



Turtle Population Study

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National
Science
Foundation

Red-Eared Slider

Introduction:

Common
Snapping Turtle

The Marsh is home to four main turtle species: painted turtles (*Chrysemys picta*), red-eared sliders (*Trachemys scripta elegans*), the common snapping turtle (*Chelydra serpentina*), and the Blanding's turtle (*Emydoidea blandingii*). Turtle trapping has been going on at Nahant Marsh for the past 16 years (since 2010) using a capture-mark-recapture method. Over the years, the population has fluctuated due to factors such as weather conditions, floods, predator populations, and nest predation. In the winter of 2025, the turtle population took a big hit due to a mortality event at Carp Lake. The goal this summer was to capture and mark turtles to get an updated population estimate following the mortality event.

The data collected over the summer will be helpful to determine patterns of distribution among species and abundance to better understand the health of the turtle population and the health of the marsh following the mortality event. It will also help us figure out where more conservation efforts are needed to keep and sustain a healthy turtle population at Nahant Marsh

Results:

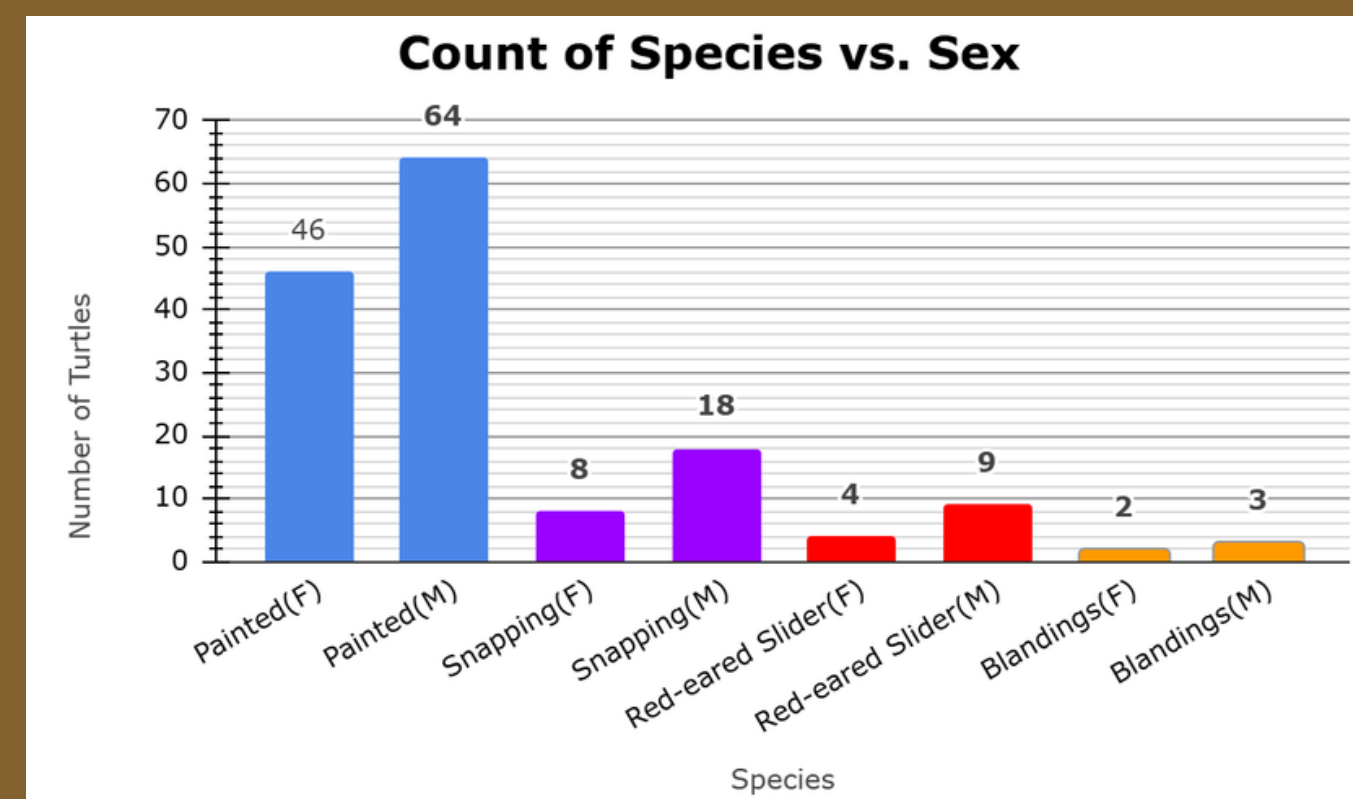


Figure 2. Count of turtle species by sex using data collected from turtles captured summer 2026 including hand captures. Shows the abundance of male vs. female turtles for each species.

Figure 3. Count of turtles caught at each location by species. Showing which location are lacking turtles and which have an abundance. Does not include handcaptures besides Blanding's, all of which were hand captured at each location via telemetry.

