

National Park Service

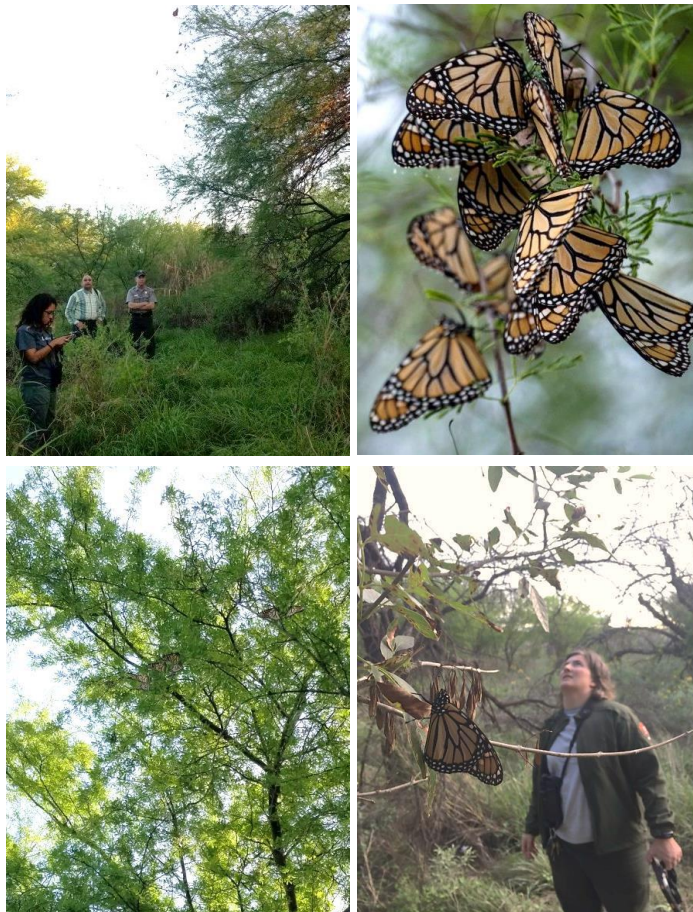
National Park Service
U.S. Department of the Interior



Amistad

National Recreation Area
Texas

Monarch Migration Report Fall 2017



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Introduction

Monarchs, *Danaus plexippus*, are a commonly recognized species of butterfly in the public eye. They complete a unique migration from the Northern U.S. to Central Mexico across many states and land use types, congregating in large numbers at communal roosts during stopovers. Even with their increase in publicity, numbers have been recorded as declining and the species is currently under review to be listed by U. S. Fish and Wildlife as a federally endangered species (Jepsen et al. 2015). In order to facilitate monitoring and management to benefit this species, more information on their fall migration needs to be assembled. Species of conservation concern are also of importance to the National Park Service as parks strive to understand and protect migratory habitat.

Amistad National Recreation Area (AMIS) has been conducting projects over several seasons contributing data to better understand the monarch's fall migration south to Mexico for the winter. Monarch tagging was completed in the park in 2001, 2002 and 2003 as a public education tool and to document migratory movements. Monarch fall migration observations have been made informally by park staff during subsequent years and formal counts of monarchs migrating and at roost sites have occurred in the park since 2015 (NPS, unpublished data). The intent of the counts is to document their arrival date, residence period in the park and habitat utilization. Although roosting behavior is still being researched, monarchs show both adaptability across habitat types and reoccurring use of roosting sites that have favorable conditions (Davis et al. 2012). With sites revisited at AMIS this is a good opportunity for counts during the migration. Due to changes in survey effort and protocols from year to year, it is difficult to speak to the overall trends in monarch numbers migrating through the park. As monitoring continues, more information will be decipherable from collected data.

Methods

In October 2017, three monarch roost sites were surveyed at AMIS (Figure 1). Monarch abundance, roost tree species, and individual tree locations were recorded at each survey site. Abundance was counted individually or estimated for large groupings of monarchs. Two sites were established based on observations of monarch use in 2015 and 2016, including one at the San Pedro Campground adjacent to campsite number one, and one at the 277 N Campground adjacent to the first campsite. One new site was included based on a sighting of roosting butterflies by park law enforcement during the migration this year. The site was located near the U. S. International Boundary and Water Commission (IBWC) office and named “Monarch Alley”. Surveys were started in the morning within 15 minutes of sunrise while the monarchs were still roosting, between the hours of 0700 and 0900. Similar routes through the roost sites were followed each day and observations were recorded by one of two methods. The Terrasync software was used on a Trimble Juno unit to collect weather conditions, roost tree GPS locations, roost tree species and number of butterflies on each roost tree. When the Juno was not available, Geojot software on Getac tablets was used to take pictures, roost tree GPS locations and number of butterflies on each roost tree. Data was loaded into the park’s monarch geodatabase for record compilation and use in ArcMap.

