

Eastern Box Turtle research Peer review:

In 2016, Herpetological Conservation and Biology, accepted and published:

Demographic Characteristics of the Eastern Box Turtle,
Terrapene carolina carolina, in a Relictual, Suburban,
Wetland Habitat of Middle Tennessee, USA
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Middle Tennessee State University

This research paper has more the feel of a college thesis with it's massive number of cites and references, and relatively little field work, and indeed appears to be a copy of the demographic data (only) included in the 2015 Masters of Science Thesis:

**DEMOGRAPHIC CHARACTERISTICS, INCIDENCE OF RANAVIRUS
INFECTION, AND SEASONAL CORTICOSTERONE LEVELS IN THE
EASTERN BOX TURTLE, *TERRAPENE CAROLINA CAROLINA*, IN A
SUBURBAN WETLANDS HABITAT OF MIDDLE TENNESSEE**

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for which Dr. Matthew Klukowski (co-author of the former) was the Thesis advisor and Thesis Committee Chair for the latter.

Author *Jessica M. West* and Jessica Marie Vannatta are the same person.

The results and speculations of this study, as submitted and published, are almost certainly and entirely invalid.

By far the biggest mistake made during this field research, was attempting to measure turtle age and using AGE CLASS, ignoring Weight class and Size class as the primary population descriptors, and making conclusions based on age demographics, and THEN justifying these conclusions using age class references and cites, rather than presenting weight and size information and using this information to describe the population structure.

With the extreme difficulty in determining Eastern Box turtle age, especially for juveniles and adults over about 17 to 20 years of age or so, it's not surprising that very few, if any demographic or population structure research has been published based on EBT age data alone. The authors of this paper DID include a chart showing MEAN values, by sex, for Mass, SL Carapace length, Carapace Width, Carapace Height, Hinge Width, and 2 plastron lengths:

Table 1. Mean \pm standard deviations of body mass (g), straight-line carapace length (SLCL), carapace height and width, length of shell hinge, length of shell anterior to hinge (LAH), and length of shell posterior to hinge (LPH) for male and female Eastern Box Turtles (*Terrapene carolina carolina*) at Nickajack Wetlands in Middle Tennessee, USA. All shell measurements are in millimeters. Sample sizes (*n*), *t*, and *P* values are provided for comparison of means by sex using the Welch *t*-test.

Variable	Male	n	Female	n	t value	P val
Body Mass	383.6 \pm 72.1	77	388.3 \pm 92.9	59	-0.32	0.747
SLCL	131.4 \pm 8.8	74	126.4 \pm 10.9	54	2.89	0.005
Carapace Width	99.2 \pm 6.1	77	97.8 \pm 7.6	59	1.16	0.250
Carapace Height	62.1 \pm 3.9	77	63.6 \pm 6.0	59	-1.65	0.102
Length of Hinge	69.0 \pm 4.5	77	67.6 \pm 5.8	58	1.55	0.125
LAH	52.0 \pm 4.3	76	50.8 \pm 5.9	59	1.25	0.215
LPH	72.3 \pm 5.5	76	72.9 \pm 7.5	59	0.57	0.572

but this data is clearly not characteristic of a population composed almost entirely of hatchling and juvenile box turtles. With a body mass mean of 383/388 grams (311.5 to 481.2 grams) this data (without including age) is much more descriptive of a population primarily of young adults and middle-aged adults, and since we suspect the population contains at least some hatchlings and juveniles, it must also contain at least a few older adults as well, to represent these means.

Turtle ID	Date Found	Sex	Found Wt	Max Wt	Height	SL Length	Tape Length	Max Width	Width @ Hinge	Hinge Width	Hinge to Ant.	Hinge to Post.
Virginia population average			377.5	398.2	5.9	12.5	15.3	9.8	9.1	6.9	5.2	7.3
West Population Mean			388.0		6.2	12.9				6.8	5.1	7.2

This chart compares the mean values of weight, carapace length and other measurements of the Tenn. Population with those of my study population in western Virginia, with a normal juvenile to old age adults span as residents.

