

# 2024 Karner Blue Butterfly Summer Survey Results

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## MONITORING:

Within the WDNR Karner blue butterfly Recovery Program, monitoring throughout the Karner's range consists of two types of survey efforts; population surveys, which are conducted using a highly intensive survey method (distance sampling) and occupancy surveys, which are conducted using less intensive survey methods (occupancy - presence/absence). Population surveys allow us to view a snapshot of what a specific site population level is estimated to be at that point in time. Occupancy surveys allow us to survey a greater number of sites and estimate the occupancy, detection, colonization and local extinction rates of the species. These estimates give us a larger picture view of the species health and its metapopulation dynamics across the state.

### *Population Surveys (distance sampling):*

In 2024, 305 acres across 7 sites in 7 counties were surveyed using the higher intensive survey method of distance sampling to estimate local population size (Figure 1). A total population of 8,861 individuals was estimated on those 305 acres (Table 1A). The number of individuals estimated is highly dependent on the effort, or number of acres surveyed, which varies annually, meaning these numbers are not directly comparable without standardization.

To examine trends across years and among sites we calculate the number of butterflies estimated per acre surveyed. When comparing butterflies per acre, we saw a 36% decrease in the total estimated number of butterflies per acre compared to 2023 (Figure 2). The number of butterflies per acre in 2024 was the lowest when compared to all 17 survey years. In 2024, the estimated total number of butterflies per acre (29) fell below the average number of individuals (93 butterflies per acre) over the study period across all sites. Populations throughout the state

fluctuate every year, meaning not every population will increase/decrease at the same time/rate. Each of the properties surveyed have been broken down into estimated butterflies per acre surveyed and can be found in the Appendix.