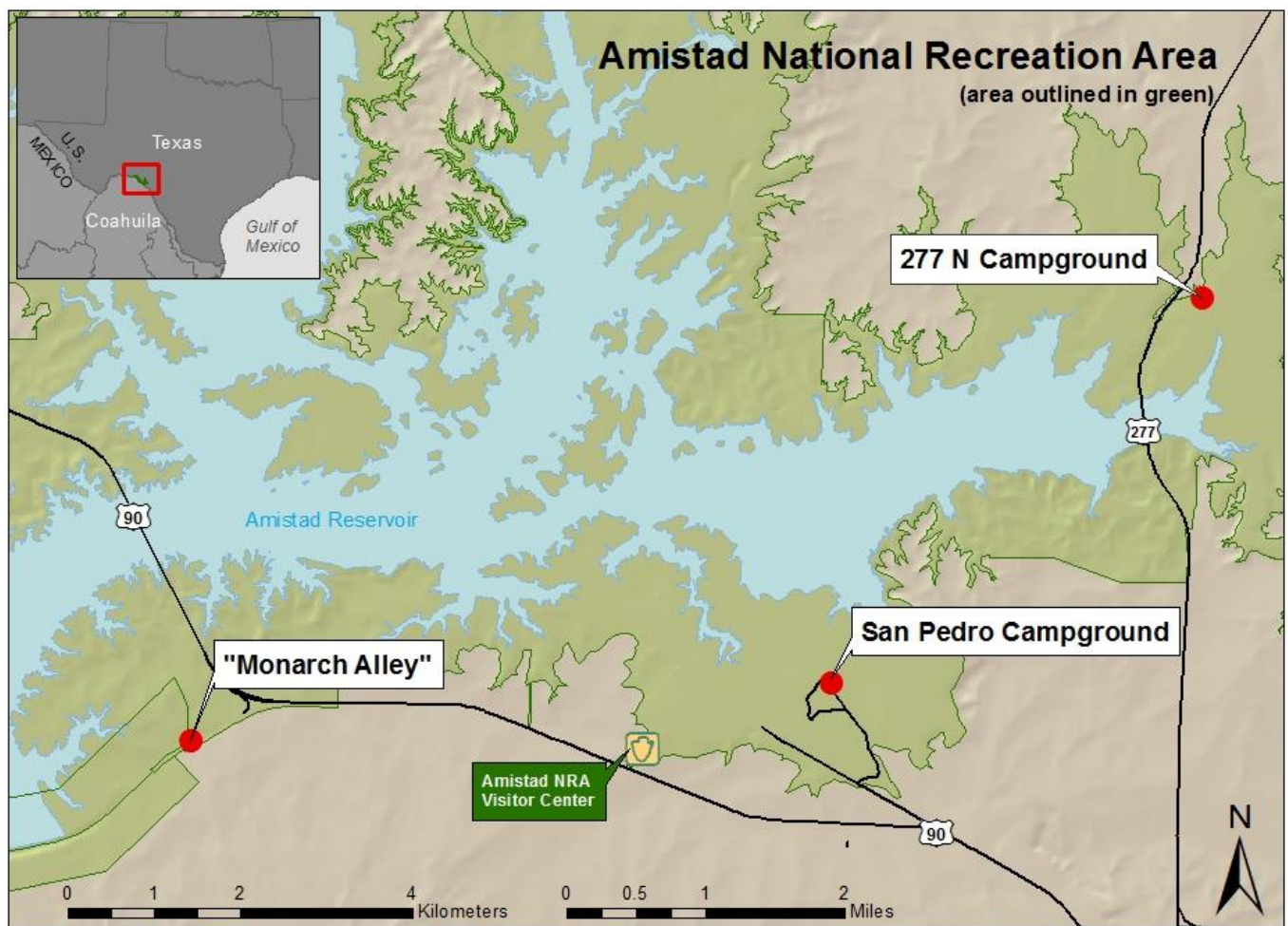


Figure 1. Locations of the three monarch butterfly survey sites at Amistad NRA visited in Fall 2017.

Results

Roost sites were surveyed from October 4 to October 26 usually alternating between roost sites or having paired observers visit different roost sites (Figure 2). The goal of roost surveys was to begin before monarchs arrived in the park and to follow each site until numbers dropped below 5 individuals. Monarchs arrived in the park on October 11. The highest numbers of monarchs were recorded on October 11 and overall numbers decreased over the course of the migration. Across the survey sites, the trees used for roosting were predominately *Acacia farnesiana* (Huisache). Other trees included *Fraxinus* species (Ash), *Celtis laevigata* varieties (Hackberry), *Diospyrus texana* (Texas Persimmon), *Prosopis glandulosa* (Honey Mesquite) and *Parkinsonia aculeate* (Mexican Palo Verde).

