



Photo by Tom Reed

Habitat Selection of Northern Harriers in Grasslands and Coastal Wetlands in Humboldt County, CA

by Riley Sullivan

Department of Wildlife and Fisheries, Cal Poly Humboldt, Arcata, CA, 95521



Photo by Steven Sachs

Background

- The Northern Harrier (*Circus hudsonius*) is a species of medium-sized hawk found in North and Central America.
- Northern Harriers are widely viewed as a grassland and prairie species. The literature covering their habitat use of other areas is relatively scarce.
- C. hudsonius* is also known to occupy coastal wetlands, but very little is known about their selection and usage of this habitat.

Objective

Comparing the habitat usage and selection of Northern Harriers between a coastal wetland and an agricultural grassland.

Hypothesis

Northern Harriers would be observed at higher rates in a grassland and pasture habitat due to ease of detectability and the openness of the landscape aiding in foraging for rodents.

Methods

- A total of 30 randomly-generated points were evenly divided between the Arcata Marsh and Wildlife Sanctuary and the Arcata Bottoms. Each site was designated a unique number.
- A 50-meter-radius, 10-minute point count was conducted at each of these points twice, with site visits being decided via random number generator.
- Plot ID number, start and end times of each point count, number of Northern Harriers sighted, temperature, precipitation, and cloud cover were recorded every point count.
- Data comparing the number of *C. hudsonius* sightings between the Arcata Marsh and the Arcata Bottoms was analyzed using a chi-squared test.

Study Area

The Arcata Marsh and Wildlife Sanctuary

- 15 points were randomly generated in the Arcata Marsh and Wildlife Refuge in an area roughly 886,000 m² (Figure 1). The area is a large tidal wetland consisting of mud flats, brackish ponds, and freshwater marshes with high bird species diversity (Fowler and Fix 2014).

The Arcata Bottoms

- 15 more points were randomly generated in the Arcata Bottoms in an area roughly 8,030,000 m² (Figure 2). The Mad River Slough area was avoided due to permitting restrictions. The area primarily consists of open agricultural fields dominated by pasture grasses. This habitat is associated with large rodent populations, which are the preferred prey of *C. hudsonius* (Lovera et al 2019).

