WILDLIFE-HABITAT RELATIONSHIP MODELING DEVELOPMENTS

Managers need to know:

• **Where on the landscape can they expect to find species of conservation concern?**

• **How many individuals exist and where are the population "hot spots" or areas where the population is greatest?**

• **What conservation actions will benefit the species?**

• **How will threats such as urban sprawl, timber harvest, mineral extraction, or climate change affect bird populations?**

Scientists at UMESC and Patuxent Wildlife Research Center have developed statistical models (hierarchical spatial count models) for predicting and mapping habitat associations across entire ecoregions for species at risk.

Counts from Breeding Bird Surveys are linked with digital maps of land cover, elevation, soil, moisture, and climate, creating bird-habitat models.

The resulting maps depict where a species likely occurs within a region and how many individuals are likely to be there (Left Figure).
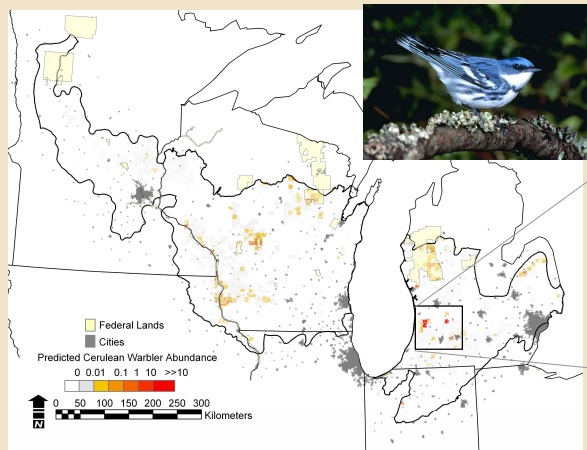

Predicted Cerulean Warbler abundance in the upper Midwestern US.
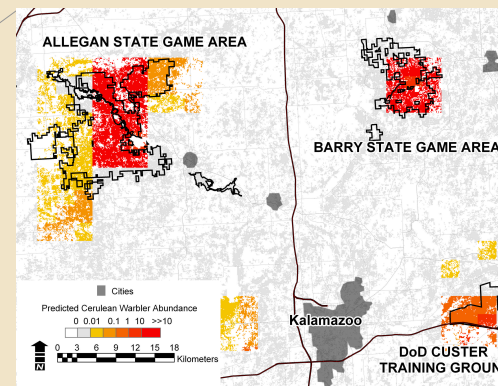
Concentrations (hot spots) of predicted Cerulean Warbler abundance in southwestern Michigan.

Resource managers can use models and maps to identify and prioritize high-quality habitats in proximity to existing wildlife management areas (Figure Above Right). Conservation partners can focus on these areas to restore habitats, protect important species, and identify new potential management areas.

Future extensions of this process will allow us to evaluate threats to breeding habitats including urban sprawl, timber harvest, mineral extraction, acid rain, and climate change. Any threats that can be mapped can be compared with maps depicting locations of bird concentrations to judge the magnitude of threats to the species.
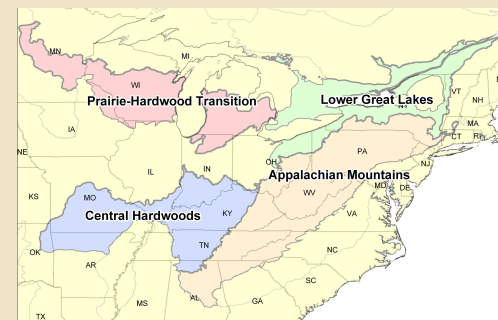
Bird Conservation Regions in the eastern US for which UMESC is modeling abundances of imperiled birds.

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