## Moose

Moose was selected as a representative species for the Designing Sustainable Landscapes project 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 consist of early successional forests, coniferous forests and wetlands. 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 four factors for foraging habitat representing: (1) foraging habitat determined by early successional habitat, mature conifer forests, wetlands and edges of lentic and lotic systems, (2) cover and thermoregulatory habitat defined by open wetland systems, water edges, and mature forests, (3) 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 (4) large extent development, representing the effects of human-mediated landscape changes that accumulate over a larger geographical area and tend to penetrate more deeply into the forest. The *HC* index represents the relative capacity of a site to provide the habitat needed by the species during the breeding season based on current scientific knowledge.

Climate niche (*CN*) - The *CN* index considers six climate variables representing: (1) annual precipitation, (2) precipitation that occurs during the growing season, (3)annual mean temperature, (4) minimum winter temperature, and (5) maximum summer temperature. The *CN* is based on a statistical model derived from 24,430 randomly distributed locations outside of the known current distribution (absent locations) and 22,074 randomly distributed locations within the mapped range for moose (present locations), within 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 during the breeding season. 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 moose across its range, we are currently unable to statistically evaluate *LC*. However, the model was qualitatively verified by several species experts.

Moose
Landscape Capability (LC) (2010)

High

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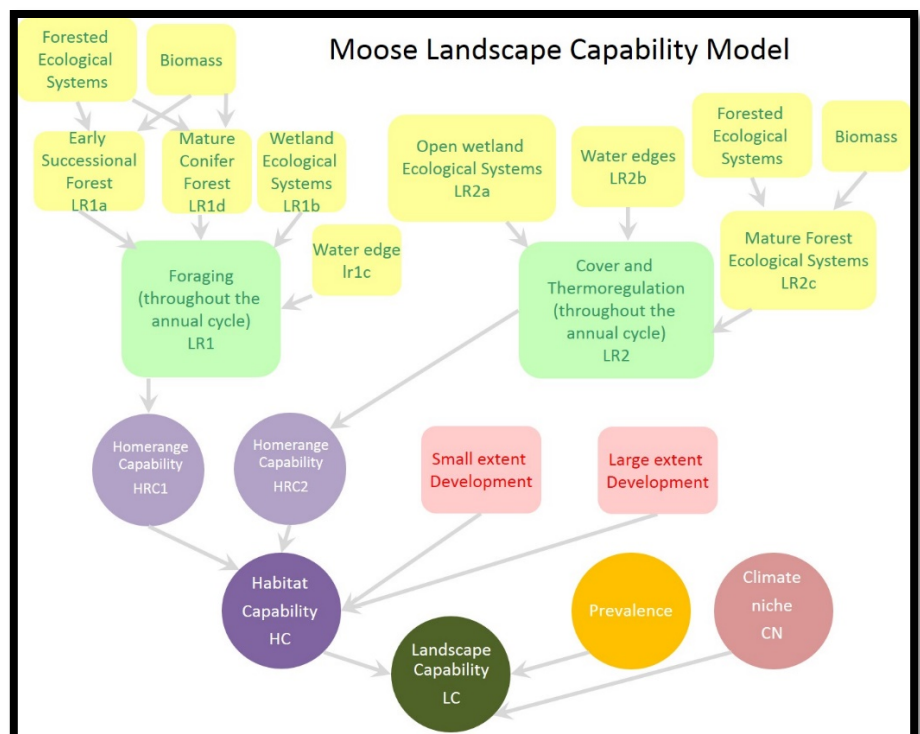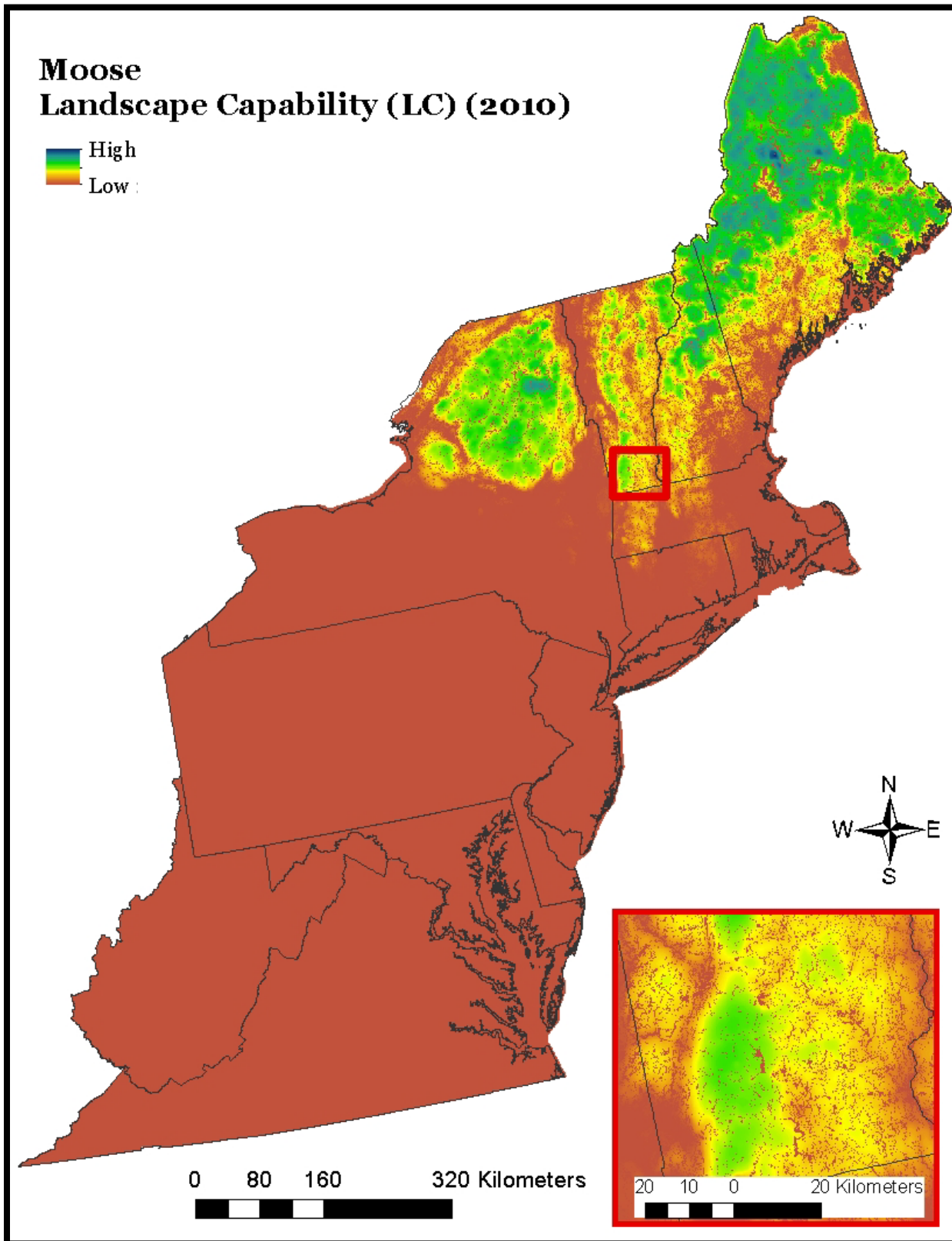
See technical document on species at https://scholarworks.umass.edu/designing_sustainable_landscapes/ for a detailed description of the Landscape Capability modeling process.