

Building a 100-Year Project: Assuring Data Quality in The Box Turtle Connection

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Box Turtles in Decline

Box turtles are a persistent species, but today they are being threatened by habitat loss, development, and pet trades. Although not facing imminent extinction, research shows that their populations are declining (Swarth & Hagwood, 2005; Keister & Willey, 2015). Quality data is needed in order to adequately assess population trends and conservation needs in North Carolina.



The Box Turtle Connection

The Box Turtle Connection (BTC) was established in 2008 as a long term study of Eastern Box Turtle populations throughout North Carolina. With only a shoestring budget, the project stands on the pillars of trained volunteers who collect data within their sites. The project is overseen by a team of biologists.



Scientific Objectives

1. Gather baseline data on population size and structure for the purpose of long-term monitoring
2. Study how box turtle populations differ across the state
3. Determine the status of box turtles in North Carolina
4. Engage citizens in scientific data collection



The Box Turtle Connection Book

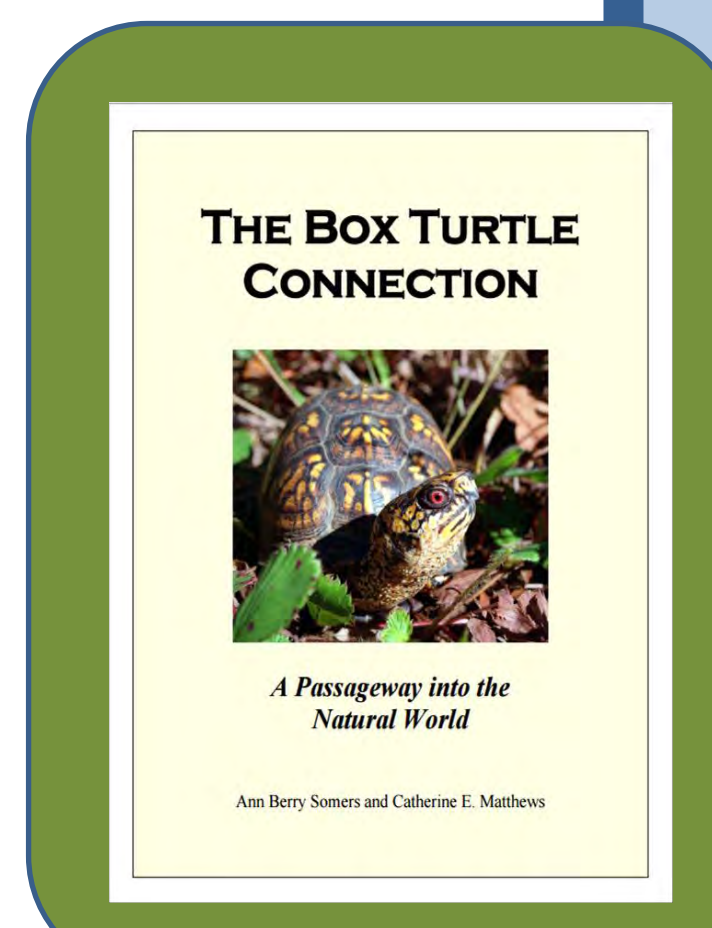
This research manual provides protocols and diagrams as well as the necessary information to start your own box turtle research and manage it long term.

