

## Representative Species Model: Piping Plover (*Charadrius melodus*)

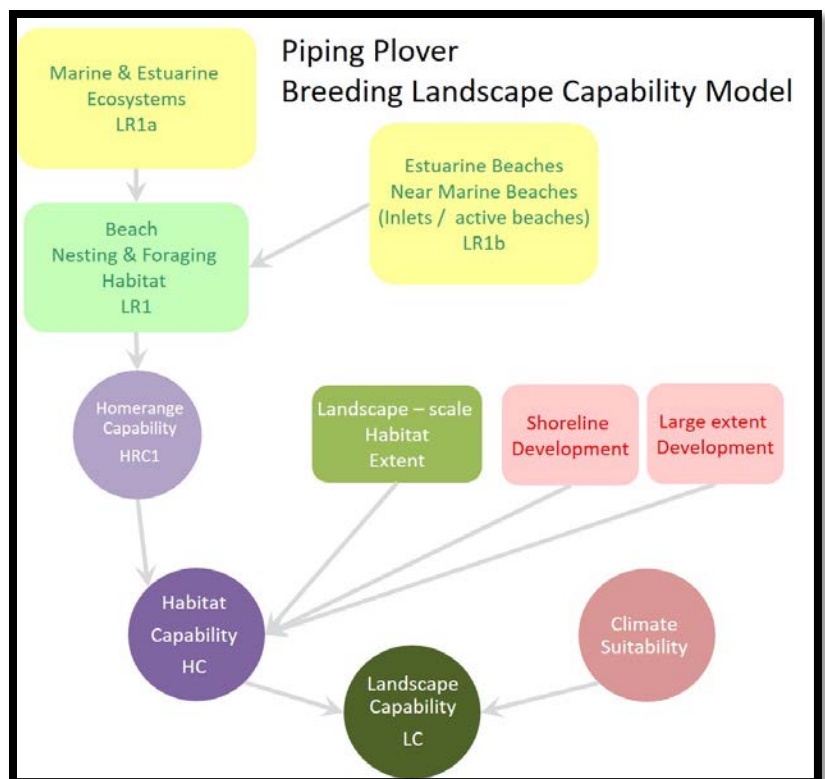
### Piping Plover

Piping Plover was selected as a representative species for the Designing Sustainable Landscapes project of the North Atlantic LCC ([https://scholarworks.umass.edu/designing\\_sustainable\\_landscapes/](https://scholarworks.umass.edu/designing_sustainable_landscapes/)). Piping Plover was selected as an additional species to the originally selected 30 representative species as part of the Coastal Resiliency, Hurricane Sandy Project. The associated wildlife species that it represents are marine and estuarine beaches throughout the NA LCC. 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.

