Virginia Rail

Virginia Rail 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 are freshwater marshes and oligohaline tidal marshes. 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 five factors representing: (1) ecological system, identifying freshwater marshes, (2) brackish, oligohaline marshes as identified by ecological systems and low marsh, (3) landscape-scale marsh extent, representing the amount of undisturbed habitat in the landscape surrounding the homerange, (4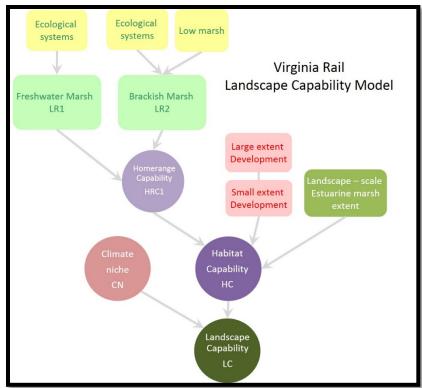) small extent development, representing short-distance edge effects such as changes in microclimate, vegetation structure and access by predators that occur on a scale of tens to a few hundred meters from a developed or agricultural edge, and (5) large extent development, representing the effects of human-mediated landscape change that accumulate over a larger geographical area and that may penetrate more deeply into the marsh than the processes of local edge effects, such as population increases of cowbirds and generalist predators. The *HC* index represents the relative capacity of a site to provide the habitat needed by the species based on current scientific knowledge.
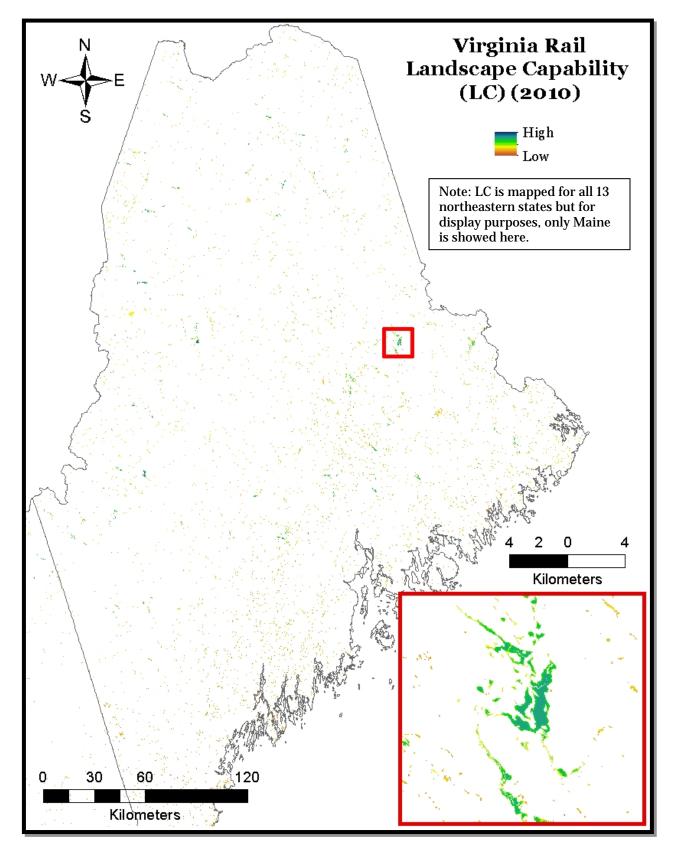
Climate niche (CN) - The *CN* index uses three climate variables representing: (1) growing season precipitation, (2) maximum summer temperature, and (3) minimum daily temperature. The *CN* model is based on a statistical model derived from 3,634 absent eBird locations and 2,920 present eBird locations distributed through 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* indices (see map). 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. Model performance was performed using 297 present and 490 absent eBird data points that were held out of the *CN* model dataset. Model performance was determined to be acceptable (Kappa = 0.49, Deviance explained=27%, AUC = 0.82).

**Virginia Rail
Landscape Capability
(LC) (2010)**

High
Low

Note: LC is mapped for all 13
northeastern states but for
display purposes, only Maine
is showed here.

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