Free Download: <http://boxturtle.uncg.edu/docs/Box-Turtle-Book.pdf>

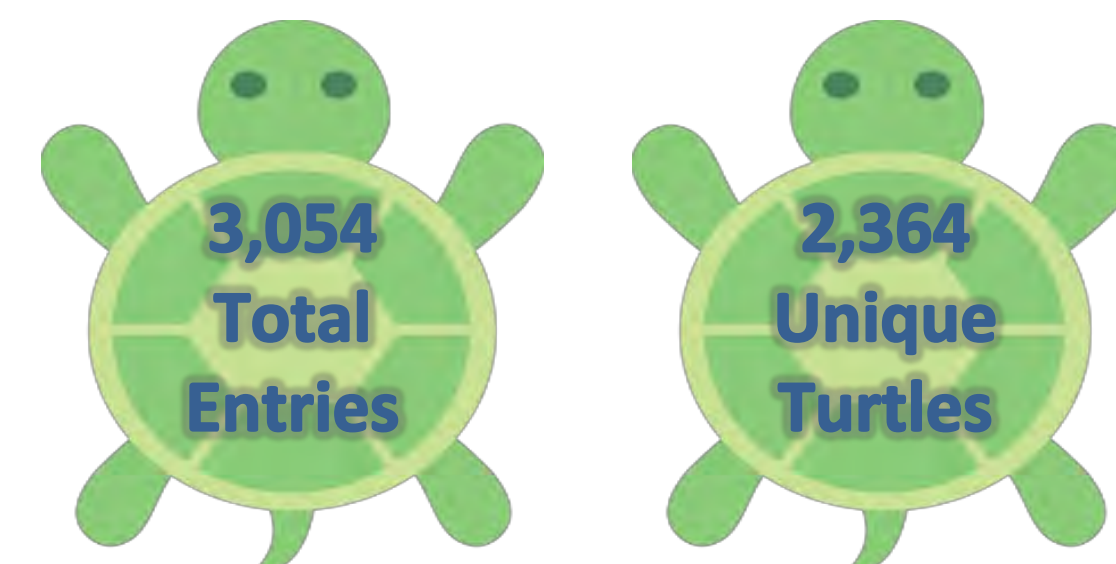
Main Components

1. Basic Box Turtle species information (range, habitat, behavior, etc.)
2. How to plan field research
3. How to mark, sex, weigh, measure, and count annuli
4. Surveying techniques

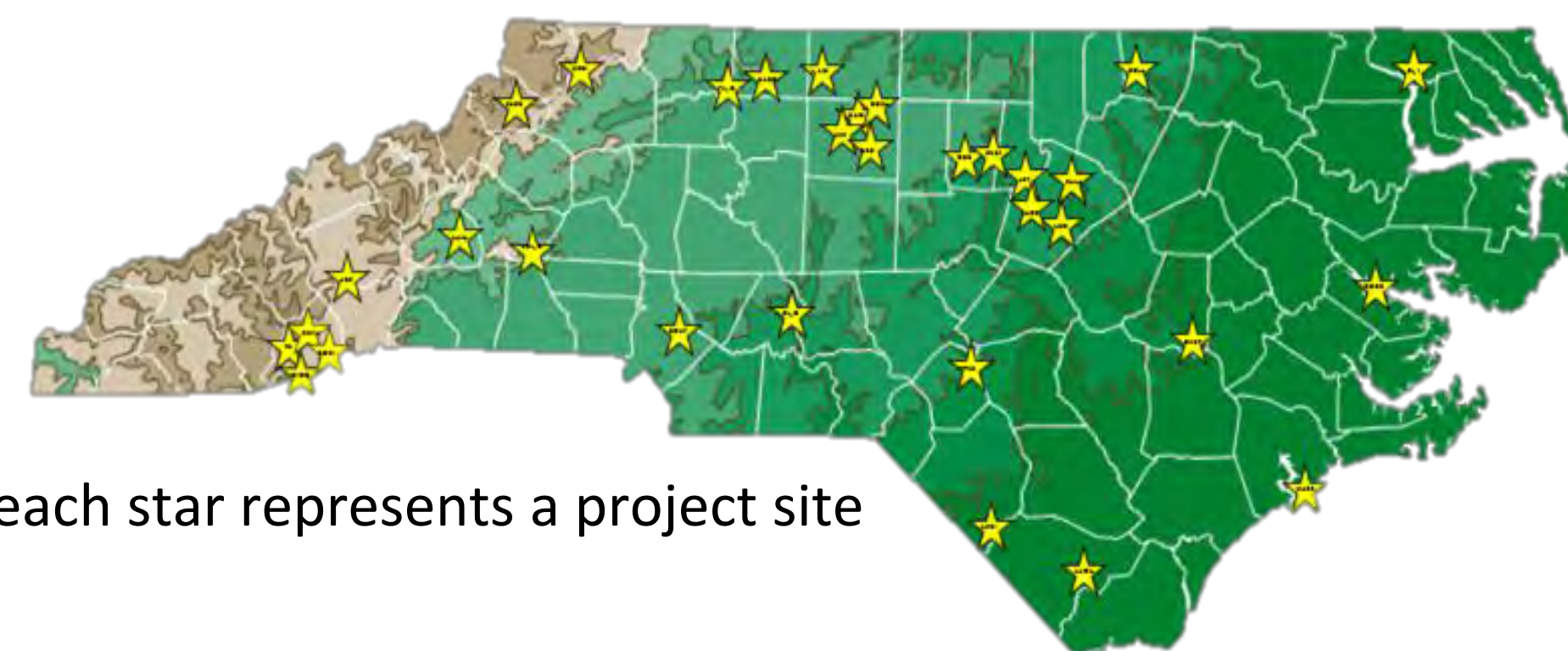
Revision of The Box Turtle Connection is currently in progress



The BTC Today:



- 34 active sites as of 2015
- Project sites in all physiographic regions of the state (Mountains, Piedmont, Sandhills, and Coastal Plains)
- Site ownership: federal, state, county, city, and privately owned
- ~ 65% of all sites are within the State Park system
- In 2014 the BTC raised ~\$77,000 for the NC Wildlife Resources Commission.