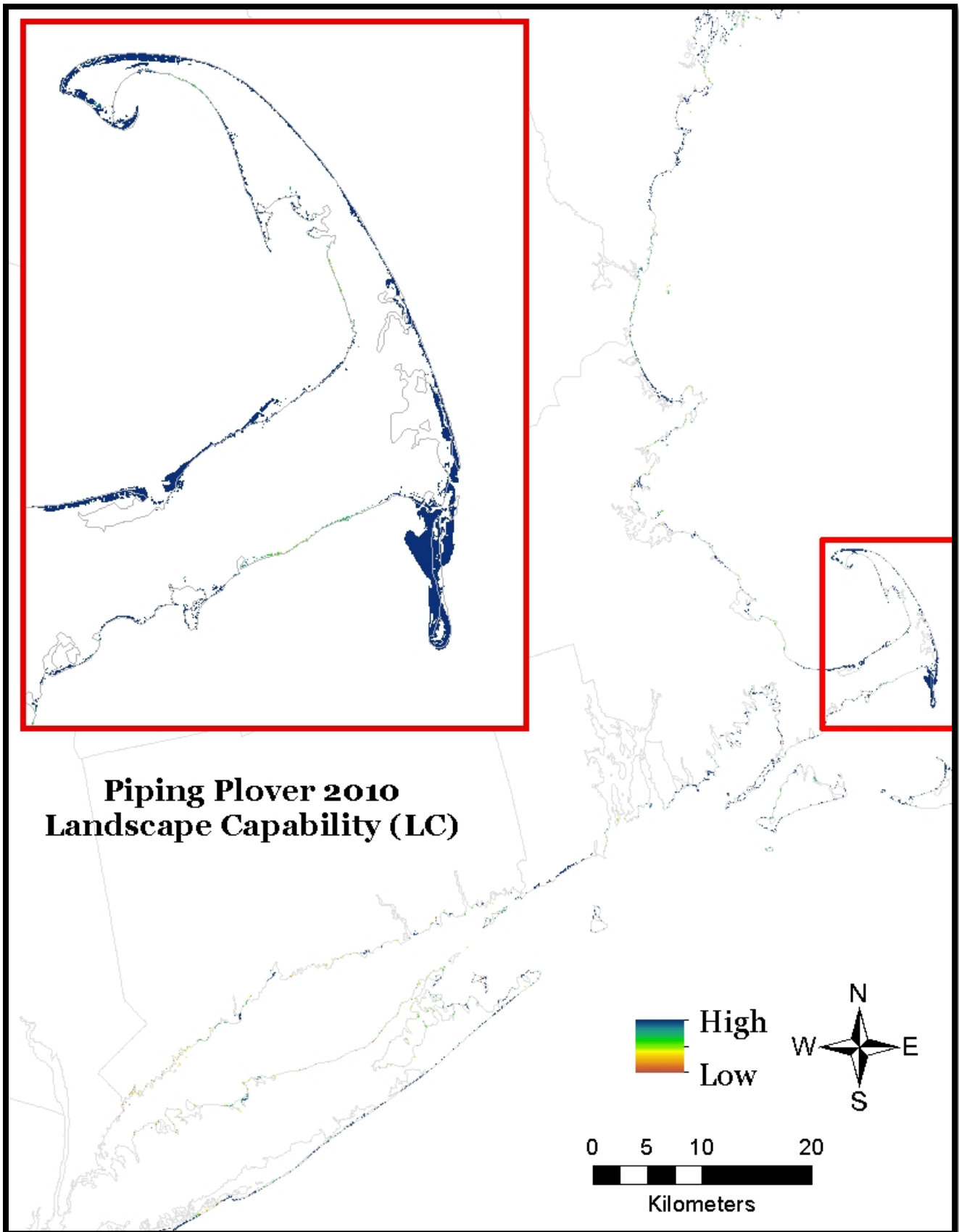
**Habitat capability (HC)** - The *HC* index considers five factors representing: (1) intertidal marine and estuarine beaches for nesting and foraging, (2) identifies estuarine beaches within close proximity to marine beaches to identify inlets and active beaches for nesting and foraging, (3) small extent development, representing short-distance edge effects and direct human interactions, (4) large extent development, representing the effects of human-mediated landscape change that accumulate over a larger geographical area, and (5) 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 uses five climate variables representing: (1) growing season precipitation, (2) annual precipitation, (3) annual temperature, (4) maximum summer temperature, and (5) growing degree days. The *CN* model is based on a statistical model derived from 3,743 absent eBird locations and 3,485 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.

