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Painting Ecological Change in Pacific Northwest Bird Populations

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painting ecological change in pacific northwest bird populations

HONORS SENIOR CAPSTONE PROJECT
BY RACHEL ROTHBERG

a visual exploration of bird populations and behavior in Bellingham and how they are impacted by other species, their habitats, and human activity.

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artist's statement

The following four oil paintings are part of an ongoing series that visually explores bird populations and behavior in Northwest Washington, particularly in Bellingham and Whatcom County. I combine biological, detailed illustration with painterly practices to communicate fragile ecological balances to my audience. My work examines the tension between life and death in the natural world to provoke conversations about environmental issues and to encourage compassion for local scenery. The work illuminates how birds, humans, and the ecosystems we inhabit are intertwined, inspiring a sense of wonder for our natural surroundings at a global turning point for climate change.

Growing up in the Bay Area in California, I was inspired to be a compassionate steward of the environment because of the biodiversity that surrounded me. I am influenced heavily by my background in biology and ornithology, and I use academic research, field observations, and outreach to the scientific community to inform my work. My paintings are in part an expression of my natural surroundings to my audience, but are also a personal exploration of ecological questions and a representation of my fascination with the nature of life and death on this planet. I think of how entire species have changed the behavior they have maintained for thousands of years, or even disappeared completely, all because of the actions of humans.

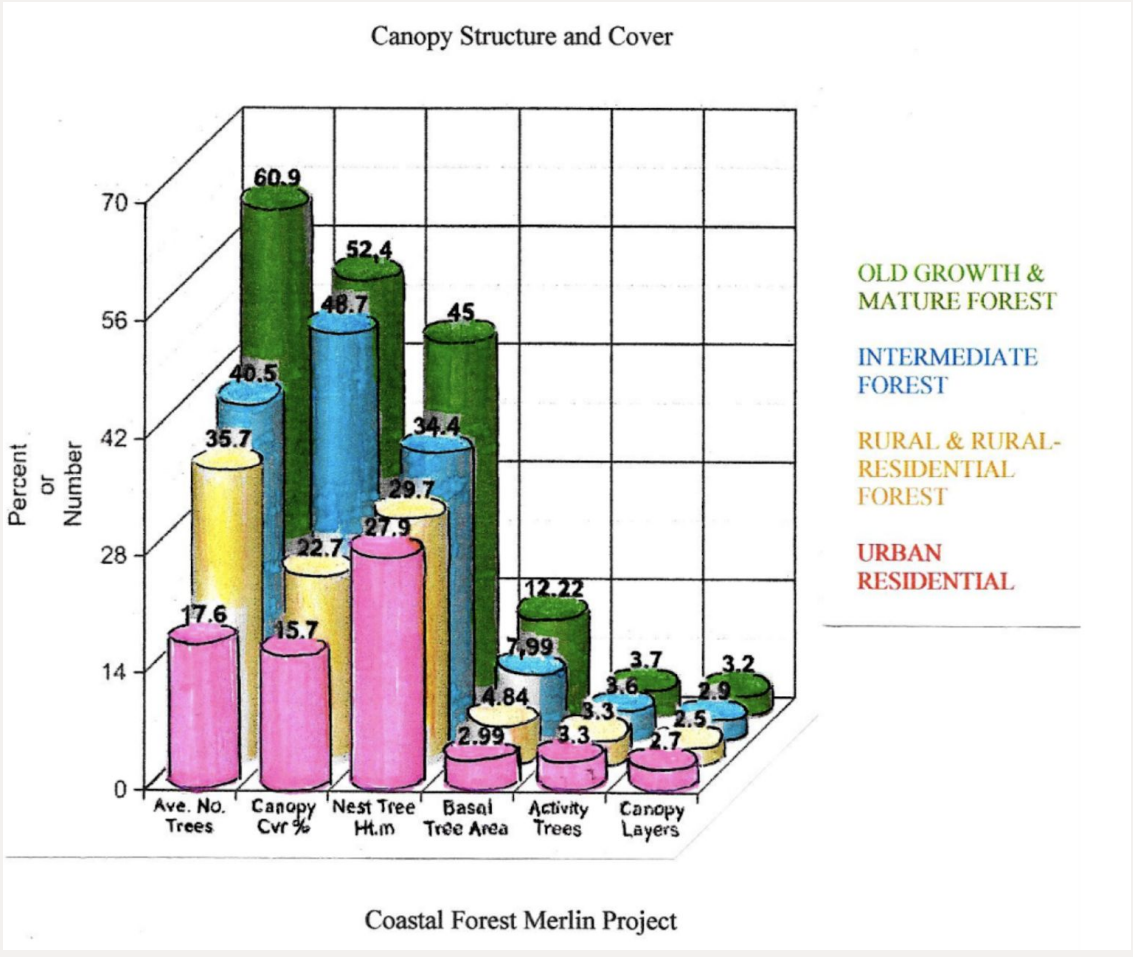
I frequently contemplate this cyclical relationship of life and death due to my personal experiences of loss and grief. I gravitate towards nature because observing environmental patterns that have been around for millennia reminds me that in nature, death can be beautiful—life always finds a way to emerge. Humans are inextricably connected to all life

