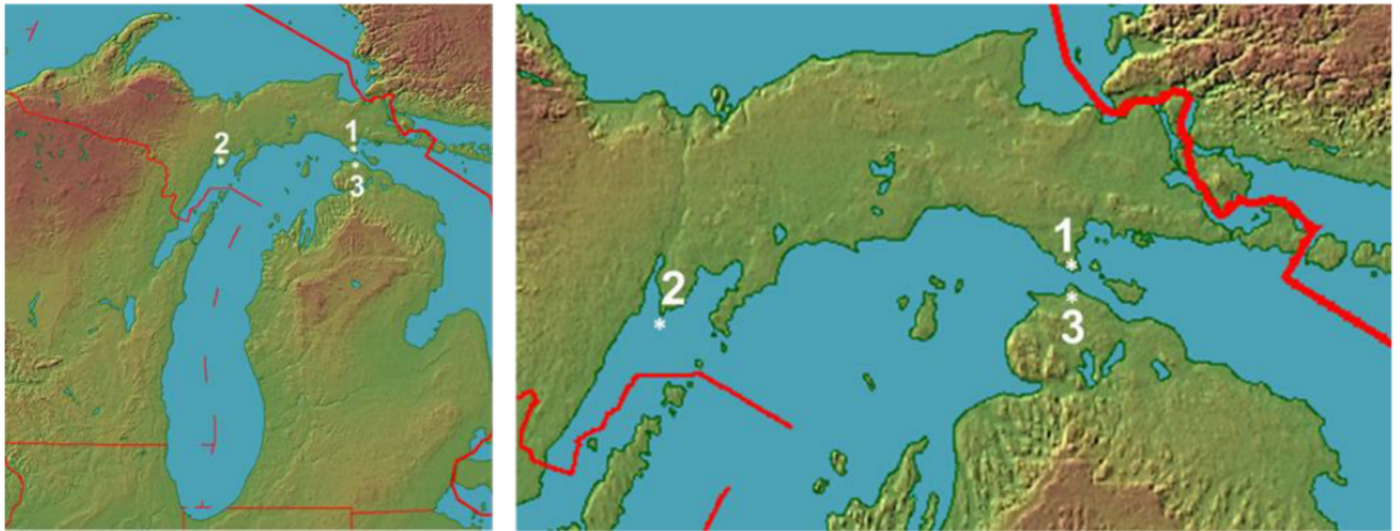




Monitoring Monarch Migration at the Mackinac Straits

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An active group of expert birders have been monitoring spring and fall raptor migration across the Mackinac Straits for the past several years. These birders are members of *Mackinac Straits Raptor Watch* (MSRW; <https://www.mackinacraptorwatch.org/>), a nonprofit group dedicated to the research and conservation of raptors in the Straits of Mackinac. Nearly daily spring counts started in 2012 near the tip of Michigan's Lower Peninsula in Mackinaw City, and nearly daily fall counts started in 2018 in the Upper Peninsula (UP) at Point LaBarbe, which is less than 2 miles west of where the Mackinac Bridge links to the UP near St. Ignace (see map; N 45.8397, W -84.7550).

Point LaBarbe is a relatively flat and open site with mostly small trees. About 3.5 miles of open water separates Point LaBarbe from the nearest land at the northern tip of Michigan's Lower Peninsula. Spring counts usually start in late February and end in early June. Fall counts typically start in late August and end in November.

In addition to raptors, the birders who first evaluated the UP site at Point LaBarbe in 2017

Maps of Michigan showing approximate location of (1) Point LaBarbe near St. Ignace where fall raptor and monarch counts are made, (2) Peninsula Point at the tip of the Stonington Peninsula where fall monarch counts are made, and (3) Mackinaw City where spring raptor counts are made near the tip of Michigan's Lower Peninsula. Base map by Ray Sterner, John Hopkins University.

also noticed large numbers of monarch butterflies (*Danaus plexippus* L). Therefore, when the official fall raptor counts started in 2018, daily counts of monarchs were also recorded. Monarchs were counted as they flew overhead or to the side of the observers. Given that the primary focus was on counting raptors, undoubtedly some monarchs were missed. Therefore, the count data discussed below should be considered a good but slightly conservative estimate.

In addition, basic weather data were recorded on an hourly basis on each observation day, including wind speed, wind direction, percent cloud cover, air temperature, precipitation, etc. Much of the count and weather data have been posted online for the Mackinac Straits Raptor Watch site at one or both of these hosting websites:

https://www.hawkcoun.org/month_summary.php?site=799 and

<https://dunkadoo.org/explore/mackinac-straits-raptor-watch/msrw-raptor-watch-fall-2020>.



