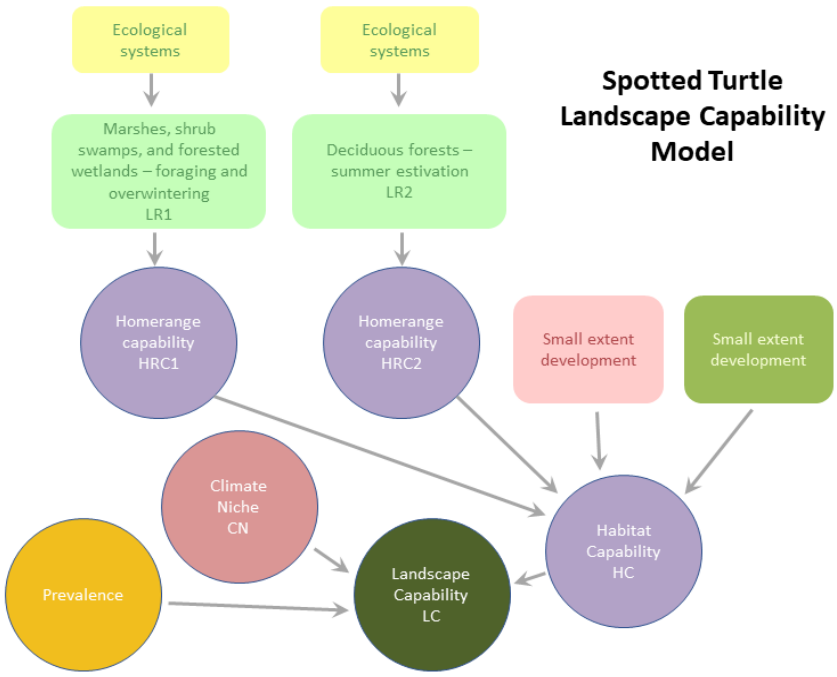
Spotted turtle

The spotted turtle is considered an at-risk species by US Fish and Wildlife Service. It occurs in shallow marshes, shrub swamps, and forested wetlands throughout much of the northeast, especially on the coastal plain. Spotted turtles move overland among wetlands and on nesting and estivation migrations, where they face risks from road mortality. 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. A companion model uses LC to derive cores, connectors, and a road vulnerability index for spotted turtles.

***Habitat capability* (*HC*)** - The *HC* index considers four factors representing the capability of a system to provide required habitat: (1) wetlands for feeding and overwintering (2) forests for summer estivation, (3) small extent development, representing the risk of mortality associated with developed land cover, and (4) 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 8,849 spotted turtle present locations weighted by the inverse of count within 3 km tiles and an equal number of random locations throughout 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 2020 reflects the gradient of worst (0) to best (maximum value) sites within the landscape that support this species. We also compute this index for the future (e.g., 2080) based on output from the landscape change model. All present location data were used to develop CN, therefore LC was not validated with an independent data source for this species. However, the model was qualitatively verified by species experts.

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

Spotted Turtle Landscape Capability (LC), 2020