Date	Location	Monarchs	Observers
4-Oct	San Pedro Campground	0	2
6-Oct	277 N Campground	0	2
8-Oct	San Pedro Campground	0	1
9-Oct	San Pedro Campground	0	1
10-Oct	277 N Campground	0	1
11-Oct	San Pedro Campground	1148	2
12-Oct	277 N Campground	41	2
13-Oct	San Pedro Campground	940	2
14-Oct	San Pedro Campground	296	1
15-Oct	277 N Campground	10	1
15-Oct	San Pedro Campground	668	1
16-Oct	277 N Campground	5	1
16-Oct	San Pedro Campground	23	1
17-Oct	277 N Campground	4	1
17-Oct	San Pedro Campground	210	2
18-Oct	San Pedro Campground	186	2
19-Oct	Monarch Alley	20	2
19-Oct	San Pedro Campground	87	2
20-Oct	Monarch Alley	62	2
20-Oct	San Pedro Campground	49	2
23-Oct	Monarch Alley	8	2
23-Oct	San Pedro Campground	50	2
24-Oct	Monarch Alley	31	2
24-Oct	San Pedro Campground	67	2
25-Oct	Monarch Alley	30	2
25-Oct	San Pedro Campground	89	2
26-Oct	Monarch Alley	2	2
26-Oct	San Pedro Campground	2	2

Figure 2. Summary of results from monarch monitoring Fall 2017 at AMIS.

San Pedro Campground was surveyed 15 times over the course of 23 days (Figure 3). The first day of detection, October 11, was also the peak in abundance for this location with approximately 1,148 individual monarchs counted. Overall numbers declined over the course of the subsequent two weeks. Tree species used at this location were predominantly *Acacia farnesiana*, with *Fraxinus* species and *Celtis laevigata* varieties also used.

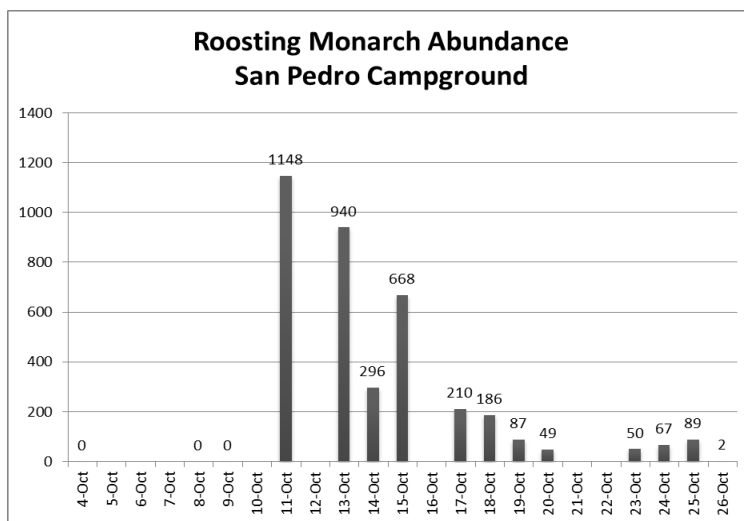


Figure 3. Monarch butterfly abundance documented at the San Pedro Campground site, October 9-26 (no surveys October 5, 6, 7, 10, 16, 21 or 22).

The site at the 277 N campground was surveyed six times over 12 days. Numbers peaked at 41 individuals documented on October 12 and dropped quickly over the next few days (Figure 4). Tree species at this location included *Acacia farnesiana*, *Prosopis glandulosa*, and *Freaxinus* species.

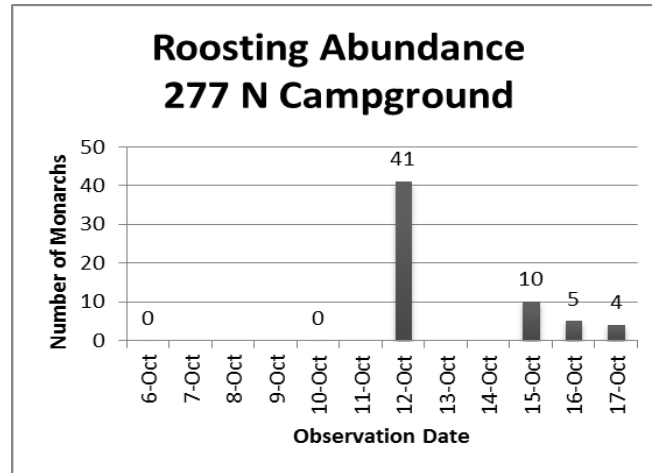


Figure 4. Monarch butterfly abundance documented at the 277 N Campground site, October 12-17 (no surveys October 7, 8, 9, 11, 13 or 14).

