

Wood Turtle Population Assessment Protocol

Northeast Wood Turtle Working Group¹

Background and Rationale

A regional collaboration to assess Wood Turtle populations in the Northeastern United States has been underway since 2012, resulting in a Conservation Plan (2018) for the northeastern states. This partnership has been funded primarily through a Competitive State Wildlife Grant and three Regional Conservation Needs (RCN) awards. This document outlines the recommended guidelines for Wood Turtle population assessments in the Northeastern United States in 2021–2023, funded again through the Competitive State Wildlife Grant (SWG) program. This document outlines the recommended methodology for: 1.) selecting and delineating sites; 2.) conducting surveys; 3.) processing turtles; and 4.) recording and submitting data. By converging on a common set of methods and constraints, the results from throughout the region may be pooled for analysis, allowing greater insight into regional trends.

Methods

Step 1.) Identify Stream. Identify an appropriate stream for targeted Wood Turtle surveys. These sites will generally fall into one of these categories:

- (a) **Focal Core Areas** (priority sites identified through the regional Conservation Plan that support high densities of wood turtles, large wood turtle populations, excellent probability of population persistence, or representation of unique ecological or genetic characteristics);
- (b) **Management Opportunities** (sites identified through the regional Conservation Plan that represent opportunities for Wood Turtle conservation because they are on federal land or would benefit from agricultural restoration activities);
- (c) **Long-term research sites**;
- (d) **Data-deficient areas** (identified either by State wildlife agencies or in regional planning documents);
- (e) **Random stream segments.**

Step 2.) Identify One-Kilometer Stream Segment(s). Select one kilometer of meandering stream (following the stream centerline) in a GIS such as Google Earth (**Fig. 1**). For sites of interest that are much longer than 1 km, establish a sequence of 1-km segments that do not overlap. Conduct a **reconnaissance visit** if feasible. Record the **upstream** and **downstream bounds** of the mapped stream segment using decimal degrees to five decimal places (e.g., Upstream bound: 42.34567°N, -73.45671°W; Downstream bound: 42.45671°N, -73.56781°W). Start and end the segment at prominent visual landmarks or flag the start and end location.

Step 3.) Schedule Surveys During Optimal Seasonal Windows. Schedule three surveys within a single biological season (see **Fig. 2**). Conduct a minimum of three surveys in a single biological season. The pre-nesting season (emergence to May 28) is optimal season in most of our area, and fall surveys are about half as productive. However, fall surveys provide useful, independent recapture information for population estimates at long-term reference sites. Avoid surveying the same site on back-to-back days—but if a site is very difficult or costly to access, it is better to survey it three days in a row than only one