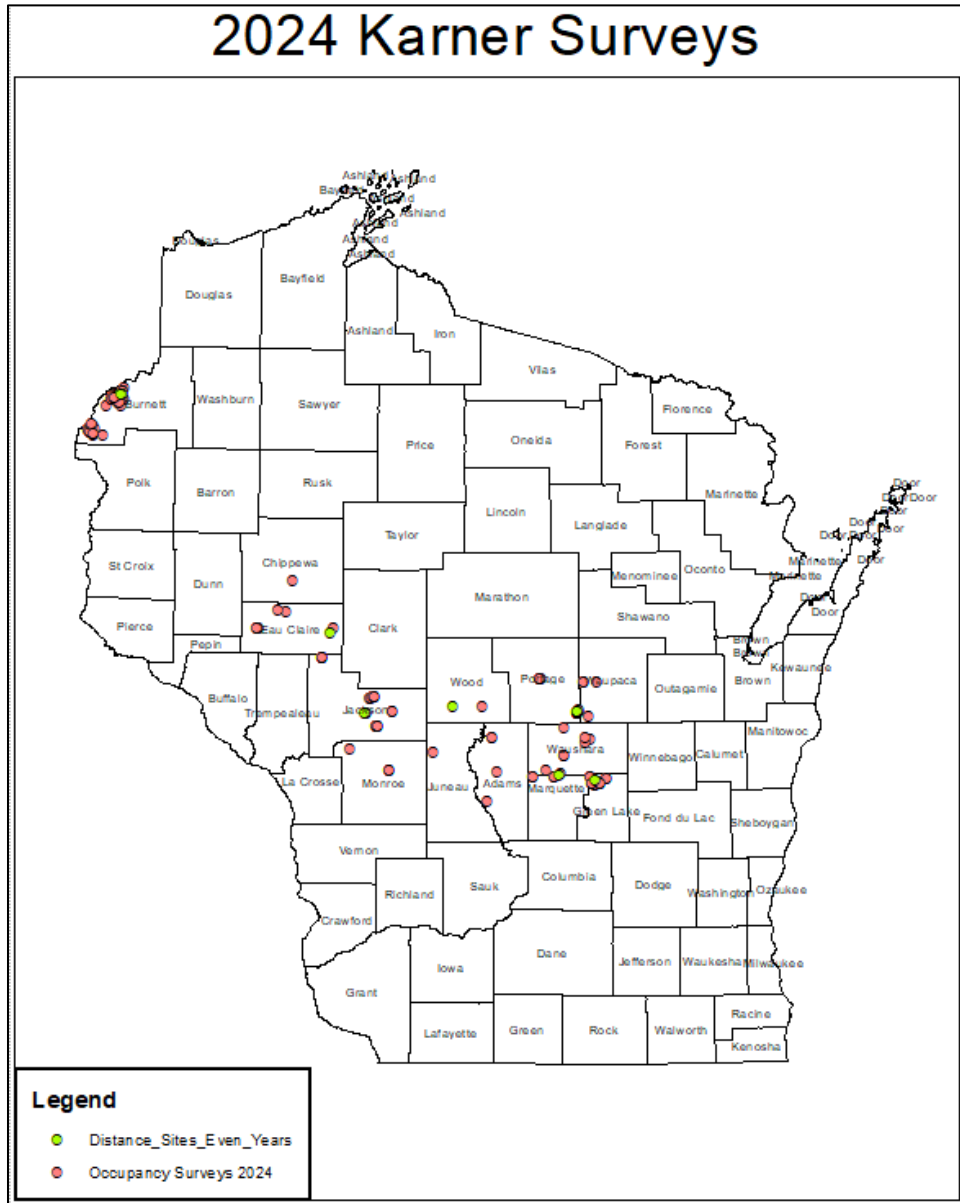
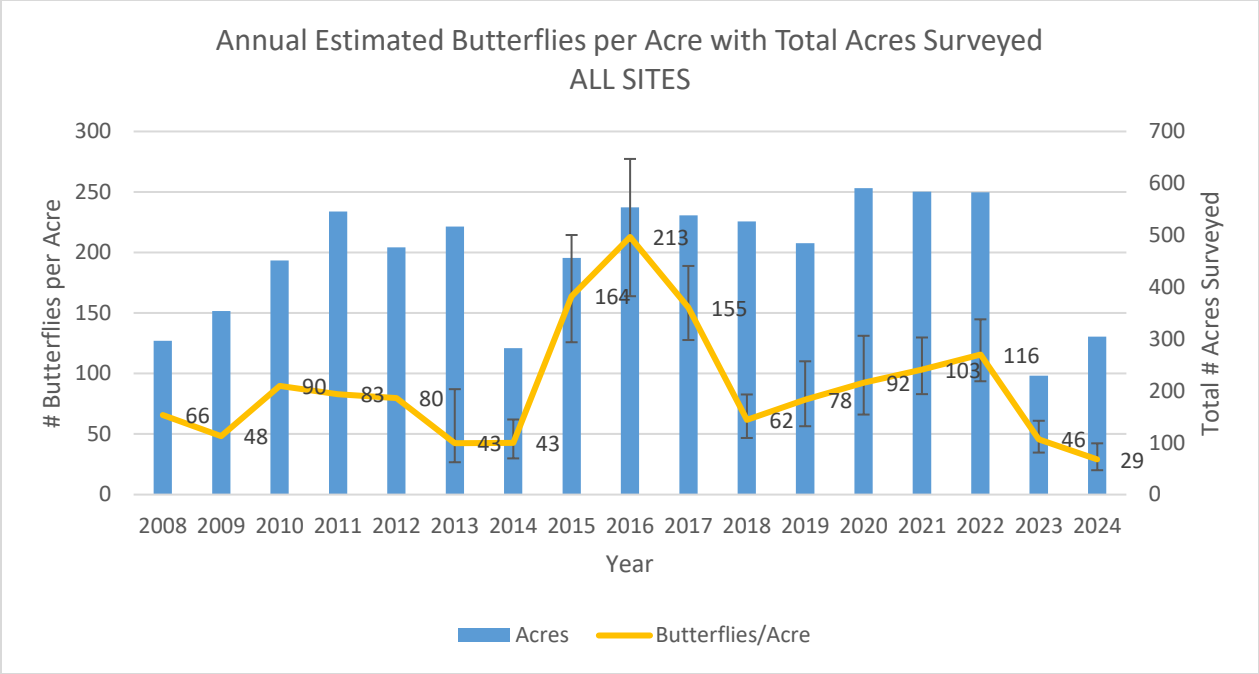


Figure 1. Wisconsin Karner Blue Butterfly Recovery Program monitoring effort in 2024.



**Figure 2.** Annual estimated number of Karner blue butterflies per acre surveyed at all sites with 95% confidence levels.

**Occupancy Surveys:**

For the 2024 field season, just under 200 acres were surveyed using the lower intensive sampling method. These observations come from a variety of sources including contract crews, DNR staff and participants in the [Karner Volunteer Monitoring Program](#). A total of 141 observations were submitted. Majority of these observations (56%) came from volunteers. Volunteers contributed 190 hours of field time to Karner surveys. Observers visited 95 sites in 2024 and of those, 60 sites had Karners present making the naïve occupancy 0.63 for 2024 (Table 1).

