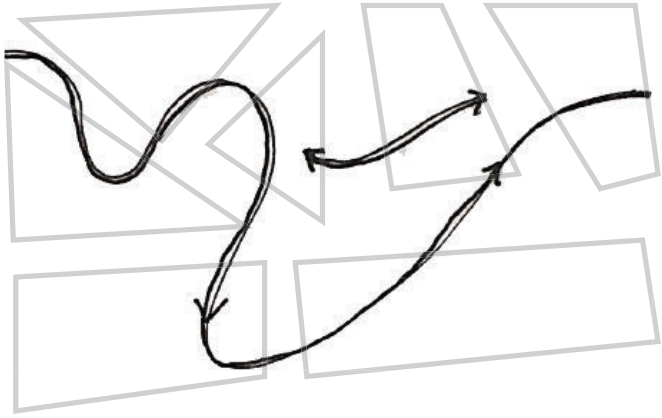
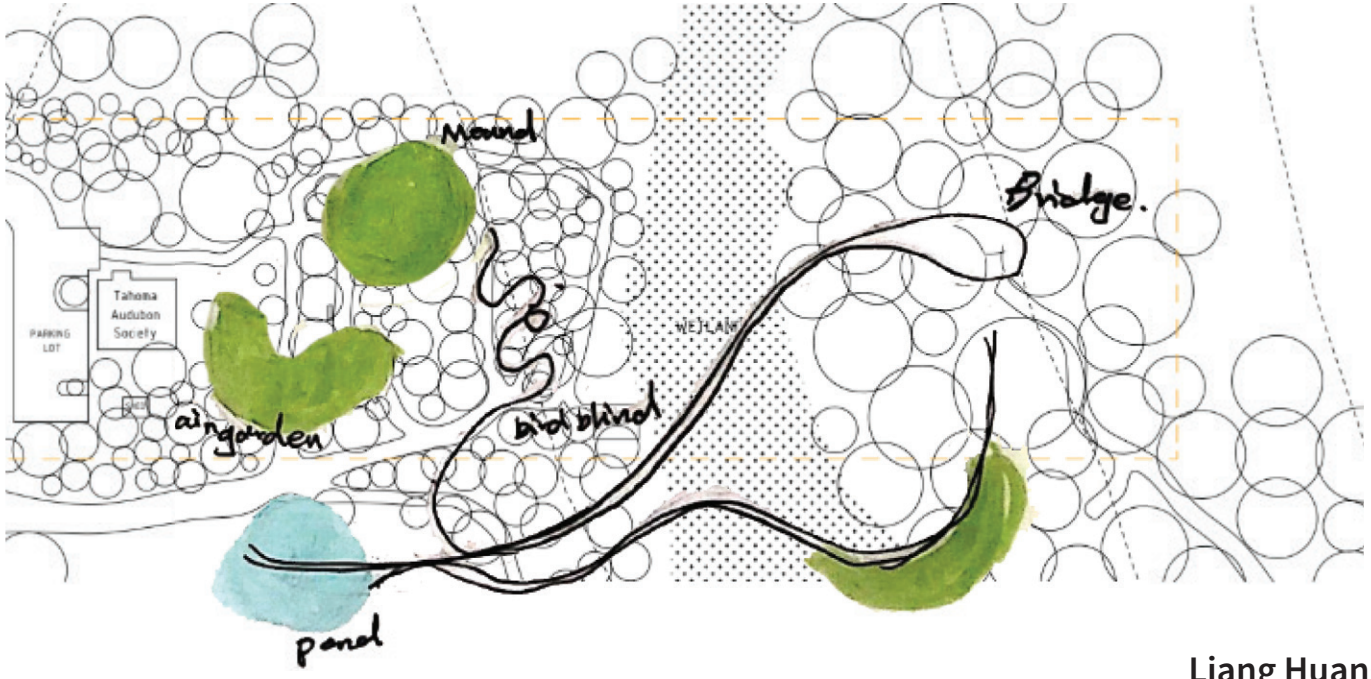
Design Parti

1. Cut the ground plane into habitat zones and “stitch” them back together
2. Follow the relationship between each habitats, create resired route that guides people through each parts
3. The circulation follows the distribution of habitats and bring people an immersive experience







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Immersive Habitat

EDUCATIONAL HABITAT DESIGN THAT ENGAGE MULTI-LEVEL OBSERVATION OF BIRDS.

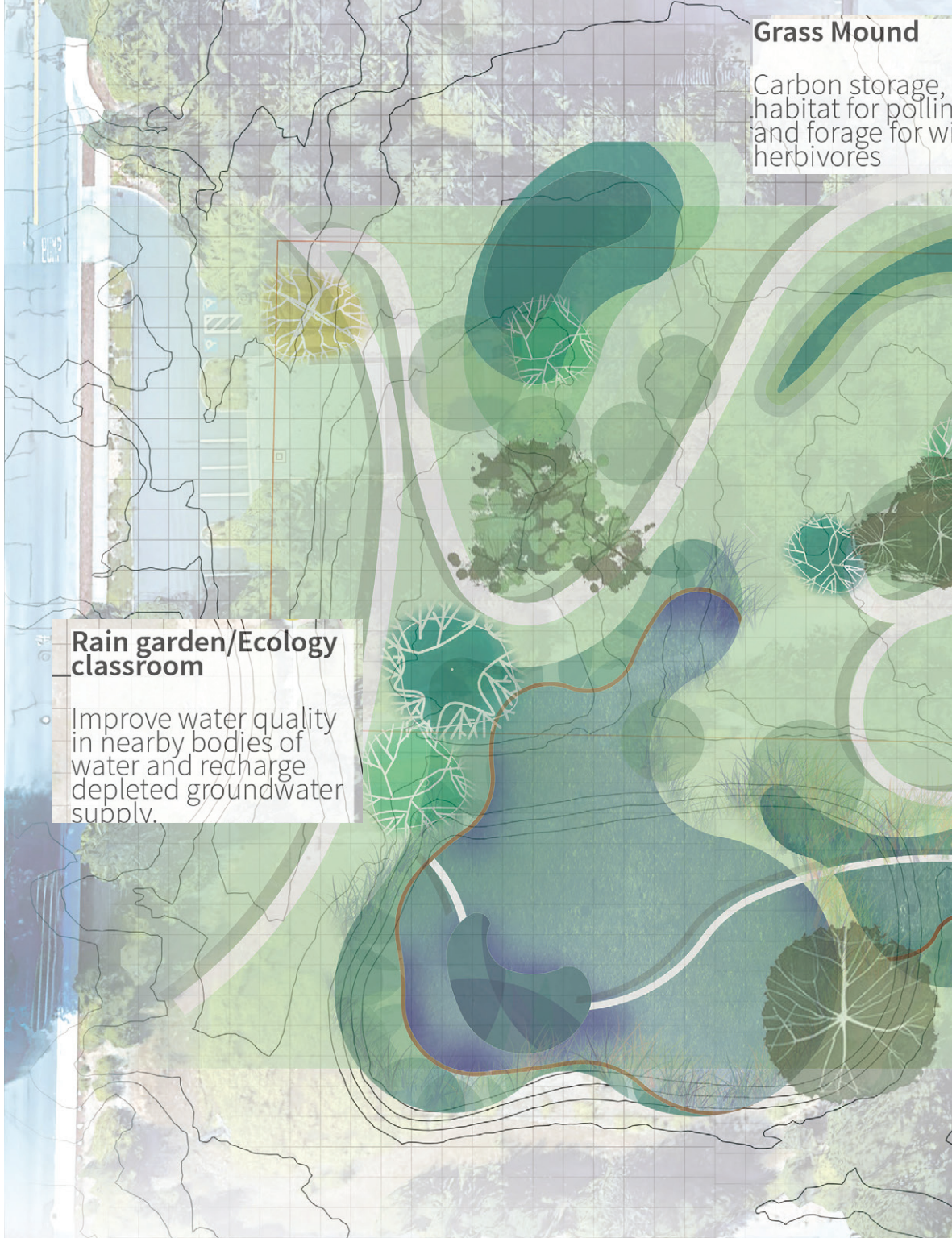
GOALS:

- Create spaces for ecological outdoor classroom;

- Create interventions to bring people inside and experience the habitats;

- Create organic paths and variation in height brings different perspectives;

- Application of ecological urbanism theory and try to mimic the pristine nature.



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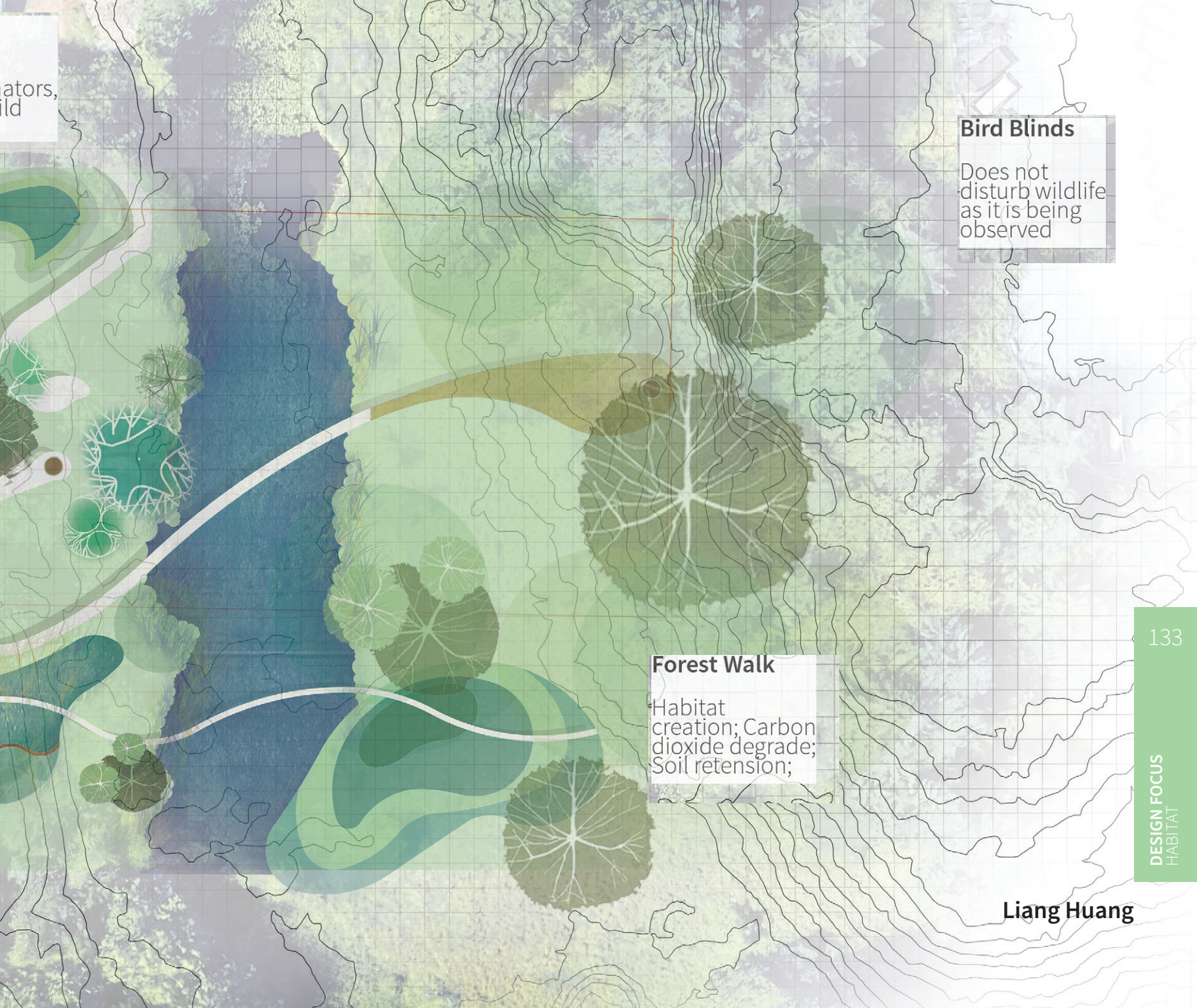
BIRDS & CLIMATE CHANGE STUDIO


ators,
ild
Bird Blinds
Does not disturb wildlife as it is being observed
Forest Walk
Habitat creation; Carbon dioxide degrade; Soil retension;

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Diagrams

1. PRESERVED HABITATS

The untouched habitats are the forest area and the wetland

2. CREATED HABITATS

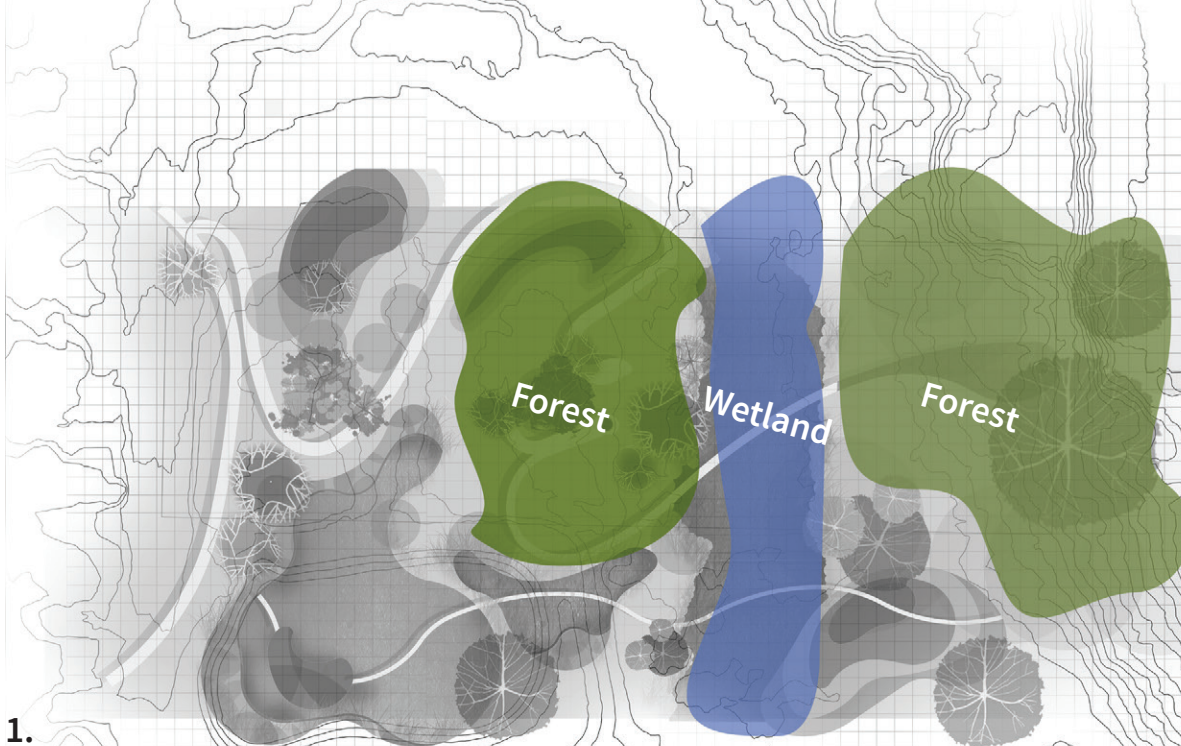
The added habitats are the grass mounds and the large raingarden area.

3. CIRCULATION PATTERNS

The primary route in red carries people through the whole site; the secondary route is a sideway that guide people through raingarden and towards the forest.

4. SITE PROGRAMS

- Mounds
- Raingarden
- Forest Walk
- Board Walk
- Bird Blinds



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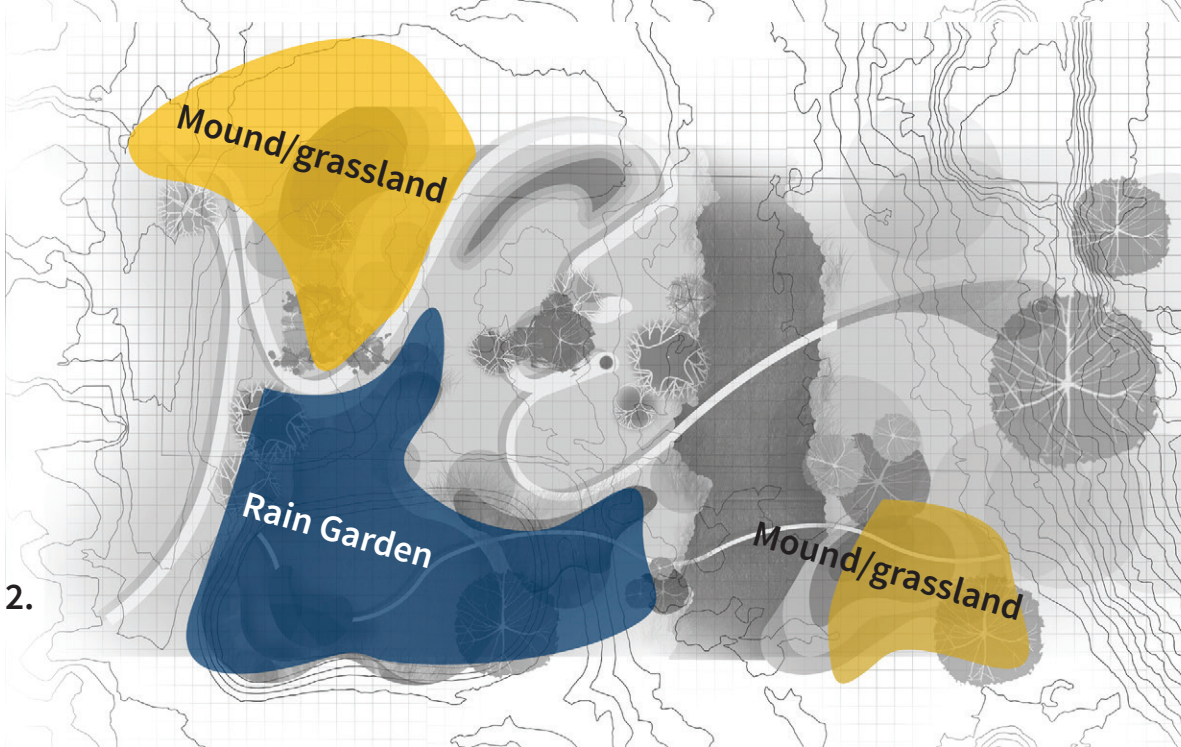

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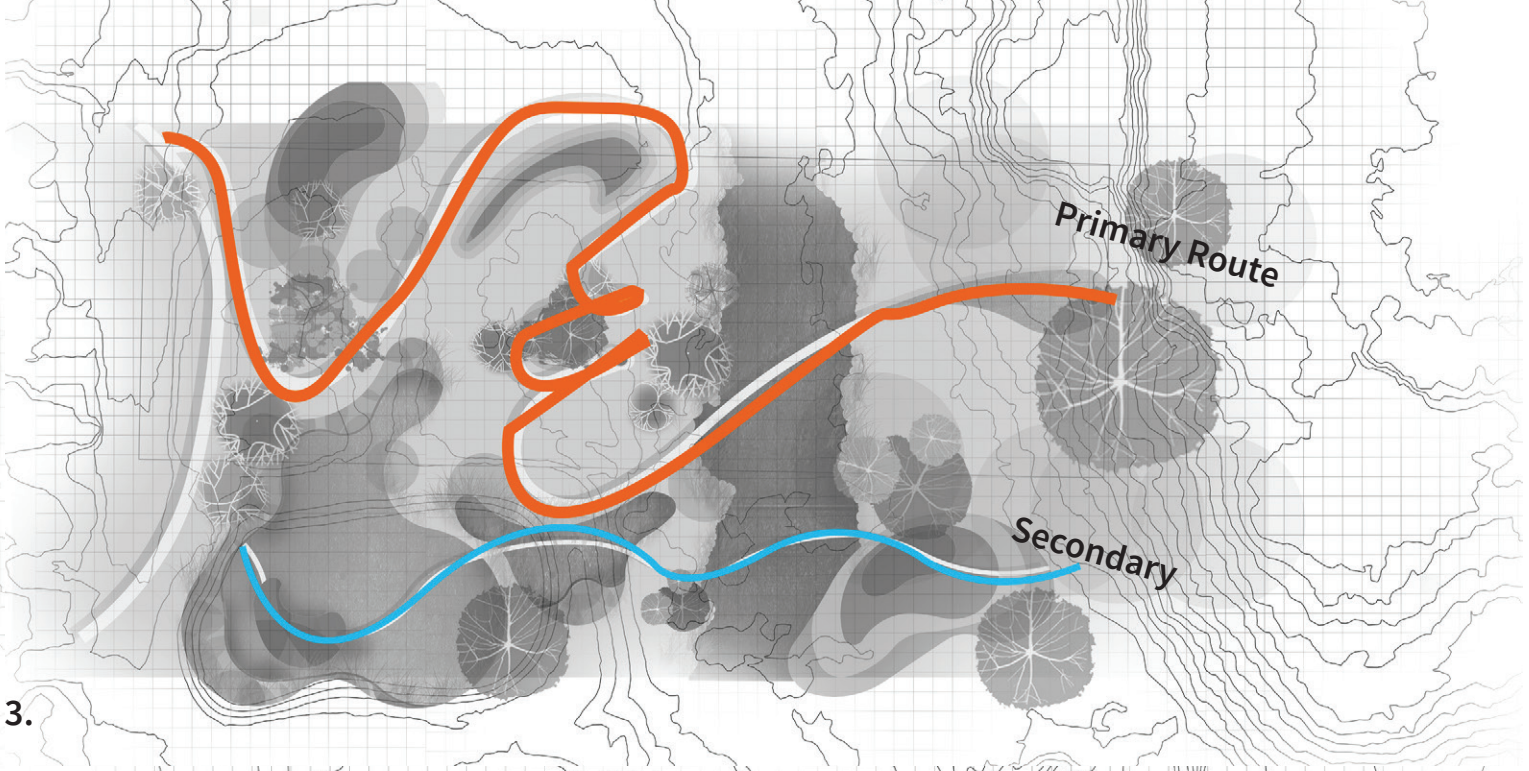
BIRDS & CLIMATE CHANGE STUDIO



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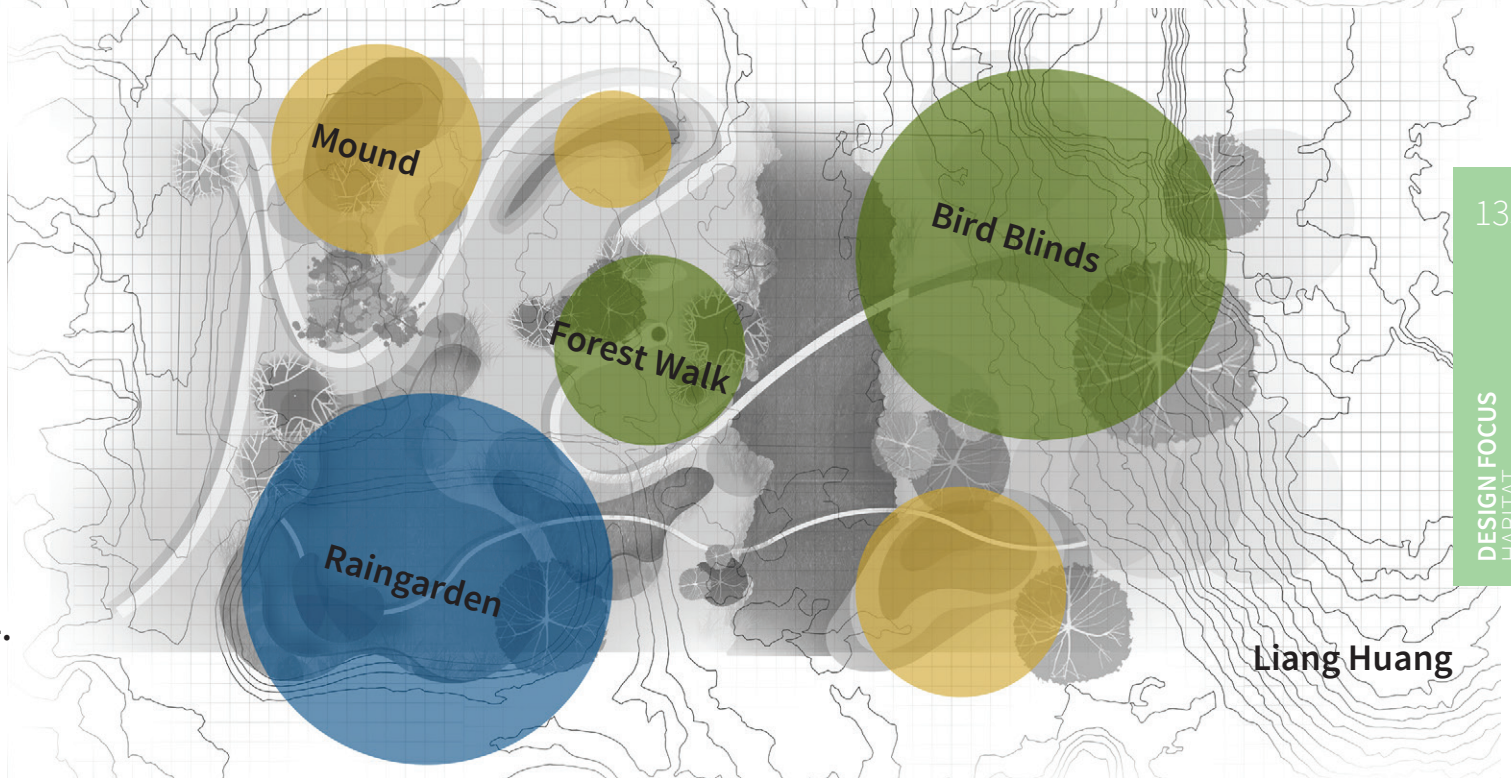

4.