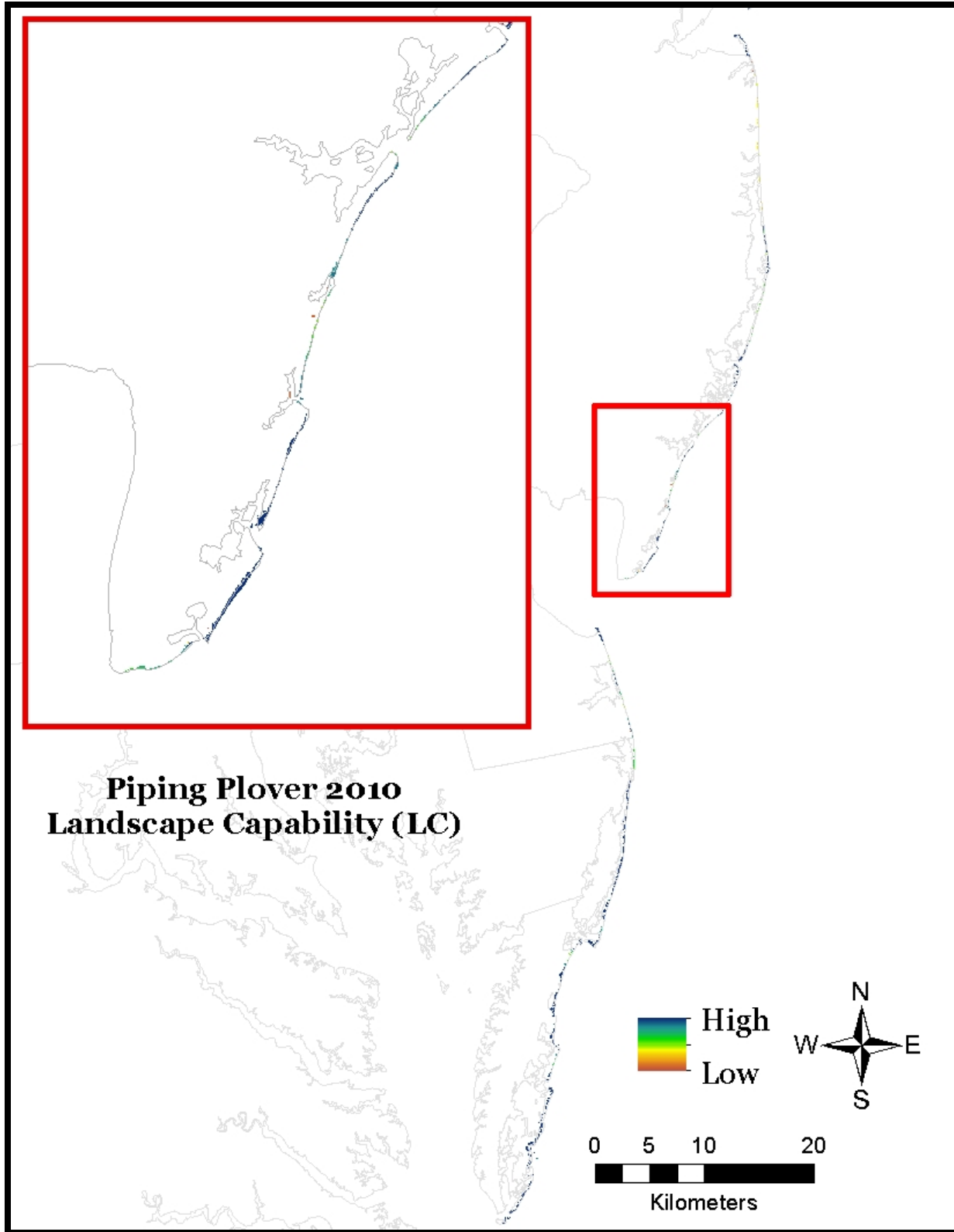
**Landscape Capability (LC)** - The *LC* index is computed as the product of the *HC* and *CN* indices (see map). Thus, the index computed for 2010 reflects the gradient of worst (0) to best (maximum value) sites within the landscape that support this species during the breeding season. Note, we also compute this index for the future (e.g., 2080) based on output from the landscape change model. Model performance was performed using 2,006 present and 1,509 absent eBird data points that were held out of the *CN* model dataset. Model performance was determined to be acceptable (Kappa = 0.71, Deviance explained=26%, AUC = 0.92). This mode will continue to be evaluated as other regional products and data become available.



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Reference [http://jamba.provost.ads.umass.edu/web/lcc/DSL\\_documentation\\_species.pdf](http://jamba.provost.ads.umass.edu/web/lcc/DSL_documentation_species.pdf) for a detailed description of the Landscape Capability modeling process.