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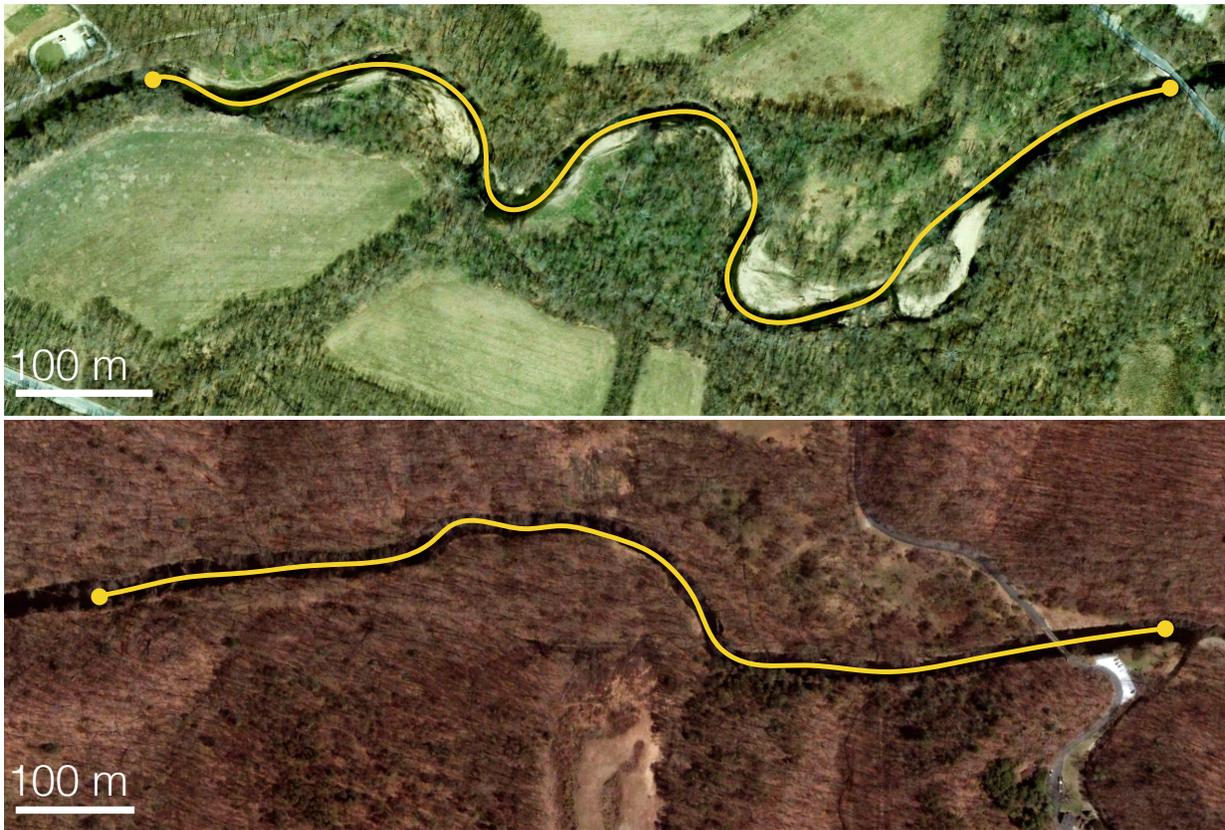


Figure 1. Standardized site selection in Google Earth, illustrating the delineation of two, 1-kilometer segments along the stream centerline. Note that both images depict “leaf-off” conditions in April. Leaf-off early spring images may be found for most regions in the Northeast using the “time machine” function in Google Earth. Note that the upper segment flows through an agri-forested landscape and that the lower segment flows through relatively uniform deciduous forest. Both sites depicted are believed to represent extirpated populations. Aerial images were obtained from **Google Earth**.

time in a season. If you are sampling two or more sites, stagger your visits (randomly visit all sites before returning to the first site).

Step 4.) Assign a Number to Each Surveyor. Each survey will be completed by one or more survey partners. Ideally, surveys will be conducted by two observers, but any number between 1–4 is acceptable. **IMPORTANT:** For each separate survey, each observer is numbered sequentially 1, 2, 3, or 4. Observer #1 is the **Lead Observer**. Surveys by a single observer are OK, but the lone observer is still identified as “Observer #1” to be comparable to other surveys with multiple people.

Emergence/Pre-Nesting	Nesting	Summer	Fall
Ideal survey window region-wide. The season begins after ice-out and the first several days above 10°C. Watch for signs of activity (basking turtles, tracks)	Ideal window only in streams that have instream and riparian nesting areas	Not an ideal survey window, although turtles may be detectable at high density sites.	Region-wide, half as productive as spring surveys, but may be locally ideal for surveys.
Emergence to May 28th	May 29th to July 8th	July 19th to Sept. 1 or Oct. 1	Oct. 1 until dormancy

Figure 2. Active biological seasons of the wood turtle. Surveys may occur in any season, although summer surveys are not recommended and negative surveys should not be construed to indicate absence. The **preferred survey window** region-wide is Emergence/Pre-Nesting (**from the onset of spring activity until May 28th**). Nesting season surveys are effective within rivers where the primary nesting habitat occurs on beaches, point bars, islands, and other features in or adjacent to the stream. Fall surveys may begin *around* September 1 in northern New England, and October 1 in the southern range states. Fall surveys are about 1/2 as productive as spring surveys (detection rates are half those in spring), but should be used to increase the independence of capture-recapture data at long-term reference sites. Each segment should be surveyed a minimum of 3 times in one season. Long-term reference sites should be surveyed three times per season in two or four seasons (total of 6 or 12 surveys).