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Climate Change+ Vegetation

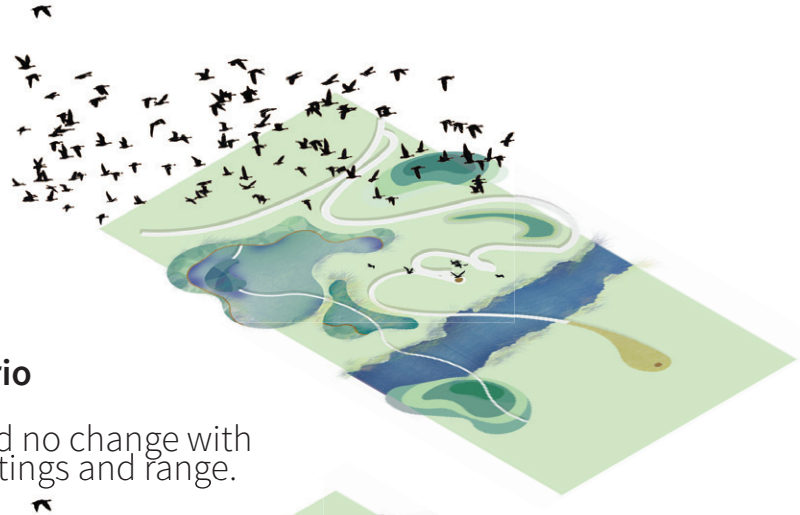
GLOBAL WARMING SEQUENCE:

The diagram sequence shows how the site condition changes in a 0°, 1.5°, and 3° scenario.

SITE VEGETATIONS

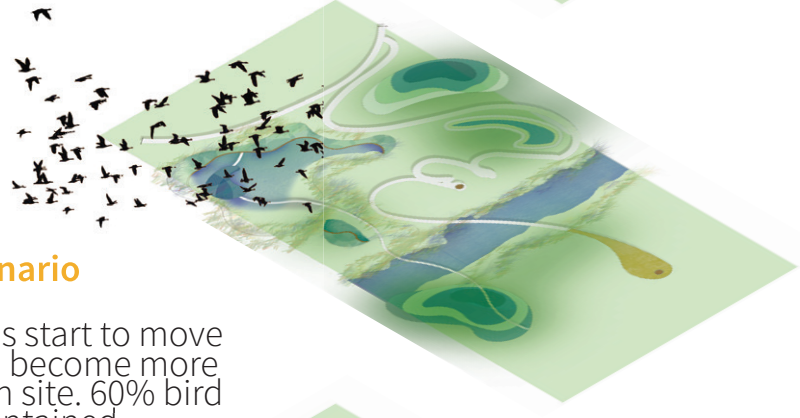
The site is divided into several different habitat zones:

- Grasslands
- Forest + forest edge
- Weland + wetland edge
- Shrubs



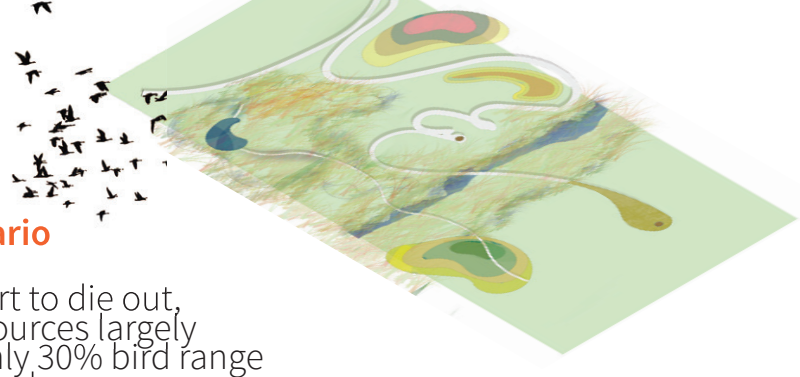
0° Scenario

Stable and no change with birds sightings and range.



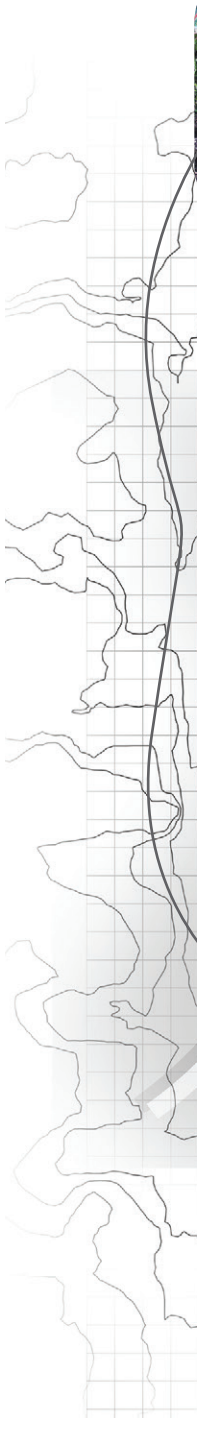
+1.5° Scenario

Grasslands start to move north and become more present on site. 60% bird range maintained.



+3° Scenario

Forest start to die out, water resources largely shrink. Only 30% bird range maintainted.



Liang Huang

BIRDS & CLIMATE CHANGE STUDIO



Perennial flowers, shrubs that absorbs water



Low woody plants, grasses, sedges



Grasses and woody plants

Mound/grassland

Forest + Forest Edge

Wetland + wetland edge

Forest + forest edge

Raingarden

Pond/Wetland edge



Mix of evergreen and deciduous plants

Liang Huang

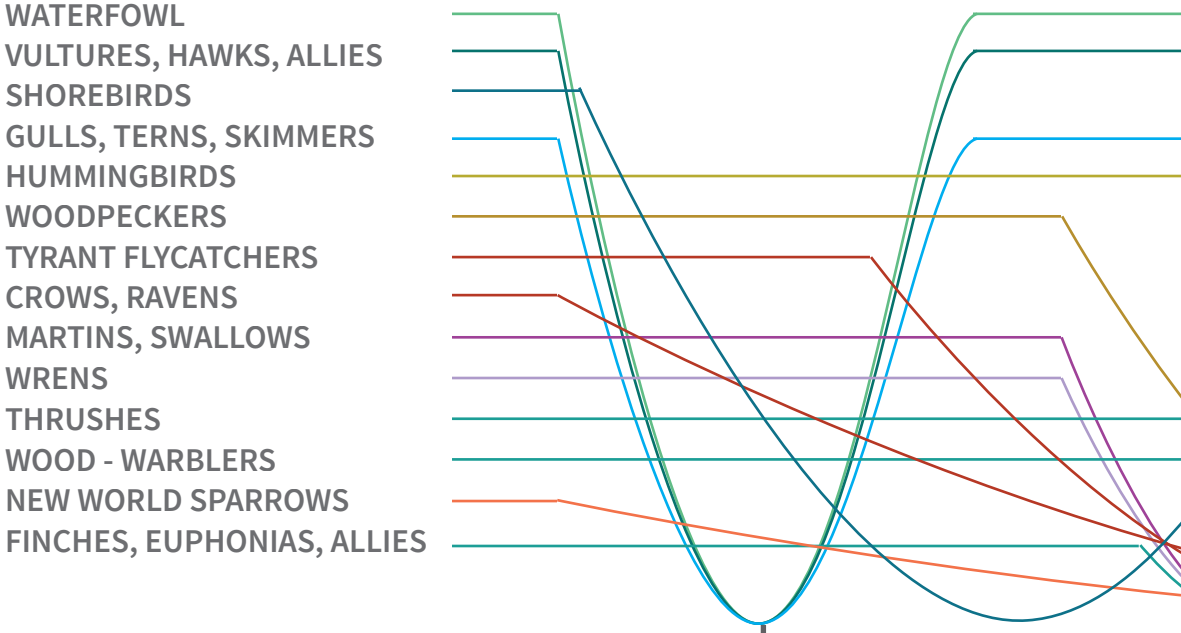
Site Section & Bird Chart

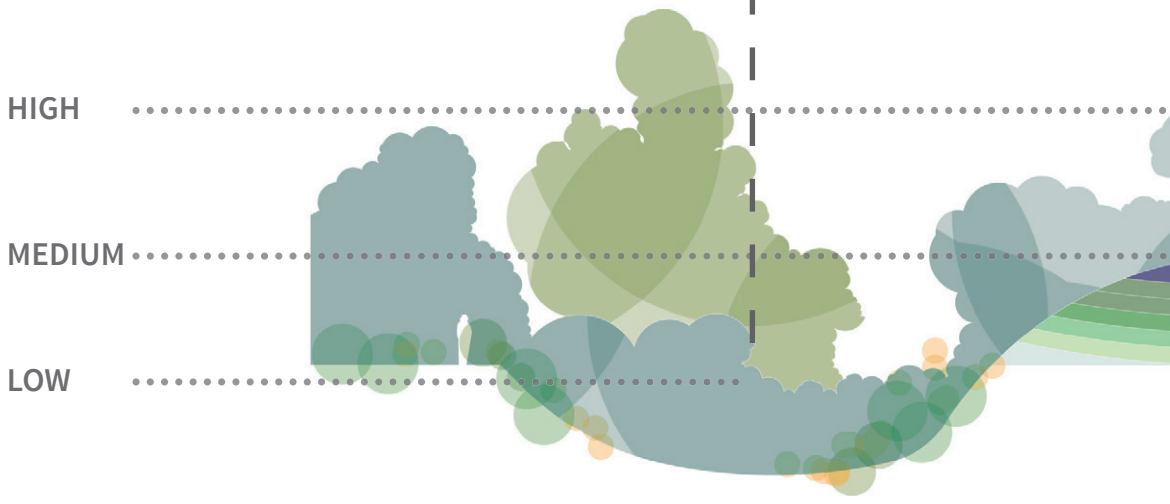
1. BIRD CHART

Shows species that had been sighted on site and their corresponding habitats.

2. SECTION

- Educational purpose
- Habitat restoration
- Multi- level experience





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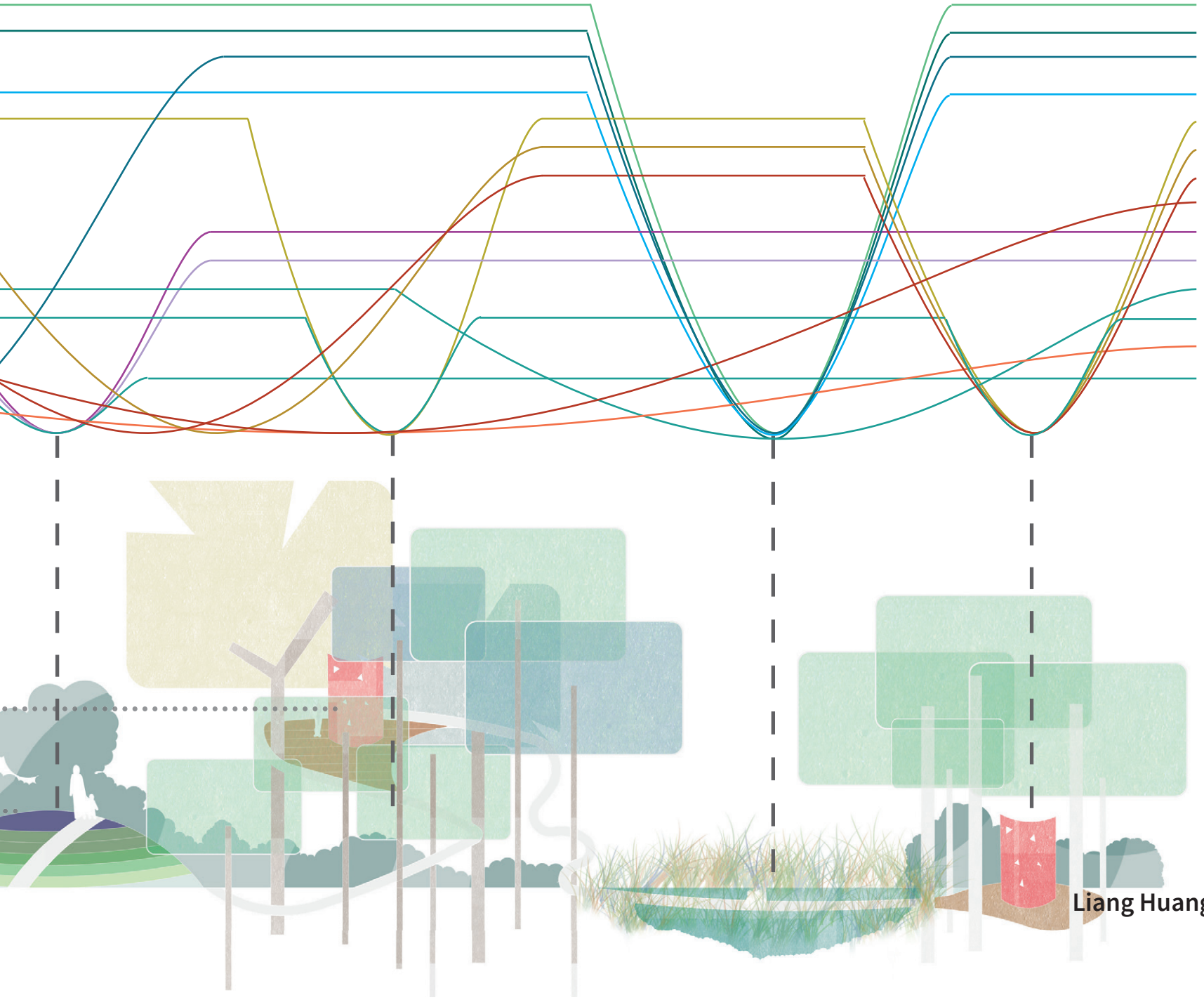


Liang Huang

Site Perspectives

HAND RENDERED PERSPECTIVES SHOWING DIFFERENT PARTS OF THE SITE DESIGN.







Liang Huang

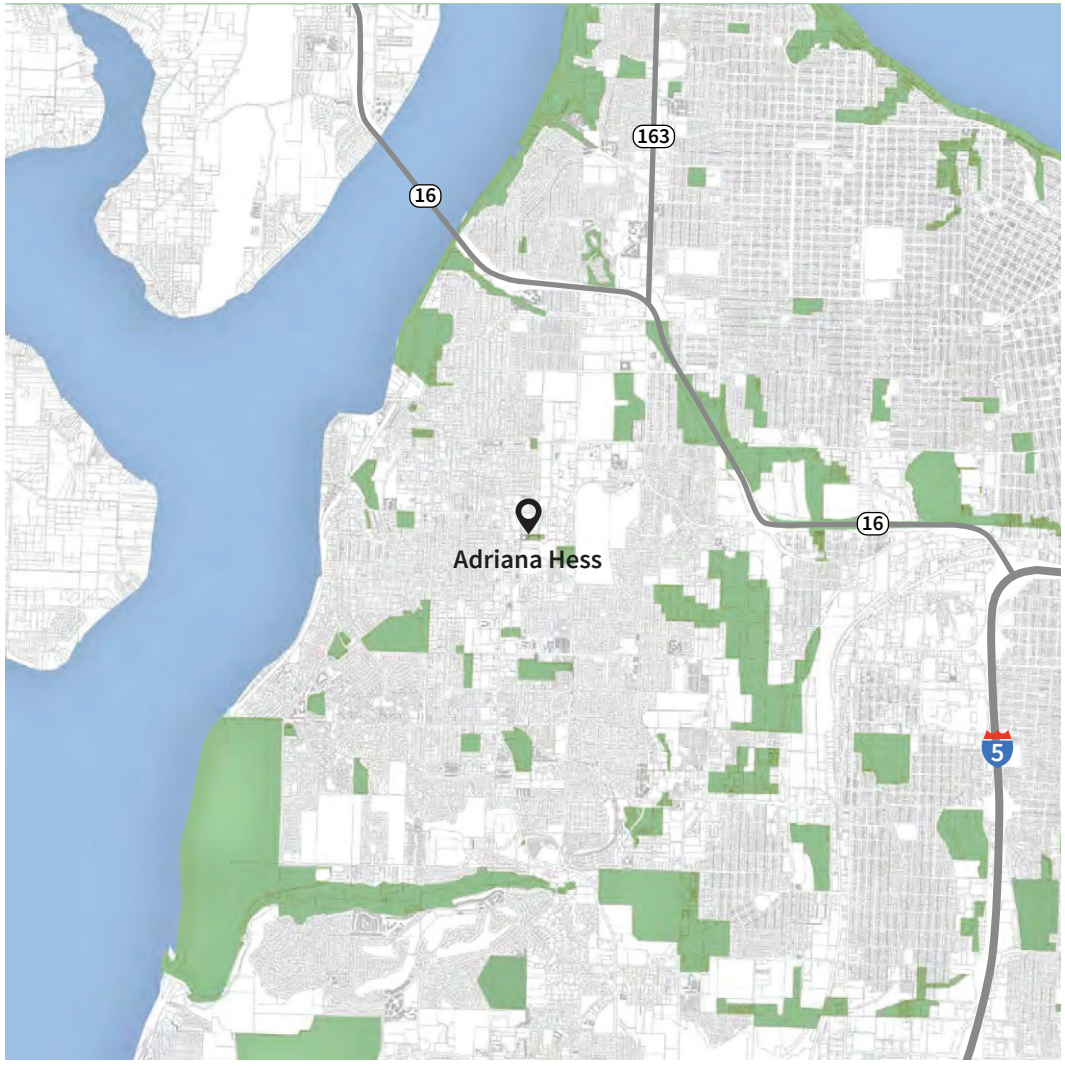
BIRDS & CLIMATE CHANGE STUDIO



Liang Huang

A Novel Ecosystem For Birds and Humans

Can we create a novel ecosystem for humans that enhances—not ignores or degrades—bird habitat?



Alicia Kellogg

BIRDS & CLIMATE CHANGE STUDIO

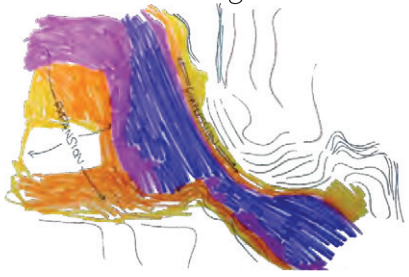
Design Goals and Process

USING WHAT IS ALREADY THERE

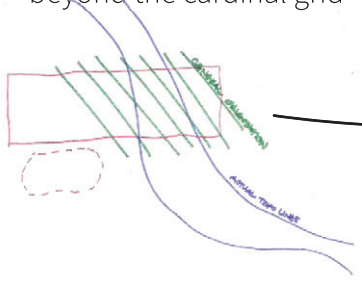
Design Goals

- Convert Adriana Hess from bird habitat inserted in a human environment to human elements inserted into bird habitat
- Address bird habitat needs on a macro level by maximizing existing habitat
- Don't attempt to obscure the human touch - instead, seek to elevate human influence while still prioritizing bird habitat creation

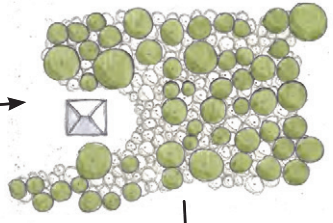
examine site at regional scale



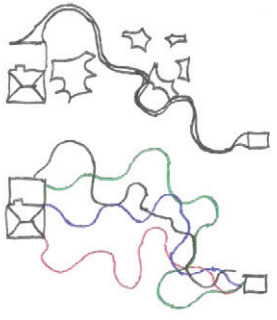
note general patterns and forms beyond the cardinal grid



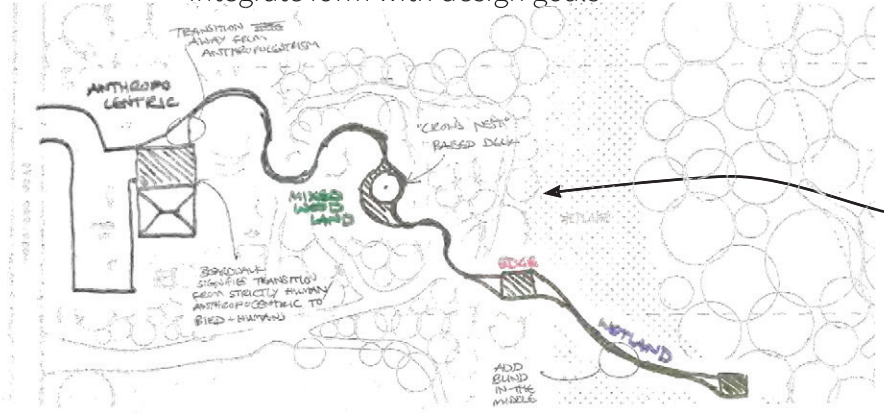
explore existing patterns, topography, and habitat



find shapes and forms that arise from these explorations



integrate form with design goals



The Bird Neighborhood

EMBRACING NOVEL ECOSYSTEMS TO ENHANCE BIRD HABITAT



Adriana Hess is ultimately an urban park surrounded on three sides by human-centered spaces. Rather than try to erase the urban context of the site, The Bird Neighborhood illustrates how we can build spaces for humans in a way that still enhance habitat opportunities for birds.

The illustrated plan above shows an increase in woodland canopy that obscures the detailed circulation, programming, and habitat types that make this rich design a destination for humans and birds alike.

Alicia Kellogg

Anthropocentric Habitat

CIRCULATION AND PROGRAMMING

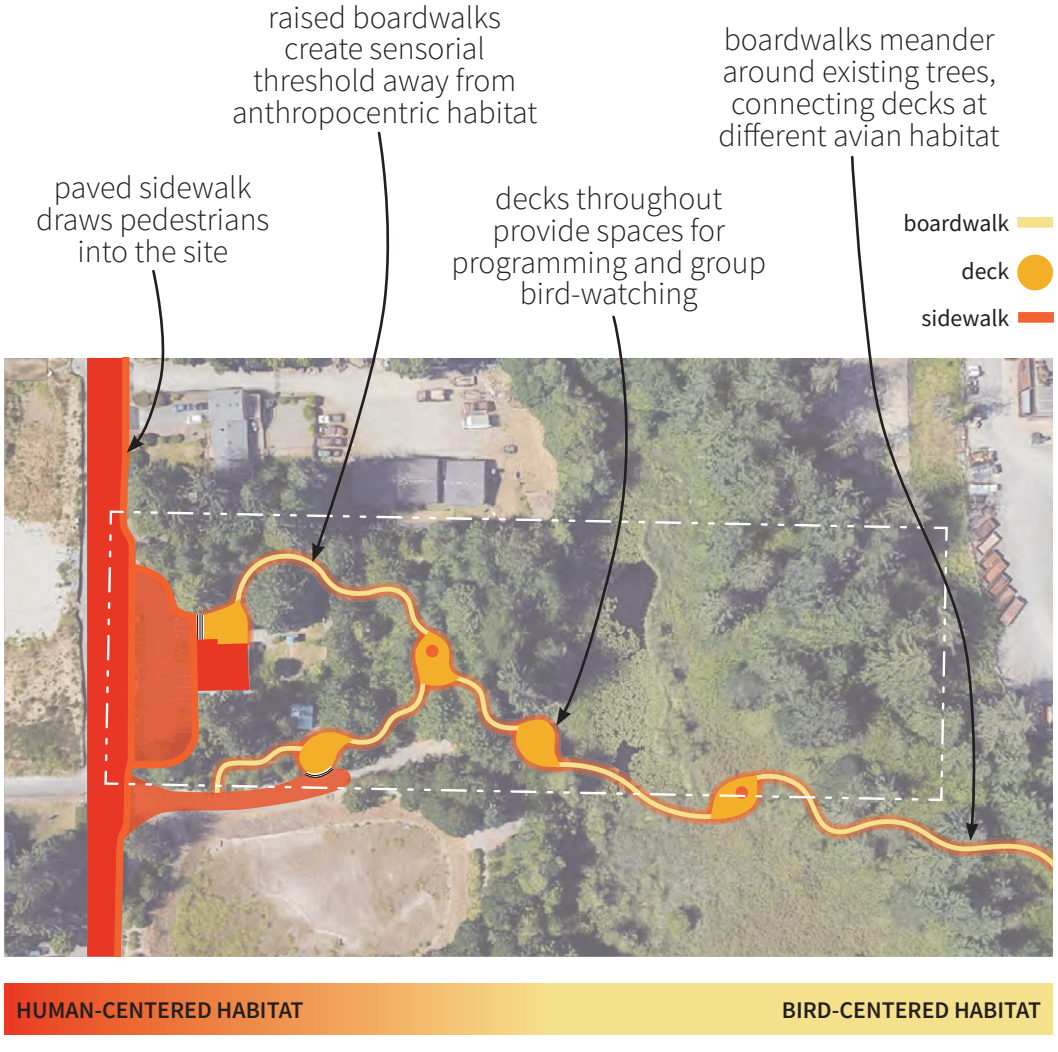
From Separation To Integration

The emphasis on anthropocentric “habitat” begins at the western edge of the site, where cars can enter and park, and pedestrians and bikers can get drawn into the site with addition of a raised sidewalk that outlines the perimeter of the parking lot.

Raised decks and boardwalks are made out of wood - the materiality change signals an experiential threshold and alerts people that they are entering a space not focused squarely on humans. The decks and boardwalks also allow humans to be immersed in the environment around them while protecting critical bird habitat from casual destruction.

The decks are placed at critical habitat types (anthropocentric, woodland edge, woodland canopy, and wetland) to emphasize the diversity of the site and to accomodate a rich bird-watching experience.

As the boardwalk progresses through the site and over the wetland, it connects to a deck at the western edge of Paradise Pond Park, transgressing Cartesian boundaries and highlighting connected, fluid habitat distinctions.



