TO PROTECT PRAIRIE SWALLOWS, WE MUST CONSERVE PRAIRIE WETLANDS

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Everyone in Saskatchewan seems to have a story about swallows. Whether it's about being dive-bombed by Barn Swallows at a family farm, or having a family of Tree Swallows in a nest box, people are eager to chat when they hear that I work with swallows. I enjoy trading swallow stories with people, but have noticed that when my accounts relate to swallows in and around wetlands, people are often surprised. *Swallows spend time around wetlands? Why are these little terrestrial birds hanging out with ducks?!*

These questions serve as an excellent launching point for me to share my stories of studying the feeding ecology of swallows in Saskatchewan. In the spring and summer, swallows fill Saskatchewan's skies, swooping left and right in pursuit of flying insects. These movements are more than an aerial ballet, however, as adult swallows must forage nearly constantly for insects to feed their growing nestlings. Unfortunately, several decades of population declines among swallows and other birds that rely on flying insects suggests that the insect communities on which they depend may be changing.[1] Specifically, here in the prairies, it is possible that intensifying agricultural practices — such as wetland loss and greater pesticide use — could be altering the habitats where swallows forage for insect prey.

Now, if you're scratching your head and thinking "don't I remember a *Blue Jay* article on this very topic back in 2020?", you're correct! My interest in the impacts of agriculture on swallows stems from the previous work by a graduate student named Andrew Elgin at the University of Saskatchewan, who did one of the first projects on Tree Swallow foraging in the prairies.[2] As such, the goal for my master's research at the University of Saskatchewan was to expand upon Andrew's work by comparing how agriculture affects the foraging of *multiple* species of swallows. Specifically, I chose to study the foraging habitat use of not only Tree Swallows (*Tachycineta bicolor*) but also Barn Swallows (*Hirundo rustica*). In eastern North America, research has demonstrated that Barn and Tree Swallows use different types of foraging habitat, with Tree Swallows foraging near wetlands, and Barn Swallows spending most of their time foraging in crop fields and meadows.[3,4] However, foraging by both species is less well known in the prairies, and I was curious to see whether these species would exhibit different foraging habitats, and if any such differences would translate into their being differentially affected by agriculture.

To study foraging, I used miniature GPS tags affixed to the back of birds using a harness to track where swallows traveled during the weeks when they were busy feeding nestlings (Figure 1). I studied nesting swallows at 17 different sites during both 2020 and 2021. The tags allowed me to identify where a bird traveled, and to determine what habitat they were feeding over — for example, whether they were flying over cropland, pasture, or wetlands. Talk about spying on birds! Using the GPS data, I compared how frequently birds were detected in different habitats relative to how abundant the habitat was. For example, if 20 per cent of a bird's GPS points were over wetlands, but wetlands covered only 10 per cent of the local area, I concluded that the bird had a preference for wetland habitat.

My data from the GPS tags clearly showed that wetlands were important for both Barn Swallows and Tree Swallows. Both species selectively used wetland habitat, and even though Tree Swallows spent a greater total per cent of their time foraging in wetlands, it was actually Barn Swallows that appeared to more strongly prefer wetlands. My analysis indicated that if all other landscape characteristics were the same, a Barn Swallow was 6.5 times more likely to forage over wetland habitat than over an area of pastureland (Figure 2). Wetlands also had an important influence on how far Tree Swallows traveled to feed; Tree Swallows whose nests were in areas of lower agricultural intensity with many wetlands did not travel as far as birds in more agriculturally intensive areas with fewer wetlands. This reinforces the idea that wetlands are valuable foraging areas, because we expect that birds surrounded by high-quality foraging habitat (like wetlands!) would stay closer to their nests than birds who must travel far to reach high-quality foraging habitat.

In contrast, the GPS data revealed that both species appeared to avoid foraging in areas planted in annual crops. When all other landscape characteristics were the same, Tree Swallows and Barn Swallows were about two times less likely to forage over crops than in pastureland. These results indicate a clear preference among foraging habitats: wetlands are the most preferred, pastures and other uncropped upland habitats are in the middle, and cropped areas appear to be the least desirable.

So what does this all mean for swallows?

