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Abstract: In the recent years, the impact humans have on other species has become an ever increasing aspect of ecology. Reptilians have not had the study like that of other taxa due to their enigmatic behavior, including their avoidance of the public. In this study we focused on the population of freshwater turtles and their basking behavior with the installation of basking logs in Centennial Lake on the campus of Rider University in Lawrenceville, New Jersey. The population of Eastern Painted Turtles (*Chrysemys picta picta*) was female biased which differs from prior research in urban areas. The installation of basking logs showed that interspecific competition occurred and adults will relegate juveniles to a less preferable basking log closer to human activity. Our data suggests that the location of a basking log is essential to its usefulness and that urban water bodies may not be male based as previously thought.

Introduction

- Freshwater turtles among most threatened vertebrate clades due to increased anthropogenic activity^{1,2}
- Human actions result in alterations in basking, feeding, and reproduction³
- Removal of basking sites from water lead to decline in recruitment¹
- Basking on land is dangerous for turtles due to increased chance of encountering predators and humans¹
- Goals of Study:
 - Identify population dynamics of freshwater turtles at Rider University before and after installing basking logs
 - Observe the basking behavior on installed basking logs



Figure 1: Aerial photograph of Centennial Lake on Rider University's campus. Red dots identify trap locations and orange rectangles identify locations of installed basking logs (Not drawn to scale). Note: Trap on bottom left was only used once due to difficulty of placing.



Figure 2: Photograph of hoop trap installation in August 2012.



Figure 3: Photograph of Eastern Painted Turtle (*Chrysemys picta picta*) on installed Basking Log in May 2013.

Methods

Sample Site: Centennial Lake at Rider University, Lawrenceville, New Jersey

- Built in 1965 and restored in 2000
- Trapping conducted in August and September of 2012 and 2013
- Followed TurtlePop Protocol⁴

Installation of Basking Logs:

- A fallen tree located on Rider's campus was cut into two pieces
- Two I-bolts and steel cables connected cinderblocks to the logs so they would remain stationary in water
- First log installed on April 25 and second log installed on June 25, 2013

Observations of basking turtles began at the end of May and continued until the middle of August

- Timing of observations varied based on availability and weather and conducted in hour-long shifts throughout day
- Data recorded when individual turtle started or finished basking on log

Results

A total of three species were captured over the two years (Table 1)

- Eastern Painted Turtle (*Chrysemys picta picta*), Common Snapping Turtle (*Chelydra serpentina*), and Red-Eared Slider (*Trachemys scripta elegans*)

2012 Collection Data on *C. picta picta* (Figure 4)

- Most specimens (62%) were captured the first day of sampling
- Five individuals were recaptured over trapping period

2013 Collection Data

- Much lower capture data with one recaptured *C. picta picta* from 2012

Basking Data

- Decline in number of observed individuals basking throughout summer (Figure 7)
- Basking log in middle of water was preferred to log adjacent to land (Figure 6).

Species	Adult Male	Adult Female	Juvenile
Eastern Painted	4	5	4
Red-Eared Slider	1	0	0
Common Snapping	4		1

Species	Adult Male	Adult Female	Juvenile
Eastern Painted	1	0	0
Red-Eared Slider	0	1	0
Common Snapping	2		2

Table 1: Collection data from 2012 and 2013. Recaptures not included in data set.

