Terrapene carolina carolina (Eastern Box Turtle): Railroad nesting

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Terrestrial turtle, *Terrapene carolina carolina* occupies a broad range throughout most of the eastern United States (Ernst & Lovich, 2009). *T. c. carolina* generally seek out dry, open upland habitat with loose, sandy soils in which to construct nests (Hulse et al., 2001; Wilson & Ernst, 2008). *T. c. carolina* populations occurring within Pennsylvania typically nest in early June through July (Hulse et al., 2001). On June 4, 2009, at approximately 16:00 h (United States Eastern Standard Time) the author observed two small groups of female *T. c. carolina* located along a railroad track bordered by woodland habitat near Espy, Columbia County, Pennsylvania USA (41°0'29.2"N, 76°25'24.3"W; WGS84 grid; 150 m elevation). Groups consisted of two and six individuals, respectively. Both *T. c. carolina* groups were watched for approximately five minutes at a distance of three meters. Individuals in both groups were observed exhibiting preliminary nesting behaviour by moving substrate associated with the railroad bed with their hind limbs to excavate a nesting cavity (Hulse et al., 2001). Oviposition was not observed, and it is unknown if nesting was completed or if potential nests were successful.

T. c. carolina have been reported to utilise anthropogenically-impacted habitats such as clearings, fields, and unpaved roadways for nesting (Flitz & Mullin, 2006; Wilson & Ernst, 2008). Additionally, nesting observations associated with railroad beds have been reported in several aquatic and semi-terrestrial turtle species including *Chelydra serpentina*, *Chrysemys picta*, *Clemmys guttata*, *Glyptmeys insculpta*, *G. muhlenbergii*, and *Trachemys scripta* (Harding & Bloomer, 1979; Hulse et al., 2001; Ernst & Lovich, 2009). However, observations of *T. c. carolina* nesting in railroad substrate are rare, and this account of *T. c. carolina* nesting groups associated with railroad bedding appears to be unique. The area in which this observation occurred consists primarily of forested and wetland habitat that have been substantially fragmented by roadways and human development. In this location, female. *T. c. carolina* may have selected railroad bed substrate to nest when other suitable habitat became unavailable. Railroad beds may be important for *T. c. carolina* populations, as these areas contain open spaces and loose substrate required for *T. c. carolina* nesting (Flitz & Mullen, 2006; Wilson & Ernst, 2008). However, *T. c. carolina* nests that occur in other anthropogenically-influenced habitats (e.g. unpaved roads and clearings) experience high rates of depredation (Flitz & Mullen, 2006).

Railroads in general appear to contribute to mortality or otherwise negatively affect a variety of vertebrate species (Heske, 2015). Negative effects associated with railroad beds have been reported in populations of several turtle species, including *Clemmys guttata* and *Gopherus agassizii* (Ernst & Lovich, 2009). *T. c. carolina* individuals have a high risk of becoming entrapped between rails on railroad beds and expiring from overheating or other causes (Kornilev et al., 2006), as do other turtle species (Iosif, 2012). Studies are needed to examine *T. c. carolina* nesting frequency and success along railroad beds, particularly within fragmented or otherwise anthropogenically-influenced habitats.

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