*each star represents a project site

Scutes of Success



Data Quality Assurance

1. Improving consistency in data collection by:

- Providing calibration weights to calibrate electronic or spring scales
- Standardizing measuring tools
- Making instructional videos on proper methods for taking measurements



2. Generating site reports that will give feedback on measuring inconsistencies or flawed data entry.

3. Revising the Box Turtle Connection Book to reflect new protocols.



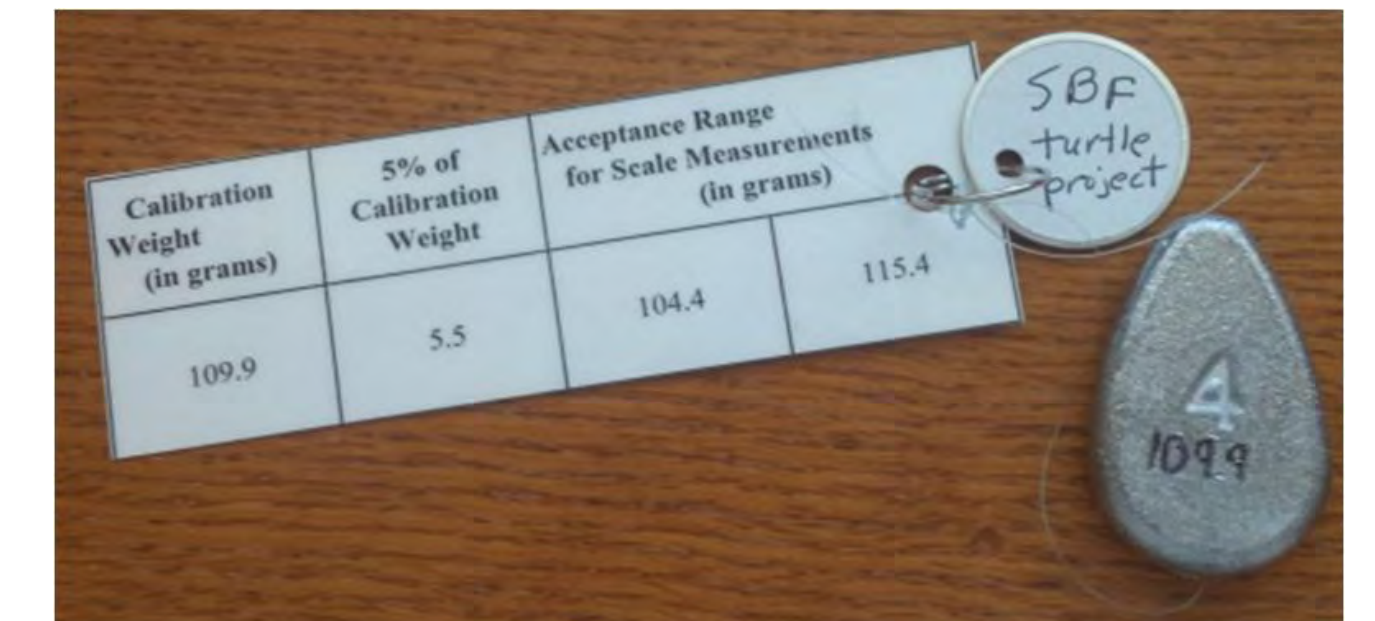
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Data Quality Assurance: Calibrating Scales