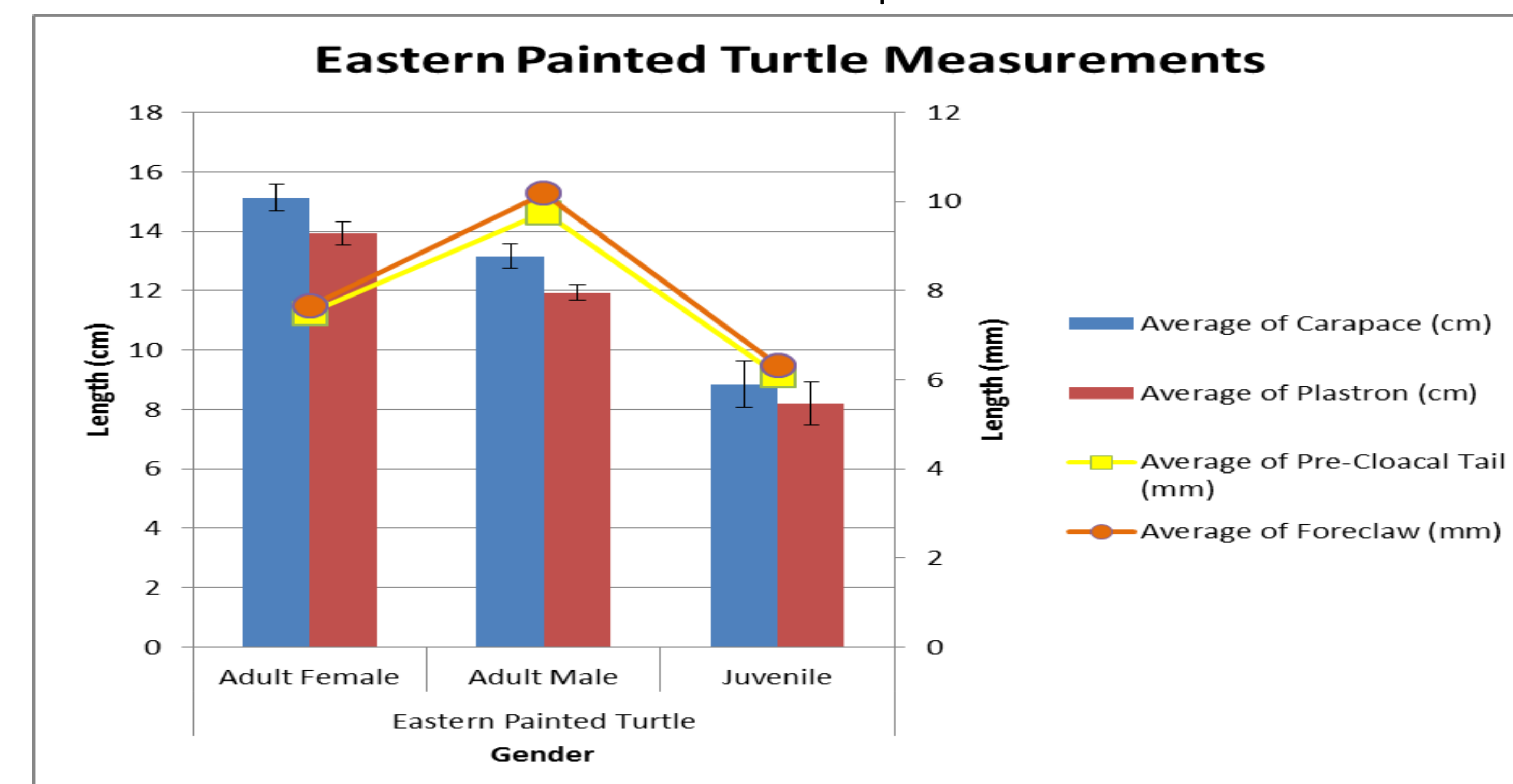


Figure 4: Length of carapace and plastron in centimeters and length of pre-cloacal tail and right middle foreclaw in millimeters. Recaptures captured in the same year were not measured and, therefore, not included. Collection dates were same as in Table 1. Figure show means \pm standard error.



Figure 5: A Northern Water Snake (*Nerodia sipedon*) basking on an installed basking log in July 2013.