Firstly, prairie wetlands appear to be important foraging habitat for swallows, even for species that we don't "traditionally" associate with wetlands, such as Barn Swallows. Even in highly agriculturally intensive landscapes, both swallow species seemed to prefer wetland habitat, suggesting that wetlands are important sources of insect prey. Secondly, my study suggests that agriculturally intensive cropped habitat is poor foraging habitat for both Barn and Tree Swallows. It is well documented that cropped habitats often have lower

FIGURE 1. A female Tree Swallow with a GPS tag. The tag recorded an individual bird's location every 10 minutes for one day. Tag deployment followed procedures approved by the University of Saskatchewan Animal Care Committee.

insect abundance, so birds may simply be avoiding areas where there is less prey. Cropped landscapes are often also highly simplified, with features like wetlands having been drained or contaminated with pesticides.[5] To be clear, this is not to say that swallows nesting in highly intensive areas will have poorer breeding success; that is a different question that a fellow master's student has investigated (results will hopefully be published soon!). My findings simply suggest that in terms of foraging, highly intensive landscapes are less desirable places for swallows to search for insects.

The results of my study, combined with other research, highlight the importance of wetlands to swallows in Saskatchewan. Research has shown that insects that emerge from wetlands, like mosquitoes, contain high levels of compounds called fatty acids that are important for the growth of young birds.[6] Building on this, research from near Humboldt, SK has suggested that in areas with high wetland presence, Tree Swallows are able to selectively forage on enough highly nutritious insects that contain fatty acids to help offset the negative impacts of highly intensive agriculture.[7] My study complements these findings by underscoring how strongly both Barn and Tree Swallows preferred wetlands for foraging; even though I collected data at 17 different study sites and during two different years, swallows reliably showed the same pattern of wetland use and crop avoidance.

My work joins multitudes of studies that highlight the importance of prairie wetland conservation. Conservation of wetland habitats, as well as uncropped uplands, is likely important for the maintenance of aerial insectivore populations in the Canadian prairies. Given that prairie populations of Barn and Tree Swallows constitute large proportions of their respective Canadian populations, conserving important foraging habitats in the prairie region should be a continent-wide conservation priority. Additionally, my project is the first research to show the importance of prairie wetlands for Barn Swallows — just think how many other species there may be for which we do not yet appreciate the importance of wetlands!

Taken together, these points underscore the urgent need for wetland conservation incentives and enforcement of stronger legal protections. Saskatchewan is the only province without a comprehensive wetland conservation policy and, as a result, the province continues to lose approximately 4,125 hectares of wetland annually.[8] Sadly, the wetland drainage guidelines recently proposed by the Water Security Agency would only accelerate wetland loss. If adopted in 2025, this policy would permit farmers to drain up to 80 per cent of the wetlands on their property, which could total approximately two million acres — an area that is 1.4 times the size of Prince Edward Island! While the economic pressures on farmers that are used to justify this policy are certainly real, wetland drainage is not the answer. Instead of implementing regressive

