

Comparing Butterfly Species at the Beaverhill Natural Area between 2017 and 2018

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Introduction:

The Beaverhill Natural Area (BNA) is located 8 km east of Tofield, Alberta and contains diverse habitats for butterflies. The land surrounding the BNA is uncultivated; however, the BNA contains numerous ecotypes allowing both prairie and boreal species to be present (Flockhart, 2002). The BNA is dominated by aspen forest, but also showcases ponds, wetlands and marshes (Flockhart, 2002). In recent years, an intern has conducted surveys to establish data on butterfly abundance and diversity. This unique data set can be used in future studies or research. However, data sets will vary due to development of adjacent land and availability of the intern conducting the surveys. For this internship I compared butterfly species between 2017 and 2018 to further document population fluctuations.

Methods

To maintain consistencies with previous years, surveys were conducted once a week by the author, and a volunteer between May 12 and August 23. Before initiating the survey, I recorded the time, date, temperature, cloud cover and wind strength. The surveys were conducted after 10 AM and before 5 PM to increase the probability of butterfly sightings. Weather was also a limiting factor for conducting the survey, since wind had to be less than 4 on the Beaufort scale, and temperature had to be greater than 15°C with little to no precipitation. Cloud cover was estimated by the observers. Two routes that were surveyed in previous years were surveyed in 2018 (Figure 1). Butterflies that were distinguishable in flight were recorded, whereas butterflies that needed further identification were caught with a hand net and photos were taken of the dorsal and ventral side and later identified using the Alberta Butterflies guidebook by Bird et al. (1995). Butterflies that I was unable to catch or identify were recorded as

unidentified. The surveys took approximately 1-2 hours depending on weather and the time allocated to catch unknown species.



Figure 1. The location of Route A highlighted in Green, and Route B highlighted in Blue within the Beaverhill Natural Area.

Results

I completed 9 surveys and there was a total of 241 individuals seen or captured, and 20 species documented (Table 1). In total there were 590 minutes allocated towards field surveys. I also calculated the number of butterflies seen per minute for routes A and B to eliminate the bias of the search effort between the two years (Table 2).

Table 1. The number of individual butterflies observed on each survey A-B in 2018.

Table 2. Comparison of butterflies seen per minute between 2017 and 2018

	May 2017	May 2018	June 2017	June 2018	July 2017	July 2018	August 2017	August 2018
Butterflies Per Minute	0.06667	0.22105	0.31250	0.23226	2.6111	0.4000	0.42553	0.64091

Discussion

Completing butterfly surveys consistently allows researchers to use them for further studies such as environmental health assessments. For this study I compared species diversity between this year, 2018, and 2017.

There were 241 total sightings in 2018, compared to 1138 total butterfly sightings in 2017. For total sightings I added all identified individuals, excluding unidentified individuals, and for 2017 I excluded routes C and D. The difference in total sightings may be a result of the number of days conducting surveys, 23 days in 2017, compared to 9 days in 2018, and total survey time. Total time for surveys was 590 minutes in 2018, whereas for 2017, it was 1125 minutes.

Species richness remained relatively consistent between the years, with July having the largest difference (Figure 2). This difference could have been a result of many factors that could include, but not limited to: observer experience, interns' availability, and survey limitations such as weather. In July, 12 species were recorded in 2017, whereas only 9 were recorded for 2018. Species that were recorded in 2017 that were not present in 2018 were the Silvery Blue, Northwestern Fritillary and the European Skipper. European Skipper sightings were the primary reason for the large difference in sightings between years. Skippers often require grassy habitats to forage and reside. The difference may be the result of the interns availability and total time allocated to surveying or the absence of European Skippers in 2018. In Flockharts "The Butterfly Fauna of Beaverhill Lake, AB." species richness was the

greatest during the month of July. The interns availability to conduct surveys was limited to only two surveys in July 2018, whereas a total of six surveys were completed in 2017 with more species documented. Weather variation may have influenced overall species diversity as on numerous occasions route B was flooded and therefore unable to conduct surveys resulting in less grassy habitats, and more pond/ marsh ecosystems. Since the intern for 2018 had a regular volunteer assistant, this could have aided in the sightings, and therefore documentation of butterfly species. In 2017 surveys were conducted by an individual. This may have led to the difference in species not seen in 2017 such as the Hobomok Skipper and the Green Comma. More butterflies were seen per minute in June and July 2017 than in 2018 (Table 2).