forms on this planet, and our dependence on these ecological systems suggests we must be responsible caretakers of our natural surroundings. In a time where our world is fragmented, I believe that observing the interconnected nature of the world can stimulate empathy and human connection.

merlin hunting house sparrows above the bellingham herald

OIL ON CANVAS
30” x 40”
2020

While many species are negatively impacted by humans, the Merlin is an example of a species that can thrive in urban areas. Merlins are a small species of falcon that primarily hunt passerines (perching songbirds). Their ideal environment has a variety of tall perches for different activities, including perches for prey exchange, nesting, and as a lookout. In Washington State, that environment would ordinarily be an old growth forest, although deforestation has greatly reduced this habitat in recent history. The following diagram shows that with increased development and urbanization, habitats have a lower percentage of trees, tree cover, and potential nest areas.



(Drummond, 2019)

When present in human-altered habitats, Merlins actively seek out breeding sites similar to old growth habitats. One would think that because of their preference for tall perches suited for different uses, Merlins would not fare well in a habitat with few trees, but Merlins have done surprisingly well in urban residential areas compared to intermediate forests and rural residential/forested habitats. Merlins have shown flexibility in choosing their habitat depending on the surrounding landscape. The first breeding Merlins in an urban area in Washington State were a pair that nested in Bellingham in 2000.

While their preferred habitat of old growth forests have receded, Merlins receive some benefits from urban areas that they do not find in intermediate forests or rural residential/forested habitats. The Coastal Forest Merlin Project found that "there were 46.3% fewer potential predator sightings within urban areas compared to old growth and mature forest sites" (Drummond, 2019). Urban areas serve as a home for some preferred Merlin prey, like House Sparrows. Cities also attract crow species. Merlins do not build their own nests; they are opportunists and most frequently use old crow nests, and have followed crows into cities. The Coastal Forest Merlin Project additionally found that "there were 46.3% fewer potential predator sightings within urban areas compared to old growth and mature forest sites" (Drummond, 2019). Because crows and prey are found in higher densities in urban areas, and predators of falcons are found in lower densities, Merlins end up favoring urban and old growth habitats over rural areas and intermediate forests.

Urban environments introduce new challenges despite these benefits. In the area surveyed in the Coastal Forest Merlin Project, there were nearly 70% fewer trees in urban areas than old growth forests. As a result, Merlins use fewer trees for their activities in urban areas

rather than having one tree for each behavior, though they still lose most of the protection from wind and precipitation that old growth forests afford. However, the benefits of urban living have outweighed the drawbacks enough to result in the continual recent success of urban Merlins, especially due to the deforestation of the Merlins' natural old growth forest habitat and the spread of urbanization. This painting illuminates the success of Merlins in urban environments as a Merlin chases House Sparrows above the Bellingham Herald building.