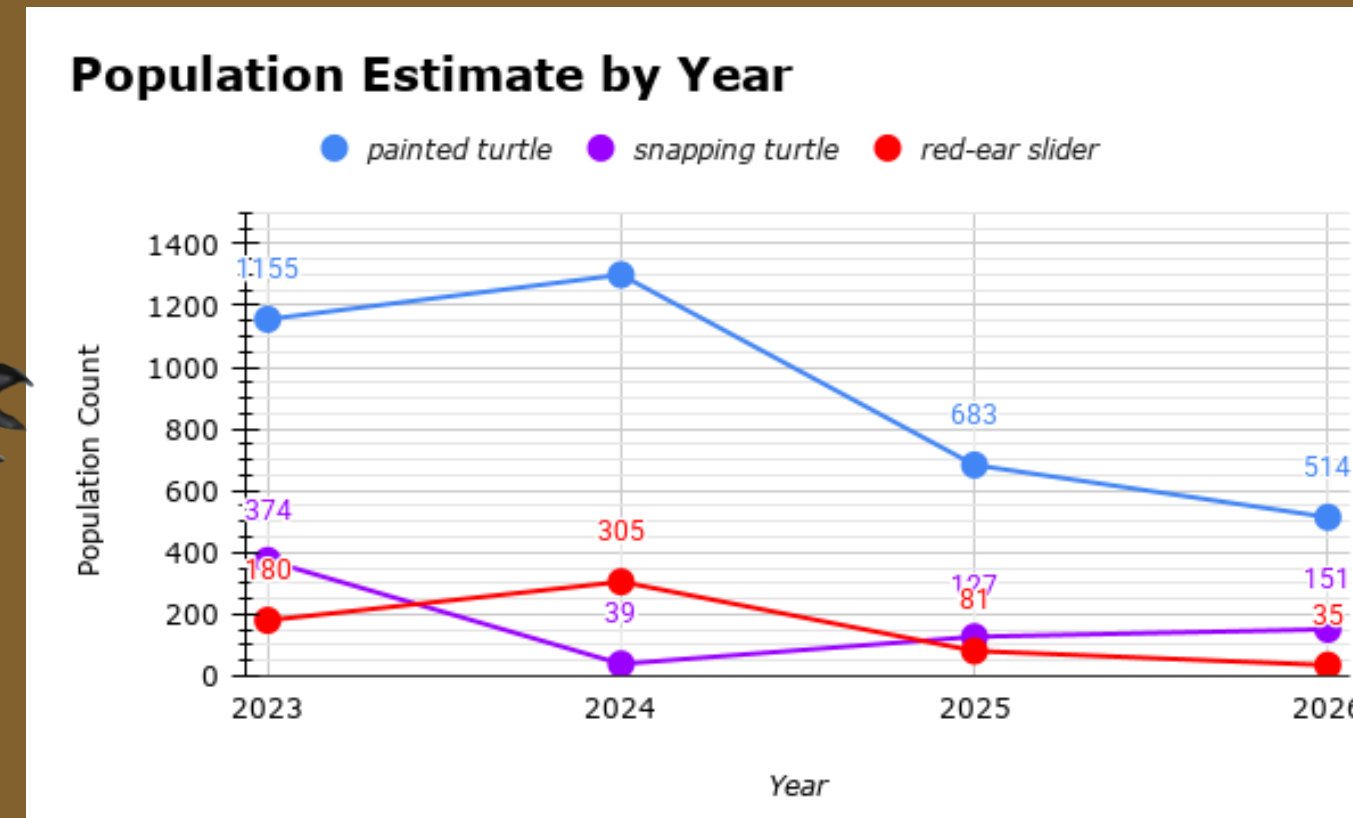