Thousands of monarchs were roosting on trees at Point LaBarbe the morning of August 30, 2018. They took off quickly as conditions warmed in the morning and flew out over the Straits. Photos by Steve Baker

Several people are involved in the official observing, identifying, and counting of the raptors and monarchs as they fly overhead. During the years 2018-20, Steve Baker and Ed Pike were some of the key participants in all three years; Jason Bojczyk mostly in 2018-19; and Calvin Brennan and Russ Edmonds in 2020. The summaries below are based on their observations as well as assistance by many other volunteers who participated on any given day. Included for each year are the starting and ending dates for the entire fall survey period, the first and last days when monarchs were observed, the total number of monarchs counted during the entire fall season (August-November), and the highest daily monarch count of the season and the date on which it occurred. Daily observations typically started between 7-9 am and ended between 3-4 pm.

The 2018 fall survey started on August 25 and ended on November 14. The first monarchs were observed on August 25 and the last were seen on October 9. Overall, about 5448 monarchs were counted in 2018. The highest daily count of monarchs was on August 30 when 1786 were counted.

The 2019 fall survey started on August 20 and ended on November 10. The first monarchs were observed on August 20 and the last were seen on October 30. Overall, over 9,950

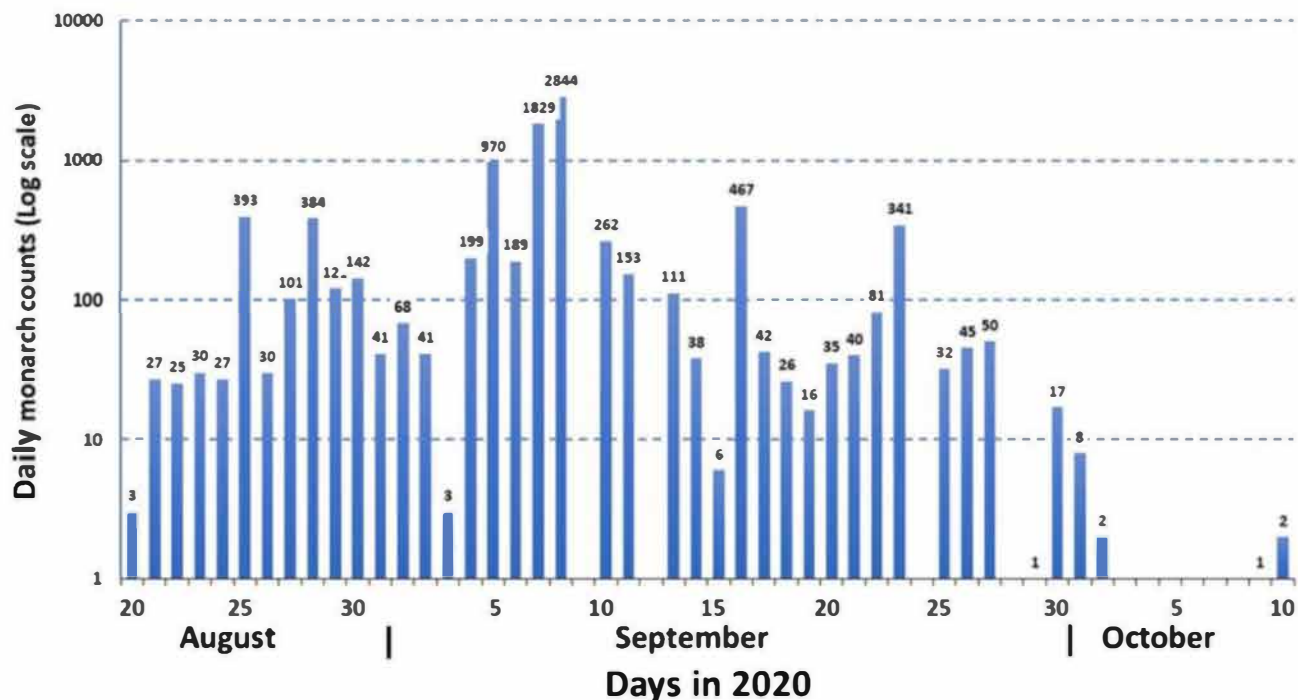
monarchs were counted in 2019 (one day's count was listed as "several hundred" and therefore was not included in the season total). The highest daily count occurred on September 2 when 3,488 were counted.

The 2020 fall survey started on August 20 and ended on November 9. The first monarchs were observed on August 20 and the last were seen on October 10. Overall, about 9,147 monarchs were counted in 2020. The highest daily count of monarchs was on September 8 when 2,844 were counted. Hourly monarch counts were listed only for 2020, and for those days where several hundred monarchs were counted, the highest counts generally occurred between 10 am and 1 pm (see data at the dunkadoo.org link listed above).

The high variability of daily monarch counts during August 20 to October 10, 2020 is shown in the accompanying bar chart. For this 52-day period, there were 20 days with daily monarch counts of 0-10, 13 days of 11-100 monarchs, 12 days of 101-1000 monarchs, 2 days of over 1000 monarchs, and 5 days when no data were recorded, usually as a result of rainy weather throughout the day.