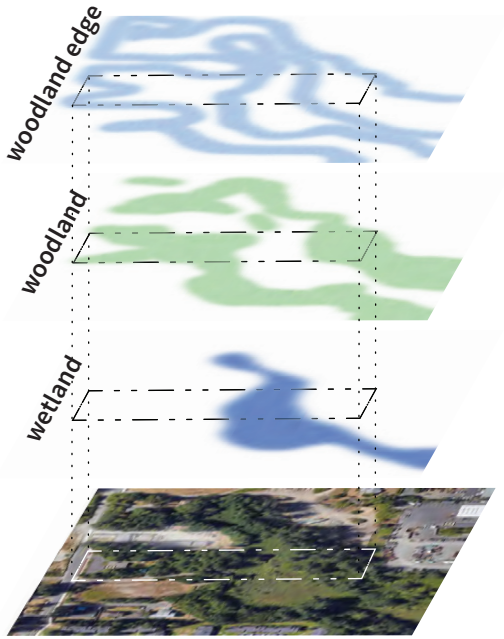
Alicia Kellogg

Avian Habitat

DYNAMIC ACROSS SPACE AND TIME

The Fluidity of Habitat Types

The bird habitat on this site falls into three broad categories, but these categories are fluid and dynamic through space and time.

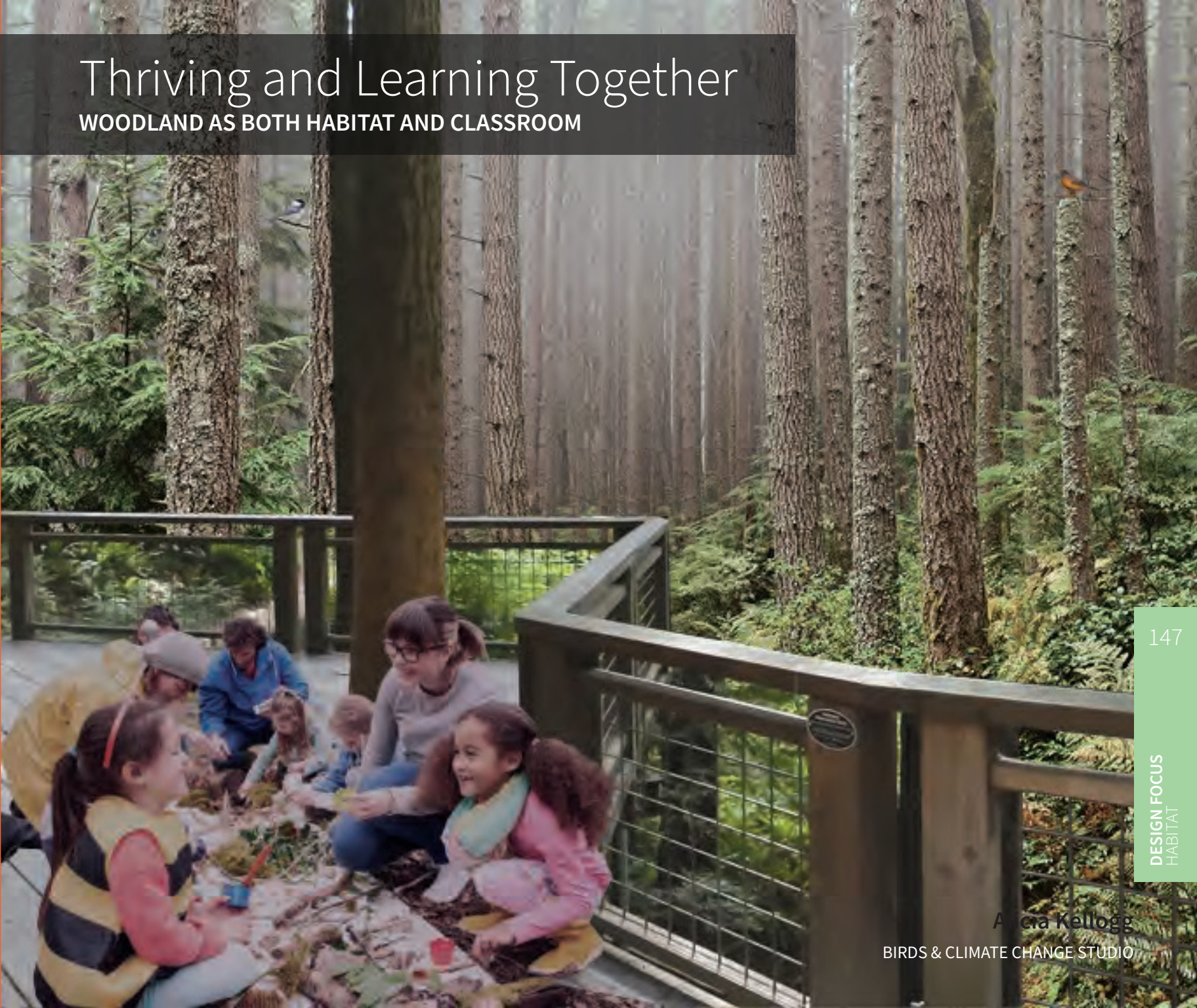




Alicia Kellogg
BIRDS & CLIMATE CHANGE STUDIO

Thriving and Learning Together

WOODLAND AS BOTH HABITAT AND CLASSROOM



Alicia Kellogg
BIRDS & CLIMATE CHANGE STUDIO

A View From The Edge

SPACE FOR BIRDS, SPACE FOR HUMANS



Alicia Kellogg

BIRDS & CLIMATE CHANGE STUDIO

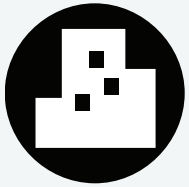
Responding to Climate Change

DIFFERENT SCENARIOS FOR THE FUTURE

Flexibility = Resilience

Climate change is a certainty. Ecological models can predict different potentialities for future habitat ranges, but it's impossible to know how these effects will play out on a site-scale.

To combat this uncertainty, this design attempts to create a "maximal habitat" situation that is as dense as possible that can respond to many different climate change scenarios.

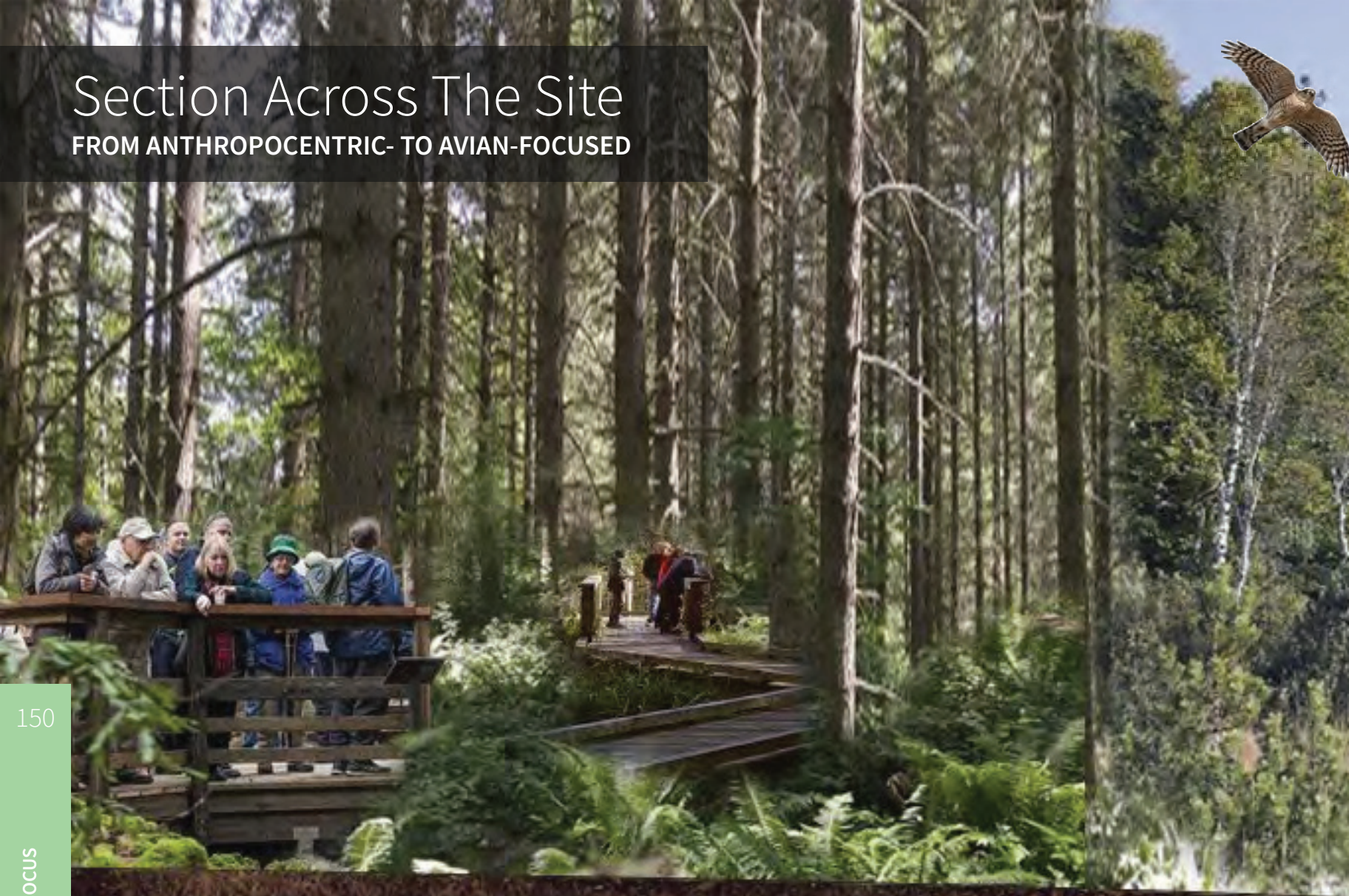
Scenario		Site Response
Warming temperatures leads to mass conifer die-off. The resulting seed bank and environmental conditions are too hostile for natural replacement recruitment.		Park grounds, protected from human activity, are still fertile for shrubs and groundcovers that can provide precious habitat and attract insects for many species of birds.
Rising population density leads to increased park usage. Usage surpasses current park capacity.		More boardwalks and decks are built, increasing park capacity for human activity while maintaining separation from bird habitat.
Transition to rain-dominated flow regimes increases stormwater runoff, exceeding the existing wetland boundary		The raised boardwalk and deck design of Bird Neighbordhood will allow visitation to the park to continue unabated.

Alicia Kellogg

BIRDS & CLIMATE CHANGE STUDIO

Section Across The Site

FROM ANTHROPOCENTRIC- TO AVIAN-FOCUSED



Alida Kellogg

BIRDS & CLIMATE CHANGE STUDIO


Edge
Wetland
Alicia Kellogg



FABRICATION: BIRD HABITAT PROTOTYPES

American Goldfinch

Spinus tristis



Description

Goldfinch displays sexual dimorphism in its coloration; the male is a vibrant yellow in the summer and an olive color during the winter, while the female is a dull yellow-brown shade which brightens only slightly during the summer. The male displays brightly colored plumage during the breeding season to attract a mate.

This species is generally monogamous, and produces one brood each year



Habitat

The American goldfinch is found in residential areas throughout its range. The American goldfinch is not threatened by human activity, and is widespread throughout its range.

The American Gol
vegetarians in the
seed-eater, the bird
much of the year, inc
ragweed, mullein, co
alder.
Unlike some finch sp
its feet extensively in

Source: https://en.wikipedia.org;
https://www.audubon.org/

Zian Zheng



Nesting

Nesting begins late in season in many areas, with most nesting activity during July and August.

This delayed nesting ensures the plants which goldfinches use to build their nests, are readily available.

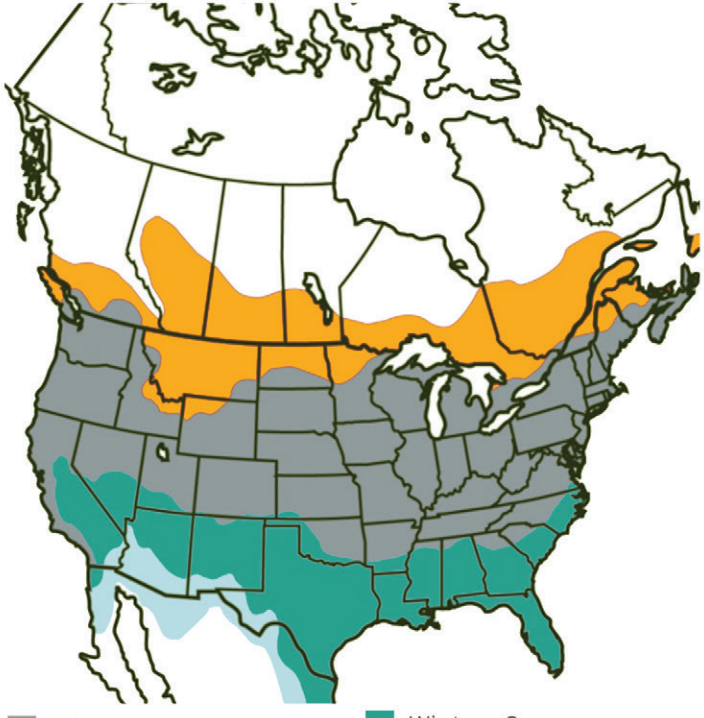
Nest: Usually in deciduous shrubs or trees, sometimes in conifers or in dense weeds, usually less than 30' above the ground and placed in horizontal or upright fork.



Feeding

dfinch is one of the strictest bird world. Being principally a has an abundant food supply for luding seeds of thistle, dandelion, smos, goatsbeard, sunflower, and

ecies, the American goldfinch uses feeding in order to reach the seed.



Migration

Irregular in migration, with more remaining in North in winters with good food supply. Peak migration is usually mid-fall and early spring, but some linger south of nesting range to late spring or early summer. Migrates mostly by day.

Zian Zheng

BIRDS & CLIMATE CHANGE STUDIO

Habitat Fabrication

DIGITAL MODEL & AXON VIEW

A MIX OF FLOWER BOX AND BIRD BOX

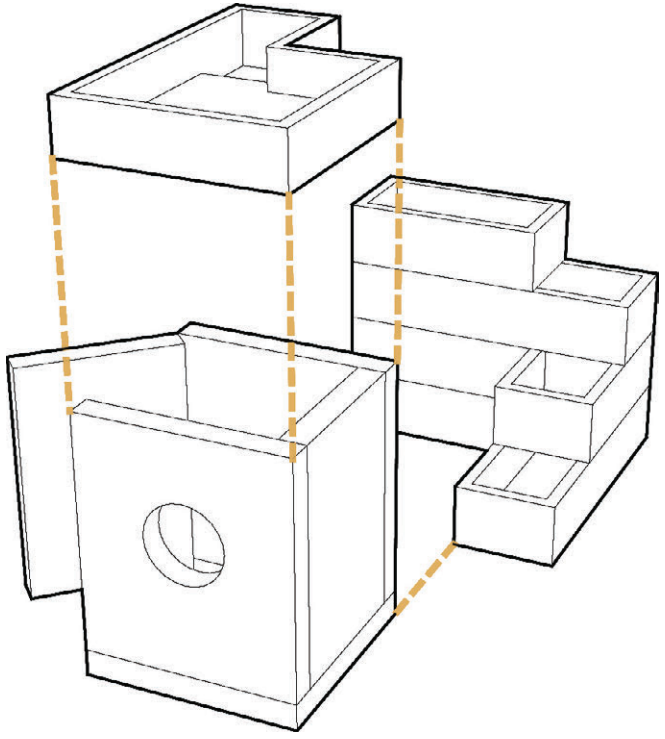
Being principally a seed-eater, the bird eats seeds of thistle, dandelion, ragweed, mullein, cosmos, goatsbeard, sunflower, and alder. In order to attract goldfinches to your backyard, grow grass and flowers on the top of the bird box to produce food for them.

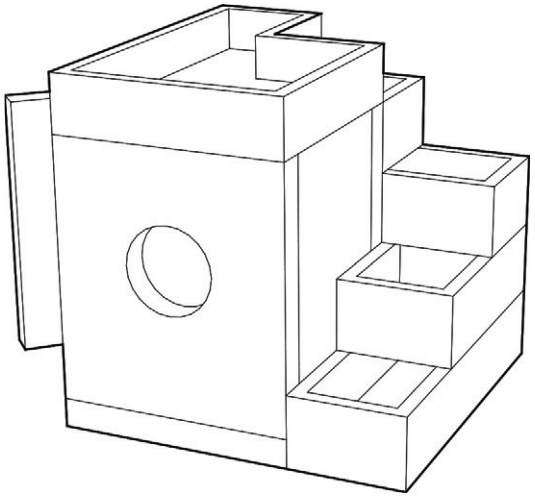


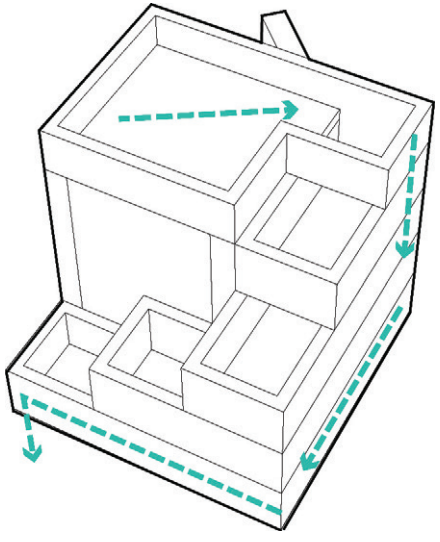


Zian Zheng



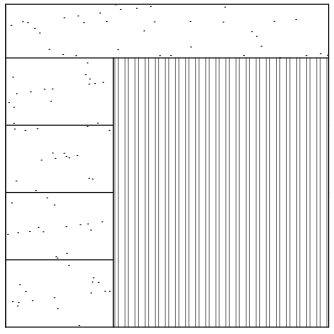


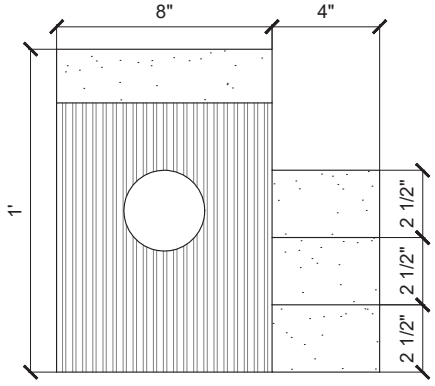


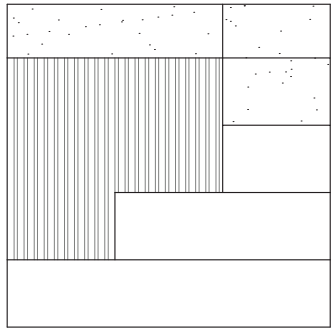


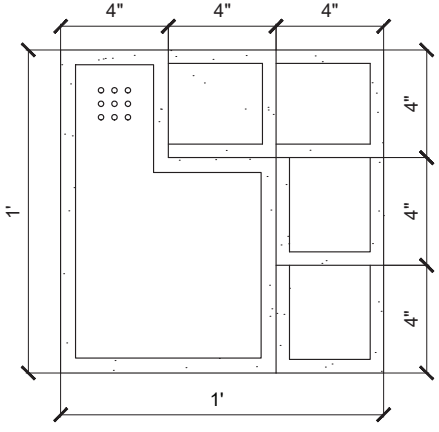
Zian Zheng

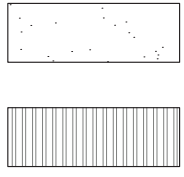
Drawings and models











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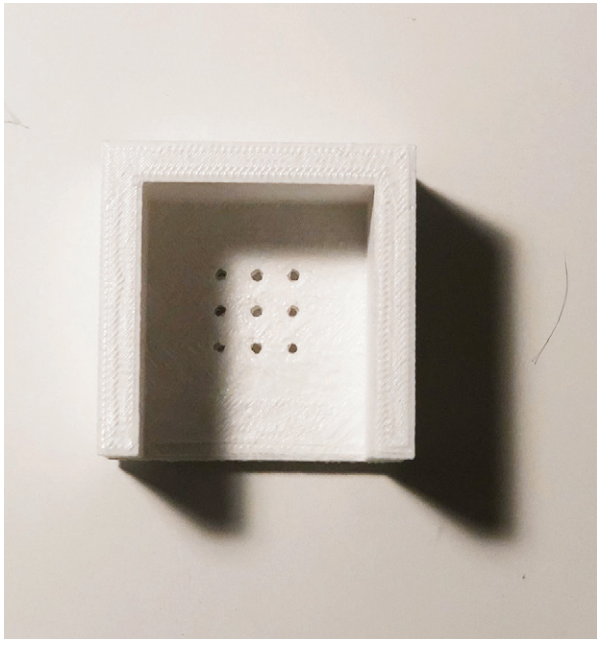
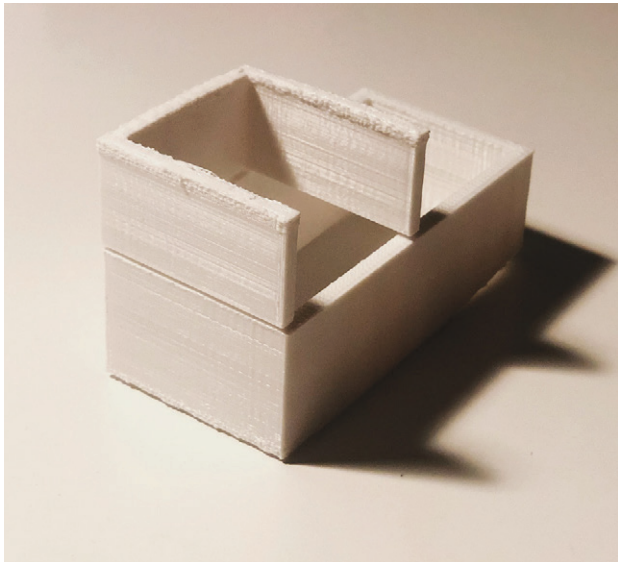
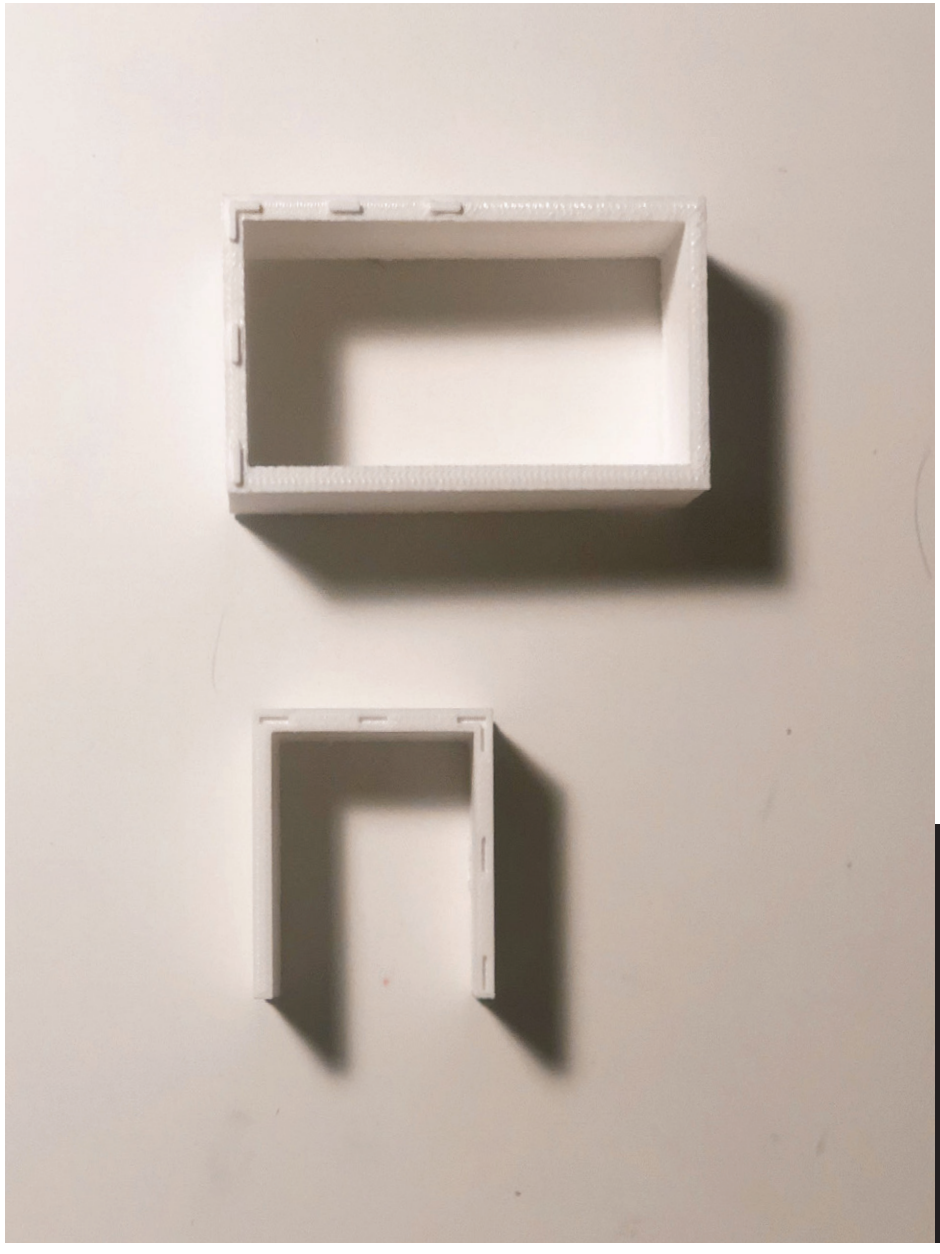






Zian Zheng

Great Blue Heron

BIRD RESEARCH

Size:

Length: 38-54 in
Wingspan: 65-79 in

Habitat:

Saltwater and freshwater; Marshes, swamps, shores, tideflats

Nesting:

Platform of sticks, usually in trees 20-60' above ground or water; sometimes in low shrubs, sometimes on ground

Food:

Highly variable and adaptable. Eats mostly fish, but also frogs, salamanders, turtles, snakes, insects, rodents, birds.