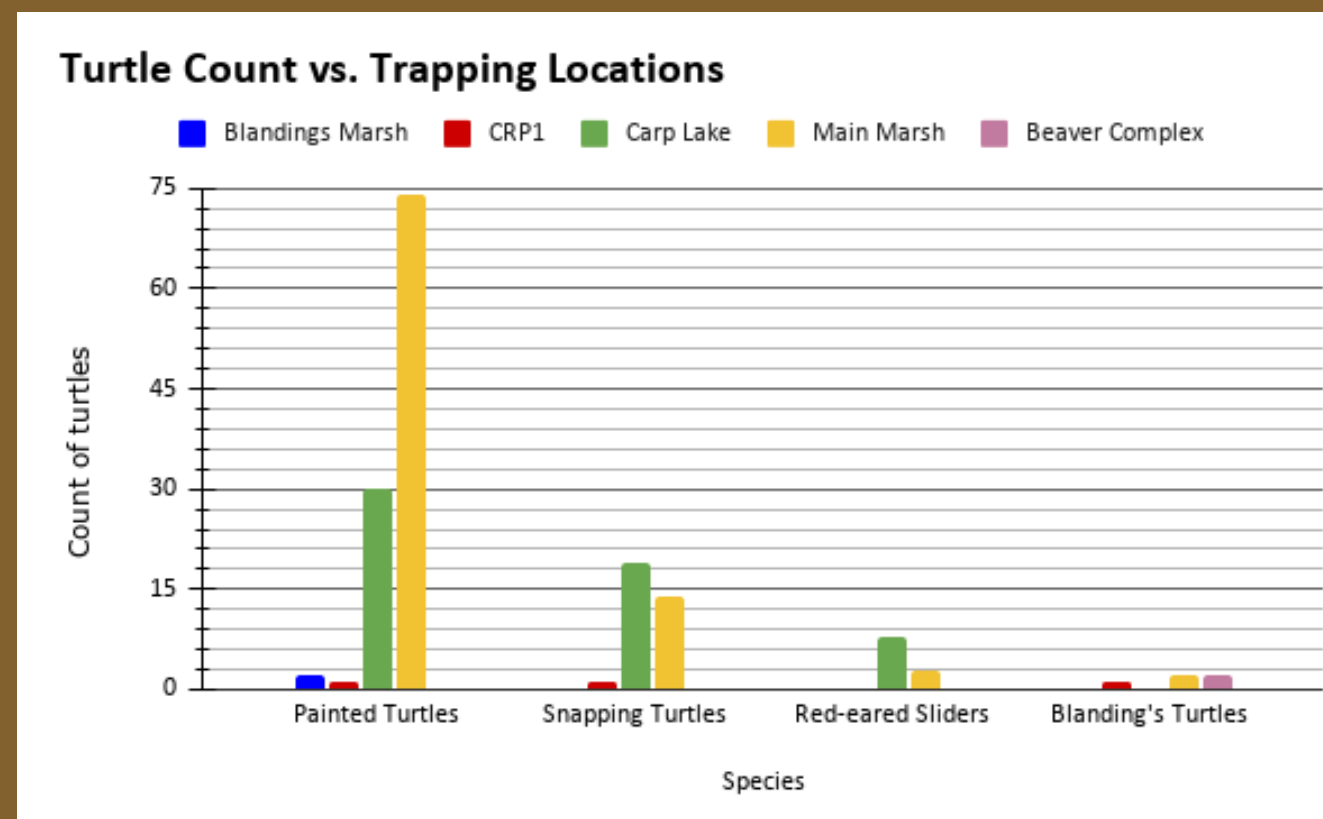