**Table 1.** Annual naïve occupancy rates for all sites surveyed and same sites surveyed.

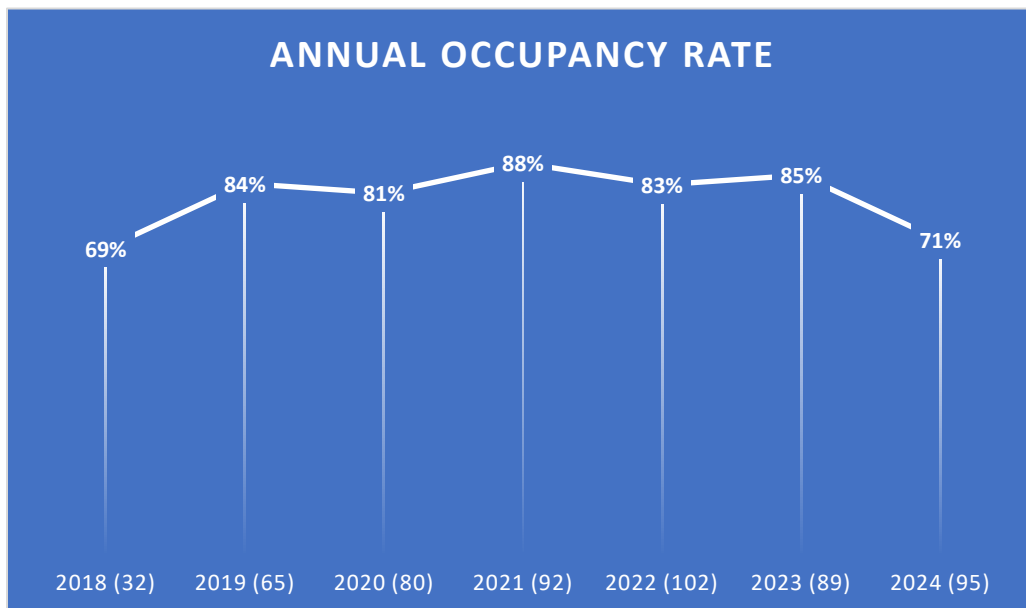
Naïve Occupancy		
Year	All Sites	Sites Surveyed Every Year
2018	0.688	
2019	0.815	
2020	0.788	
2021	0.870	
2022	0.794	0.900
2023	0.775	0.800
2024	0.632	0.567

Utilizing these data, we can estimate occupancy rate (proportion of sites that are occupied), colonization rate (proportion of successful colonizations of unoccupied sites), and local extinction rate (proportion of formerly occupied sites becoming unoccupied). Based on these data, Karners are found to be consistently detectable at 0.9 (Table 2). Probability of extinction is 0.08, whereas colonization probability is 0.31, showing colonization is still occurring more frequently than local extinction suggesting Karners are persisting within their Wisconsin habitats (Table 2).

**Table 2.** Detection, extinction, and colonization rates with standard error estimated from 2018-2024 data.

2018-2024		
Parameter	Estimate	Standard Error
Detection Probability	0.90	0.0146
Colonization Probability	0.31	0.0832
Extinction Probability	0.08	0.0186

Occupancy rate is calculated each year and was lower this year at 0.71 than in 2023, indicating fewer surveyed sites were occupied (Figure 3).



**Figure 3.** Annual Karner occupancy probability with standard error calculated in R. Number in parentheses represent number of sites surveyed per year.

In conclusion, Karner populations were lower in 2024 but site colonizations continued to occur more frequently than local extinctions. A likely contributing factor to the reduced population estimates is the summer drought in 2023 (5<sup>th</sup> driest on record) followed by an extremely wet 2024. The summer of 2024 ranked as the 6<sup>th</sup> wettest summer on record for Wisconsin. And the spring was exceptionally wet ranking as the 4<sup>th</sup> wettest spring on record. Anecdotally, heavy spring/early summer rain benefited lupine but may have negatively impacted Karner 1<sup>st</sup> flight emergence. Continued monitoring will determine the duration and extent of current trends.

Interested in helping Karners & other pollinators? Check out these resources:

- [Saving Wisconsin's Native Pollinators](#)
- [How You Can Help](#)
- [Native Plant Resources](#)

## FUN FIND!



DNR Staff came across Karners on public lands, in Chippewa county! This is the second known Karner record in Chippewa county (the first being from 1996).

*Interested in joining the Karner Volunteer Monitoring Program?  
Click [here](#) to learn more or e-mail [Chelsean.Weinzinger@wisconsin.gov](mailto:Chelsean.Weinzinger@wisconsin.gov) to sign up!*

## Appendix

**Table 1A.** Karner population estimate per recovery property. Estimates are not directly comparable due to varying number of acres surveyed each year. Note that 2023 was the first year in which a new sampling approach was instituted where only half of the sites will be visited each year, leading to a much smaller overall estimate.