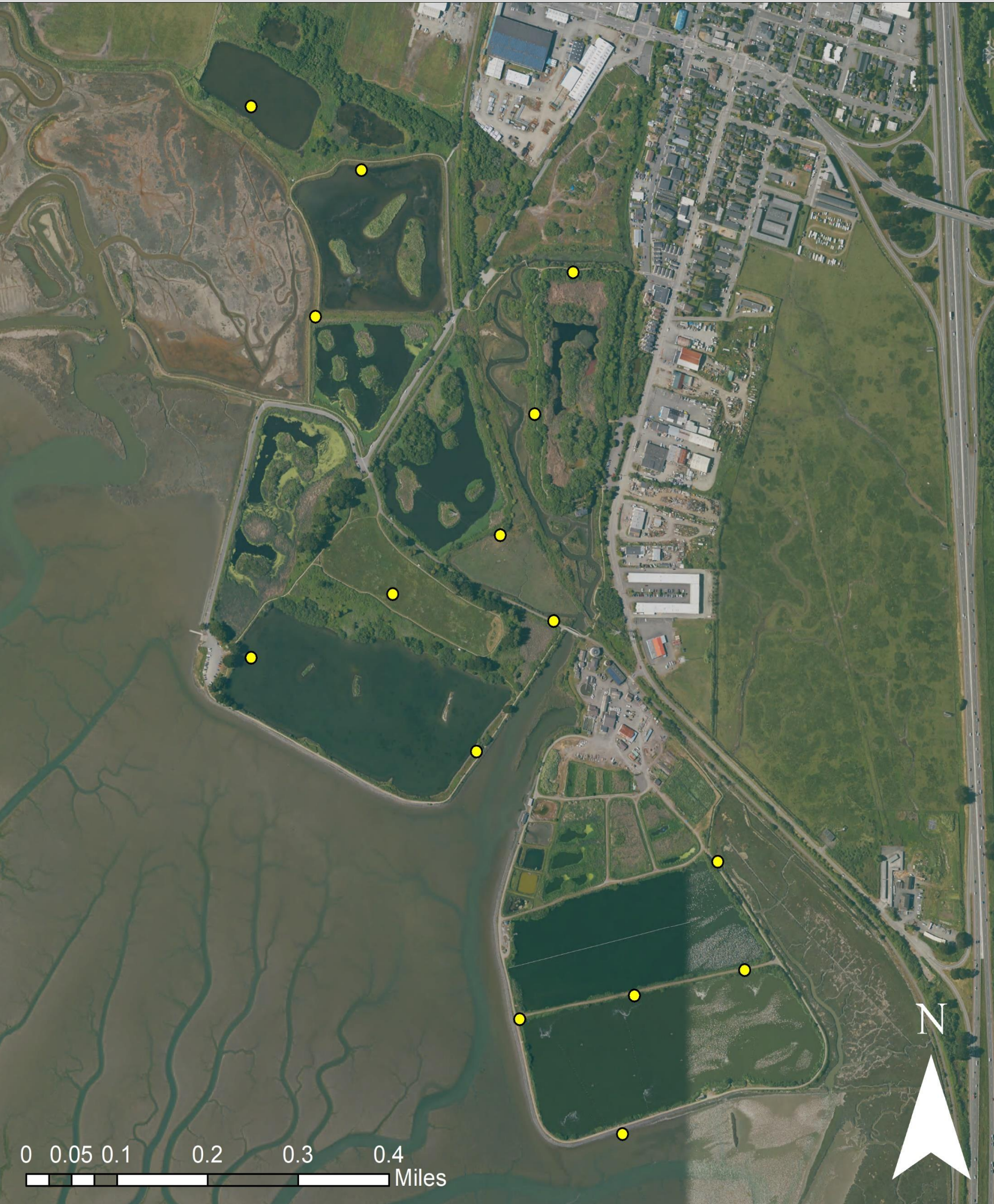


Figure 1. Sampling plots within the Arcata Marsh and Wildlife Sanctuary.



Figure 2. Sampling plots within the Arcata Bottoms.

Discussion

- There was no significant difference in the rate of Northern Harrier observations between the Arcata Marsh and the Arcata Bottoms.
- This implies that they may be demonstrating some selection of wetland habitat, but further study is needed to determine if this goes beyond a local phenomenon.
- Further research should likely occur over a longer study period and involve more frequent sampling to yield a larger sample size.

Conservation Implications

- Because the Northern Harrier is seen as a grassland specialist, it is frequently lumped into management plans for grassland birds in general (Littlefield and Johnson 2005).
- This species' usage of wetlands indicates that more wetland conservation actions within their range should take the conservation of *C. hudsonius* into account.
- Further addressing this knowledge gap is vital to understanding how Northern Harrier habitat usage and selection responds to emerging conservation threats, especially as raptors face significant population declines worldwide (McClure 2018).

Acknowledgments

I give my thanks to D. Sinn for his invaluable guidance and patience during my work on this project. Additionally, I would like to thank the City of Arcata for permitting me to sample the Arcata Marsh and Wildlife Sanctuary.

Literature Cited

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Results

- 12 Northern Harrier sightings were recorded over 60 total site visits (Table 1).
- Despite more total Northern Harrier sightings in the Arcata Marsh, *C. hudsonius* was observed in the Arcata Bottoms at a similar rate when the chi-squared test was adjusted to account for the dramatic size difference between these two study areas (P = 0.7518).

	Harrier Detections	No Harrier Detections	Site Visits
Arcata Marsh	9	21	30
Arcata Bottoms	3	27	30
Total	12	48	60

Table 1. Number of *C. hudsonius* detections and total site visits between the Arcata Marsh and the Arcata Bottoms.