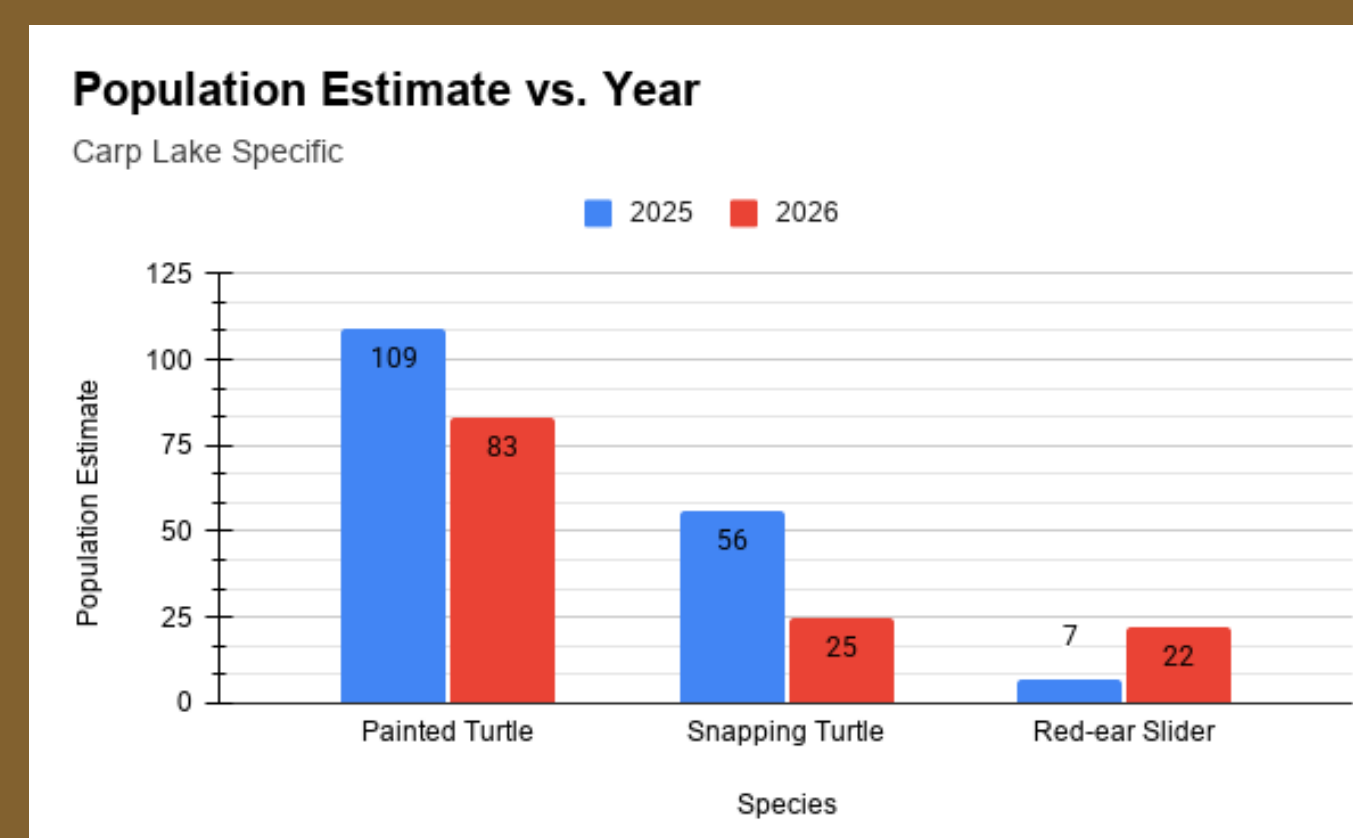


