

Representative Species Model: Eastern Box Turtle (*Terapene carolina*)

Eastern Box Turtle

Box Turtle was selected as a representative species for the Designing Sustainable Landscapes project at the mid-Atlantic workshop of the North Atlantic LCC

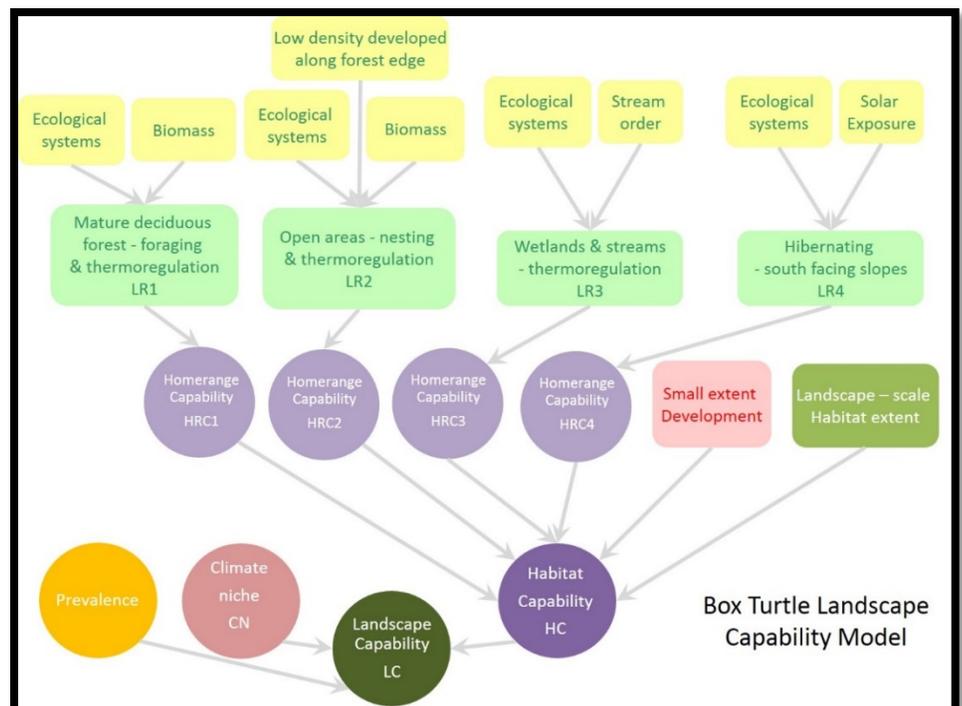
(https://scholarworks.umass.edu/designing_sustainable_landscapes/). The habitat clusters (ecological systems) and associated wildlife species that it represents generally comprise of mesic hardwood and mixed forests including southern and central hardwood forests (both Coastal Plain and Appalachian) and cove forests. The *Landscape Capability (LC)* index integrates habitat capability, prevalence and climate suitability into a single index that reflects the relative capacity of a site to support the species.

Habitat capability (HC) - The *HC* index considers six factors representing the capability of a system to provide required habitat: (1) mature deciduous forests (2) open areas for nesting, (3) wetlands and streams, (4) forests with high solar exposure for hibernating (5) small extent development, representing the risk of mortality associated with developed land cover, and (6) landscape scale habitat extent. The *HC* index represents the relative capacity of a site to provide the habitat needed by the species based on current scientific knowledge.

