

Population and Movement Ecology of Wood Turtles (*Glyptemys insculpta*) on Maine's Working Lands

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The overarching objectives of this project are to measure population demography and movement ecology at fine and broad scales at sites in Maine with differing land management histories and regimes. This annual report covers activities that took place during Year 2 of the two-year project from October 1, 2023 to September 30, 2024. The objectives for this work were to: (1) estimate population demographic characteristics (e.g., population size, age class structure, and sex ratio) and conduct site-specific population viability analyses using data from time constrained surveys of fixed transects and capture-mark-recapture methods; and (2) investigate movement ecology (e.g., macrohabitat habitat selection, home ranges, and movement patterns) by tracking turtles using long-life VHF and GPS tags. Status updates on these objectives are provided in detail below.

Population demography and viability

As stated in the proposal, we aim to estimate population demographic characteristics and conduct population viability analyses. To this end, in 2023 we selected three study sites in western Maine; each site was chosen because of the presence of wood turtles and its proximity to forestry lands including those owned by Wagner Forest Management, American Forestry Management, and Weyerhaeuser Company. Beginning in spring 2023 and continuing throughout the 2024 field season, we conducted standardized population surveys along 2 km of river at two out of three of the study sites. These surveys are being used to determine fundamental population demographic characteristics. The surveys are also instrumental in capturing turtles for the habitat selection study. During these assessments we located turtles visually, either on foot or by boat. In addition, we regularly augmented visual encounter surveys with the use of conservation scent detection dog teams, which include Sequoia Dixon and canine June and Lindsay Ware of Science Dogs of New England and her dog Chili.

Once turtles were located, the team collected data on morphology (length, width, mass), location (GPS coordinates), and nearby habitat (both micro- and macrohabitat data, including timber stand information, canopy cover, woody tree species, extent of herbaceous vegetation, and amount of woody debris). Turtles are then marked with individual notch codes filed into the marginal scutes of their carapaces and a pit tag is inserted under the skin; both marking methods allow for identification of recaptured animals. A subset of 39 healthy adult turtles received VHF and GPS tags. All turtles were subsequently released at the site of capture.

To date, we have marked a total of 168 individuals across the three sites. These marked turtles will be used for the population demography analysis that will aid in understanding the health and viability of these populations. Because of length and configuration, standardized surveys are not feasible on the Dead River, so we will likely not conduct population demography analyses on site 3. As part of his graduate research, however, Brad Compton conducted a wood turtle habitat study on this section in 1998 and 1999, which makes it an excellent candidate for a long-term

habitat selection and movement ecology study (see below). Turtles at this site were found with the use of canine June covering large areas along the main branch of the river and connected tributaries. To date, we have marked 15 turtles at this site and, because of the large area and low population density, all but one turtle was found by June. Three of these turtles were recaptured from the 1998–1999 Compton study, potentially providing insights into development and maximum ages of wild wood turtles.

Movement and habitat selection on forestry land

In addition to continuing data collection on the population demography study that we initiated in 2023, we began collecting habitat selection and movement data this year. We used VHF radiotelemetry throughout the season to relocate wood turtles 1–3 times each, and recorded microhabitat characteristics for each animal. Data collection also included a general bodily health assessment and any interesting behaviors (e.g., feeding, courtship, agonistic interactions). We then classified the habitat around the turtles using variable radius plots and characterized the amount of coarse woody debris and other important microhabitat features. Following Compton et al.'s (2002) paired logistic regression approach for determining habitat selection, we collected analogous data at randomly selected locations within 50m of each turtle's position. This approach will allow us to estimate the habitat used by turtles given the amount of available habitat of each type within the study area. We are pleased to report that we have tracked ~40 adult wood turtles for one complete season. In addition, we collected data from a total of 10 paired variable radius plots. The logistics of timing, deployment, and retrieval of GPS tags limited the amount of time we were able to spend on microhabitat data collection. Therefore, we have decided to continue the project for another year to allow for the collection of additional variable radius plot and other microhabitat data.

In order to address movement patterns and macrohabitat selection, we used store-on-board GPS tags from Lotek Wireless Inc. We programmed tags to collect location data twice daily. Tags were subsequently deployed on turtles captured during stream surveys in May and June, then recaptured at the end of season in late fall, at which point data were downloaded for analysis.

By the close of the 2024 season, we obtained GPS tag data from a total of 30 turtles with complete or nearly complete GPS data. As expected, GPS data from some turtles is not retrievable as some turtles lost their GPS tag, their tags had battery failures or, in three instances, turtles died from predation or unknown causes. We should note, however, that these deaths appeared unrelated to the VHF or GPS tags or to the routine handling experienced by all our study animals.

The future of the habitat and movement ecology study

Looking forward, we have decided to extend the habitat and movement ecology project for another year. We will focus on collecting additional microhabitat data on the same individuals tracked this past year. We have recently submitted a request for additional funding from NCASI that will cover the cost of ~10 GPS tags that we plan to affix to individuals who spend relatively longer periods of time in managed forests. This will give deeper insights into how these

individuals move through the a mosaic of forest ages and types to determine which management regimes are most compatible with wood turtle habitat needs.