Habitat Characterization Model for Federally Listed Plants in Kentucky

Kentucky State Nature Preserves Commission

Nicholas Drozda, Eric Ivanovich, Deborah White and Sara Hines

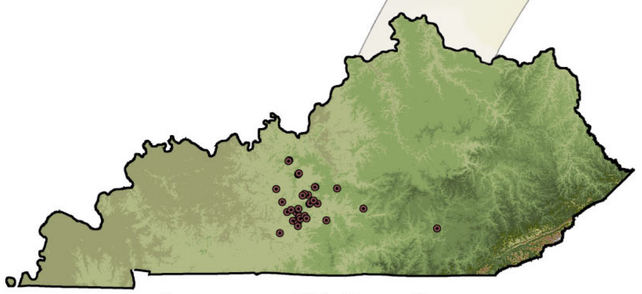
Habitat prediction modeling utilizes a geographic information system (GIS) to integrate information about the habitat characteristics for a species. Physical, geologic, hydrologic, or ecological parameters that are characteristic of the known occurrences of a species are identified and the associated spatial data are incorporated into the model. GIS allows for the integration of these parameters, thus enabling potential habitat to be identified and ranked.

The Kentucky Natural Heritage Database (KNHD), a database maintained by Kentucky State Nature Preserves Commission (KSNPC) on rare species and natural communities, was utilized for this project. The authors used the locations of known occurrences for the species to be modeled and their familiarity with these species to identify characteristics of the habitat that could be used in habitat modeling. Each identified parameter of the model was differentially weighted relative to the statistical/perceived importance to the occurrence of the species. Modeled habitat areas were given a "score" based on the number of parameters that coincide in a particular area.

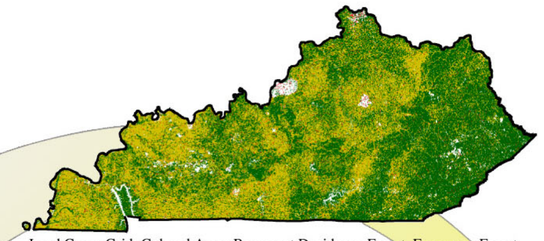
The objective of this work was to develop habitat models for nine federally listed plant species in Kentucky. The species in this example is *Helianthus eggertii* (Eggert's sunflower). Known species occurrences were used to assist in the identification of the appropriate spatial datasets to incorporate. The following five spatial datasets were utilized to characterize the potential habitat sites (the numbers in parentheses indicate the weight values of the datasets):

1) Land Cover (2)
2) Soil pH (1,2)
3) Karst Topography (1)
4) Elevation (1)
5) Alluvial Soils Excluded (2)

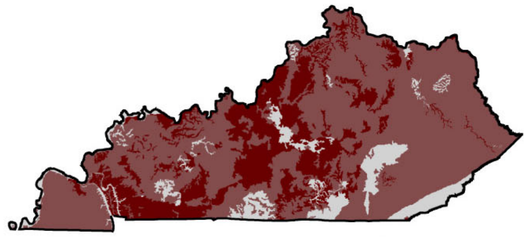
The *Helianthus eggertii* Model rankings range from 0 (low probability) to 8 (high probability)



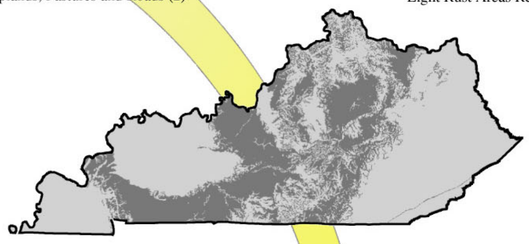
Known occurrences of *Helianthius eggertii*



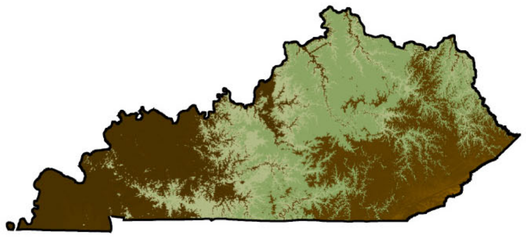
Land Cover Grid: Colored Areas Represent Deciduous Forest, Evergreen Forest, Mixed Forest Lands, Croplands, Pastures and Roads (2)