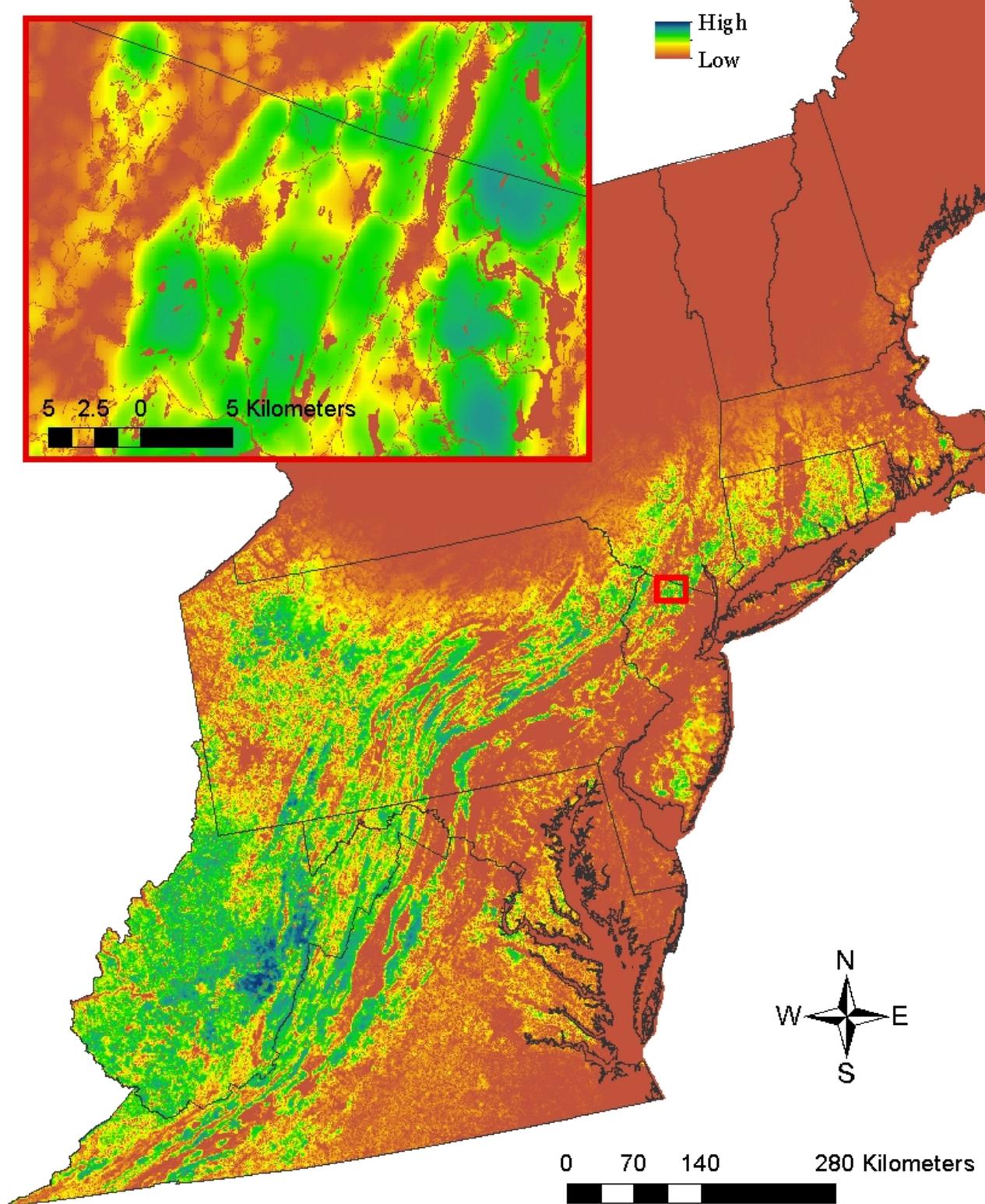
Climate niche (CN) - The *CN* index considers five climate variables representing: (1) growing degree days, (2) annual precipitation, (3) growing season precipitation, (4) minimum winter temperature, and (5) maximum summer temperature. The *CN* is derived from a logistic regression model derived from 25,000 random locations outside of the eastern box turtle range and 25,000 random locations within the box turtle range inside of the Humid Temperate Domain. The *CN* index represents the probability of the climate being suitable for the species based on its current distribution in relation to current climate.

Prevalence index - The Prevalence index is based on the proportional presence of the species across space and is derived from a smoothing of the presumed present and absent locations used the *CN* model. The prevalence index represents the species' relative occurrence based on its current distribution without consideration of environmental determinants and is intended to address biogeographic factors other than habitat or climate (e.g., disease) that influence the species' current distribution.

Landscape Capability (LC)
The *LC* index is computed as the product of the *HC*, *CN* and *Prevalence*. Thus, the index computed for 2010 reflects the gradient of worst (0) to best (maximum value) sites within the landscape that support this species. Note, we also compute this index for the future (e.g., 2080) based on output from the landscape change model. Due to the lack of occurrence data for box turtle across its range, we are currently unable to statistically evaluate *LC*. However, the model was qualitatively verified by several species experts.



Eastern Box Turtle Landscape Capability (LC) (2010)



See technical document on species at https://scholarworks.umass.edu/designing_sustainable_landscapes/ for a detailed description of the Landscape Capability modeling process.