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Drummond, D. P. & Stillman, R C. (2019). Coastal forest Merlin (Falco Columbarius Suckleyi) breeding habitat and climatic influences on fledgeling success in Washington state and British Columbia. *Coastal Forest Merlin Project*. https://coastalforestmerlinproject.org/wp-content/uploads/2019/03/CFM-Breeding-Habitat-Paper.pdf

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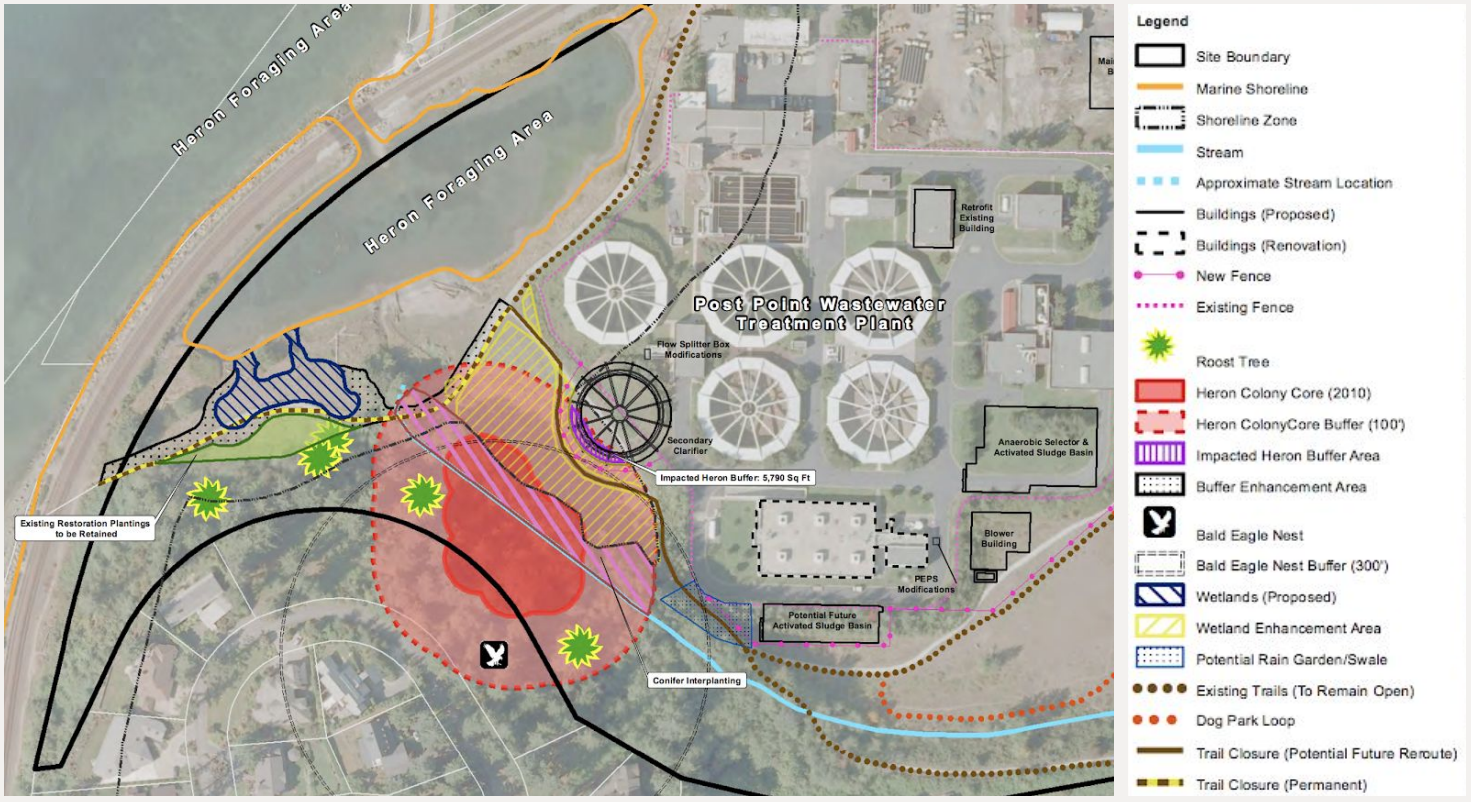
great blue heron rookery at fairhaven marine park