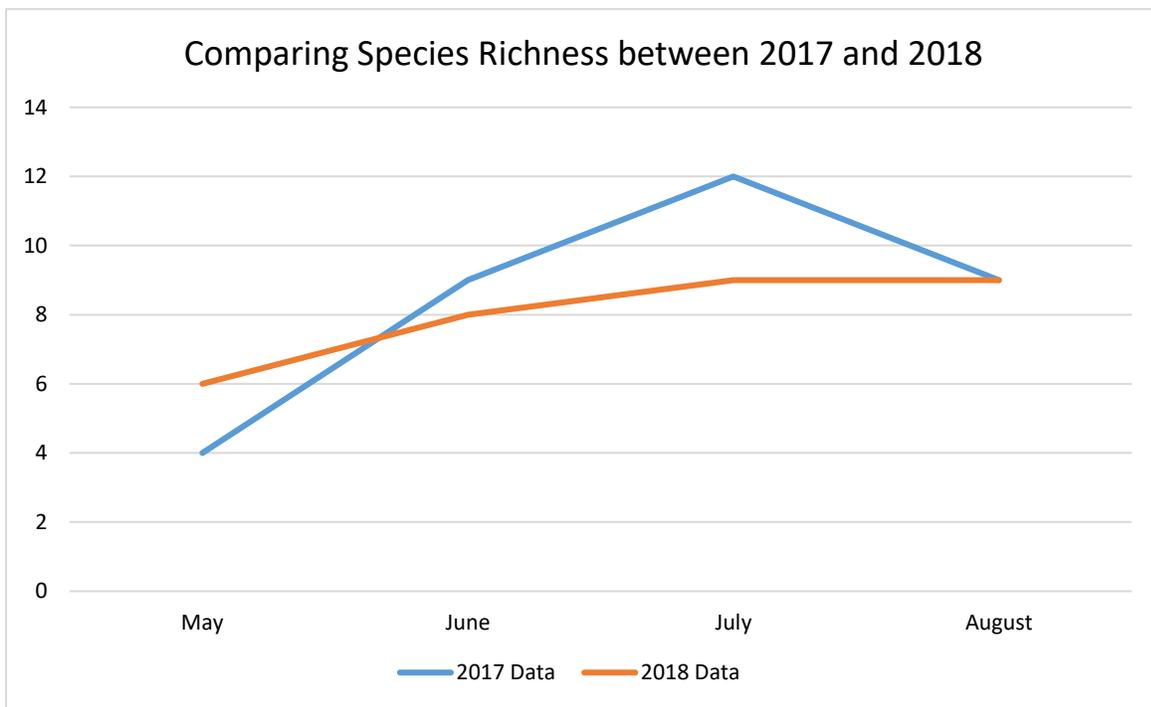


Figure 2. Comparison of Butterfly Species Richness between 2017 and 2018

Conclusion

Overall, a notable difference was that total sightings in 2018 were significantly lower compared to last year's; however, this may have been a result from the number of surveys conducted and the overall time dedicated to surveying. Species richness remained relatively the same between 2017 and 2018, where the month of July had the largest difference possibly due to the difference in number of surveys. European Skippers were more abundant in 2017 and many factors could have resulted in this drastic difference, like foraging opportunities and time allocated to surveying. Further research on the topic would aid in how butterfly populations are fluctuating with an increasingly disturbed landscape, how vegetation and weather can impact butterfly populations and what role we have to further document this topic. Future research should continue to study the diversity of butterflies in the Beaverhill area. For future research I recommend documenting areas that are more susceptible to disturbance as this is inevitably a result of adjacent lands becoming cultivated. There may be an abundance of species that prefer wooded areas and ecosystems where limited water accumulation may occur.

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