Behavior:

Forages standing still or walking slowly

allaboutbirds.org



Danielle Dolbow

Artificial Rookery

PRECEDENTS

Heron's nest, often in groups high in the trees, are called rookeries. Rookery could become more architectural or more sculptural.



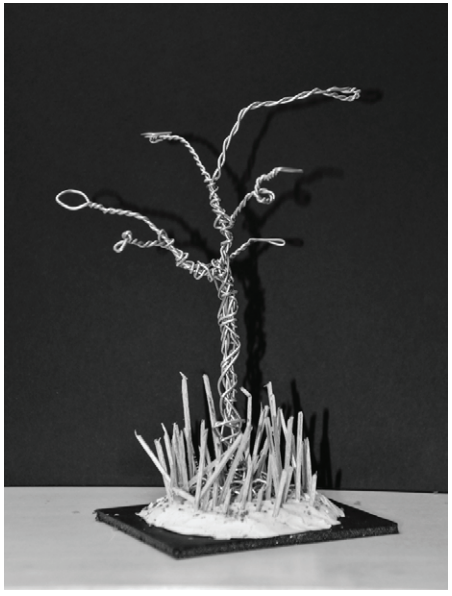


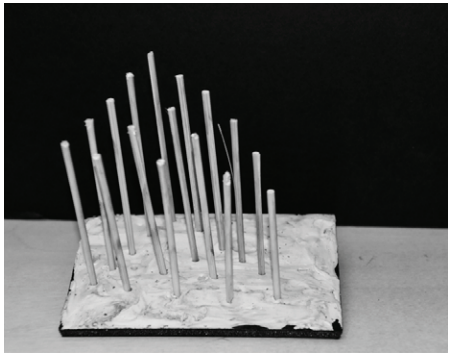


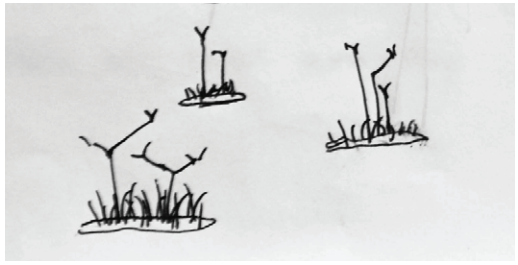
Danielle Dolbow

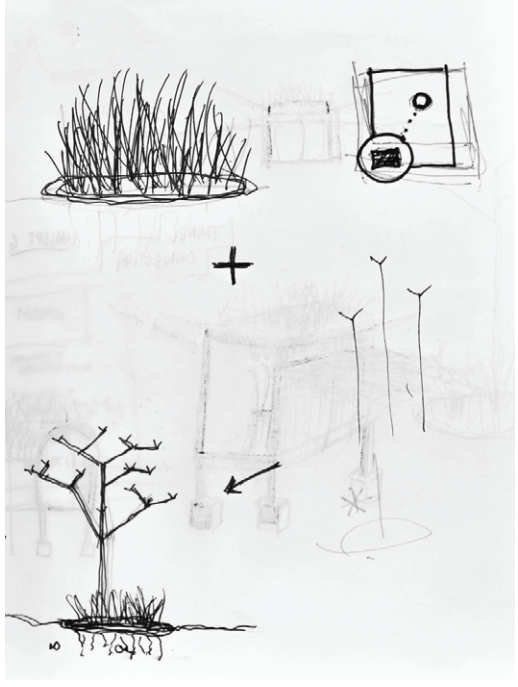
Sketch Model

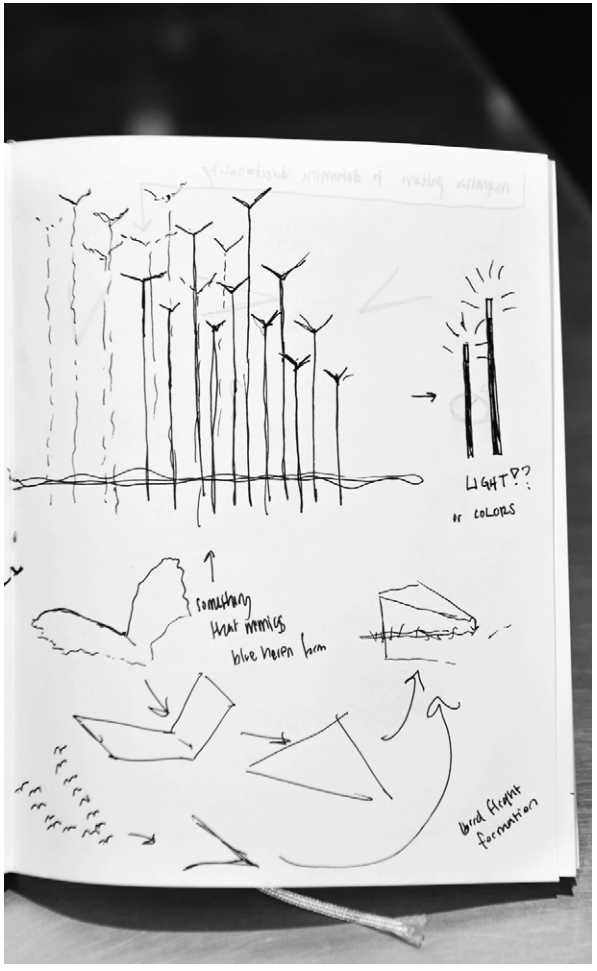
ROOKERY VARIATIONS







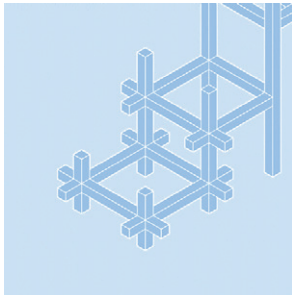




Danielle Dolbow

Development

COMPUTER MODEL AND TECTONIC EXPLORATION





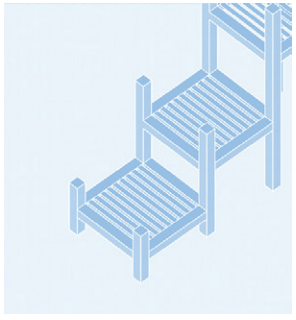


PROS

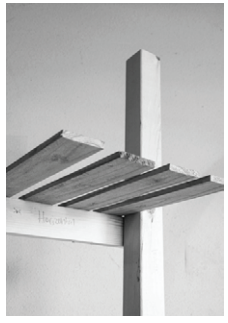
- EASIEST TO CONSTRUCT

CONS

- NOT STRUCTURALLY SOUND
- CANNOT DRAIN THROUGH PLATFORM
- NOT AESTHETICALLY AS INTERESTING





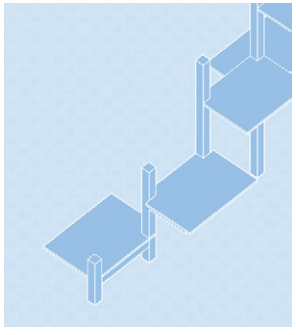


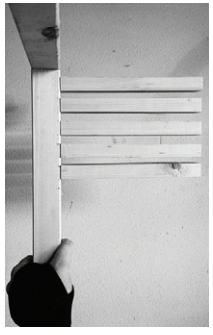
PROS

- WATER CAN DRAIN
- MORE AESTHETICALLY PLEASING
- EASY TO CONSTRUCT

CONS

- NOT STRUCTURALLY SOUND
- SLATS ARE A LITTLE FLIMSY







PROS

- WATER CAN DRAIN
- MOST AESTHETICALLY PLEASING
- SEAMLESS AT INTERSECTIONS
- PLATFORM MORE STURDY

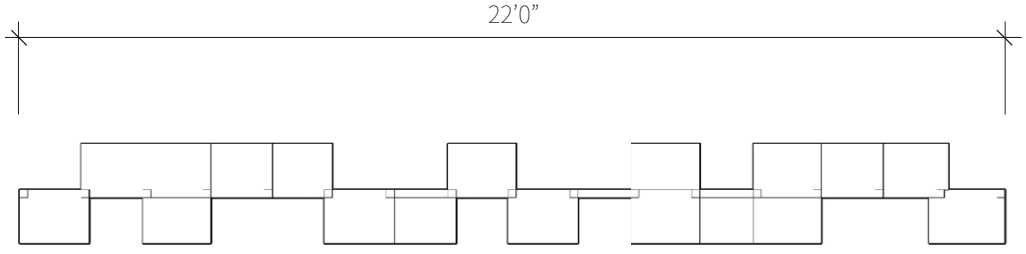
CONS

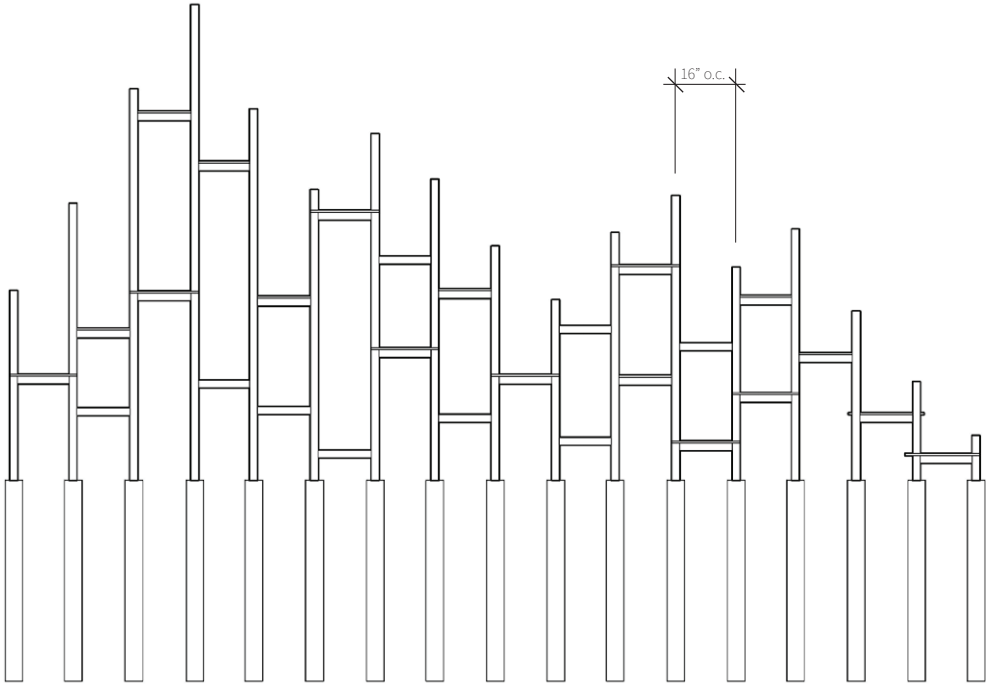
- NOT STRUCTURALLY SOUND
- HARDER TO CONSTRUCT

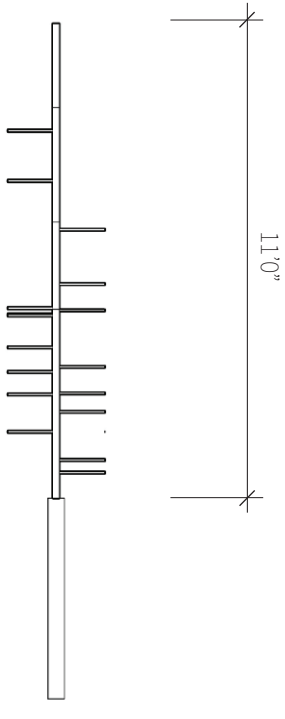
Danielle Dolbow

Final Prototype

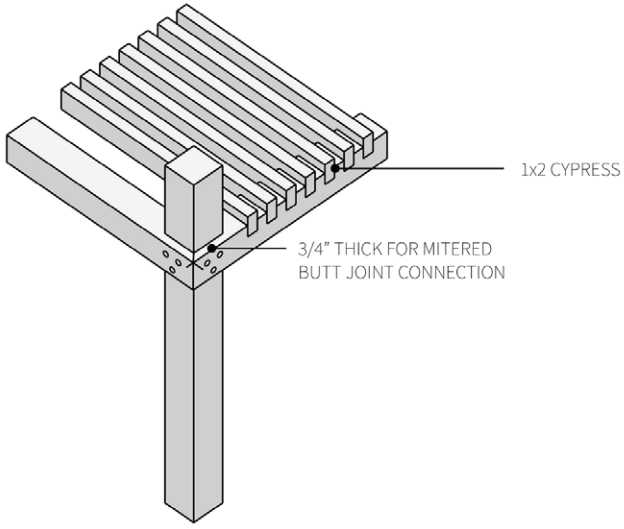
DIGITAL DRAWINGS

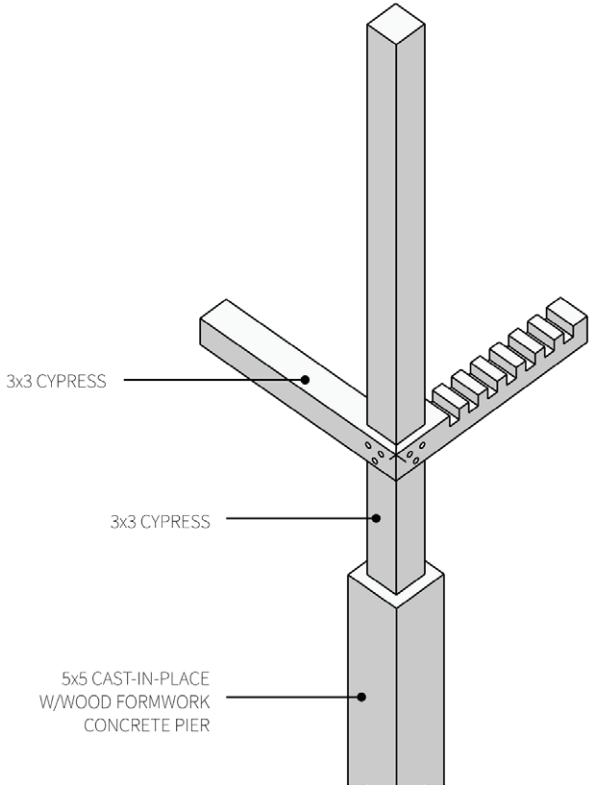


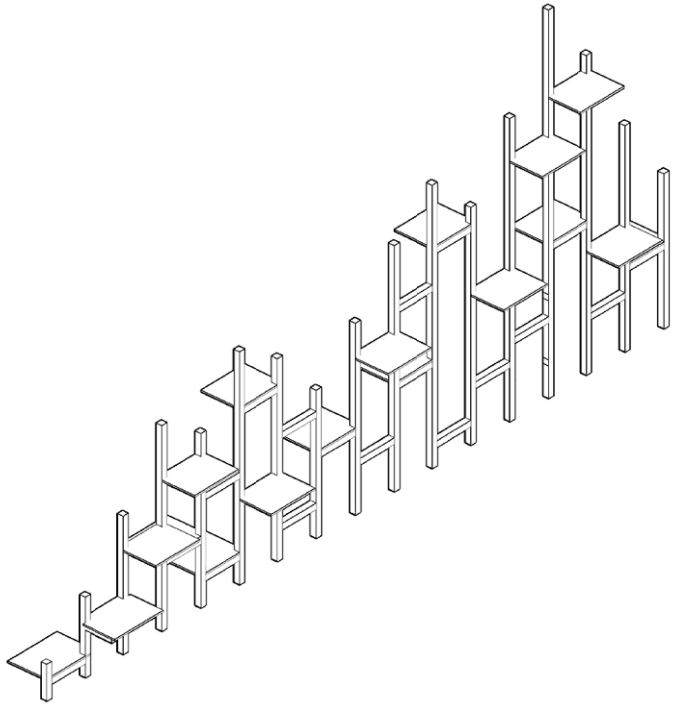




Danielle Dolbow
BIRDS & CLIMATE CHANGE STUDIO







Danielle Dolbow
BIRDS & CLIMATE CHANGE STUDIO

Sharp-shinned Hawk

ACCIPITER STRIATUS

Size: small, with females 1/3 larger than males

Identification: long (sometimes square-tipped) tails, small heads, blue-gray, orange bars on chest

Hunting: agile fliers, hunt in woods, mixed woodland boarders and back-yards, use low perches

Habitat: breed and nest in remote forests, migratory

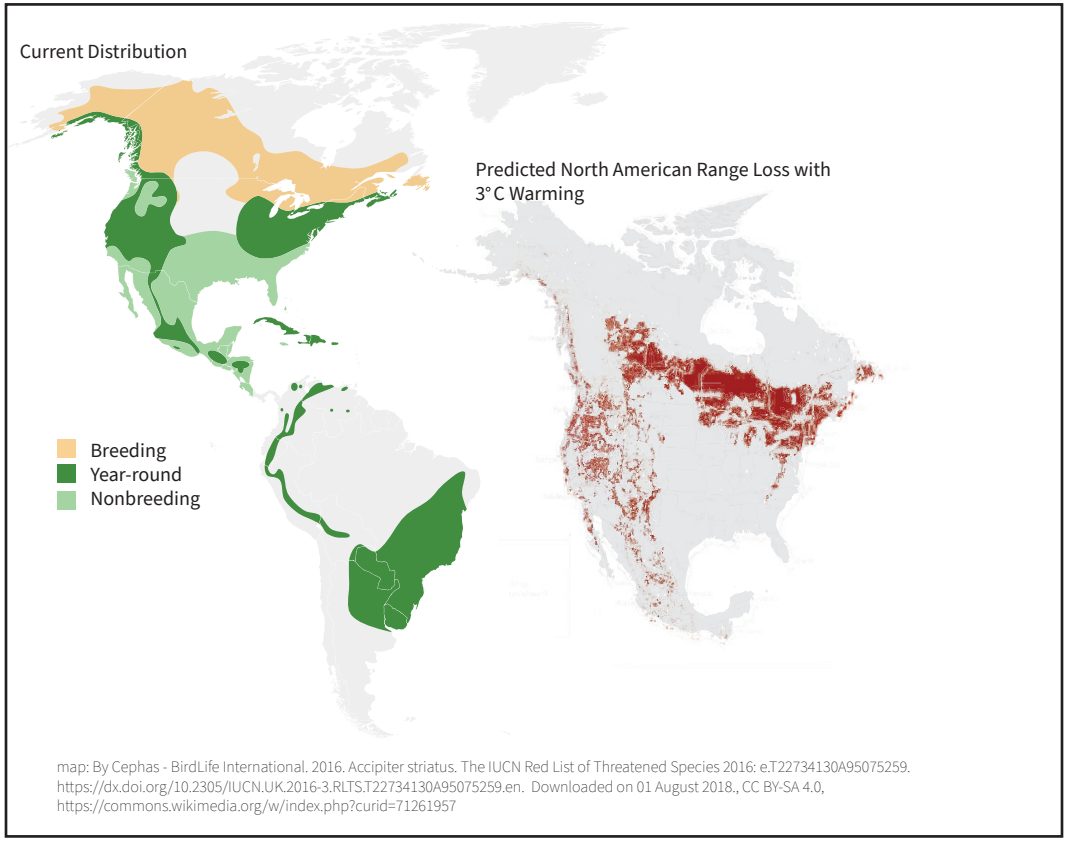
Food: small mammals and song birds

* information from https://www.allaboutbirds.org/guide/Sharp-shinned_Hawk/id

John J. Audobon Plate 374

https://www.audubon.org/birds-of-america/sharp-shinned-hawk





map: By Cephas - BirdLife International. 2016. Accipiter striatus. The IUCN Red List of Threatened Species 2016: e.T22734130A95075259. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22734130A95075259.en. Downloaded on 01 August 2018., CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=71261957

Claudia Sackett Hennum

Sharp-shinned Hawk
wingspan: 16.9 - 22.1”



Ferruginous Hawk wingspan 48 - 60”



Summering and Breeding
Deep Conifer Forest; Remote



Wintering and Hunting
Mixed Woodland: Edge: Urban Areas







Claudia Sackett Hennum

Perching Predators

HAWKS PERCH WHILE THEY HUNT; FALCONRY HAS A HISTORY OF CONSTRUCTED PERCHES

Sharp-shinned Hawks breed in protected forests; they are most likely to be seen at the Adriana Hess Wetland site while they are hunting. In order to fabricate a habitat piece for them at Adriana Hess, I explored different types of perches.

As a precedent study, I looked to falconry. Falconers have been working with birds of prey for centuries. They have created a variety of perches.

Source:

https://www.westernsporting.com/FE2171A/stainless-rotating-ring-perch-for-outdoor-use-beautiful-construction-28051708.html

https://sustainablelivingcenteroregon.com/2017/02/21/truffles-hawks/

https://www.themodernapprentice.com/perches.htm











Claudia Sackett Hennum

Home & Hunting

EXPLORING HABITAT THROUGH MODEL MAKING

During my iterative design process, I explored different types of perches. I was interested in a perch which both could both serve Sharp-shinned Hawks, and connote them in their absence.

After experimenting with various sculptural forms, I settled on a hanging perch which would respond to the weight of the hawk.









Claudia Sackett Hennum

Design Development

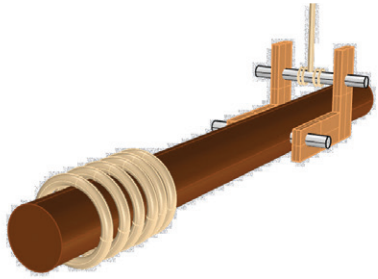
SKETCH MODEL



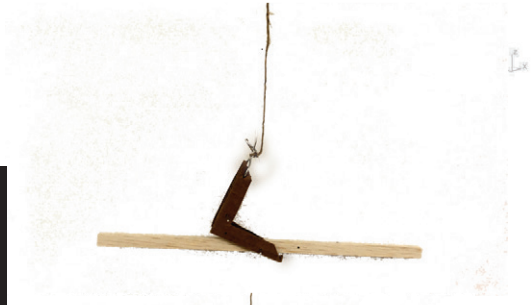
MATERIAL EXPLORATION



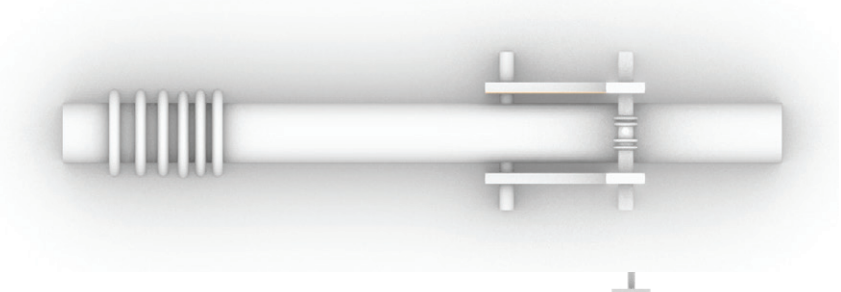
RHINO MODEL



BALANCE EXPLORATION









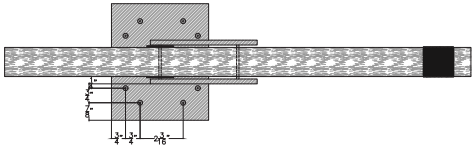
Claudia Sackett Hennum

Final Perch Design

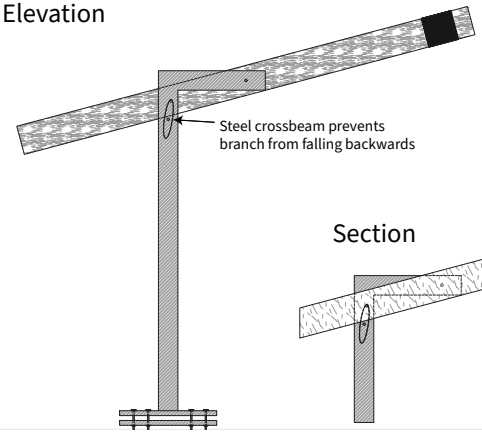
For my final design, I wanted to maintain the simplicity of form and mobility of the original model.

I settled on a design that comes up from below, rather than hanging from above. With this small change, I was able to plan for a piece that had stability as well as mobility.