OIL ON CANVAS
36” x 48”
2020

The only known Great Blue Heron colony in Bellingham is located at Post Point by Marine Park in Fairhaven. The rookery was originally established in 2000 after a colony from Chuckanut Bay was flushed out in 1999 during the construction of the "Blue Heron Estates," a housing development, and took refuge the following year in Bellingham. The number of nests rose again in 2017 when another colony was flushed from Samish Island and came to Bellingham. Great Blue Herons likely choose Post Point because of the surrounding landscape, which includes freshwater, marine shoreline, wetlands, and roost trees. In 2018, the number of active, documented heron nests at the Post Point rookery had grown to 44. So far, the herons present at Post Point have been tolerant of the nearby residential neighborhood, an off-leash dog park, pedestrian trails, a railroad, and the Post Point Wastewater Treatment Plant.



(Routhe, 2011)

A proposal for the construction of another water clarifier structure emerged in 2011 to ensure the Post Point Wastewater Treatment Plant remained within its water treatment capacity. Although construction was required to occur during heron non-breeding season, "the permanent placement of the new clarifier…[resulted] in unavoidable encroachment into the eastern part of the 100-foot heron colony buffer" and "[resulted] in the loss of 5,790 square feet of heron buffer area" upon completion (Zemke, 2011). The herons returned to nest during the following breeding seasons despite this disturbance.

In November of 2018, property owner Herb Ershig submitted a proposal to develop the land on 20 Shorewood Drive, a residential property directly adjacent to the heron colony, "into two single-family lots and an open tract of land…called Heronwood Cluster" (Relyea, 2019). Despite potential mitigation efforts, the plan threatened to disturb the herons through human intrusion into the essential buffer zone around the rookery and the removal of wind-blocking trees. This would potentially flush the herons out in the same way these individuals and their relatives had been prevented from safely nesting at previous rookeries. However, Jamie Donaldson, an Audubon member and advocate for the herons in Bellingham, helped raise money through a GoFundMe to pay for an attorney to represent an appeal of the city-approved proposal. Ershig's development proposal was withdrawn prior to the hearing. While the herons were spared temporarily, the withdrawal does not ensure their protection in the future. Another development plan could go through if the City of Bellingham does not take action to permanently protect the land the herons depend upon. In fact, another proposal emerged at the beginning of 2020 "to sub-divide the last large undeveloped property on Shorewood Drive and

build two houses just outside the 197-buffer," which has not been adjusted to account for potential change in nest sites since 2018 (Donaldson, 2019).

This painting is a visual representation of the development proposal for 20 Shorewood Drive and the blueprint of the wastewater treatment plant clarifiers superimposed on the Post Point Great Blue Heron Colony. The heron rookery is composed of individuals who have taken refuge from previous human disturbances, and we do not know when or if they will decide it is unsafe to breed at Post Point due to human disturbance. Therefore, it is essential for the City of Bellingham to take action to obtain all the undeveloped land surrounding the heron colony by purchase or donation to create a protected reserve for the Great Blue Herons to thrive.