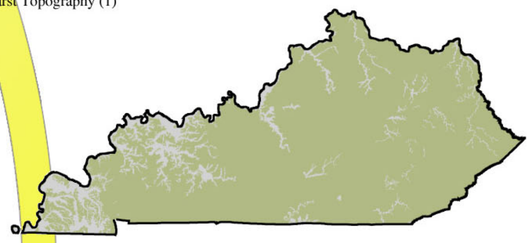
Soil pH Grid: Dark Rust Areas Represent Soil pH Ranges of 5.6-6.0 (2)
Light Rust Areas Represent Soil pH Ranges of 5.1-5.5 and 6.1-6.5 (1)



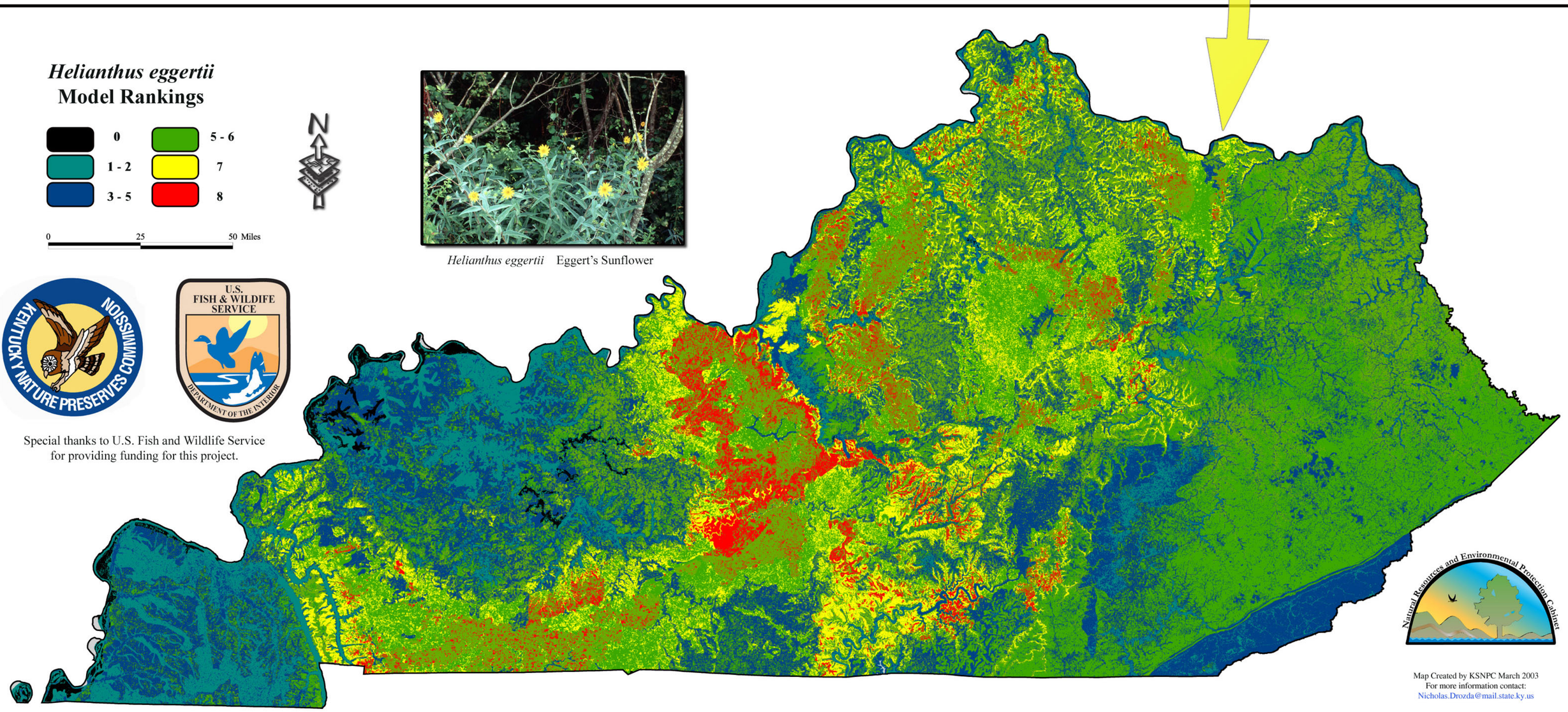
Karst Grid: Dark Areas Represent Karst Topography (1)



Elevation Grid: Shades of Green Represent Elevation from ~600-900 ft. (1)



Soil Grid: Dark Areas Represent Upland Soils (Model Excluded Alluvial Soils) (2)



Helianthus eggertii Eggert's Sunflower

Special thanks to U.S. Fish and Wildlife Service for providing funding for this project.

Map Created by KSNPC March 2003
For more information contact:
Nicholas.Drozda@mail.state.ky.us