Plan View

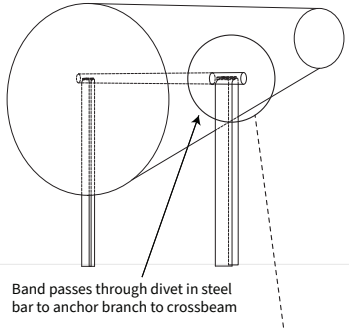


Elevation

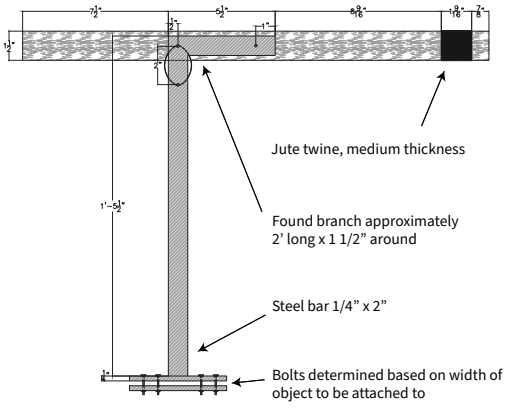


Section

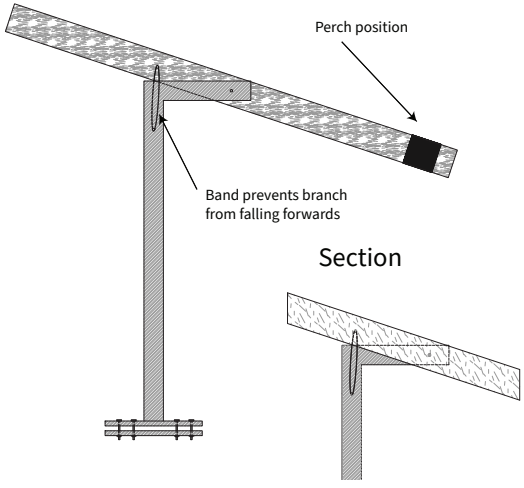
Detail



Annotated Elevation

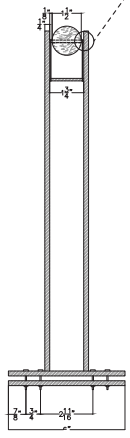


Elevation



Section

Elevation



Claudia Sackett Hennum

Woodpeckers

GENERAL CHARACTERISTICS

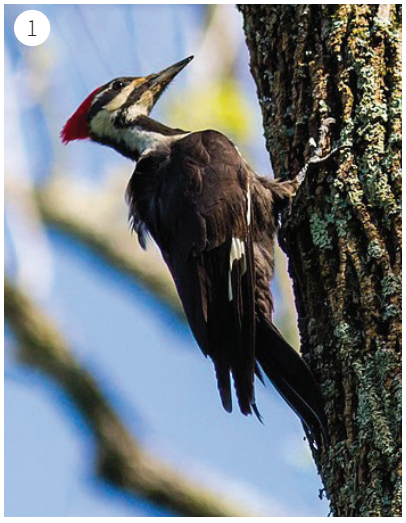


Stefanie Hindmarch

Photo by Lee Hunter

Woodpecker Species

OF THE PUGET SOUND AREA



Pileated Woodpecker



Red-breasted Sapsucker



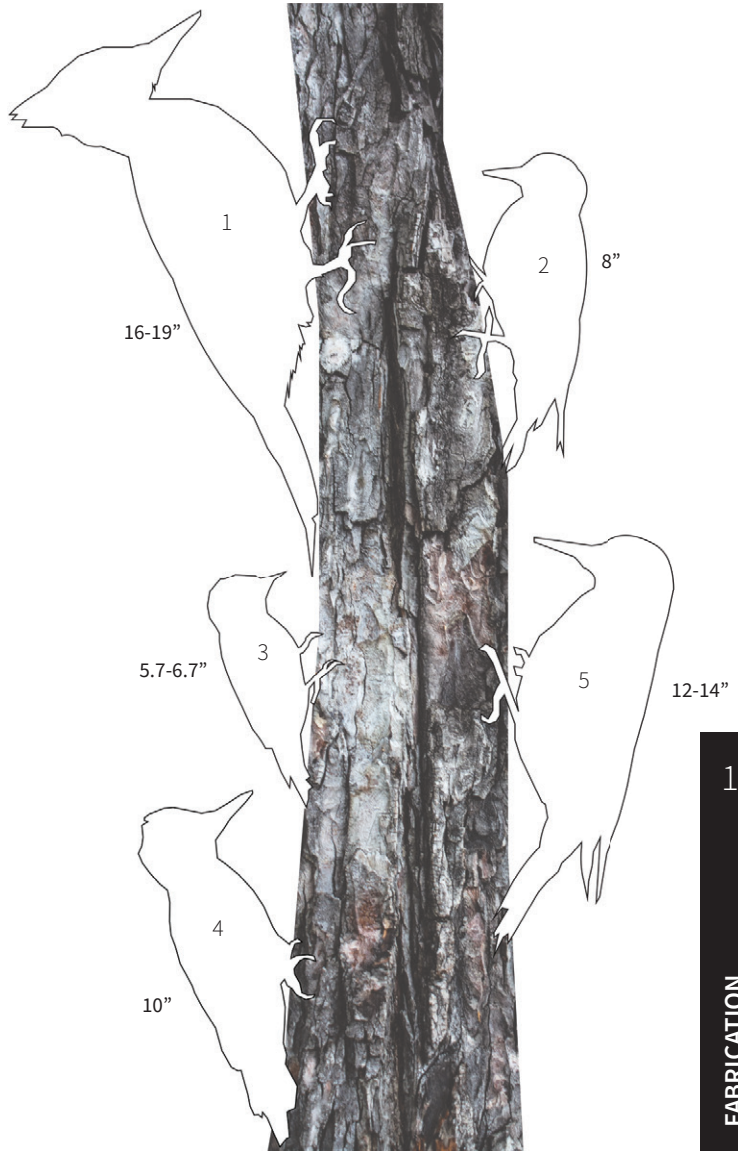
Downy Woodpecker



Hairy Woodpecker



Northern Flicker



Stefanie Hindmarch

Photos from Wikimedia

Mating

DRUMMING TO ATTRACT A PARTNER

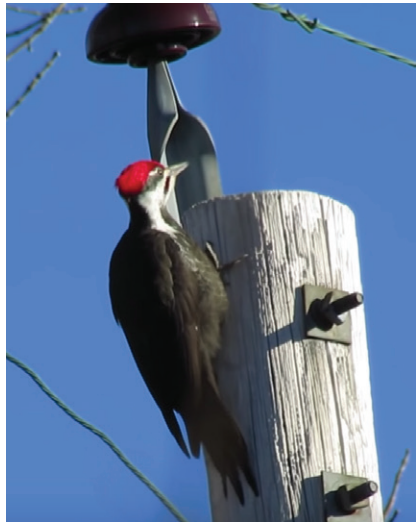
Drumming is the primary source of communication for woodpeckers. Both the male and female will drum to attract a mate. They will also use drumming to claim territory, communicate the location of a food source, or raise alarm of a threat.

Woodpeckers will drum on a wide range of objects. They can be observed using natural materials like hollow trees and stumps, and man-made materials like chimneys, rain gutters, trash cans, and utility poles.

Breeding season is typically April-June.







Stefanie Hindmarch

Habitat Precedents - Mating

DRUMS IN HIGH PLACES



Objects that are high in the air



Materials that create loud sounds



Somewhere to perch when drumming

Stefanie Hindmarch

Prototype

DRUM WITH PERCH

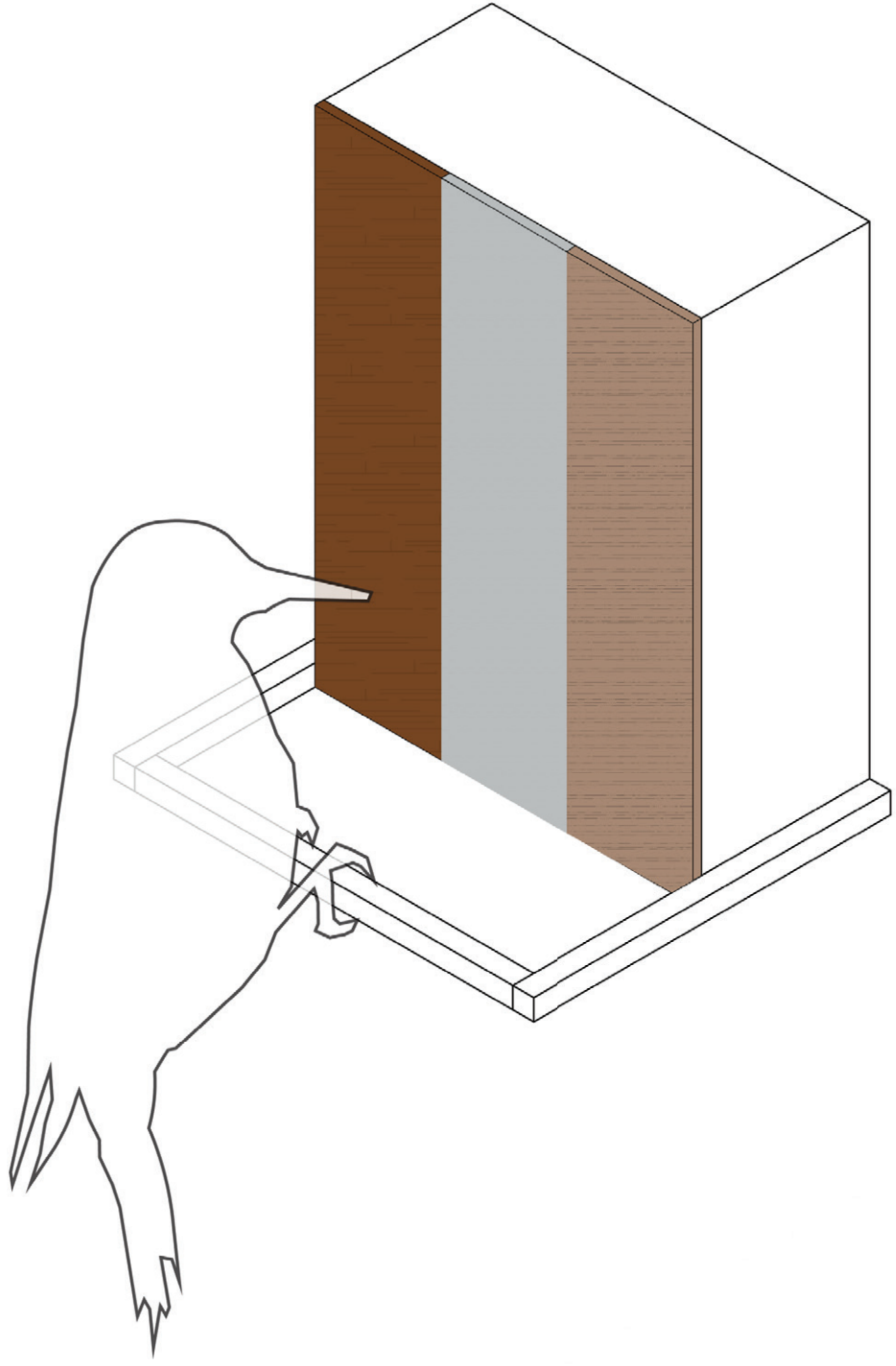
This drum prototype would be placed at Adriana Hess Wetland Park in a highly visible area, to make it possible for visitors to experience a moment of wonder with a woodpecker. Instead of perpetuating the negative reputation of woodpeckers as pests, a drum helps reframe woodpeckers as musical.

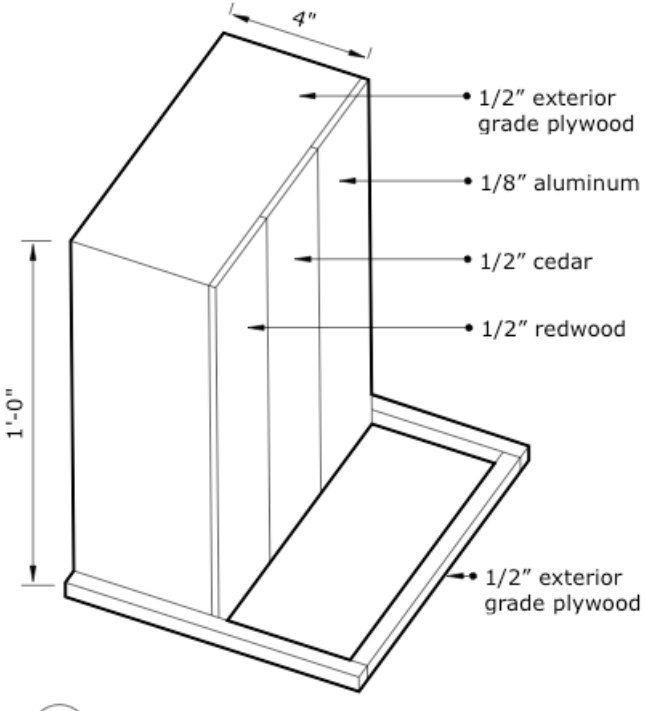
A drum could also be used as a tool to inspire children to connect with birds. Interpretive signage and a tool for tapping could accompany the drum and encourage the user to mimic common woodpecker sounds.



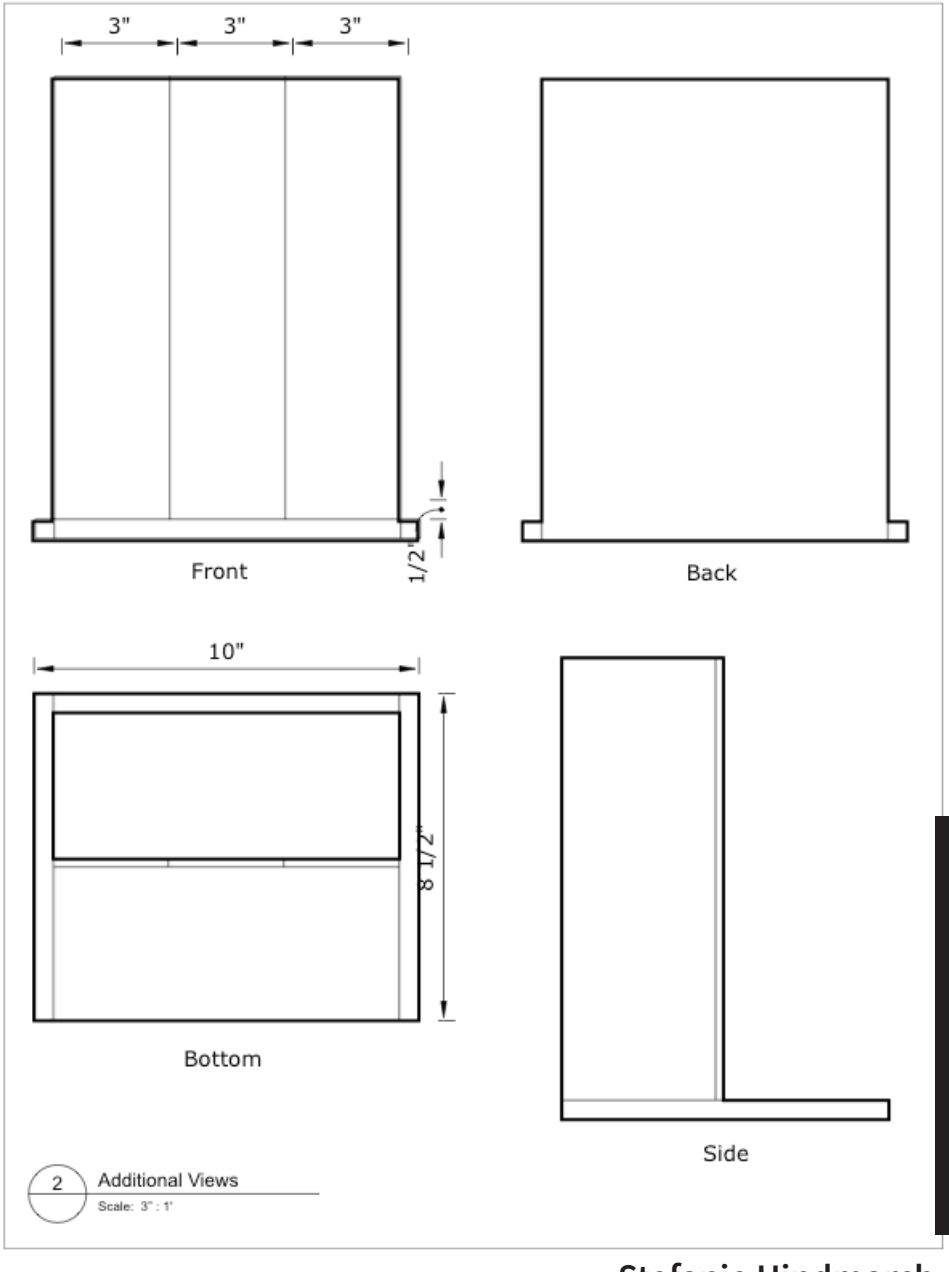
The person constructing the drum might experiment with different materials, using furring strips to slide pieces in and out.

Stefanie Hindmarch





1 Axon View
Scale: 3" : 1'



2 Additional Views
Scale: 3" : 1'

Stefanie Hindmarch

Habitat Fabrication

CORVID PUZZLE FEEDER

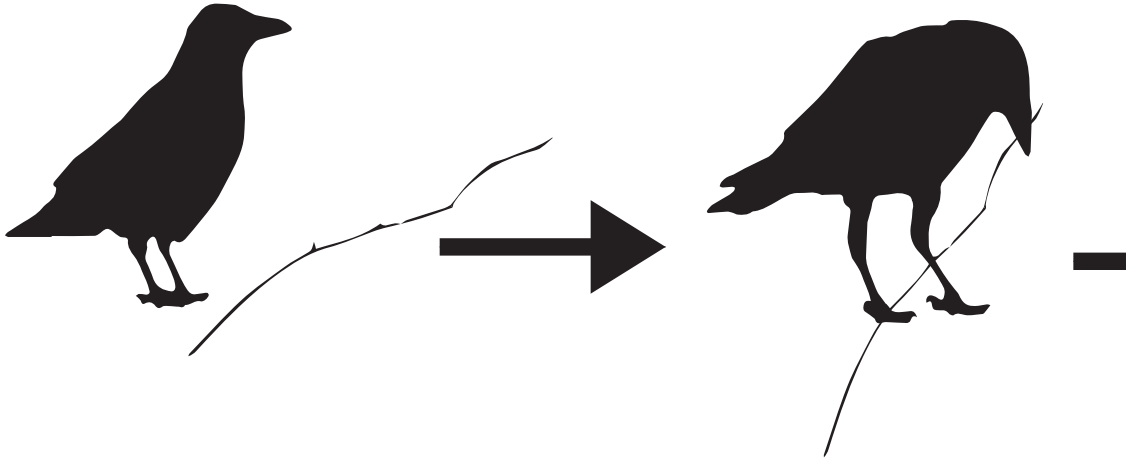
Intelligence and Playfulness

Corvids are a family of birds including Crows, Ravens, Jays, and Magpies. They are highly adaptable, social and widely considered to be the **most intelligent birds**, possibly on par with great apes.

Corvid species have been observed **making and using tools**, **solving puzzles**, and **playing games**.*

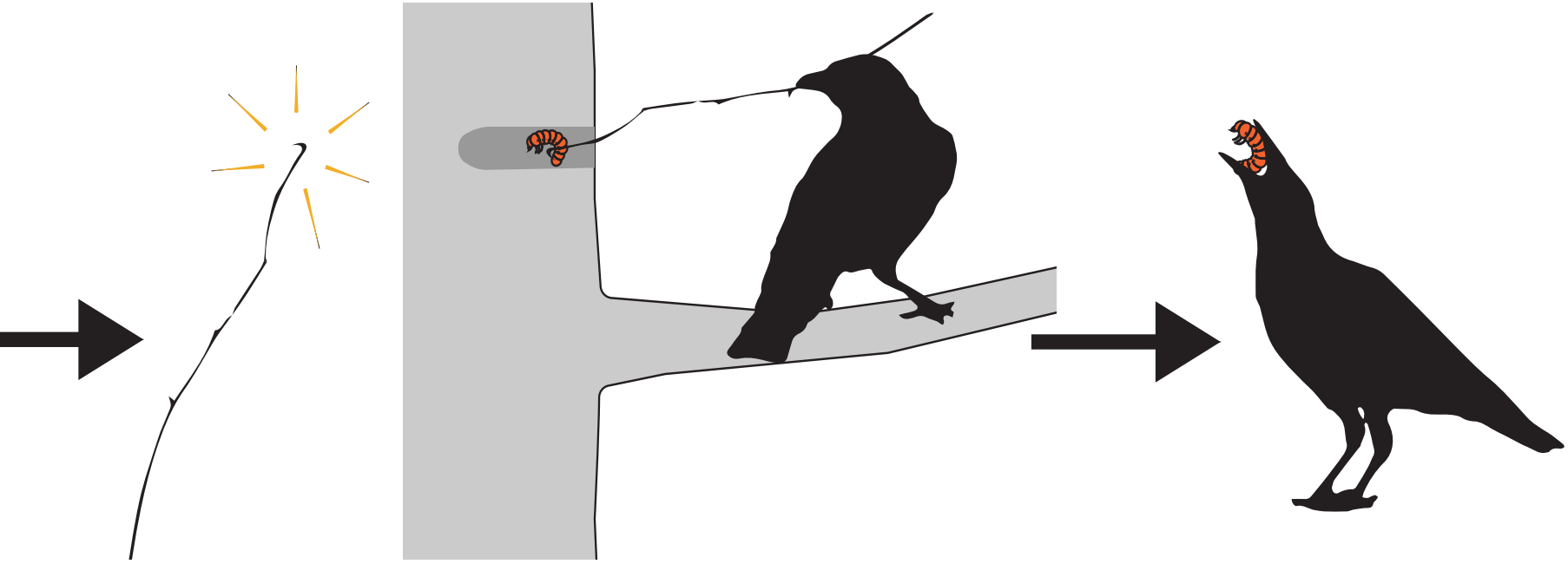
The Eurasisan magpie has even been shown to exhibit **self-awareness** using the mirror test. It is the only non-mammal to do so!

This feeder design engages with that intelligence and playfulness by providing Crows and other urban corvids an interactive experience.



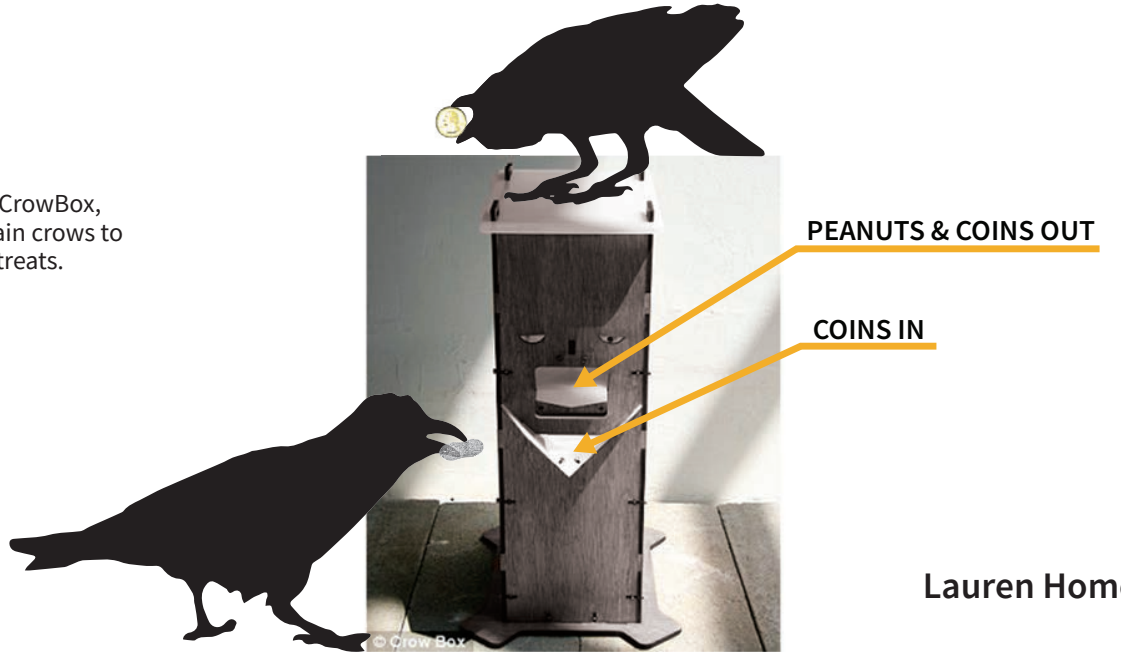
Lauren Homer

*For more information about Corvid intelligence see these resources:
https://www.dailymail.co.uk/sciencetech/article-2556662/Bird-brained-This-crows-genius-Amazing-video-reveals-creature-solves-8-complex-puzzles-unlock-treat.html
See How These Birds Solve Tricky Puzzles | National Geographic - YouTube
http://www.thecrowbox.com/



“CrowBox” Precedent

The puzzle feeder was inspired by the CrowBox, an open source project that aims to train crows to collect and deposit coins in return for treats.