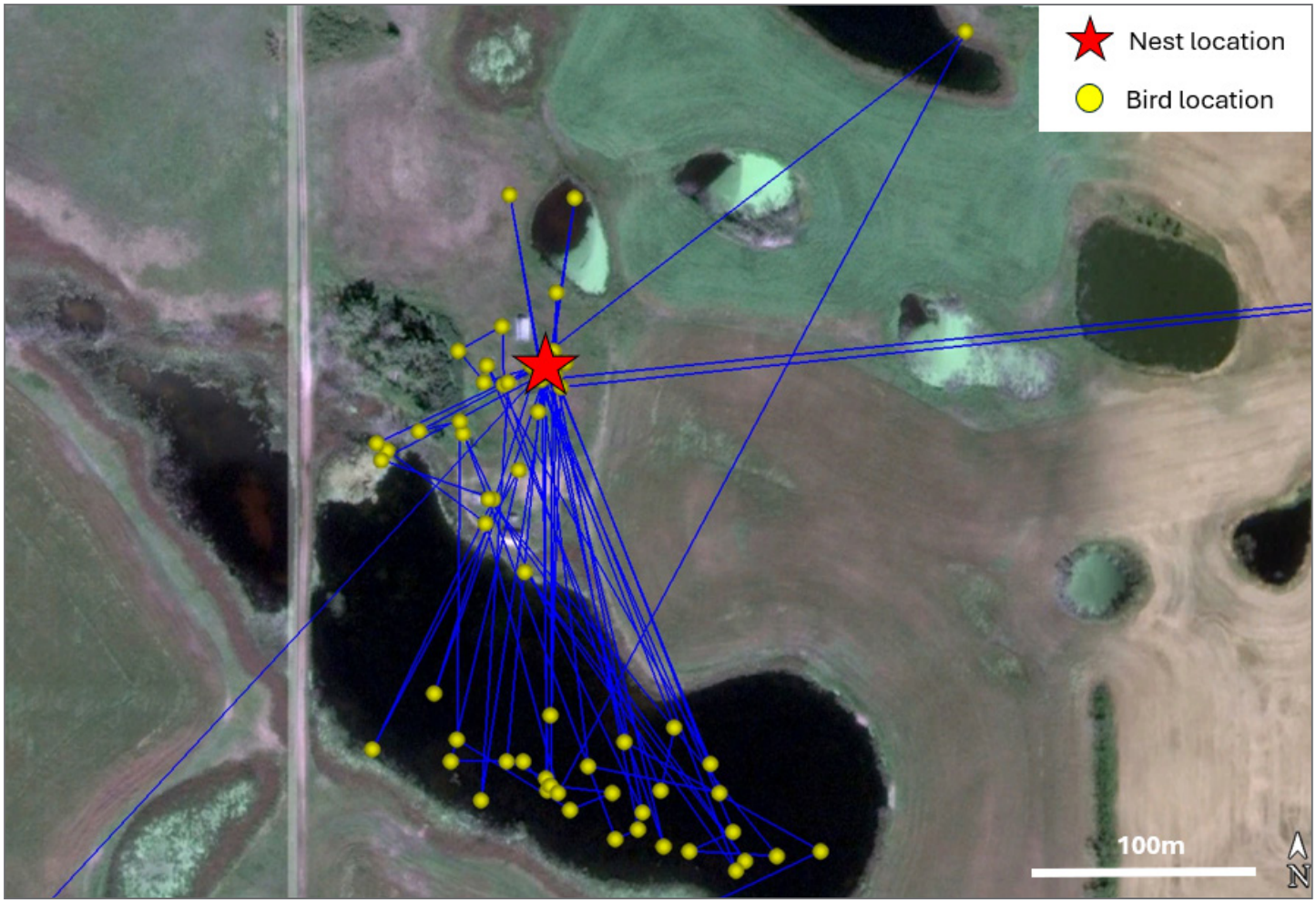

FIGURE 2. Map of points where a GPS tag recorded an individual female Barn Swallow on a single day in 2020. A star marks the Barn Swallow's nest location, and each yellow circle represents a location where the bird was recorded. The lines mark the route traveled. Two GPS points far from the nest are not shown on this map for visualization purposes. Even though Barn Swallows are not typically considered to be associated with wetland habitats, this Barn Swallow showed a clear pattern of traveling over, and presumably foraging above, the large wetland south of her nesting location. Points overlain on Google Earth imagery, © 2024 Maxar Technologies.

policies, including charging a $1,000 fee to file a claims of illegal wetland drainage, our leaders should strive to adopt modern wetland conservation policies like those in Manitoba and Alberta. If wetland destruction is allowed to continue unchecked, and indeed worsen under the proposed policy, swallows and other wildlife will certainly suffer due to our leaders' short-sightedness.

As I reflect on my time studying swallows, one thing that particularly sticks with me is how these birds connect people to the natural world. Everyone can appreciate the beauty of these nimble aerial acrobats, and people are usually genuinely interested when I talk about the importance of wetlands for swallows and other wildlife. When my stories about swallows help people realize that wetlands are a key habitat for more than just ducks and geese, that's an exhilarating feeling! I hope that next time you see a swallow, you will think not only about how beautiful they are, but also about wetlands. And, if this article has made you ponder other questions about swallows — say you are wondering what swallows actually eat as a result of their wetland foraging — stay tuned! Diet composition and dietary insecticide exposure were two other aspects of my master's thesis, and I hope to share the results of those studies in a future *Blue Jay* article.

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