



Effects of Industrial Linear Landscape Features on Grassland Songbirds

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One of the most threatened habitats globally is grasslands, which continue to experience widespread declines due to land use conversion and fragmentation, including through industrial development. Grassland loss, which ranges from 57% in the Dry Mixedgrass region, to nearly 90% in the Aspen Parkland of Alberta, has negatively affected many bird species that rely on these critical habitats for survival.

A research project that recently concluded at the University of Alberta Mattheis Research Ranch in southeastern Alberta assessed the impact of high voltage transmission line construction on birds in this region of the Mixedgrass Prairie. Early surveys of bird diversity from 2012 through 2013 indicated more than 100 different bird species were found across a network of 168 sample plots distributed across the 3500 hectare study area. Select sample plots from this initial investigation were resampled during the spring breeding seasons of 2016 and 2017 by Caroline Martin, an MSc student in the Department of Renewable Resources working with



MSc student Caroline Martin watching birds at sunrise at Mattheis Ranch.

Drs. Scott Nielsen and Edward Bork, following the construction of two high voltage transmission lines (2014-15) built to redistribute power regionally across the province.



Baird's sparrow at Mattheis Ranch.
Photo by Caroline Martin.

Field data on bird richness and composition from before and after construction were used to evaluate the effects of transmissions lines, as well as primary and secondary highways traversing the study area. Overall, bird species richness generally did not differ between the pre- and post-construction sampling periods, but tended to be greater in plots near highways. Plots in close association with transmission lines tended to have more corvids (e.g., ravens, crows and magpies), while perching songbirds were more common in non-disturbed areas further from transmission

lines. Among six focal grassland bird species examined, divergent responses were evident to the new transmission lines, with some positively affected (Baird's sparrow, grasshopper sparrow, long-billed curlew), some negatively (Brewer's blackbird, Eastern kingbird), and others unaffected (marbled godwits).



Collecting plant data at Mattheis Ranch. Photo by Caroline Martin.

A second component of this study examined the effects of transmission lines on bird mortality. Using search surveys of transects located directly under lines, adjacent to highways, and in control (no development) areas, a total of 47 mortalities were found under transmission lines, 9 adjacent to roads, and none in open grassland. When these results were combined with the results of concurrent detectability and scavenging trials, an estimated 1,948 birds were projected to perish during each spring migration. Given the amount of transmission lines within the Mixedgrass Prairie (3800 linear km), and potential for mortality during both the spring and fall migrations, estimates of mortality in this region may exceed 192,000 birds. These findings highlight the need for

more information on the impact of habitat loss and fragmentation, including from industrial disturbance, on bird communities across the prairie region.



Left: Clay coloured sparrow; Right: Western Meadowlark. Photos by Caroline Martin.