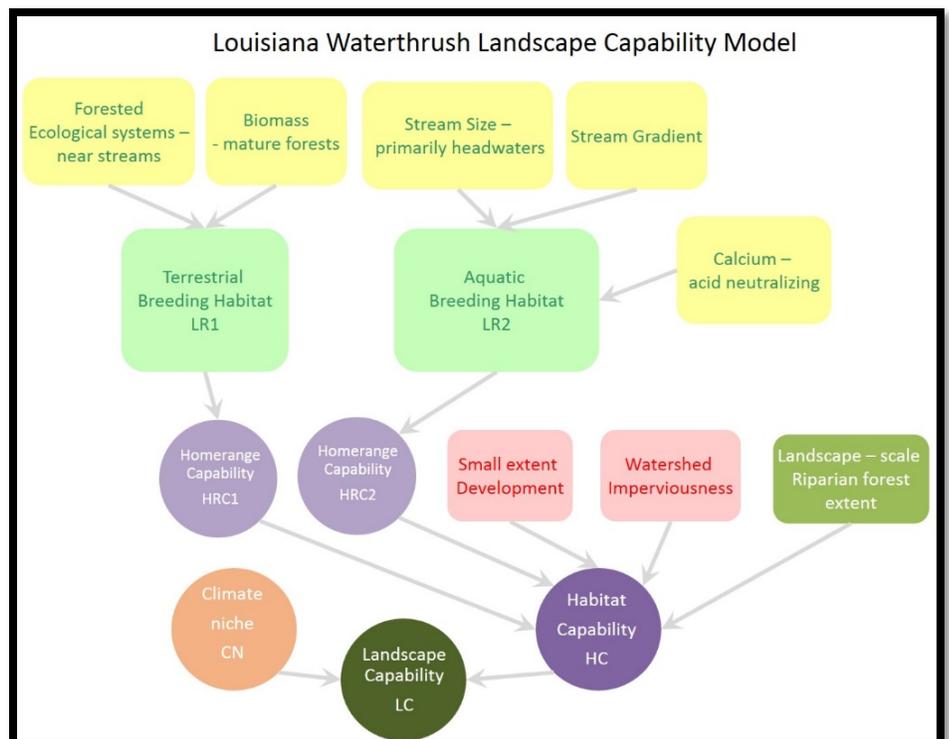# Louisiana Waterthrush

Louisiana Waterthrush 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 comprise of riparian deciduous forests. 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.
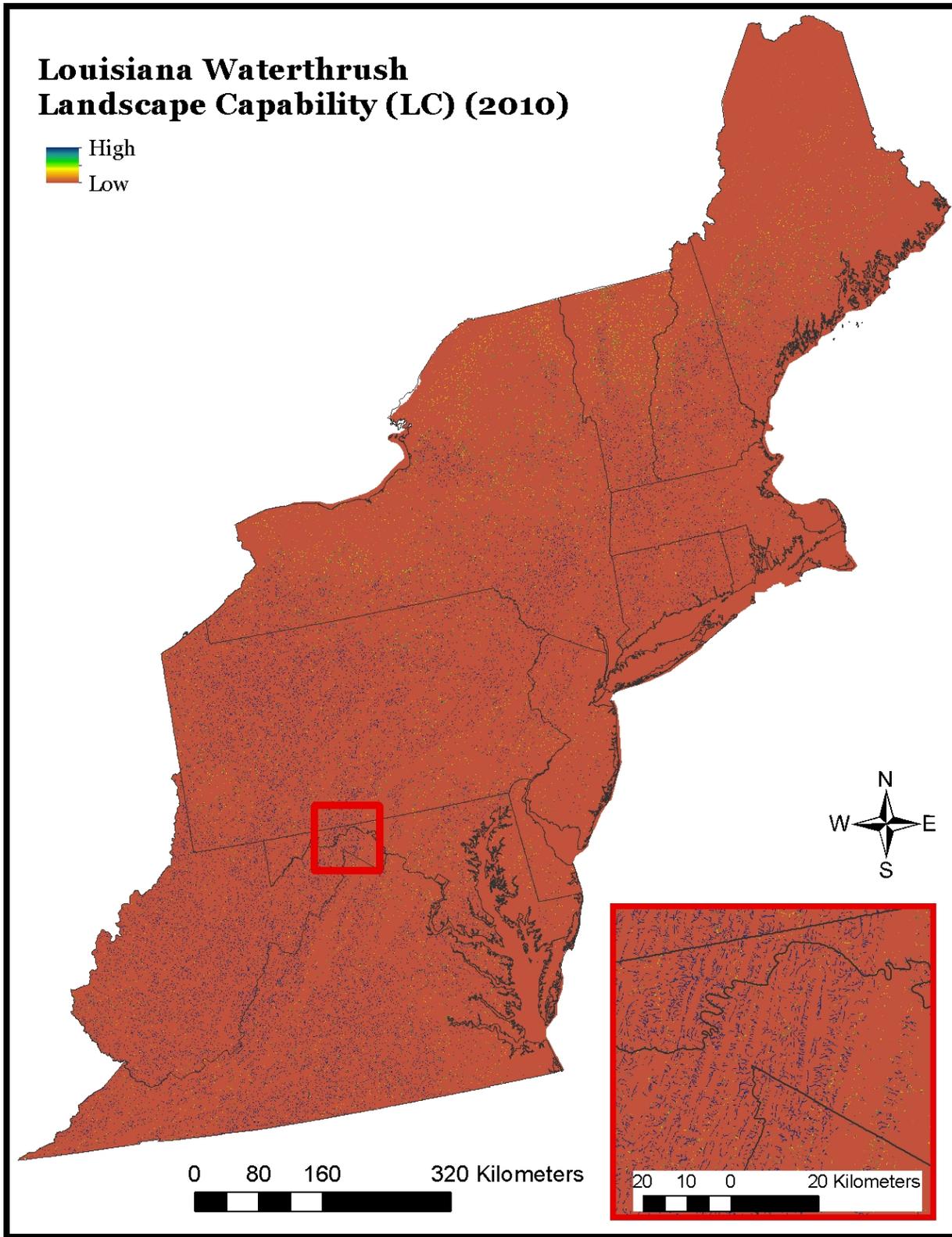
Habitat capability (**HC**) - The *HC* index considers two factors representing the capability of a system to provide the required nesting locations needed for breeding: (1) ecological system, identifying riparian forests and (2) biomass, identifying mature forests. The *HC* index considers three factors representing the capability of a system to provide adequate aquatic foraging: (1) stream size, identifying primarily headwater and other small streams, (2) stream gradient, identifying medium to high gradient streams, and (3) calcium bedrock sources, representing the streams ability to neutralize acidic conditions. Finally, the *HC* index includes measures of (1) landscape-level riparian forest extent, representing the amount of undisturbed riparian forest habitat in the landscape surrounding the homerange, and (2) extent of imperviousness in the watershed, and (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. 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 four climate variables representing: (1) growing degree days, (2) annual precipitation, (3) annual temperature, and (4) maximum summer temperature and is based on a statistical model derived from 5,522 Breeding Bird Survey (BBS) route segments 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*. 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 evaluated using an independent dataset (eBird occurrence data; 943 present locations and 1,368 absent locations) and determined to be acceptable (Kappa = 0.89, Deviance explained=82%, AUC = 0.95).

Louisiana Waterthrush Landscape Capability Model

**Louisiana Waterthrush
Landscape Capability (LC) (2010)**

High
Low

0   80   160   320 Kilometers

20   10   0   20 Kilometers

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