WI KBB Population Estimate by Recovery Property								
RU	Property	2018	2019	2020	2021	2022	2023	2024
GL	Sandhill W.A.	12,692	3,159	18,066	32,504	38,533	-	3,279
MS	Emmons Creek F.A.	1,629	4,173	3,933	1,939	1,224	370	137
	Hartman Creek S.P.	-	-	-	-	-	-	-
	Welch	3,183	10,154	5,361	5,660	9,487	5,306	-
	Greenwood W.A.	-	-	-	-	-	-	-
	White River W.A.	1,987	6,124	1,560	3,286	4,108	2,795	1,555
	Private Property 1	2,356	2,433	4,973	3,058	1,521	353	464
	Private Property 2	1,860	3,889	1,487	2,140	8,105	-	1,719
	Private Property 3	1,030	1,677	1,093	-	-	-	-
WCD	Black River S.F.	5,375	4,852	6,568	2,476	799	606	-
	Bauer Brockway SNA	372	0	569	1,209	446	-	375
SO	Crex Meadows W.A.	871	355	2,935	2,430	156	-	-
	Fish Lake W.A.	1,186	1,216	3,006	2,256	498	640	-
ESP	Canoe Landing Prairie SNA	-	-	2,203	1,567	1,153	390	-
	Coon Fork Barrens SNA	-	-	2,816	1,779	1,284	-	1,332
<b>Total Population Estimate</b>		<b>32,541</b>	<b>38,032</b>	<b>54,570</b>	<b>60,304</b>	<b>67,314</b>	<b>10,460</b>	<b>8,861</b>

# Wisconsin Karner Blue Butterfly Recovery Units

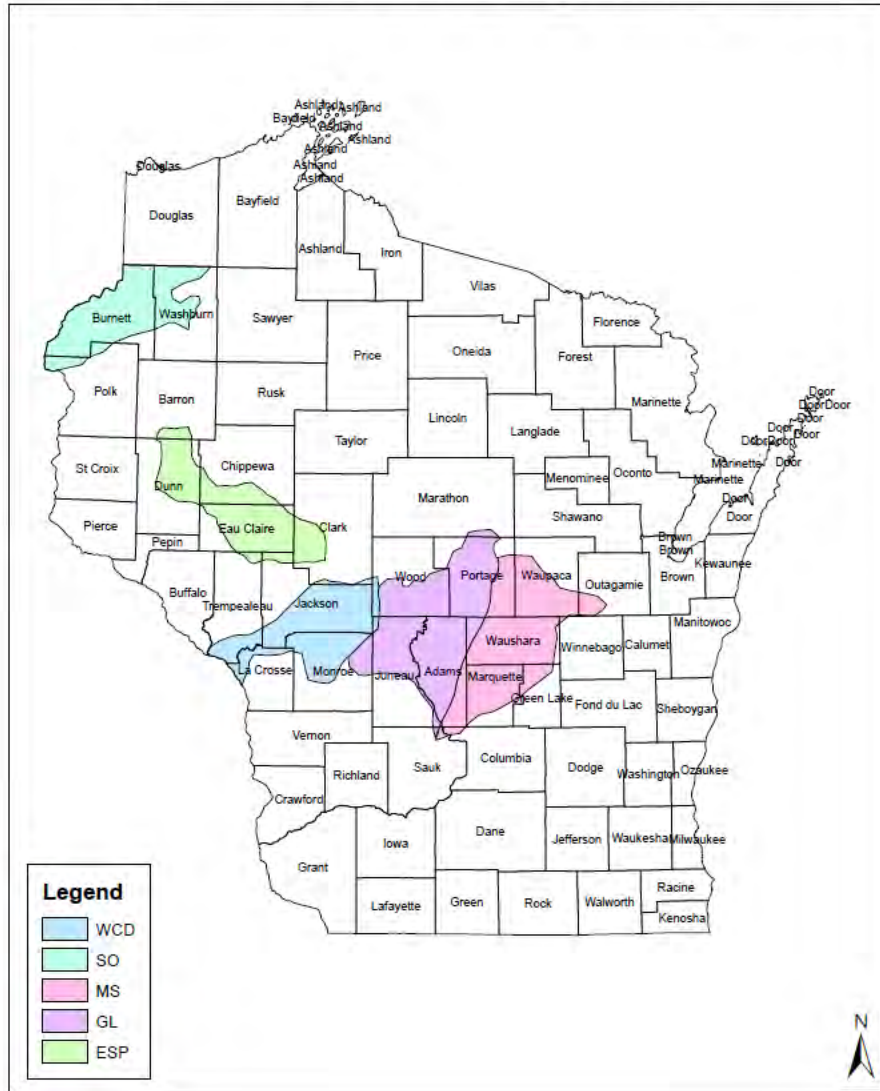
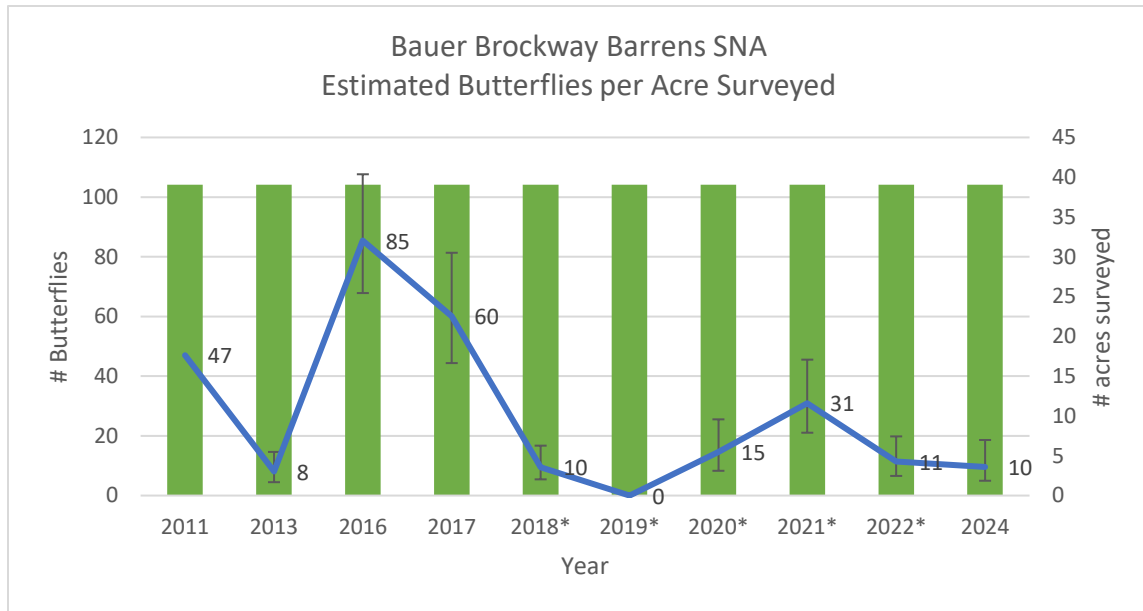