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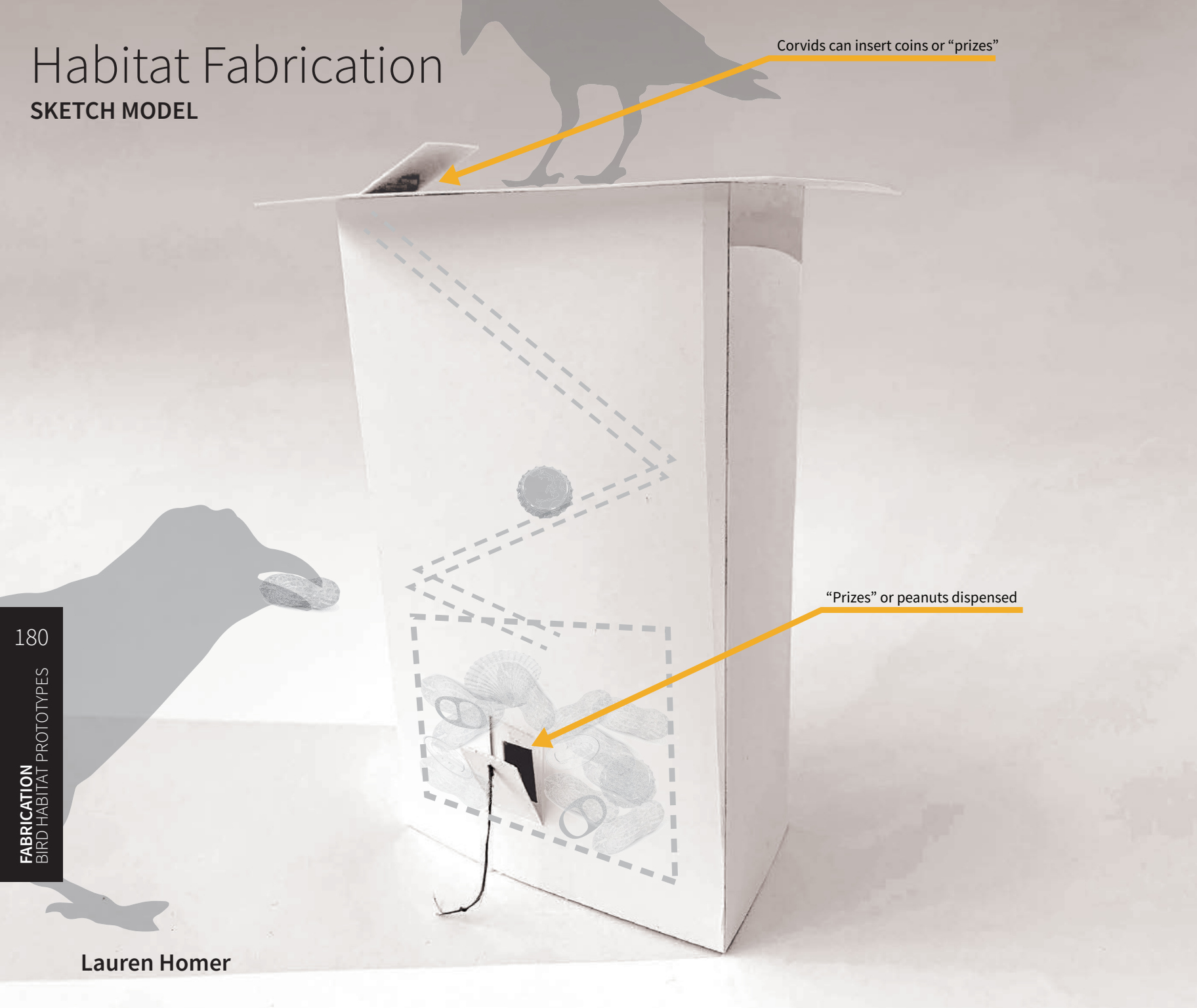
Habitat Fabrication

SKETCH MODEL



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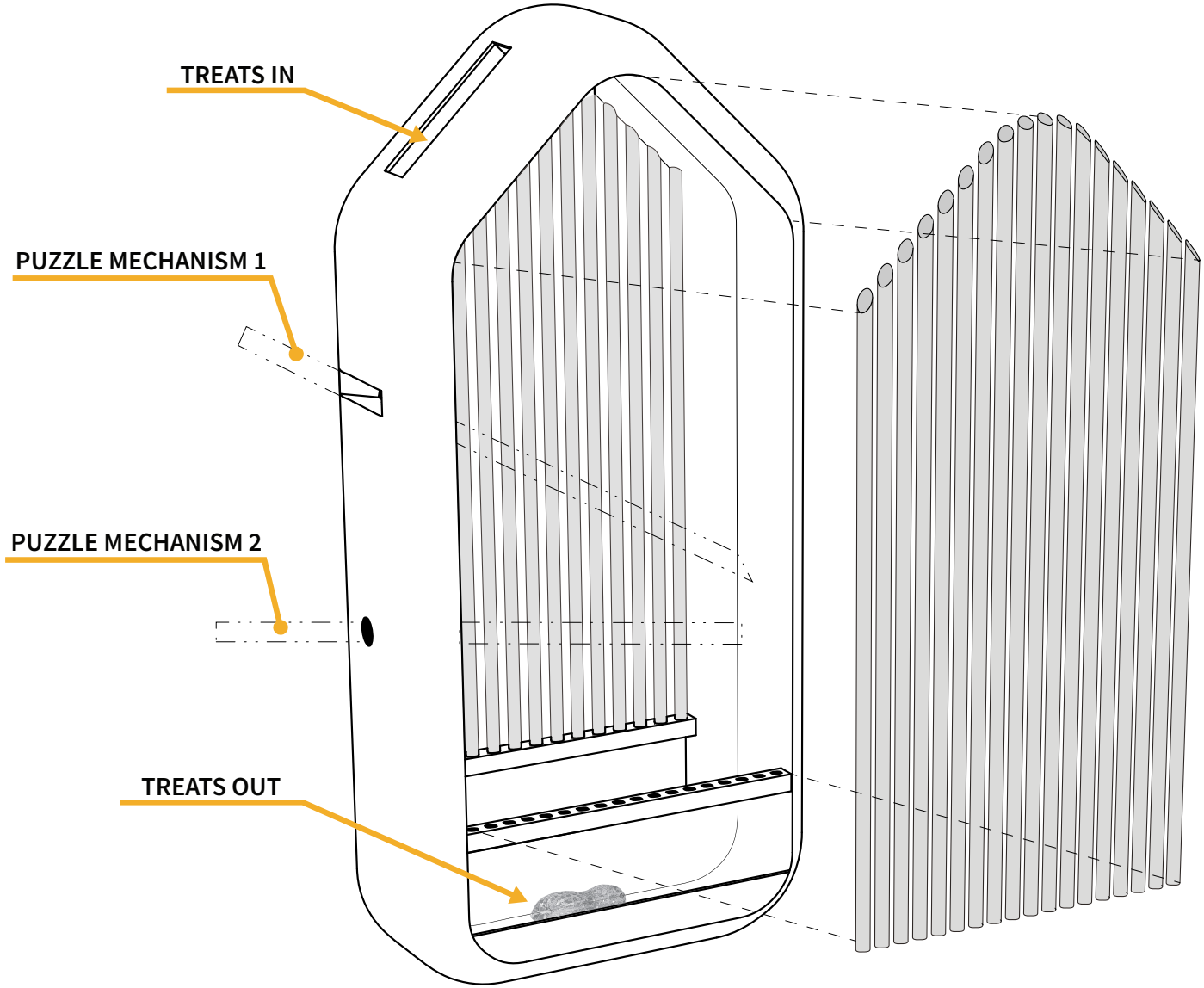
Habitat Fabrication

SECOND ITERATION

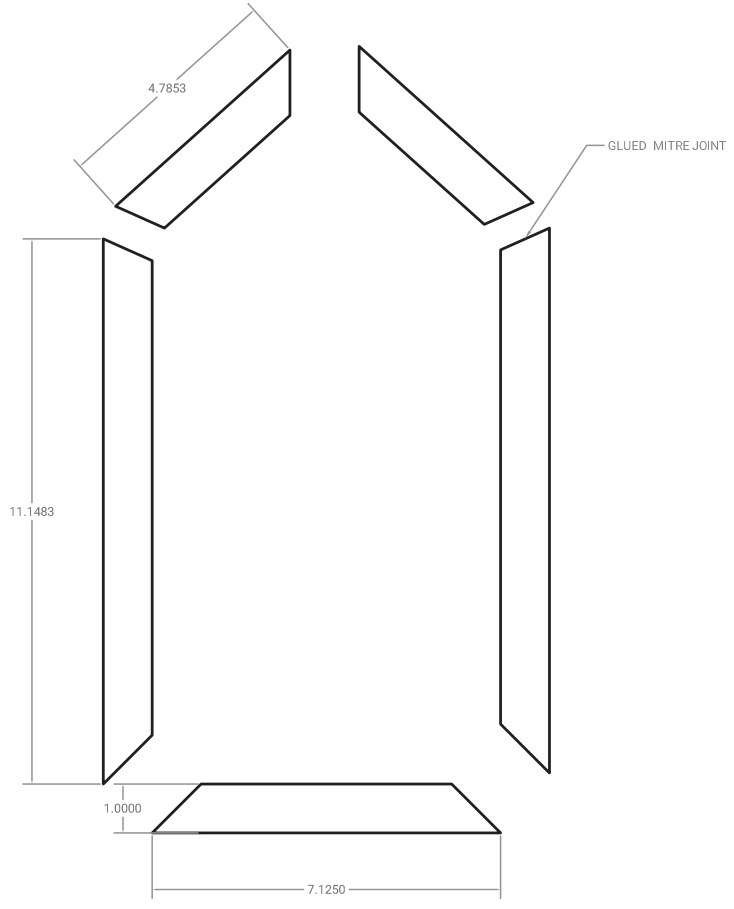


Lauren Homer

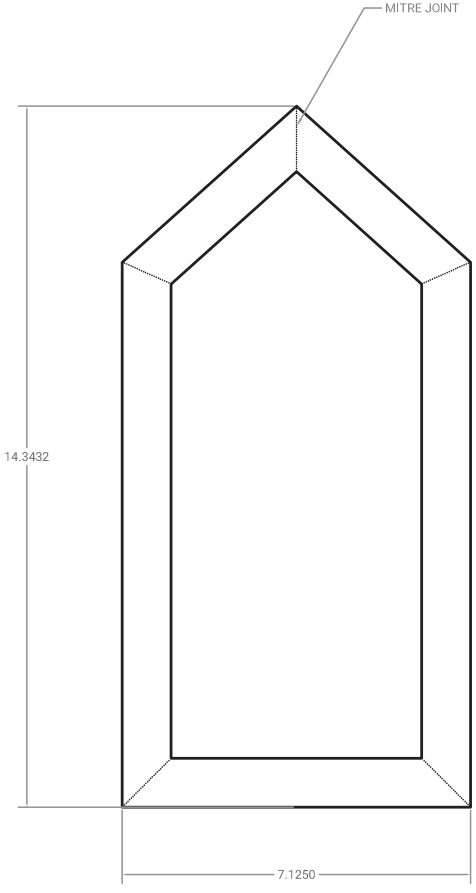
Habitat Fabrication

FEEDER FRAME CONSTRUCTION DRAWING EXPLORATION

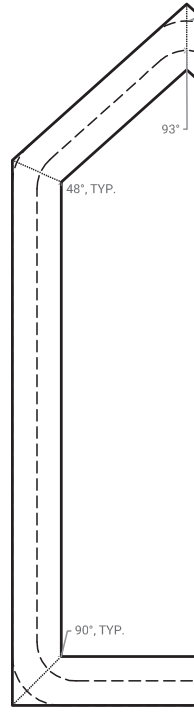
With its smooth, curved form, the frame of this feeder presents a unique construction challenge. This is a preliminary exploration in a likely method of constructing this deceptively complex frame. Poplar is a likely material. Wall thickness may need to be adjusted due to material requirements.



STEP 1



STEP 2



STEP

FRONT VIEW

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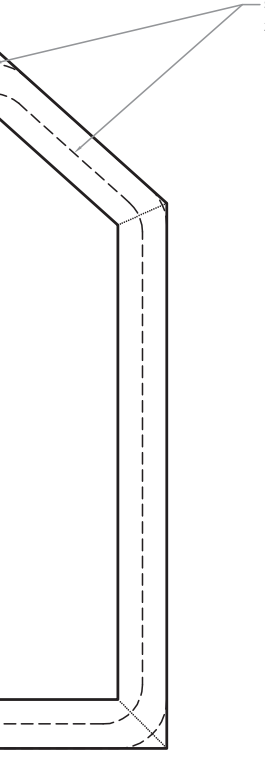
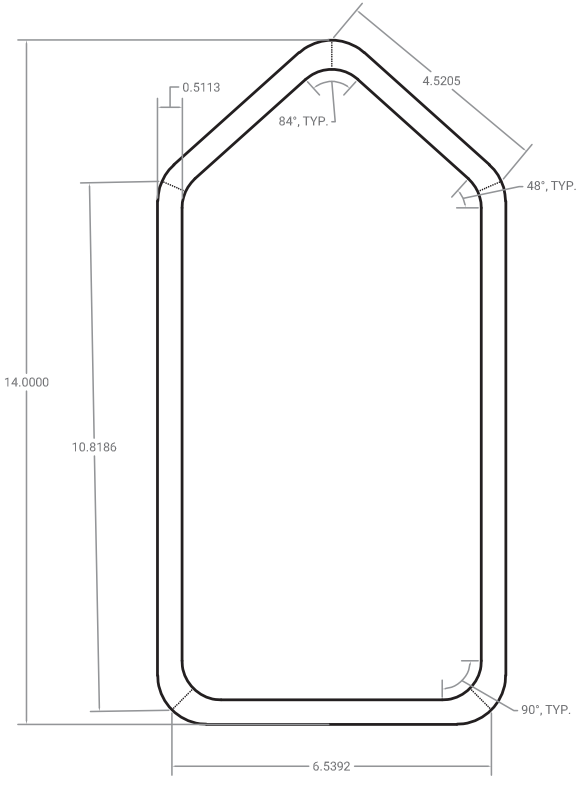
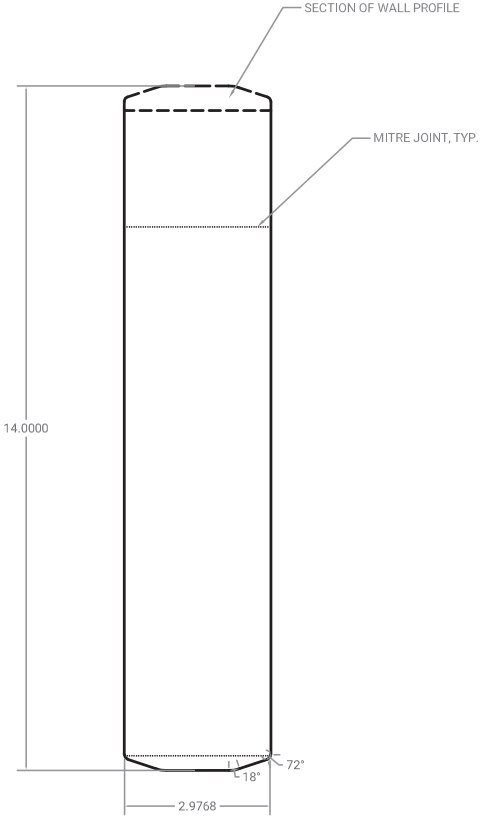






P 3

STEP 4

SIDE VIEW

Lauren Homer

The Great Horned Owl

Most owls are nocturnal predators, with hooked bills and needle sharp talons called claws. They have wide wings, lightweight bodies, and feathers specially designed to allow them to silently swoop down on prey.

Fifteen different species of owls can be found living in the state of Washington, 13 of which have been sighted within Pierce County. The great horned owl (*Bubo virginianus*) is the most widely distributed, both in Washington and North America.

Great horned owls are flexible in their habitats, and can occupy dense forests, open woodlands, clearcuts, deserts, and urban environments, including golf courses, cemeteries, and parks with adjacent woodlots.

Source: http://www.seattleaudubon.org/sas/Learn/SeasonalFacts/Owls.aspx

Alicia Kellogg

BIRDS & CLIMATE CHANGE STUDIO



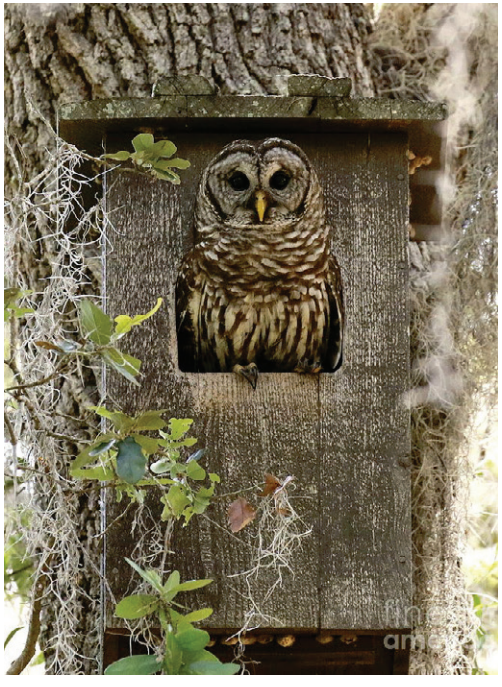
Human-Built Habitats

NEST BOXES & CONES











Sizing

The entire brood must reach adult size inside a nest box before fledging, so owl boxes should be larger than other bird boxes. Aim for at least 24” deep, 18” high, and 18” wide.

Entrance

All cavity nesting birds prefer an entrance hole that is just large enough for them to squeeze through, but too small for larger animals that might prey on the eggs or chicks.

Place the entrance hole at least six inches off the floor to prevent babies from falling out prematurealy.

Do not add a perch - they are unecessary for birds and can help predators get into the box.

Material

Nest boxes should be made out of untreated, unpainted wood. Since owls require larger boxes than other birds, nonpressure-treated, CDX exterior-grade plywood is more suitable than other lumber like cedar or pine. Walls should be at least 3/4” thick.

Drainage and Ventilation Holes

Each side wall should have small holes to ensure adequate ventilation.

Source: https://nestwatch.org/learn/all-about-birdhouses/features-of-a-good-birdhouse/

Alicia Kellogg

Nest Sketch Models

ITERATING FUNCTIONAL FORM









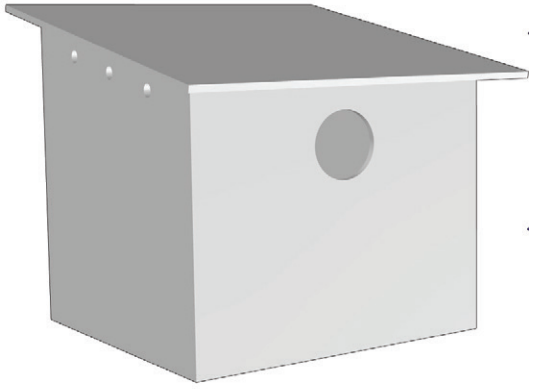


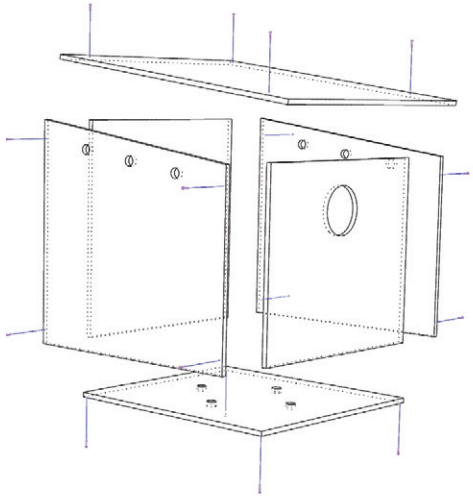
Alicia Kellogg
BIRDS & CLIMATE CHANGE STUDIO

Construction Exploration

CREATING BIRD HABITAT FOR EASY HUMAN CONSTRUCTION

MODELING SIMPLICITY





CRAFT EXPLORATION







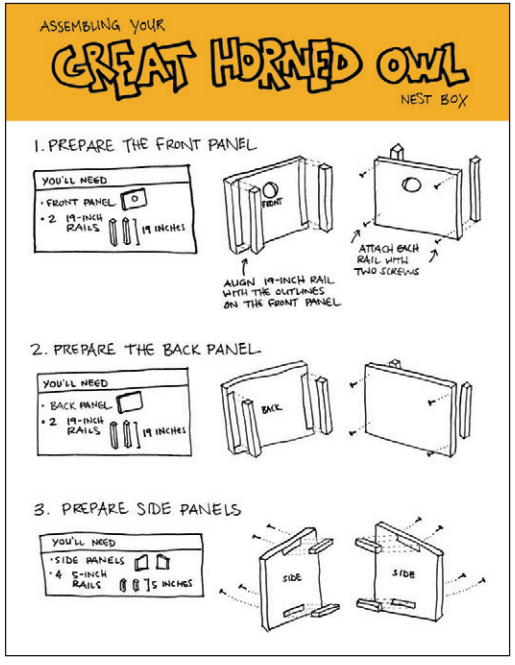
Alicia Kellogg
BIRDS & CLIMATE CHANGE STUDIO

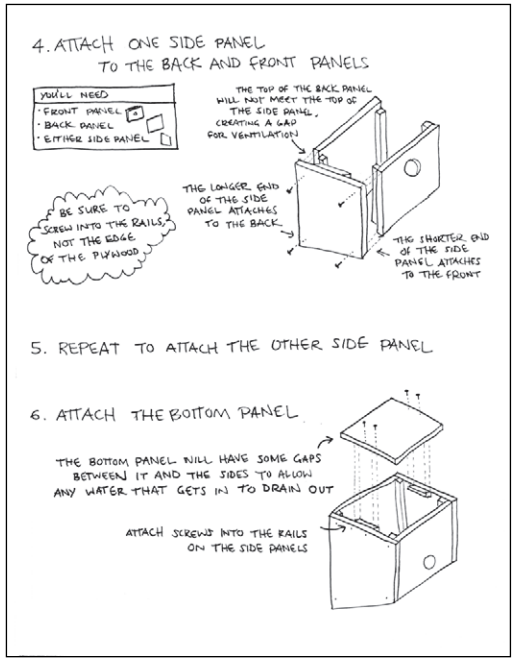
Democratizing Fabrication

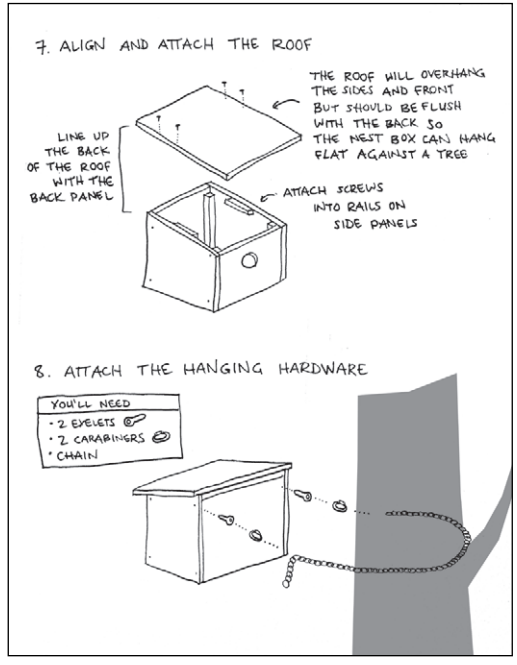
CREATE THE SIMPLEST, CHEAPEST, DESIGN

Community-Built Novel Ecosystems

Creating a nest box design that is accessible for as many people as possible - including those with no construction experience - allows community members to become their own stewards of novel ecosystems that enhance bird habitat.