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Relyea, K. (2019, September 30). 'Do it now,' residents tell Bellingham as they push for reserve for these iconic birds. *Bellingham Herald*. www.bellinghamherald.com/news/local/article235195987.html

Routhe, R. (2011, March 8). City of Bellingham land use application: 200 McKenzie Avenue. *City of Bellingham Planning*. https://www.cob.org/documents/pw/utilities/ppwwtp/shoreline-application-march%20-2011.pdf

Taysi, A. (2018, February 5). City of Bellingham notice of application: 20 Shorewood Drive. *City of Bellingham Planning and Community Development*. https://www.cob.org/gov/dept/pcd/Lists/notices/Attachments/3559/Notice-of-Application-SUB2018-0045-CAP2018-0059.pdf

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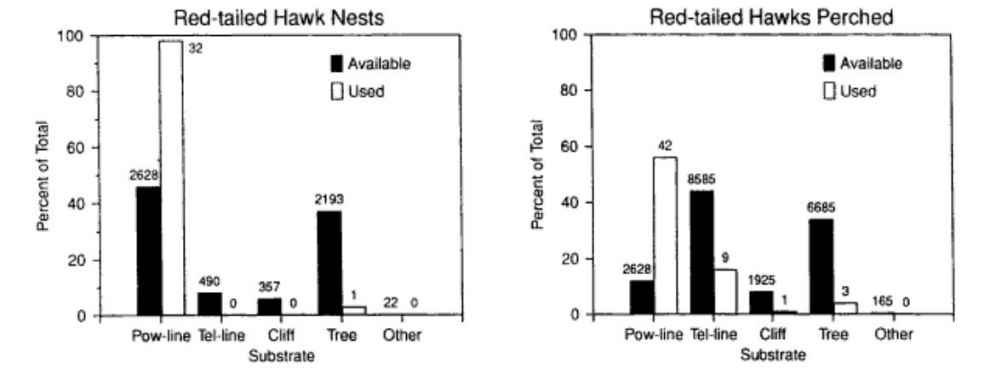
accident on I-5

OIL ON CANVAS
30” x 40”
2020

Red-tailed Hawks and Barn Owls are two bird species that are frequently found hunting on I-5. These birds of prey both take advantage of the rodents that live in the artificial grasslands at the shoulders and median strips. In Washington, "Red-tailed Hawks were first documented in Seattle after the I-5 freeway opened in the mid-1960s." A member of the Klamath Bird Observatory Board of Directors, Harry Fuller, stated that Red-tailed Hawks are especially drawn to I-5 because "compared to plunging through tall weeds, it's easier for hawks to hunt rodents in the mown grass on the sides of the interstate and in-between the north and southbound lanes" ("Hawks use I-5 as hunting ground," 2014). Due to differences in fundamental biology, however, the owls and the hawks end up experiencing alarmingly different fates.

A study performed in Southern California revealed that hawks preferred perching and nesting on power lines even when trees were more available. The study noted that "...[Red-tailed Hawk] nests on towers supposedly experience greater cooling in hot environments due to increased openness around the nest (Williams & Colson, 1989). In addition the beams and latticework of powerline towers provide secure nest-anchors against extreme winds (cf. Gilmer & Wiehe, 1977)," which offers one explanation as to why the hawks prefer this proximity to highways (Knight & Kawashima, 1993).



(Knight & Kawashima, 1993)

While hawks and most other diurnal birds of prey are capable of fast decision-making and maneuvering which allows them to avoid fast-moving cars, owls are nocturnal and have adapted to hunt prey using silence, not speed (J. L. Bower, personal communication, June 11, 2020). Barn owls fly low to the ground and are well-adapted to their nocturnal lifestyle, which means they have extremely light-sensitive eyes. A study in northeastern France of grassland roadway Barn Owl deaths analyzed the weight of roadkill owls and found that all dead birds were in good body condition prior to their death except for females in late autumn. The study found that "the peak of traffic and the onset of hunting activity of Barn Owls (following the sunset)" was correlated with "increased mortality of Barn Owls" (Massemin, Maho, & Handrich, 2008). Unfortunately, even though their prey is more concentrated near roadways, Barn Owls are still stunned by road lighting and unable to interpret the blinding lights of fast-moving vehicles (J. L. Bower, personal communication, March 11, 2020). A large percentage of Barn Owls are lost annually to vehicle collisions, while Red-tailed Hawks thrive overall in the very same habitat. My painting juxtaposes the benefits and drawbacks of roadways experienced by these two top predators.