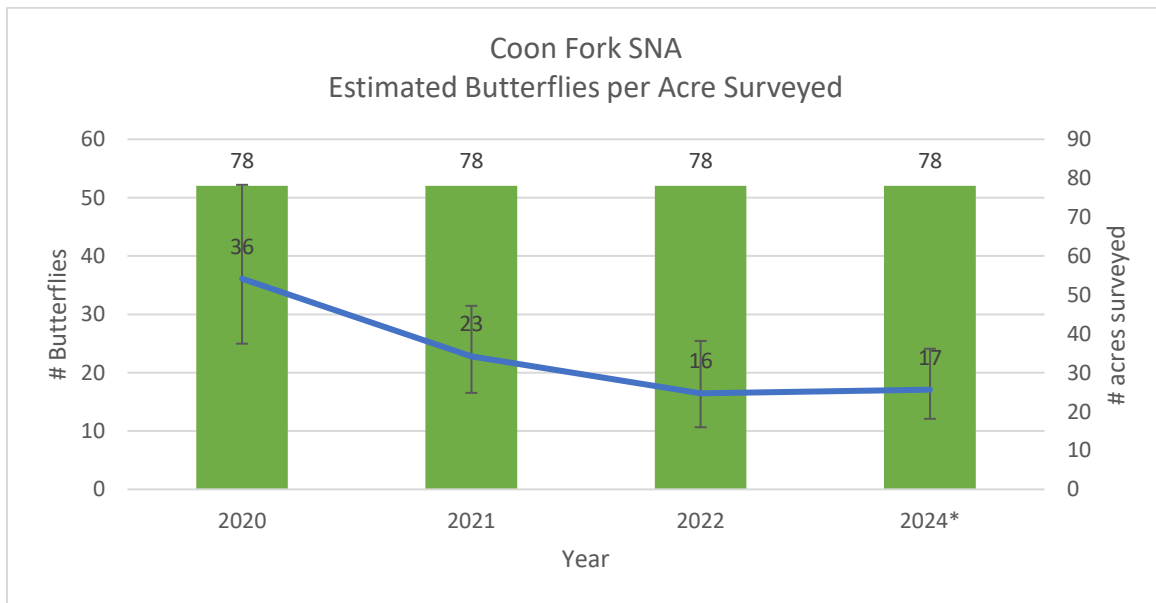
Figure 1A. Breakdown of Recovery Units in Wisconsin.

**West Central Driftless Recovery Unit (WCD)**



**Figure 2A.** Annual estimated number of Karner blue butterflies per acre surveyed at Bauer Brockway Barrens with confidence levels. Some estimates come from years where model assumptions were violated, making them less reliable (starred years).