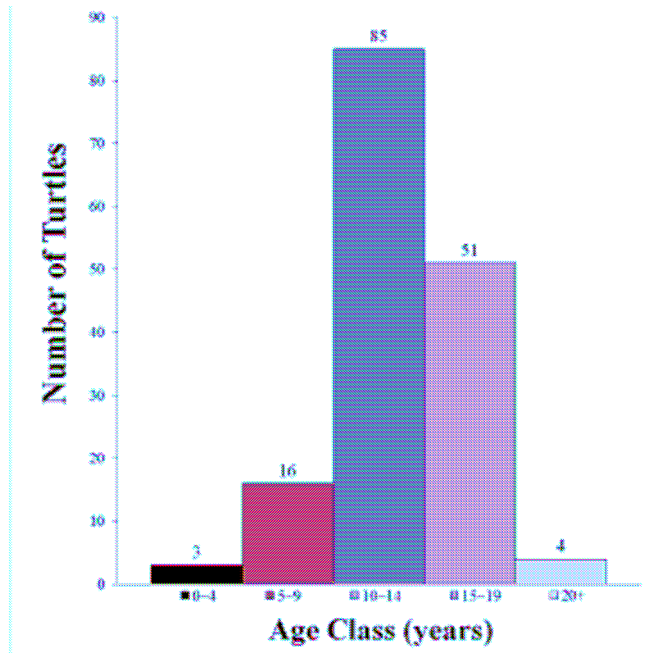
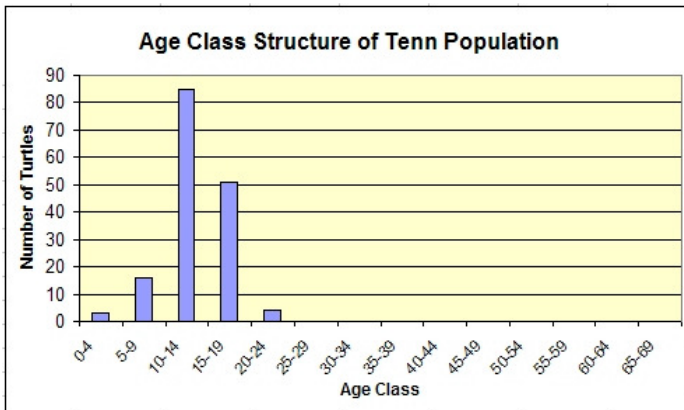
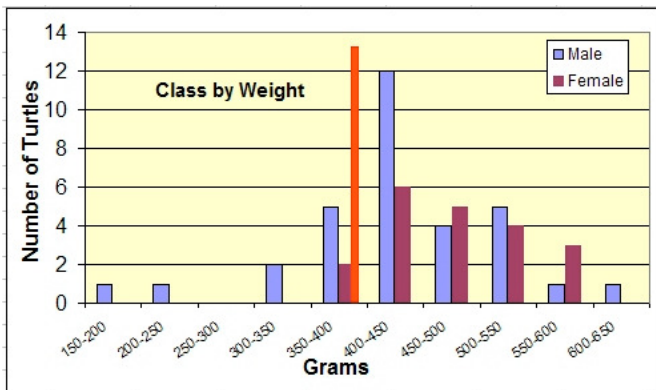


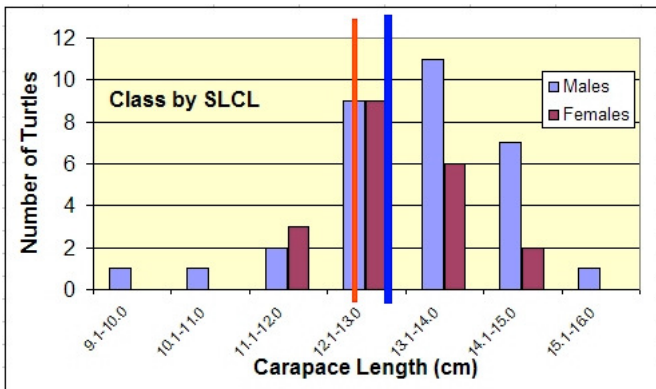
FIGURE 1. Age class structure of the sampled Eastern Box Turtle (*Terrapene carolina carolina*) population at Nickajack wetlands in middle Tennessee, USA. The numbers above the bars indicate number of turtles in that age class.



This chart of the Murfreesboro study population is better representative of the (published) age structure than that included in the paper. A FEW of the older turtles of this population structure COULD have born a FEW of the youngest members, but there are no adults presently in the population that would have born the older juveniles, and young adults and few, if any, turtles here are of reproductive age to preserve this local population in the future. Why would a box turtle population be missing its adults? It's EXTREMELY unlikely that any single or combination of events (disease, road mortality, poaching, development, etc.) would destroy the adult population and leave the hatchlings and juveniles untouched. No known events would have this kind of targeted effect.



This chart shows the weights of 55 individuals in my Virginia EBT local population by weight class, with the overlay (red line) of the Mean Mass of the Murfreesboro Tenn. Population.. This mean is representative of the weight structure of a normal (21st century) local population, not the <20 year old age structure of this Tenn. population



This chart shows the Carapace lengths of 55 individuals in my Virginia EBT local population by carapace length class, with the overlay (red and blue lines) of the Mean Carapace Lengths of the male

and female Murfreesboro Tenn. Population. This mean is representative of the CPL structure of a normal (21st century) local population, not the <20 year old age structure of the Tenn. Population.

The thing about this paper is that if all the age based demographic data, related cites, conclusions, etc. were deleted and replaced with size and mass data, this might be an interesting and useful paper. One step further would be to replace or supplement the mark/recapture data with at least some telemetry based movement and behavior data, especially nesting data; with the marshy character of the site, nesting behavior and related data could be useful.

I'm 100% certain that this local population is a near normal (for the 21st century) Eastern Box turtle population with a majority of the residents being adults, and at least a few being older adults, and likely an occasional transient visiting the area and leaving behind some genes., the former being determined by basic field morphometric data collection, the later with telemetry and multi-season study. If I'm correct, the entire premise of this paper: to describe the demographics of an unusual (odd) resident population, is lost and invalid

But as-is, this research project and subsequent publication has very little value in Eastern Box Turtle research. One other related comment concerns the ***RANA VIRUS and SEASONAL CORTICOSTERONE LEVELS*** research and results published as the thesis: "If you can't get the small stuff right, how trusting can one be of the big stuff?"

There are, unfortunately, far too many Eastern Box turtle research papers out there with questionable or outright false or missing data and conclusions, questionable methodology, and very short-term research with very few member subjects, that have received very little or no peer review, and are being published and used as primary reference sources of Box turtle data in later publications. College Thesis advisors and Thesis Committee members, in particular, should be ashamed of themselves for letting questionable research slide through without adequate review before being published, but this is very common.

But as for professional research, little peer review seems to exist to sort the quality of published data and conclusions. At least I don't see the peer review, if it is occurring.

And so it goes on and on.