The newest located site, Monarch Alley, was surveyed six times over the course of eight days, starting October 19 after it was first reported to staff (Figure 5). The peak abundance recorded was 62 individuals on October 20. While the overall trend in abundance was decreasing over the week, numbers at this site fluctuated more so than at sites. Tree species at this location included predominantly *Acacia farnesiana* and one *Prosopis glandulosa*.

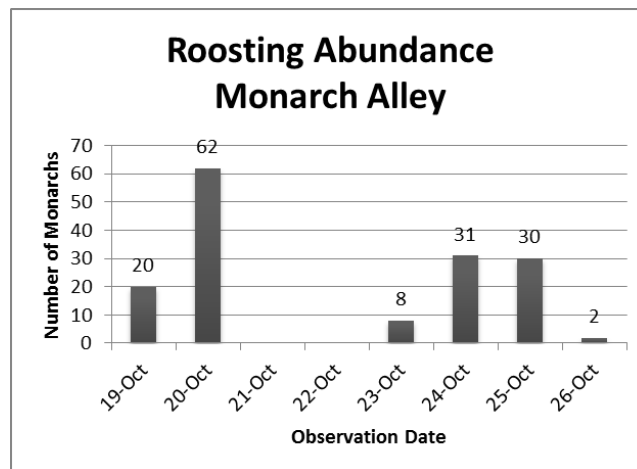


Figure 5. Monarch butterfly abundance documented at the Monarch Alley site, October 19-26 (no surveys October 21 or 22).

Discussion

Survey data collected this year at AMIS differed from 2015 and 2016 in collection and record keeping methods. In previous years, GPS locations of individual trees were not recorded. Observations on in flight migrations were recorded with some weather data. Numbers documented in 2015 and 2016 were higher, however migrating and other non-roosting butterflies were included across many locations throughout the park. The site at San Pedro Campground was the most consistently surveyed location this year and also had the greatest monarch abundance documented. The 277 N site had the lowest abundance and shortest observation period. The newest site, Monarch Alley, was started after the initial monarch arrival at the park and has the potential to be a large abundance site if surveyed over the whole migration period. It is unknown what the monarch abundance was at this location before the roost site was reported on October 19. Large changes observed in total documented abundance this year can be explained in part by lack of daily surveys at every site.

From the data collected this season we can start a baseline for continued monitoring at Amistad NRA. Trends in weather conditions as correlated to monarch abundance could add insight into migration patterns. Although weather data has not been analyzed yet in relation to the fall migration at AMIS, it has noted for many years that large distance movements of migrating monarchs are linked to cold fronts moving from the Great Plains (NPS, unpublished data). These strong winds likely aid monarchs, and conversely, strong headwinds likely delay their migration. Historical weather data from local weather stations could be analyzed to look more closely at correlations. Identification of individual plant species used as roosts will aid in locating additional sites to survey at the park. At each survey site at AMIS, *Acacia Farnesiana* was the primary roost choice for monarchs. Most individual trees were observed being used as roosts repeatedly throughout the migration period. As time and staffing allow, additional measurements could be included in future surveys to contribute information on roost tree preferences at the local level of AMIS.

Tracking monarch migrations across the U.S. and Mexico is a monumental task, and AMIS is an important stop along their way. National Parks are areas kept from development and thus provide large areas of potential habitat for migrating species. With contributions from parks, organizations, agencies, and individuals we can continue to shed light on this special species for further understanding and protection as warranted.

References

Davis, A. K., Nibbelink, N. P., and Howard, E. 2012. *Identifying Large- and Small-Scale Habitat Characteristics of Monarch Butterfly Migratory Roost Sites with Citizen Science Observations*. 9pp. International Journal of Zoology, vol. 2012, Article ID 149026, doi:10.1155/2012/149026.

Jepsen, S., D. F. Schweitzer, B. Young, N. Sears, M. Ormes, and H. Black. 2015. *Conservation Status and Ecology of Monarchs in the United States*. 36pp. NatureServe, Arlington, Virginia, and the Xerces Society for Invertebrate Conservation, Portland, Oregon.

Journey North. (no date) Monarch Butterfly Peak Migration Maps 2012-2017. Retrieved from <https://www.learner.org/jnorth/monarchs>.