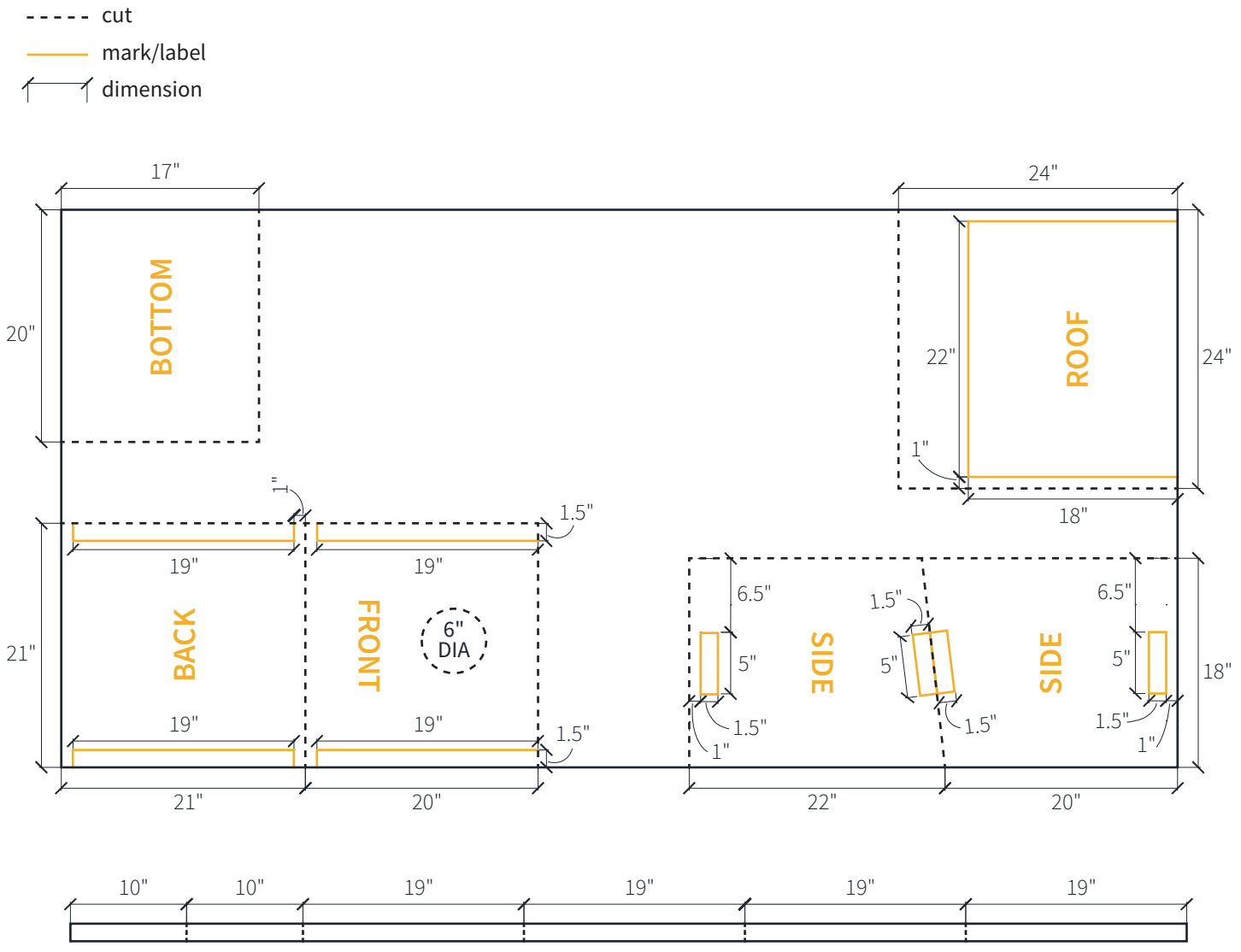




Alicia Kellogg

Nest Box Schematic

CREATING A KIT



Alicia Kellogg

Democratizing Fabrication

CREATE THE SIMPLEST, CHEAPEST, DESIGN

Great Horned Owl Nest Box Kit

Creating the Kit

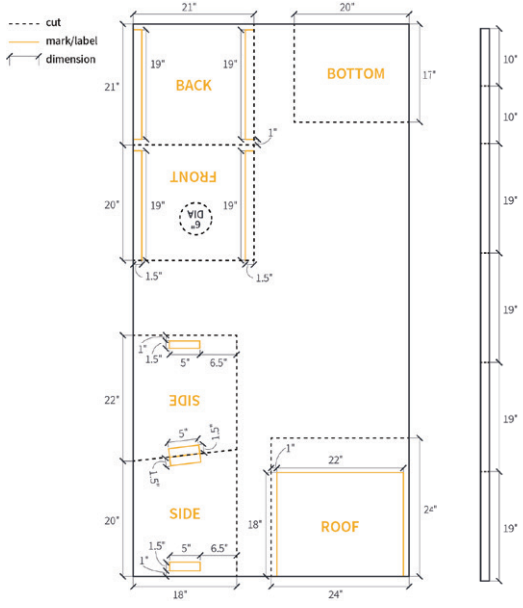
SUPPLIES NEEDED

ITEM	DESCRIPTION/PURPOSE
4x8' sheet of 15/32" CDX exterior-grade plywood	This will form the box structure
Stainless steel decking screws, #8 x 1.5"	Fasteners
2x2" 8'-long wooden baluster	The plywood will all be screwed into the baluster rather than other plywood. Cedar will be the most resistant to water damage, but will be more expensive. Weigh your priorities and make your purchase decision based on that.
4' of #2 zinc-plated steel swing set chain	This chain will attach to the back of the box and be used to hang it on a tree
¾" x 3" zinc-plated screw eyes	Screw these into the back of the box to attach the chain to
1/8" zinc-plated quick links	Attach the chain to the screw eyes with these
Boiled linseed oil (optional)	Apply to the exterior of the box to protect from water damage

TOOLS NEEDED

ITEM	DESCRIPTION
Saw	Table saw + circular saw combo will be best, but a circular saw alone will be sufficient if it's the only thing available.
Drill and/or driver	For installing screws and to cut out the front entrance hole
6" hole saw bit	To drill the entrance hole

CONSTRUCTION



Alicia Kellogg

Democratizing Fabrication

CREATE THE SIMPLEST, CHEAPEST, DESIGN

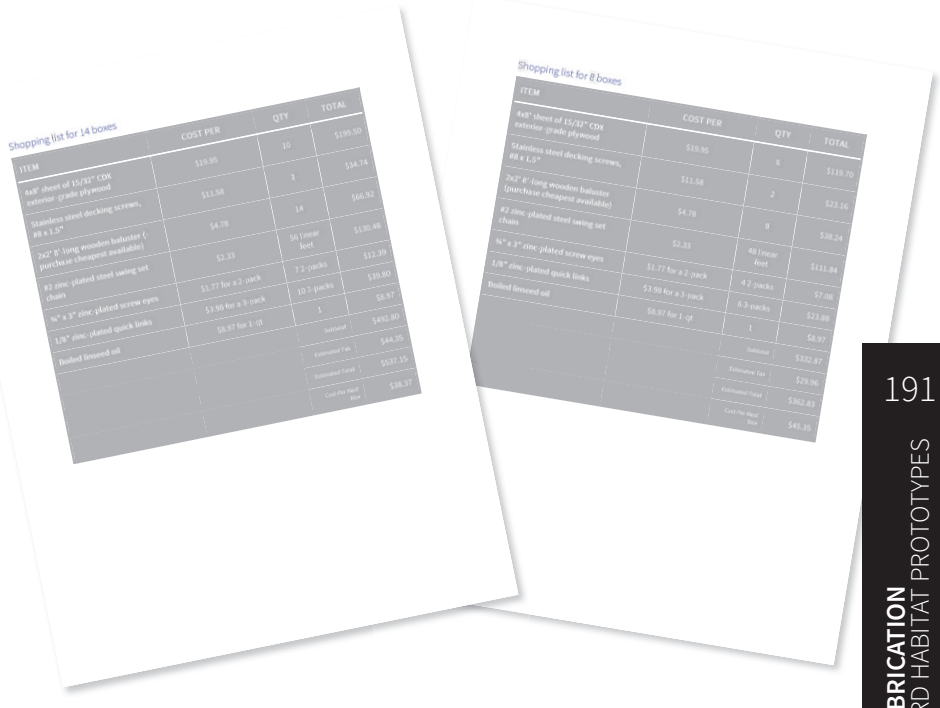
PURCHASING NOTES

Tools costs

ITEM	COST
7 ¼" circular saw	$50
Electric driver/drill	$75
6" hole saw bit	$15.67

Shopping list for a single box

ITEM	COST PER	QTY	TOTAL
4x8' sheet of 15/32" CDX exterior-grade plywood	$19.95	1	$19.95
Stainless steel decking screws, #8 x 1.5"	$11.58	1	$11.58
2x2' 8'-long wooden baluster (purchase cheapest available)	$4.78	1	$4.78
#2 zinc-plated steel swing set chain	$2.33	4 linear feet	$9.32
¾" x 3" zinc-plated screw eyes	$1.77 for a 2-pack	1 2-pack	$1.77
1/8" zinc-plated quick links	$3.98 for a 3-pack	1 3-pack	$3.98
Boiled linseed oil	$8.97 for 1-qt	1	$8.97
		Subtotal	$60.35
		Estimated Tax	$5.43
		Estimated Total	$65.78
		Cost Per Nest Box	$65.78



Alicia Kellogg

Red-breasted Nuthatch

SITTA CANADENSIS

Distribution

Northern most populations migrate south each year when cone production is poor. However, here at Adriana Hess Wetland Park, the Red-breasted Nuthatch is a year round resident because of the mild Washington conditions.

A Nuthatch Favorite

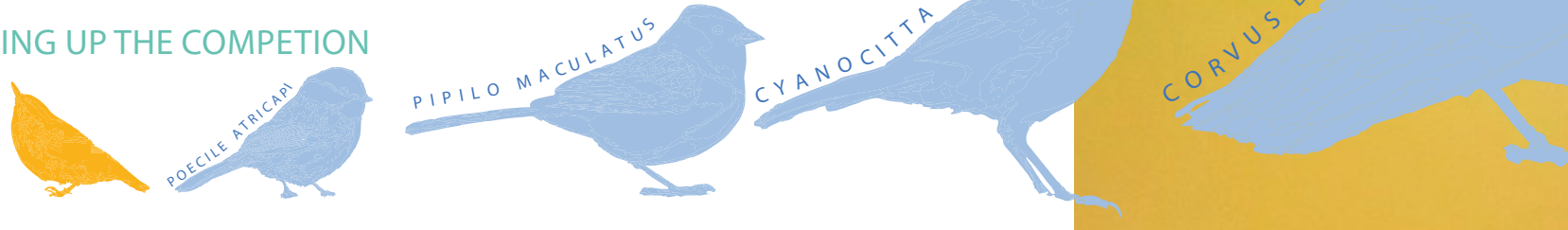
Adult Nuthatches feed primarily on insects during the spring and summer. In the fall and winter when insect populations don't provide the calories needed for colder weather, they prefer seeds from the cones of conifers. This bird is also a common visitor to bird feeders. They prefer black oil sunflower seeds, suet, and peanuts.

Agility & Caching

Because of their environment and food preferences, nuthatches have developed an evolutionary advantage that many other birds don't have. The Red-breasted Nuthatch is able to climb vertically, horizontally, right-side up and upside down practically on any object that they are able to grip their small talons to. This gives nuthatches an advantage to go anywhere for the food they love. Once a Nuthatch has obtained a seed, they will "Cache" that seed by taking it to a tree and using their sharp narrow beak to hatch it into a crevice for a later meal.



SIZING UP THE COMPETION





Kayla Powlesland
Geoff Anderson

Habitat Model

CONCEPT + BUILT

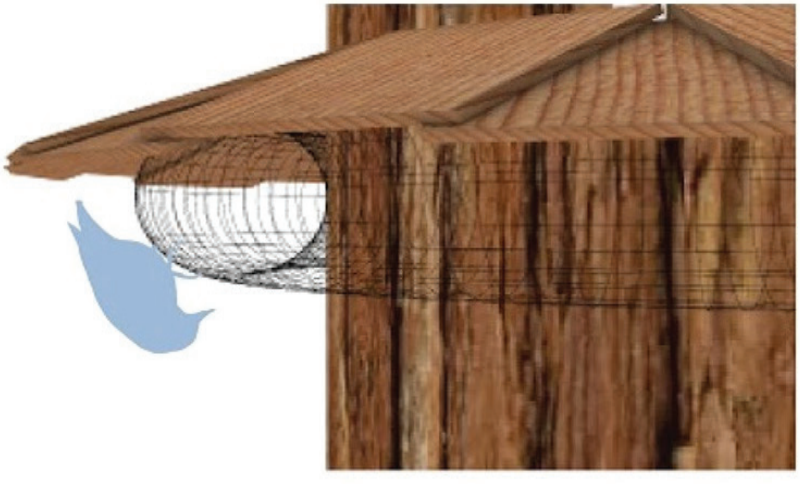
My design concept came from wanting to provide a feeder that would only be accessible to a nuthatch, a feeder that would give it an advantage over other birds. The nuthatches agilic abilities give it an advantage in reaching food in any position, unlike other birds. Using this characteristic, I created a model that would allow the seeds to only be reached from the underside.

For materials, I wanted something that would look more naturalistic to its habitat. One of the nuthatches favorite trees are conifers. I decided to pay respect to that by making the shingled roof out of cedar. The feed holder would be made out of metal.









Kayla Powlesland

Next I built my feeder based off of my concept design. To save on cost and be more ecologically friendly, I found some old cedar roof shingles that I sanded down and repurposed for the roof. This made my deisgn more abstract then my origial design becuase of the variation in the material scraps. But I liked it because it reminded me of our native Artist's Conk Fungus.

One of the biggest challenges of this build was the wire tube for the feeder. I quickly learned that the difference in diameter from the inside circle of the feeder to the outer caused the tube to deform. This was a good learning experience for contruction building.

At the time of this project, my feeder has only been up for a couple days, but I am eagerly looking forward to seeing how the local birds react to this new feeder. I hope a Red-breasted Nuthatch will visit soon.









Canada Goose

Physical description

1.Flying overhead in V- shaped formation

2.A Blackhead and crown, long black neck and white cheek patches that connect under the chin.

3.The adult gander (male) tends to be bigger than the goose (female) and averages 30 inches in length with a 60-inch wingspan.

Feeding Habitat

1. Canada Geese graze while walking on land, and feed on submerged aquatic vegetation by reaching under the water with their long necks

2. Wild food plants include pondweed, bulrush, sedge, cattail, horsetail, clover, and grass;

Agricultural crops include alfalfa, corn, millet, rye, barley, oats, and wheat.

Geese also eat some insects, snails, and tadpoles, probably incidentally.

Nests and Nest Sites

1. Geese nest close to water

2. Other nest sites include planter boxes and nesting structures provided specifically for geese.

3. The nest could be like a bowl-shaped depression approximately 1½ feet in diameter lined with grass, leaves, and goose down.

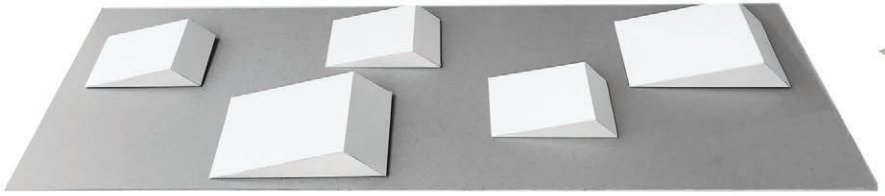
4.A pair of geese may return to the same nest site in consecutive years.