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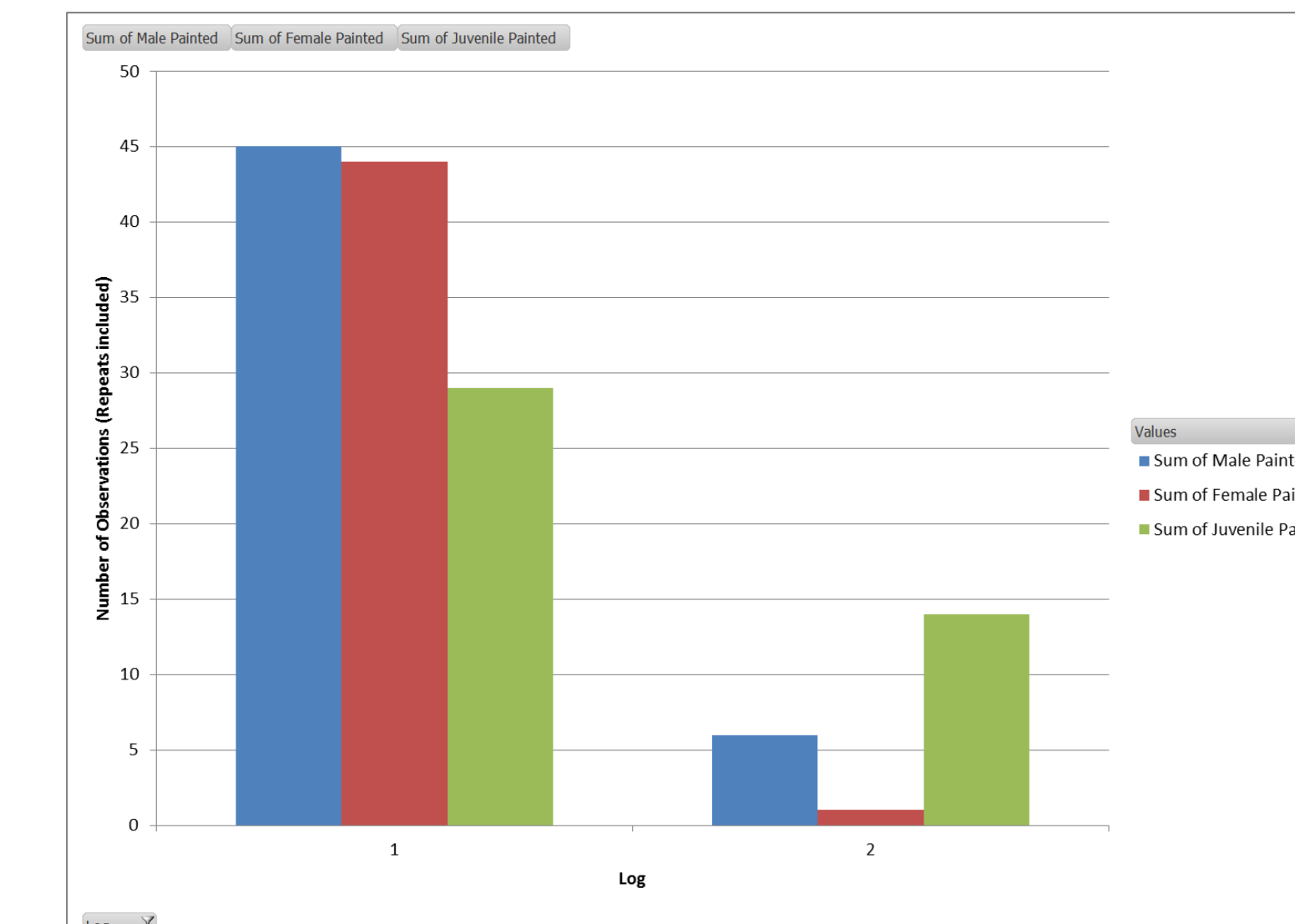


Figure 6: Differences in observed sightings of eastern painted turtles (*C. picta picta*) on each basking log. Log 1 indicates the log that was placed in the middle of Centennial Lake while Log 2 is the log placed along the shoreline. Data shown is the total number of sightings not the number of different individuals. Observations were conducted using binoculars from the shoreline during the summer of 2013.