Figure 4. Population Estimate of turtles by species across the marsh from 2023-2026. Shows fluctuation in the populations as well as decline during and after mortality event. An overall decline of 21.4% can be seen across all species combined from 2025 - 2026. Created using Chapman's Modified Schnabel Estimator to help account for small sample size.

Figure 5. Population estimate of turtles at Carp Lake for 2025 and 2026. Shows a decline in population at Carp Lake following the mortality event. Overall population of turtles at Carp Lake declined by 24.4%.



My results show that the turtle population across the marsh is declining. At Carp Lake specifically, the population overall seems to have declined by 24.4%. This year, more male turtles were caught than females across all species. There was a lack of turtles caught in traps at Blanding's Marsh, CRP1, and the Beaver Complex. The majority of turtles were caught in the Main Marsh and Carp Lake. Carp Lake was trapped in a very similar layout as last year to try and replicate the trapping efforts during 2025. This should have lowered the errors and differences in numbers based on trapping efforts. All the data collected has a field of error and may be skewed due to differences in trapping efforts at the various locations, sample sizes, and weather allowances for trapping and data collection.



Figure 6. Map of trapping locations around the Marsh and turtle nest locations, made using QGIS. BM stands for Blanding's Marsh, BC is Beaver Complex, and CRP1 is Conservation Restoration Project 1. Nests were found when turtles were actively laying eggs or had been depredated by spotting egg remnants around the nest. A camera probe was also used to try and find more nest around the marsh.

Discussion:

Population Trends

- Overall population dropped 45.8% ('24-'25) and 21.4% ('25-'26).
- Species changes:
 - Painted turtles: ↓ 47.4% ('24-'25), ↓ 24.7% ('25-'26)
 - Snapping turtles: ↑ 225.6% ('24-'25), ↑ 18.9% ('25-'26)
 - Red-eared sliders: ↓ 73.4% ('24-'25), ↓ 21.4% ('25-'26)
- Carp Lake: Overall ↓ 24.4%; painted ↓ 23.9%, snapping ↓ 55.4%, red-eared ↑ 214.3%.
 - Note: Small sample sizes may skew results (e.g., 6 sliders caught in 2025 vs. 11 in 2026).

Sex Ratios and Nesting Success

- More male turtles were captured than females across all species.
- Possible causes:
 - Fluctuating temperatures during nesting seasons. Higher temps female, cooler temps male.
 - Soil and nest-site heat retention differences.
 - Trap bias—males may be more active while females nest.
- 26 nests located; 78.5% of nests depredated (eggs eaten by predators).
- Nest proximity didn't predict depredation—monitoring was limited.

Spatial Patterns

- North side sites (Blanding's Marsh, Beaver Complex, CRP1): Very few captures were made despite consistent trapping effort.
 - Likely dominated by juveniles that are able to escape traps.
 - Around 10 out of 26 nests found in north side locations
 - Turtles captured and seen were on the smaller size
 - Movement observed: Turtles migrate southeast into the main marsh as temperatures rise, seeking richer vegetation and food resources.

Further Research

- Research the soil quality and temperature at nesting sites to see if that is effecting sex ratios.
- Use of different traps at the North Side to see if it is trap type or quality that affects turtle capture count.
- Use of different bait types to see if that affects trapping count.
- Migration of turtles as the summer goes and and weather ultimately gets warmer.



Painted Turtle



Blanding's Turtle

Methods:

- From June 4th to July 17th we spent two days a week trapping turtles at Carp Lake, Main Marsh, Blanding's Marsh, Beaver Complex, and Conservation Restoration Project 1. (see figure 6.)
- The turtles are caught using semi-submerged hoop net traps and box traps with sardines as bait. (see figure 1. for example of hoop net trap.)
- Turtles are identified by species, sex, size (length of carapace and plastron), and ID numbers, if no previous ID number a new one would be given. All information is recorded on datasheets and entered into a master turtle sheet containing data from all the years.
- The data collected was used to create a population estimate following the Chapman's Modified Schnabel **Estimator** and to determine how the population is surviving after a mortality event.
- When possible, nesting turtles were found, and the location of the nest was collected. The nests were then periodically checked to see if they were intact or depredated.



Figure 7. picture of Carapace and Plastron



Figure 1. Image of hoop net trap used to capture turtles. Bait is placed in trap and turtles can swim in but not back out

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