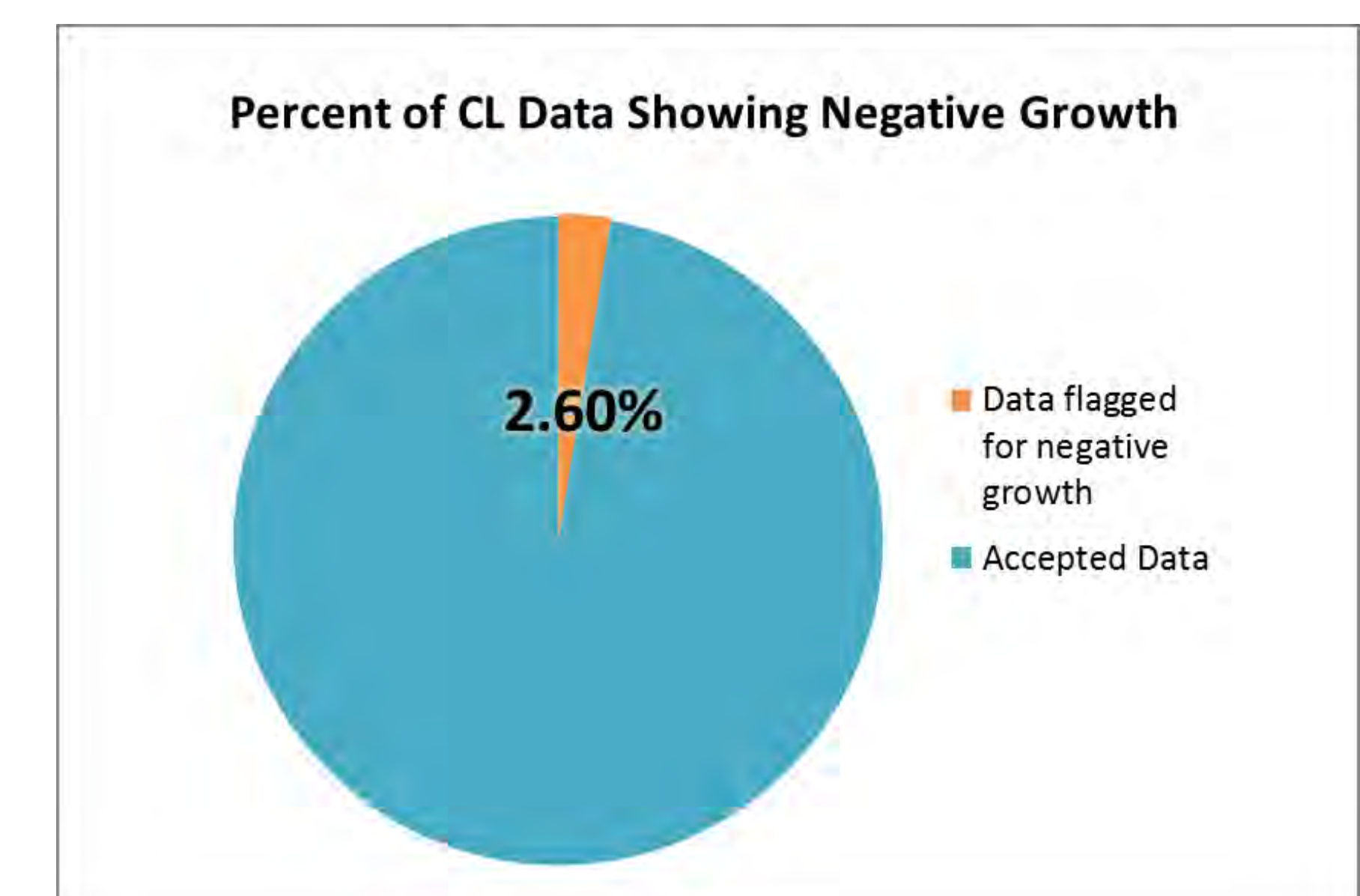
Electronic scales and especially spring scales can become uncalibrated and therefore inaccurate. The BTC recommends that scales be tested monthly using a provided calibration weight. Scales must measure within the 5% acceptance range or be replaced.

Calibration weights were created for Project Leaders and their known weights etched onto the front for reference.



Data Quality Assurance: Flagging Data

Data from each site were filtered for length measurements that were inconsistent with the original capture data. For example, we identified carapace length (CL) measurements on recaptured turtles that indicated greater than 5% negative growth. Since turtles are not expected to get smaller, these data were flagged and will be included in site reports provided to the Project Leaders for re-examination. Five percent or less negative growth was considered an allowable error.



Percentage of data entries where the CL measurement for a recaptured turtle was smaller than the original capture by >5% and flagged as negative growth.

Summary

- 797 entries of 818 (97.4%) recapture data responses were within the allowable error
- 21 flagged entries, representing < 3% of total entries of CL for recaptured turtles.

Possibilities for Future Analysis

Entries outside of +5% were counted as acceptable data since growth is expected. In order to separate normal growth patterns and measurement inconsistencies, a method will have to be developed to standardize what is considered natural growth and what is considered a measurement error.

References:

- Swarth, C. W. and S. Hagood (editors). 2005. Summary of the Eastern Box Turtle Regional Conservation Workshop: Recommendations for Action. Published by the Humane Society of the United States, Washington, D.C.
- Kiester, A.R. and L.L. Willey. 2015. *Terrapene carolina* (Linnaeus 1758)- Eastern Box Turtle, Common Box Turtle. Published by Chelonian Research Foundation.