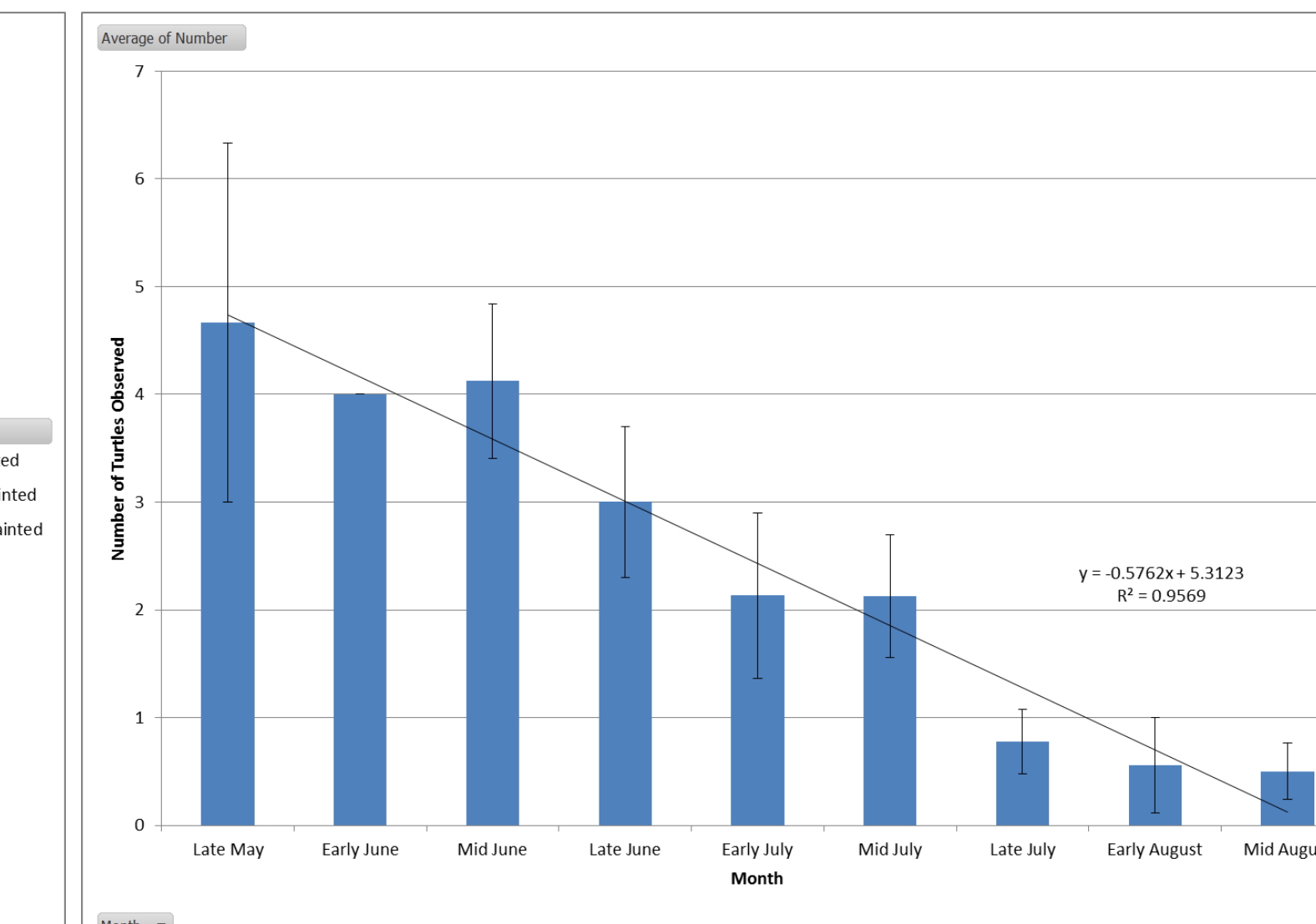


Figure 7: The number of turtles observed using the basking logs for each period of time. Months were divided up into 3 parts (Early, Mid, Late) with each part being 10 days in length. All species, ages, and genders are included in data. Observations were conducted using binoculars from the shoreline during the summer of 2013. Figure show means \pm standard error.

Discussion

Population Demographics of *C. picta picta*

- Population was not male biased as other studies have shown³
- Females could be abundant due to availability of nesting sites without travelling far^{2,5}
- Juvenile populations could not accurately be determined

Basking Observations

- Decline in observed basking individuals most likely caused by environmental factors
 - Macroalgae bloom provides enough solar radiation to raise their internal temperature while limiting their exposure from water⁶
- Bird species that reside at Centennial Lake compete for space on basking logs
- Log 1 had more observations of basking individuals than Log 2 due to its distance from the shoreline (Approximately 20 feet) it had limited contact with land disturbances
- Log 2 received less solar radiation than Log 1 which could alter thermal regulation of basking individuals

Further Research

- Another year of trapping will attempt to identify the cause of the decline in specimens trapped from 2012 to 2013
- Further observations of basking individuals will allow confirmation if logs are chosen selectively

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