Step 5.) Conduct Surveys Following Protocols. Surveys should follow these protocols:

- a.) *Season.* Surveys should be undertaken in a clearly defined season, as described in #3, above;
- b.) *Form.* Use a standardized **Survey Field Form** to record survey results;
- c.) *Pace.* Observers should maintain an approximate pace of **1 hr per km**, meaning that they should aim to complete the survey at the end point one hour after they begin, if they spend the entire time searching;
- d.) *Tracking minutes.* During each survey, record the start time and end time. Record the number of minutes within this window that you spend *not surveying*;
- e.) *Recording environmental variables.* At the beginning and end of each survey, record: the air and water temperature, water depth, and clarity. Air temperature should be measured in the shade. Water temperature should be measured at the surface in the swiftest current accessible. Weather should be recorded categorically: clear, overcast, mostly cloudy, partly cloudy, light rain, heavy rain, thunderstorm. Surveys will ideally be completed during daylight hours at air temperatures between 9° and 24°C and water temperatures of 7° and 20°C, but any temperatures are acceptable.
- f.) *Lead Observer has right of way.* The **lead observer** has the right of way and must survey in front, so that the other observers cannot scare turtles into the water.
- g.) *Search area.* Observers may search in the water or on land, including bank and floodplain areas. All observers should remain within the floodplain or within 10 m, whichever is a greater distance from the riverbank. Observers may search riparian features such as oxbows, sidestreams, flood channels, pools.
- h.) *Record turtle detections.* For all wood turtles detected, record the number in the river, on the bank, and in the floodplain. Record the number observed by each observer. Record the identity and sex of Wood Turtles observed. Follow the turtle processing guidelines outlined in Step 6.

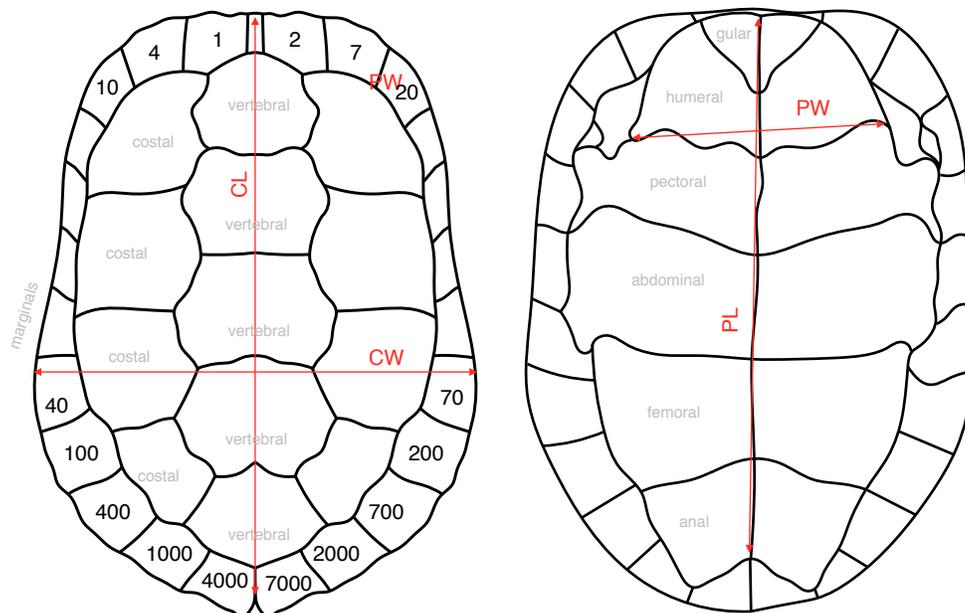


Figure 3. Four recommended shell measurements are illustrated on the diagram of a wood turtle carapace (left) and plastron (right), above. The recommended carapace notching scheme of Ernst et al. (1974) is illustrated on the carapace. Key shell morphology is also noted in gray text. The anterior portion (head) is at top.