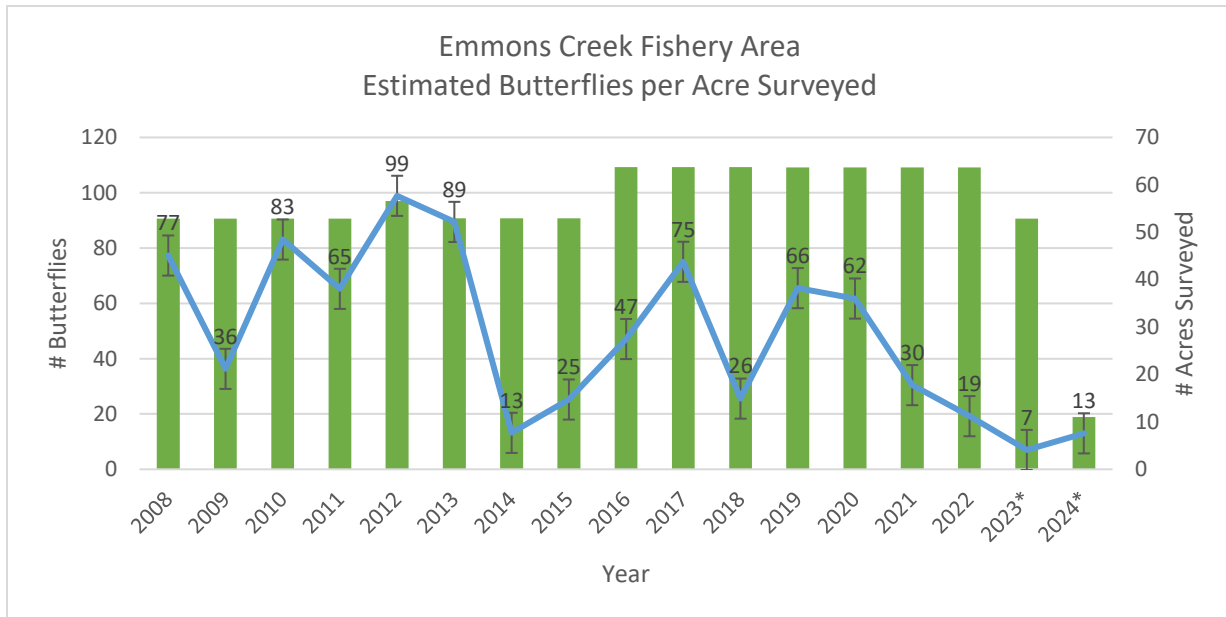
**Escarpment & Sandstone Plateau Recovery Unit (ESP)**



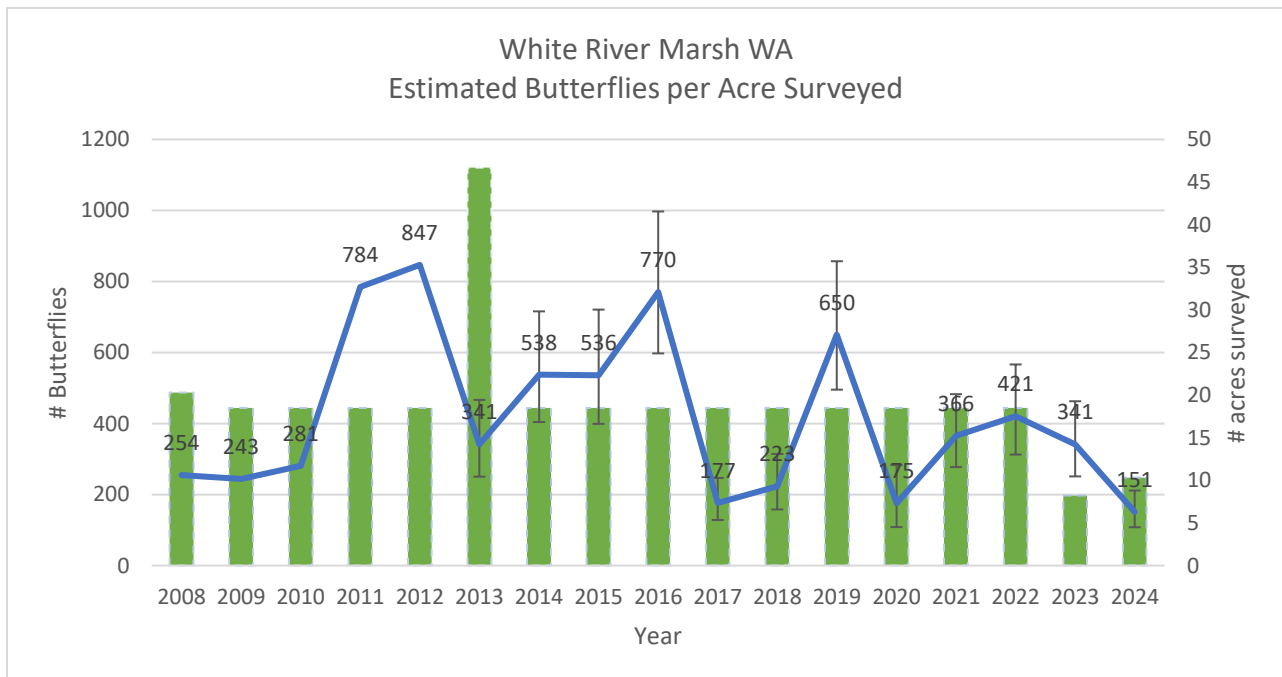
**Figure 3A.** Annual estimated number of Karner blue butterflies per acre surveyed at Coon Fork State Natural Area with confidence levels. Some estimates come from years where model assumptions were violated, making them less reliable (starred years).