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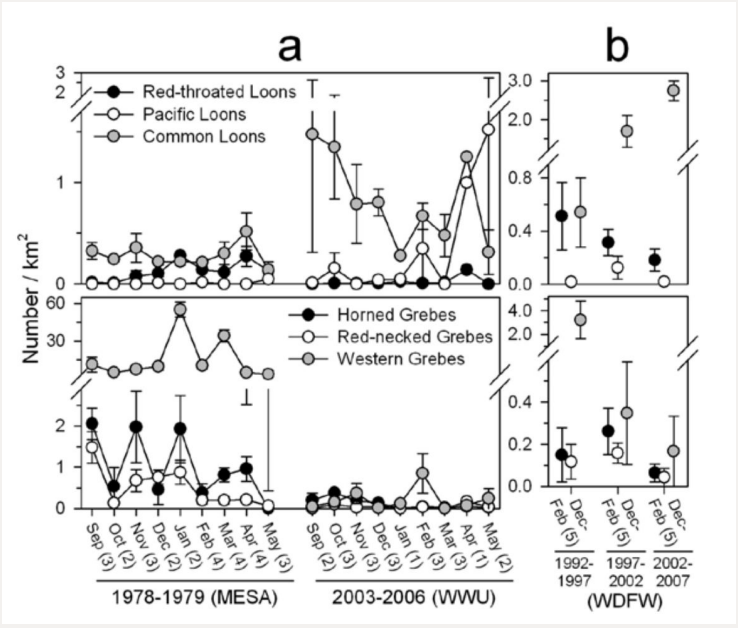
Knight, R. L. & Kawashima, J. Y. (1993). Responses of Raven and Red-Tailed Hawk populations to linear Right-of-ways. *Journal of Wildlife Management* 57:2, 266-271. https://doi.org/10.2307/3809423

Massemin, S., Maho, Y. L., & Handrich, Y. (2008). Seasonal pattern in age, sex and body condition of Barn Owls Tyto Alba killed on motorways. *Ibis*, 140(1), 70–75. https://doi.org/10.1111/j.1474-919x.1998.tb04543.x

western grebe disappearance in birch bay

OIL ON CANVAS
36” x 36”
2020

Western Grebes are large aquatic diving birds with long, slender necks. In the winter, they migrate to marine waters in large concentrations, and are found during the breeding season in freshwater wetlands. Western Grebes disperse and forage at night, and gather in large flocks during the day. In Bellingham, Western Grebes have historically gathered in flocks numbering in the thousands during the winter. One observer in 1974 documented three thousand Western Grebes, saying "this number [was] not at all unusual in [the] 1970s" (Weber, 1974). Nowadays, observers are lucky to see even a few hundred at best. Between the late 1970s to the early 2000s, the combined density of marine birds found in Whatcom County and Puget Sound declined overall, and Western Grebes were some of the hardest-hit species. According to a paper published in 2009, the density of Western Grebes declined from over 50 per square kilometer in 1978/1979 to less than one per square kilometer (Bower, 2009). I reflected this 98% decline by painting 19,150 individual red dots over Western Grebes in Birch Bay, and then painting 383 of them white to represent the remaining grebes in the area.



(Bower, 2009)

Numerous other studies at all seasons have shown an overall decline in Western Grebe populations. There is no singular reason explaining the decline of these grebes, though they are shown to be affected by contamination levels that disrupt endocrine function, oil spills, and habitat degradation. The reproductive success of breeding colonies are especially affected by "wetland draining, pollution and human disturbance" (Bower, 2009). Grebes will abandon their nests when disturbed by humans which drastically lowers their reproductive productivity. Restoring Western Grebes to their past abundance would require habitat restoration and protection as well as researching and monitoring grebe populations.

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Edson, J. M. (1908). Birds of the Bellingham Bay region. *The Auk*, 25: 4, 425–439. https://doi.org/10.2307/4070648

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Washington State Department of Fish and Wildlife. https://wdfw.wa.gov/sites/default/files/publications/01135/wdfw01135.pdf

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