Step 6.) Complete an Individual Turtle Field Form. For every wood turtle captured, complete an individual turtle form (Appendix B).

- a.) *Mass.* Record the mass of the animal using a spring-loaded scale (e.g., 2 kg Pesola).
- b.) *Morphometrics.* Record the straight carapace length (CL), carapace width (CW), plastron length (PL), plastron width (PW) at the seam between the humeral and pectoral scutes, and the shell height (Fig. 3) using 300 mm dial caliper.
- c.) *Deformities and injuries.* Note any deformities or injuries to the limbs, tail, face, or shell.
- d.) *Marking turtles.* Assign a unique ID to the turtle and notch the marginal scutes accordingly with a triangular file or drill, following the local numbering system or Ernst et al. (1974) (Fig. 3). It is helpful to number the turtles as sequential integers (1, 2, 3, 4) rather than combinations of numbers (1-1, L1R1, etc.).
- e.) *Photography.* Photograph the carapace and plastron of the captured turtle straight on, not from an oblique angle. Photograph the turtle in full sun or full shade, if possible (not in dappled light). Record the photo ID and camera ID on the individual turtle form, or include a card with the turtle information in the photograph. In either case, organize your photos soon to avoid confusion. For ideal photographs, see Fig 4.
- f.) *Blood draws.* If you are trained or qualified, collect blood from the caudal vein of ≤ 20 turtles per site (see “Collecting tissues from Wood Turtles”; http://northeastturtles.org/NE/GLIN_GeneticsProtocol.pdf). Store the sample in a sterile tube with ethanol.

Step 7.) Record the location of each turtle observed in decimal degrees using a hand-held GPS. Note the exact location on the **Individual Turtle Form**.

Step 8.) Report Data. Report your results using the data-entry portal on <http://northeastturtles.org>. Alternatively, enter your data into an Excel (.xlsx) file with all Wood Turtles detected during standardized surveys. Alternatively, submit the original forms. Remember to submit BOTH the survey results AND the individual turtle data. Also, remember to list the turtle identification numbers on your survey form.

Other considerations:

- a.) *Boat surveys.* Boats (canoes, kayaks, or inflatable boats) may be used to facilitate access along the 1 kilometer stream segment on larger rivers. However, the Lead Observer will (ideally) walk along bank and in stream habitats (as in the typical) form of the survey, and the support boat will follow behind at >100 m to avoid disturbing turtles before they are detected by the Lead Observer. Avoid the use of outboard motors *during the survey*. **In all cases**, spend as much time on the banks as possible, searching bank habitats and floodplain features. When the entire survey team spends part of the time in the boat, the Lead Observer should ride in the bow of the boat.
- b.) *Small, Medium, and Large rivers.* The survey form has a new field to record whether the river is crossable or not during your survey. If a river cannot safely be crossed during a given survey, it is considered “Uncrossable.” Note this on the survey form. In this case, two observers should select different banks (if possible) to surveys of each bank on the same day.
- c.) *Visual aids.* At a minimum, polarized sunglasses are recommended for universal use. Other visual aids may be used, including underwater bucket scopes and snorkel equipment. Note the use of either on the field form. If visual aids are used, they will ideally be used only by the Lead Observer, so that the effects may be quantified.

d.) *Observer overlap.* Generally, data are more useful if a single observer surveys a large number of sites, and has sufficient overlap with other observers. To the extent possible, arrange for biologists to “switch” lead observer roles across nearby sites. Single surveys by single observers should be discouraged. Regional biologists at SCBI and UMass can be scheduled into LT sampling to ensure observer overlap.

e.) *Equipment decontamination.* Surveyors should follow the most recent NEPARC decontamination guidelines.

Questions?

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Figure 4. Standard-angle photographs of Male #37 from New Hampshire.