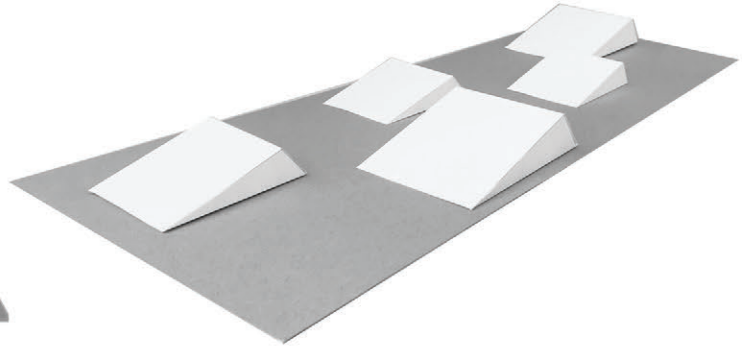


Yuqing Zhang

Sketch Model

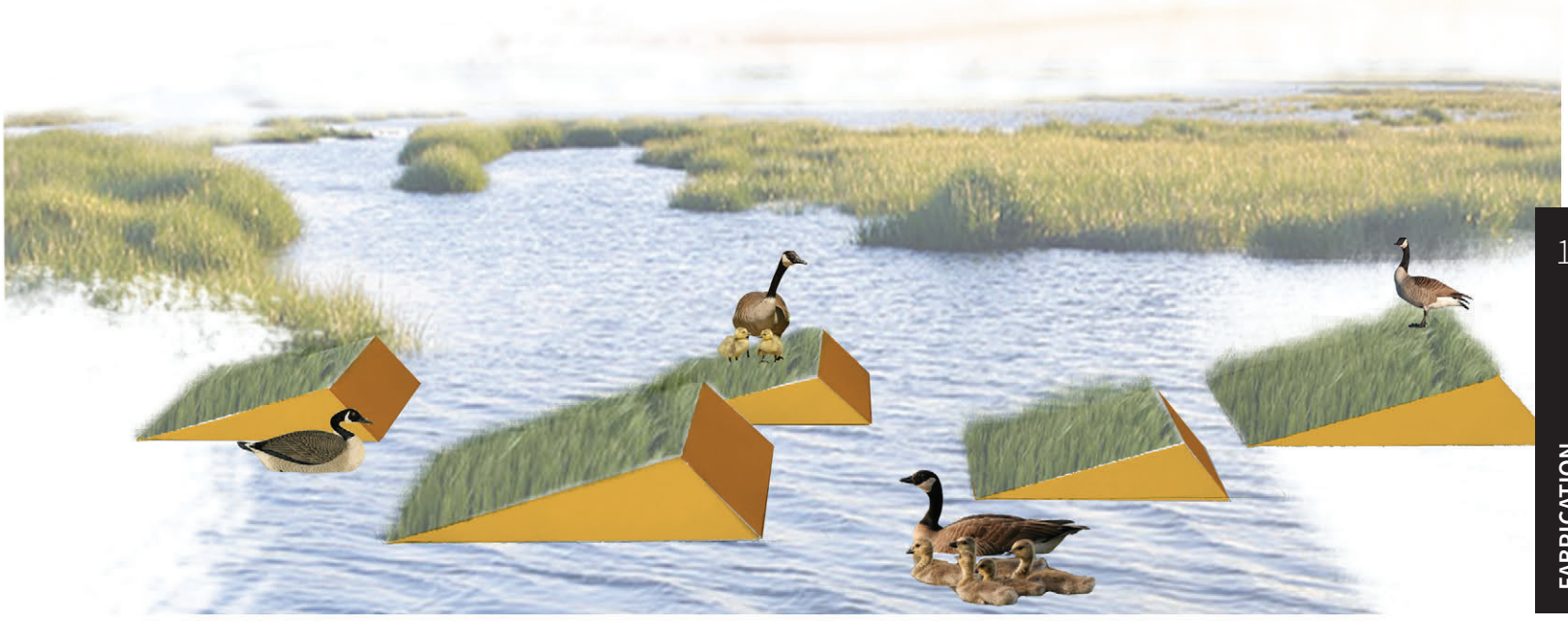
Sketch Model



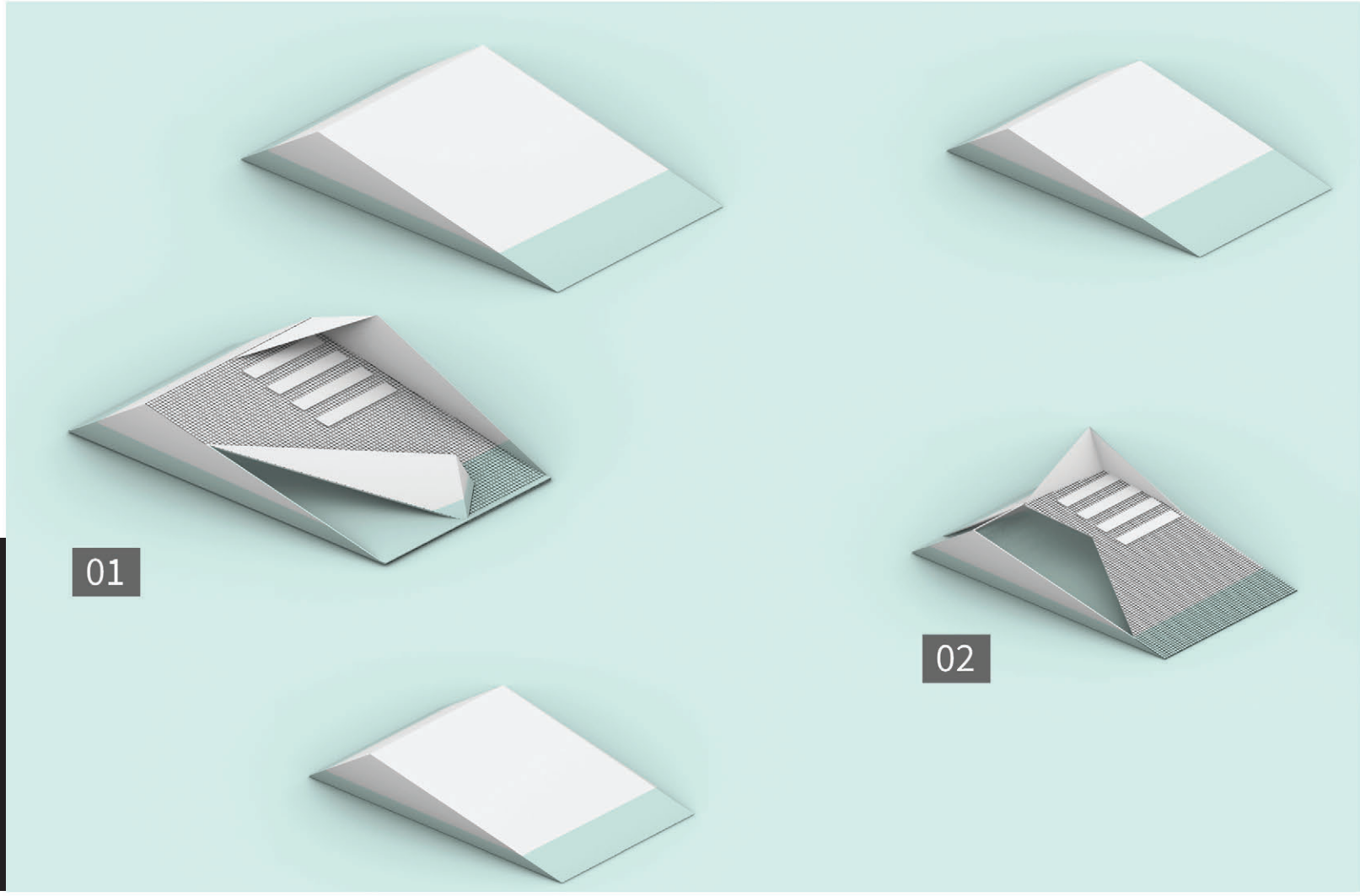


Perspective View





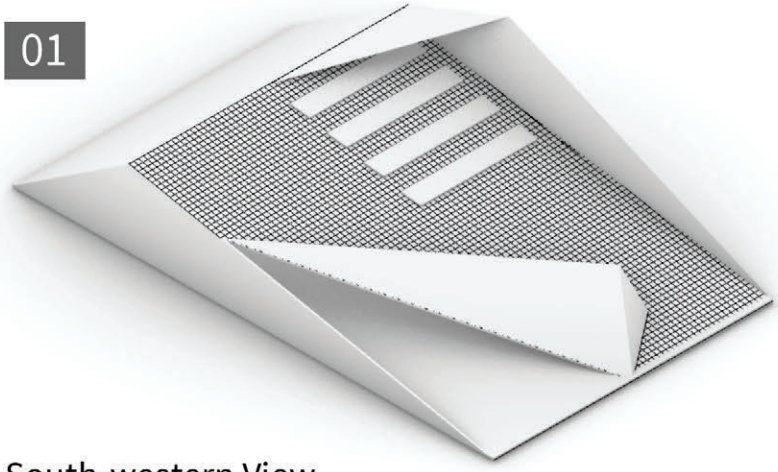
Rendered Scenario



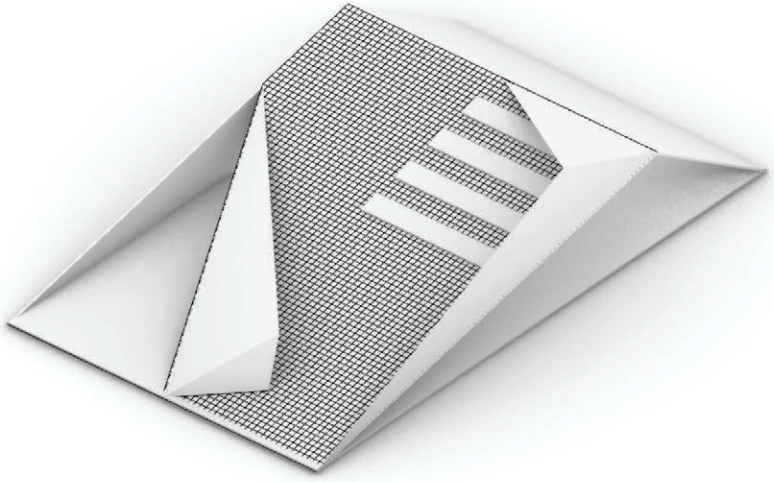
Yuqing Zhang

Detailed Model

01

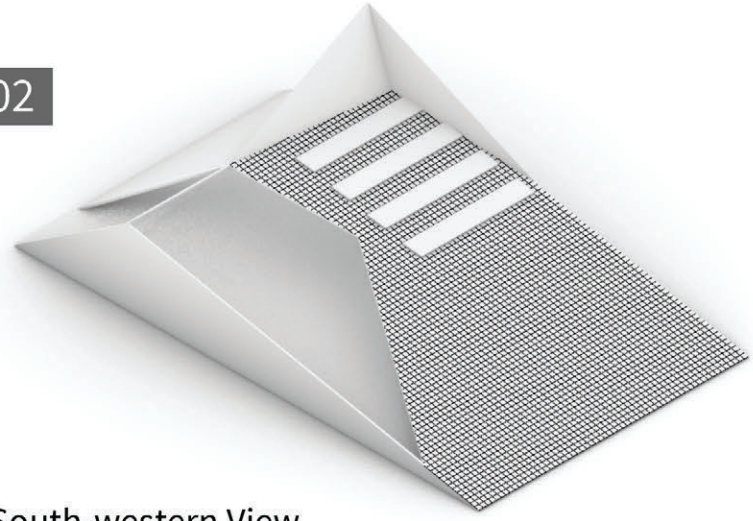


South-western View

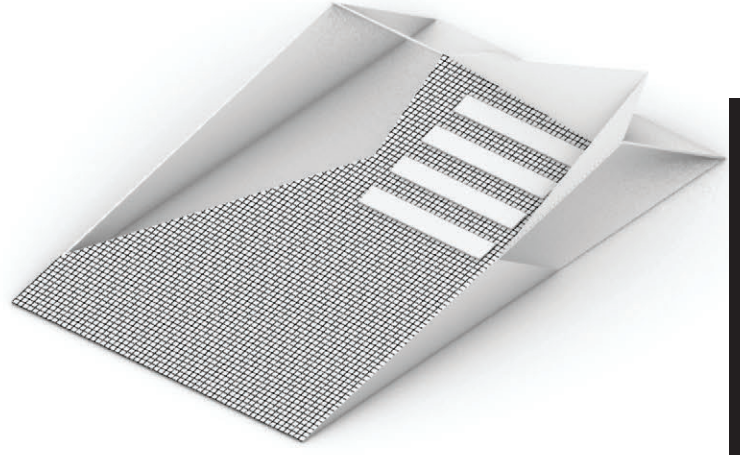


South-eastern View

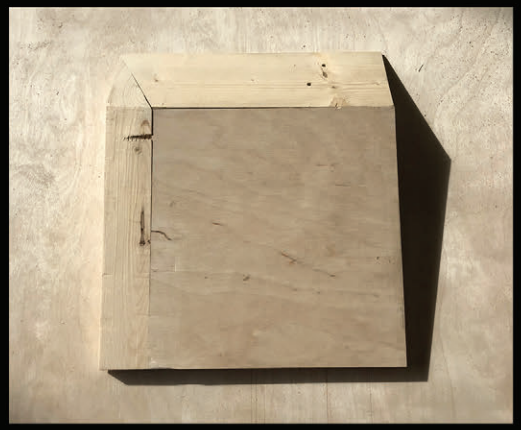
02

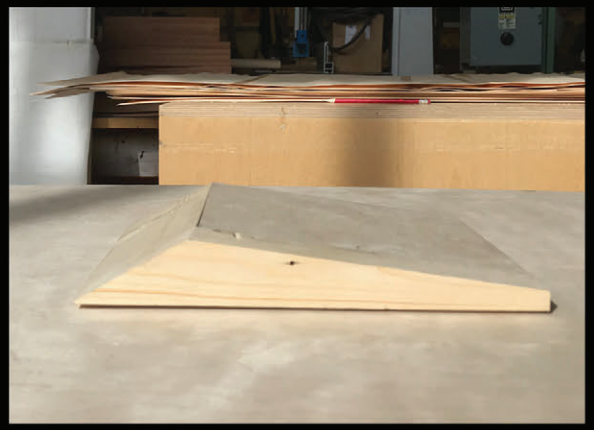


South-western View



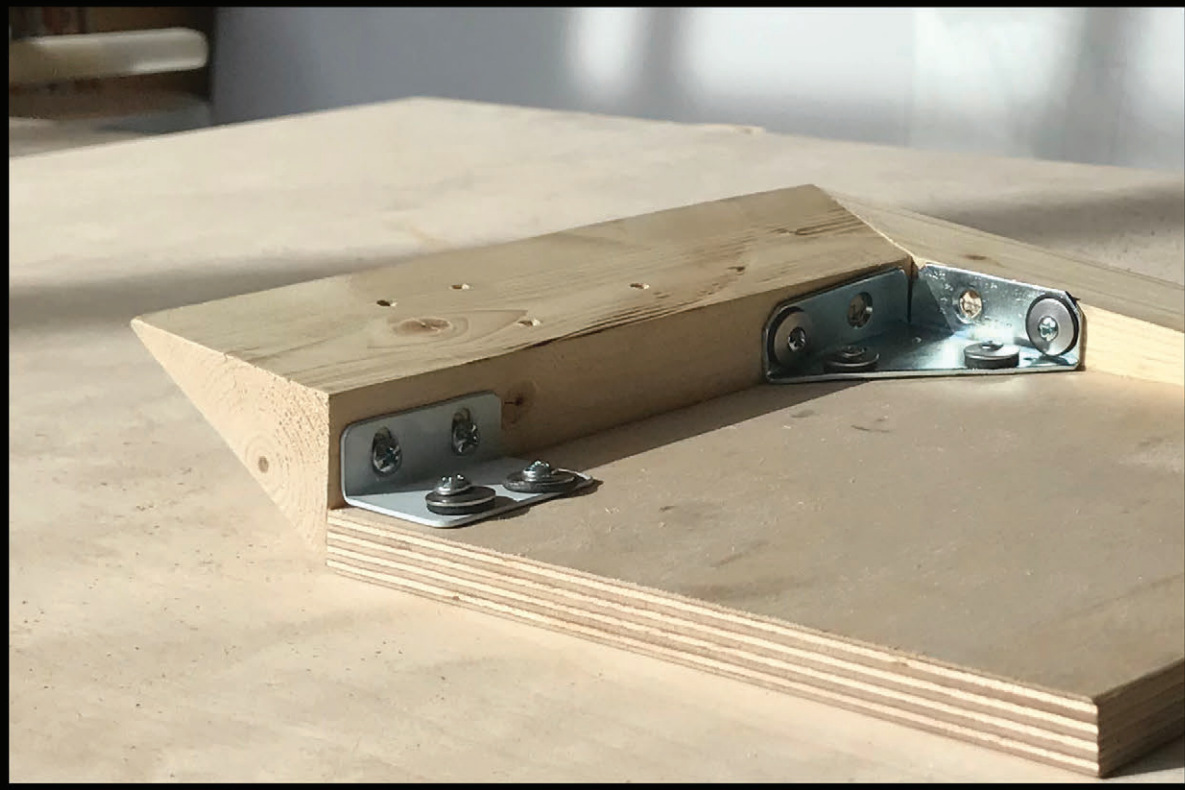
South-eastern View







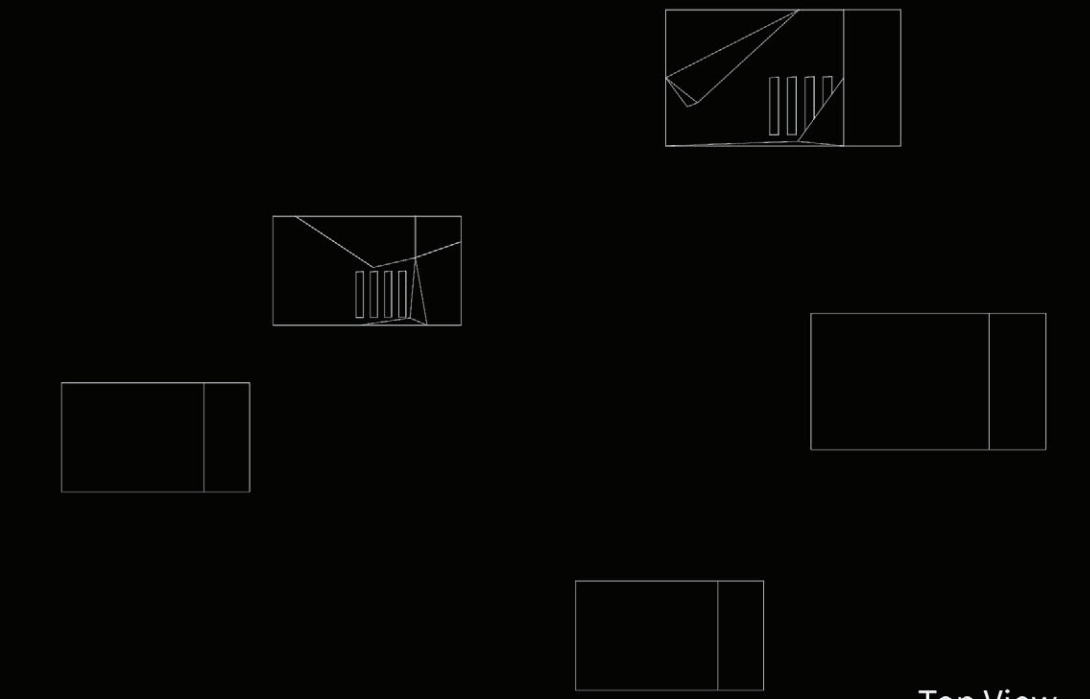




Top View	South-western View	South-eastern View
Joint Point 1#	Perspective view of Joint Point	

Yuqing Zhang
BIRDS & CLIMATE CHANGE STUDIO

Con-struction Drawing



Prototype Model

Yuqing Zhang
BIRDS & CLIMATE CHANGE STUDIO

Rufous Hummingbird

[SELASPHORUS RUFUS]

Size & Shape:

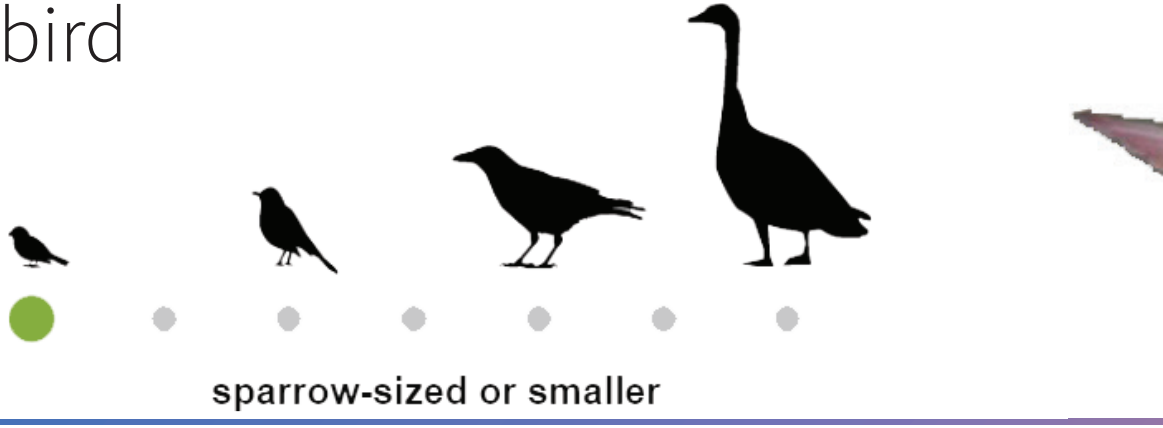
A small hummingbird with a slender, nearly straight bill, a tail that tapers to a point when folded, and short wings that don't reach the end of the tail when the bird is perched.

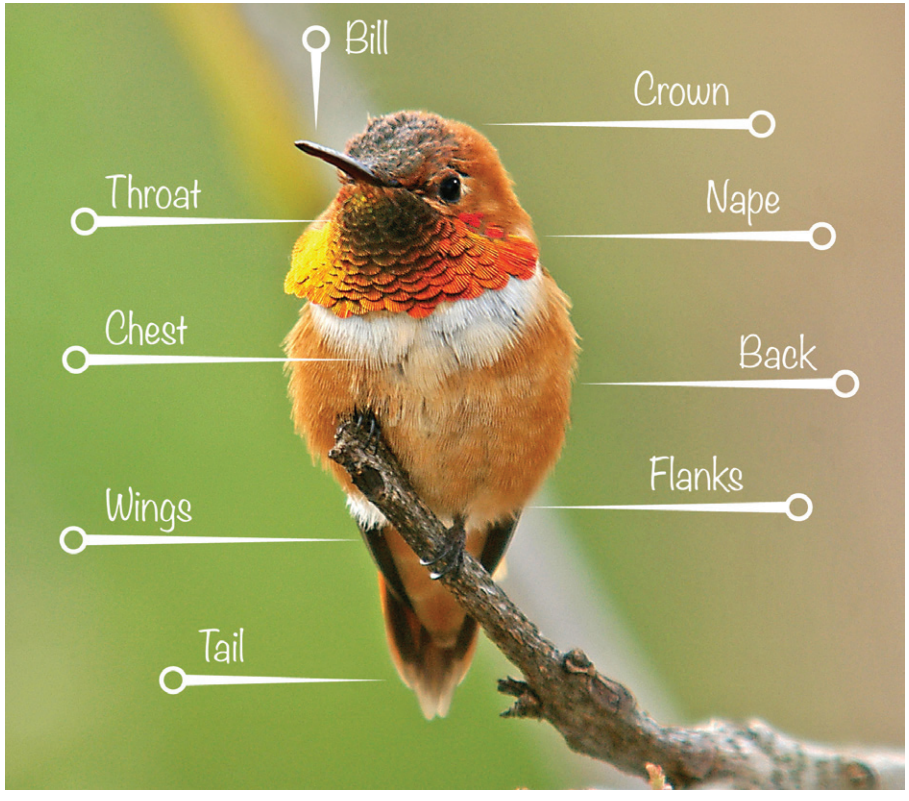
Behavior:

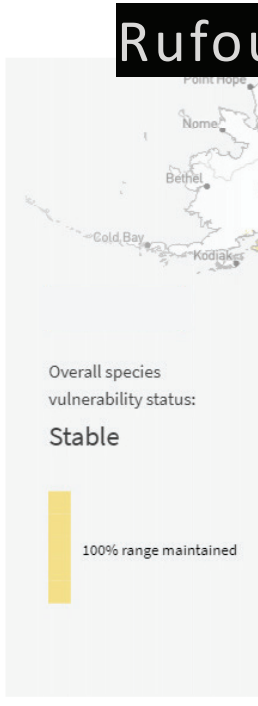
They are pugnacious birds that tirelessly chase away other hummingbirds, even in places they're only visiting on migration. Like other hummers, they eat insects as well as nectar, taking them from spider webs or catching them in midair.

Habitat

Breed in open areas, yards, parks, and forests up to treeline. On migration they pass through mountain meadows as high as 12,600 feet where nectar-rich, tubular flowers are blooming. Winter habitat in Mexico includes shrubby openings and oak-pine forests at middle to high elevation.



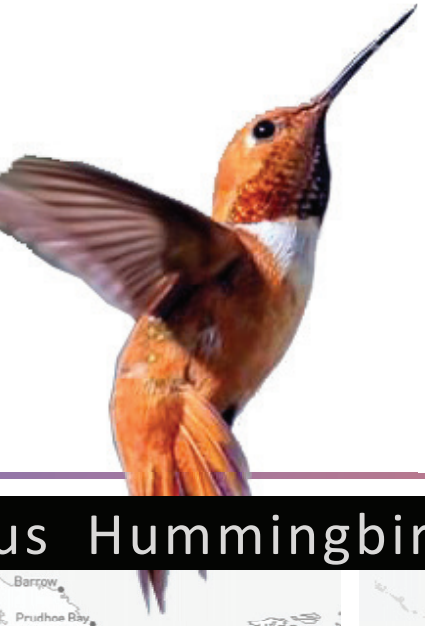




Warning Sc

Liang Huang

BIRDS & CLIMATE CHANGE STUDIO



Habitat
Open
Woodlands

Food
Nectar

Nesting
Trees

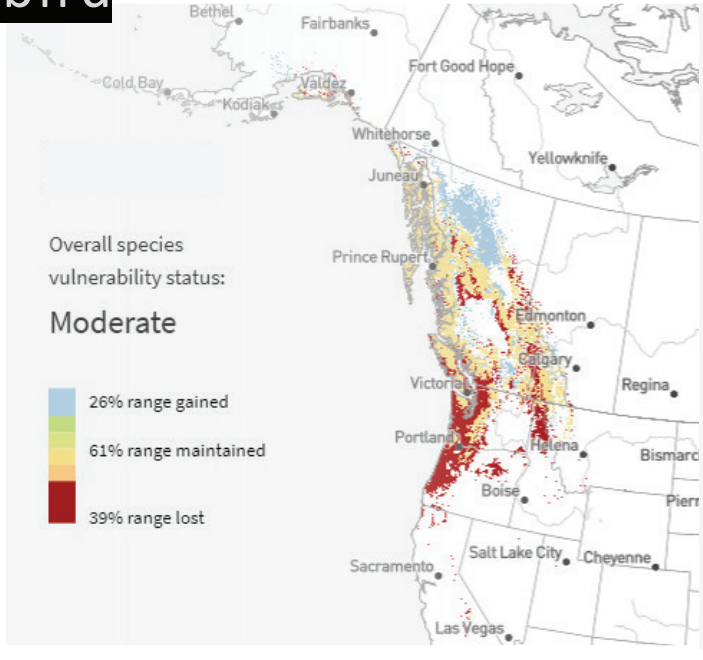
Behavior
Hovering

Conservation
Declining

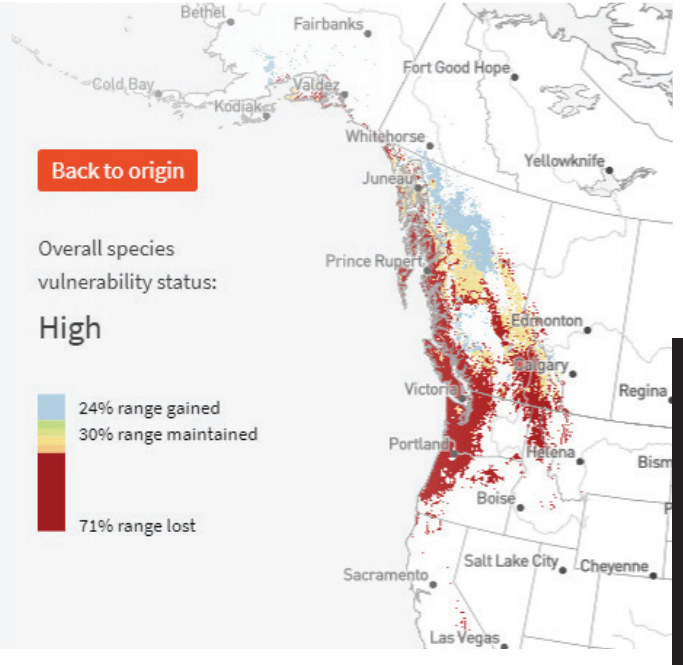
us Hummingbird



cenario: Current



Warning Scenario: +1.5 C



Warning Scenario: +3.0 C

Source: https://www.allaboutbirds.org/guide/Rufous_Hummingbird/id#

Liang Huang

Nesting Facts

ATTRACTING HUMMINGBIRDS IS EVEN MORE FUN

Basics

Females build their nests 10 to 90 feet high.

Hummingbirds build velvety, compact cups with spongy floors and elastic sides that stretch as the young grow. They weave together twigs, plant fibers, and bits of leaves, and use spider silk as threads to bind their nests together and anchor them to the foundation.

Hummingbird eggs are about the size of navy beans.



Image courtesy: George Harrison

Attracting Hummingbirds

Adding nectar plants to your garden is an important part of attracting hummingbirds.

Hummingbirds don't use nest boxes or tree cavities. Instead they generally build their nests in sheltered trees or shrubbery, often in a fork of branches. Enhance your own hummingbird habitat by growing a diversity of leafy trees and large shrubs that provide shelter at varying heights.



Image courtesy: Diane Richards



Image courtesy: Michael R Duncan

Characteristics

Rufous hummingbirds, a western species, are very **pugnacious around the nest**, often driving away much larger birds.

Source: http://www.birdsandblooms.com/birding/attracting-hummingbirds/hummingbird-nest-facts/

Liang Huang
BIRDS & CLIMATE CHANGE STUDIO

Precedents

NESTS AND FEEDERS

1.

Nendo's Bird Apartment is perched in the forest of Nagano prefecture.





Image courtesy: KELSEY CAMPBELL-DOLLAGHAN

2.

Hand-Blown Glass Hummingbird Feeder



Image courtesy: Vermount County Store

3.

Hummingbird Birdhouse for Outside Hanging, Grass Hand Woven Bird Nest.



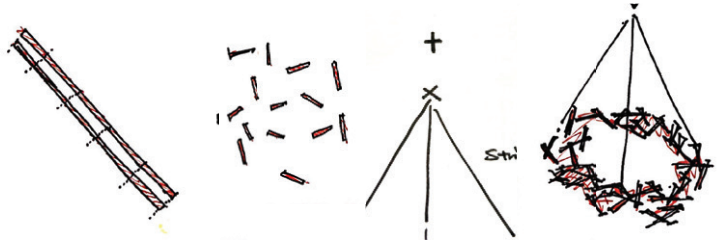
Image courtesy: KimDio

Liang Huang
BIRDS & CLIMATE CHANGE STUDIO

Prototype

Previosu draft 1.

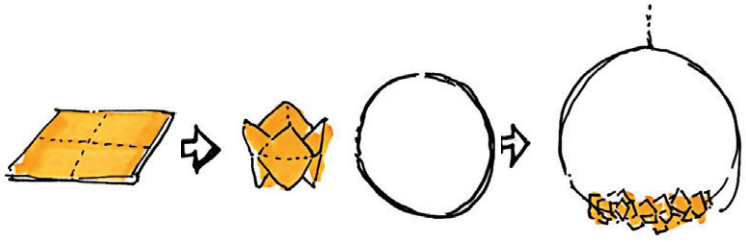
Hanging wood feeder.





Previosu draft 2.

Origami fun.





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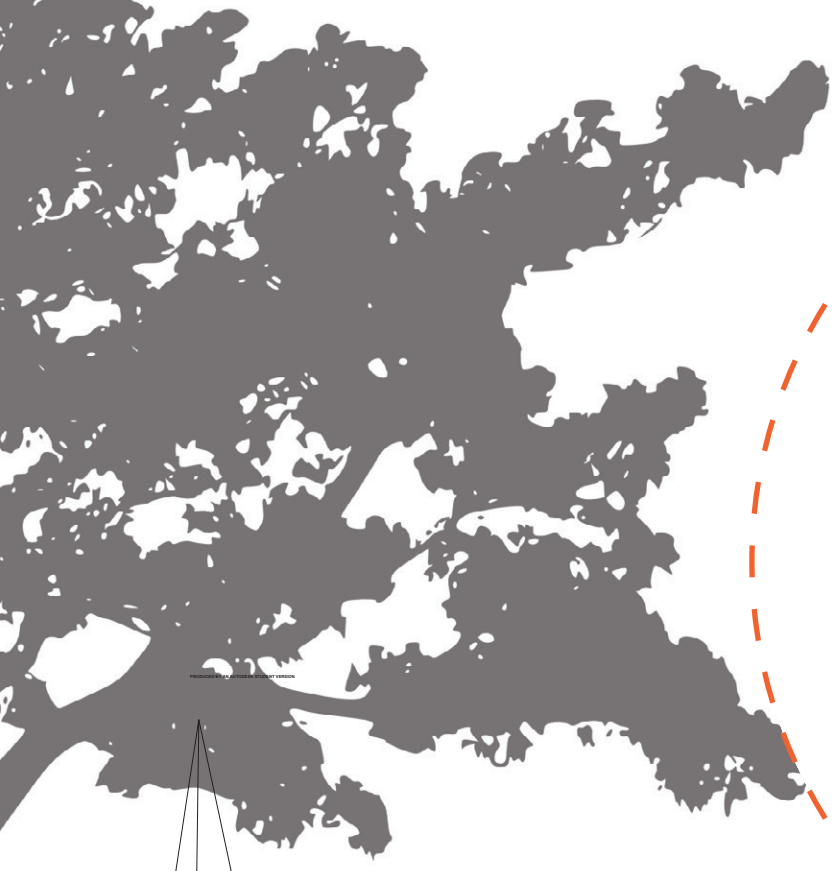
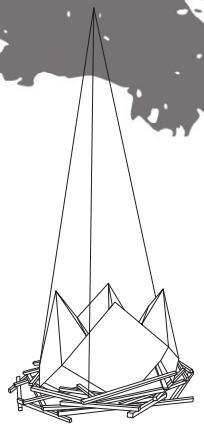
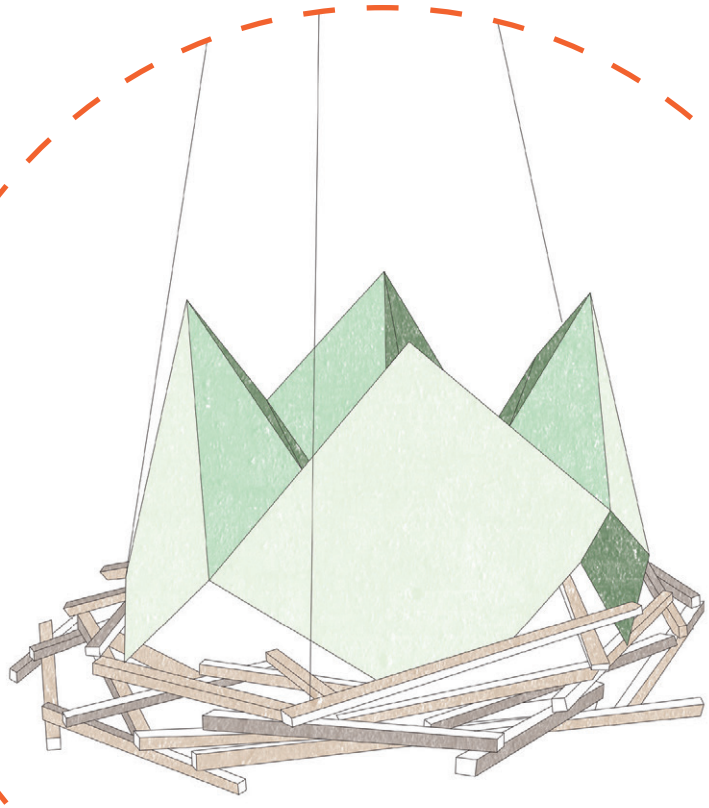
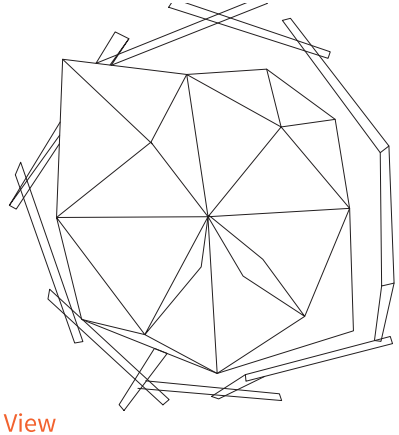
BIRDS & CLIMATE CHANGE STUDIO



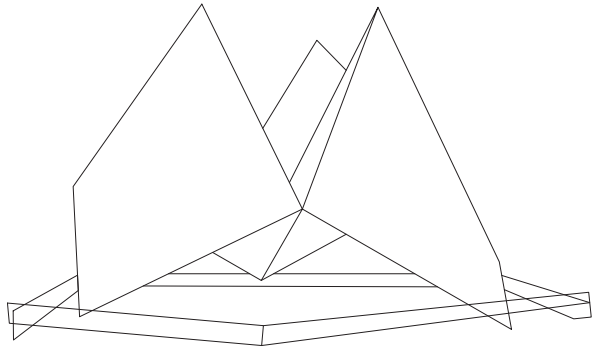




Perspective



Top View



Side View

Liang Huang

UNIVERSITY OF WASHINGTON

COLLEGE OF BUILT ENVIRONMENTS

DEPARTMENT OF LANDSCAPE ARCHITECTURE

“Birds are early responders to climate change and can be important indicators of large-scale ongoing and future ecological change. [The Audubon Society] found that 54% of Washington’s 296 bird species are vulnerable to climate change across seasons.”

1 National Audubon Society. 2014. Survival by Degrees, 389 Species on the Brink. National Audubon Society, New York. Contributors: Gary Langham, Justin Schuetz, Candan Soykan, Chad Wilsey, Tom Auer, Geoff LeBaron, Connie Sanchez, Trish Distler. Version 1.2.

Photo credit: Rufous Hummingbird. Jim Nelson