In 2020, monarchs were one of 23 species recorded at Point LaBarbe (data at the dunkadoo.org link listed above). Of the 22 bird species recorded, there were 17 raptor species, and 5 other species of interest, such as sandhill cranes. The total 2020 count was just over 35,000 individual monarchs and birds. The 9,147 monarchs counted represented 26% of this total, sandhill cranes (N = 6,205) about 18%, and the raptors (N = 19,077) about 54%.

The days when thousands of monarchs were counted at Point LaBarbe during 2018-2020 typically experienced no rain with gentle winds (1-7 mph) from the northwest or north and sometimes northeast (data at links listed above). By contrast, weather patterns during the preceding one or two days often included or were characterized by strong winds (8-24 mph) mostly from the southwest, and sometimes rain as well. Such data suggest that monarchs will accumulate at points along the northern shores of Lake Michigan when facing strong southerly winds or



Bar chart showing daily total monarch counts at Point LaBarbe from August 20 through October 10, 2020. Note a base-10 log scale is used on the Y-axis.

rain but will quickly take flight when conditions are dry and day-time winds shift to the north.

It is interesting to note that migrating monarchs were observed at Point LaBarbe on the first survey days in August (20-25) in each of the years 2018-2020. Therefore, monarch migration across the Mackinac Straits likely starts earlier than August 20 in most years. As support, consider the story by Carol Meitner (1996) on the fall monarch survey she helped organize at Peninsula Point, which is also along the northern shoreline of Lake Michigan about 100 miles west of Point LaBarbe in Michigan's UP. Peninsula Point is located at the southern tip of the Stonington Peninsula in Delta County, MI, which is part of the Hiawatha National Forest (Meitner 1995, 1996). Surveys at Peninsula Point were initially conducted from August 15 to September 15 in 1996 and included an early morning (starting at 7 am) count of monarchs roosting on vegetation along a set route as well as an afternoon timed survey along a set route that counted monarchs both in flight and roosting. Again, a few (under 10) monarchs were seen

flying on their very first survey day (August 15), with peak numbers recorded on August 23, when about 25% of all the monarchs recorded during this month-long survey period were counted (Meitner 1996).

The above observations at Point LaBarbe (45.8397° N Lat) and Peninsula Point (45.667° N Lat), generally agree with the fall migration data accumulated over many years by Monarch Watch for locations of similar latitude. For example, peak monarch abundance usually falls between 24 August and 5 September at 47°N Latitude, and 29 August and 10 September at 45°N Lat (<https://www.monarchwatch.org/tagmig/peak.html>).

Tagging monarchs has also occurred at both Peninsula Point and Point LaBarbe. The monarch tagging program at Peninsula Point began in 1994 and has continued for many years (Meitner 1995, Warner 2017). One of the first monarchs recovered in Mexico with a tag from Peninsula Point occurred in 1999 (Monarch News 2000). This individual was a male monarch that was tagged on 4 September 1998 by Ruth Gifford of Delta County, and recovered on 23 March 1999 in El Rosario (a monarch butterfly reserve near

Anganguero, Michoacán, Mexico) by Dr. Lincoln Brower (who made some of the initial discoveries of the monarch overwintering sites in Mexico in 1976). As of 2017, 21 of the monarchs tagged at Peninsula Point had been recovered in Mexico (Warner 2017). In addition, the count data gathered at Peninsula Point has been used by many researchers to assess monarch declines in recent years, which indicates the value of long-term datasets. For example, Badgett and Davis (2015), using 19 years of data from Peninsula Point, did not detect declining numbers of monarchs at Peninsula Point, while populations in Mexico were showing a decline. These authors concluded that the lower numbers of monarchs in Mexico reflected greater mortality during migration rather than lower numbers of monarchs initiating migration at northern locations like Peninsula Point.

Tagging monarchs at Point LaBarbe began in 2019, with 376 monarchs tagged in 2019 (Ebberts 2019) and 500 in 2020 (Dykehouse 2020). Perhaps some of the tagged monarchs from Point LaBarbe will be recovered in years ahead as they migrate to and from Mexico. There is a YouTube video online that shows large numbers of monarchs gathering at Peninsula Point and some of the tagging efforts that have occurred there (<https://www.youtube.com/watch?t=100&v=oXmhayhaWew&feature=youtu.be>).

In future years, hopefully the MSRW staff and volunteers will continue to count monarchs as these butterflies journey across the Mackinac Straits towards Mexico. If you are interested in helping in these survey efforts or want to learn more about the programs offered by the Mackinac Straits Raptor Watch, please visit their website at www.mackinacraptorwatch.org.

Acknowledgments: The author thanks the Mackinac Straits Raptor Watch Research Committee for granting permission to summarize the Point LaBarbe monarch data, and to the many staff and volunteers who helped collect the data.

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