Snowshoe Hare

Snowshoe Hare was selected as a representative species for the Designing Sustainable Landscapes project at the Northern 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 the boreal and mixed forests of northern New England and at the highest elevations of the Appalachian mountain range. The *Landscape Capability* (*LC*) index integrates habitat capability 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 four factors representing the capability of a system to provide required habitat: (1) montane spruce-fir forests and mixed coniferous forests that either relatively young or old growth in order to provide sufficient structural complexity, (2) small extent development, representing short-distance edge effects such as changes in microclimate, vegetation structure and access by predators that occur on a scale of tens to a few hundred meters from a developed or agricultural edge, and (3) large extent development, representing the effects of human-mediated landscape change that accumulate over a larger geographical area and that may penetrate more deeply into habitat patches than the processes of local edge effects, such as population increases of generalist predators, 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) annual mean daily temperature. The *CN* is derived from a logistic regression model derived from 25,000 random locations outside of the snowshoe hare range and 25,000 random locations within hare 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.

***Landscape Capability* (*LC*)** The *LC* index is computed as the product of the *HC* and *CN*. 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 snowshoe hare across its range, we are currently unable to statistically evaluate *LC*. However, the model was qualitatively verified by a species expert.
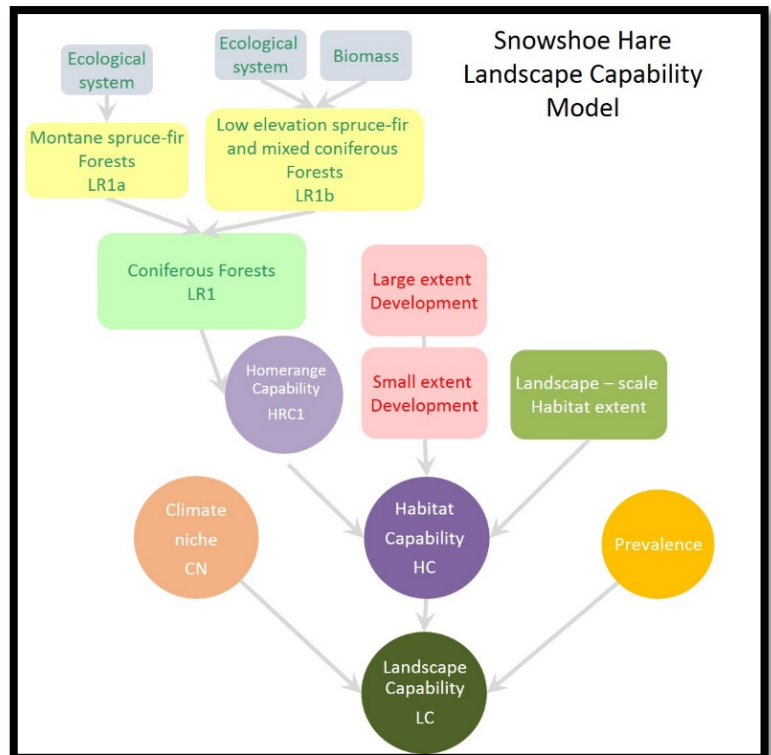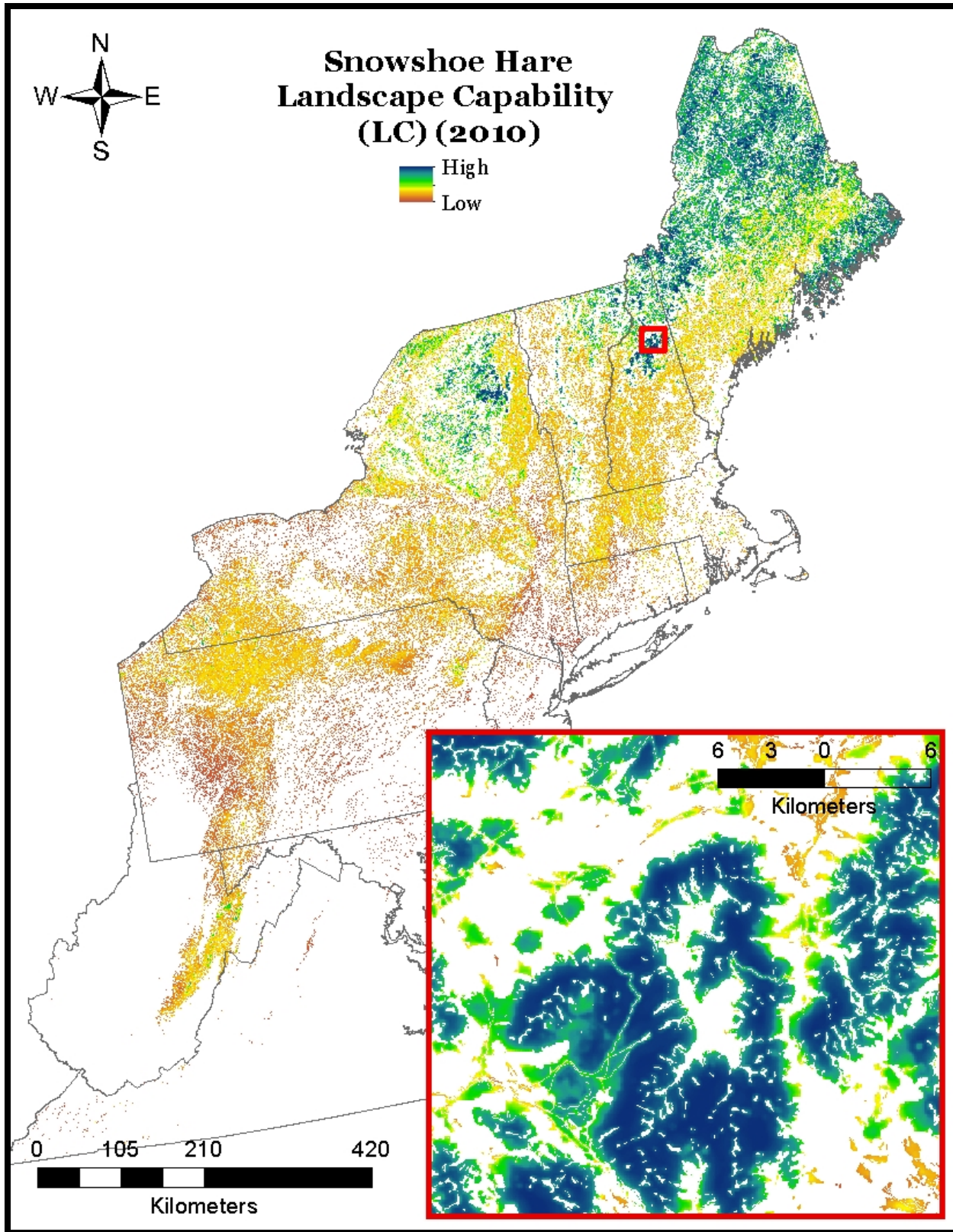
See technical document on species at https://scholarworks.umass.edu/designing_sustainable_landscapes/ for a detailed description of the Landscape Capability modeling process.