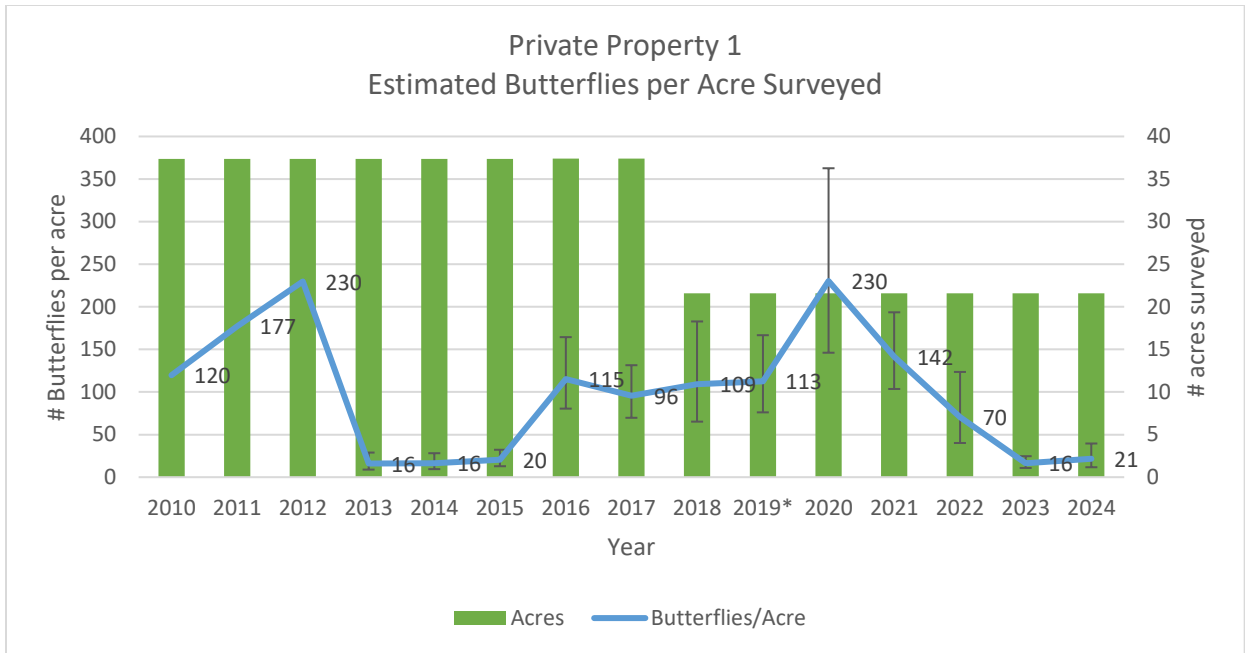
**Morainal Sands Recovery Unit (MS)**



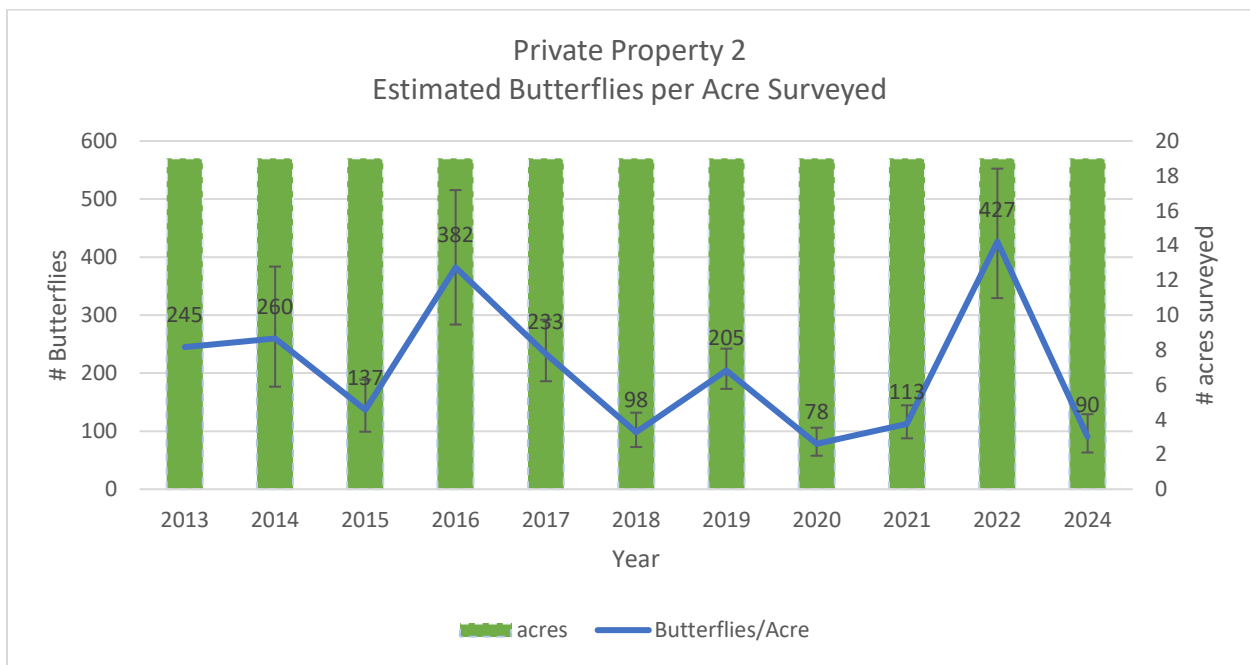
**Figure 5A.** Annual estimated number of Karner blue butterflies per acre surveyed at Emmons Creek Fishery Area with confidence levels. Some estimates come from years where model assumptions were violated, making them less reliable (starred years).



**Figure 6A.** Annual estimated number of Karner blue butterflies per acre surveyed at White River Marsh Wildlife Area with confidence levels.

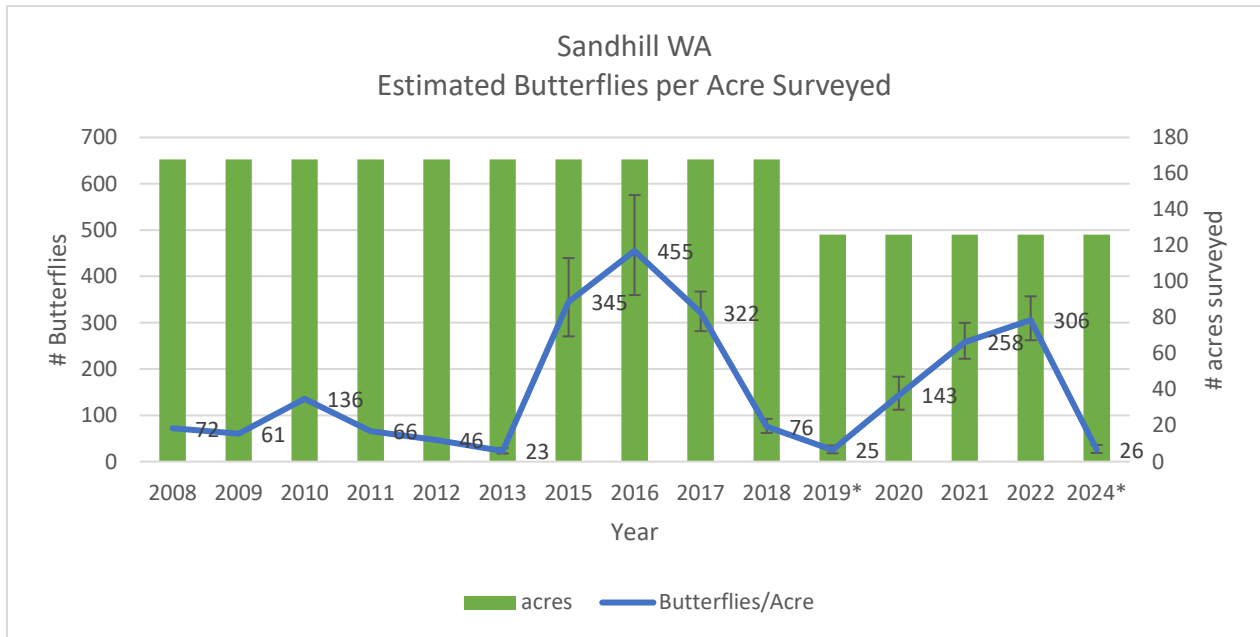


**Figure 8A.** Annual estimated number of Karner blue butterflies per acre surveyed at Private Property #1 with confidence levels.



**Figure 8A.** Annual estimated number of Karner blue butterflies per acre surveyed at Private Property #2 with confidence levels.

**Glacial Lake Recovery Unit (GL)**



**Figure 5A.** Annual estimated number of Karner blue butterflies per acre surveyed at Sandhill Wildlife Area with confidence levels. Some estimates come from years where model assumptions were violated, making them less reliable (starred years).