



Status Update: Modeling Potential Cougar Habitat in Midwestern North America

Above: Trailcam photo taken near Savage, Minnesota. Courtesy Kerry Kamman.

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Cougars are becoming a species of interest to Midwestern wildlife biologists and the general public because of their increasing presence in the region. As confirmed by the Cougar Network, cougar carcasses, scat, and tracks in Midwestern states have increased dramatically during

the past 15 years, suggesting eastward movement of cougars. Recent research has found that cougars can disperse considerable distances, as evidenced by a juvenile male dispersing 1,067 km into Oklahoma from the Black Hills and a juvenile female dispersing 1,336 km within western cougar range. Given the increasing number of confirmations and their long-distance dispersal capability, it is possible that cougars are attempting to re-colonize the Midwest via juvenile dispersal.

Although wildlife biologists will require information to support management, protection, and public education regarding cougar

presence in the Midwest, currently no information is available to assist such efforts. To concentrate on these needs, as reported in the June 2005 issue of the *Wild Cat News*, efforts are currently being undertaken to provide the first model of cougar habitat in the Midwest by using expert opinion surveys, geospatial data, and a geographic information system (GIS). This article provides a status update on the model's progress.

Approach to Modeling Potential Cougar Habitat

Habitat models have been created for many carnivore species using

animal location data, remotely-sensed land cover data, and multivariate statistics within a GIS. These models typically rely upon empirical data regarding species occurrence or habitat use. However, cougars have been extirpated from the Midwest for more than 100 years, so obtaining empirical data regarding habitat use is not possible. To overcome this problem, expert opinion surveys are being used to provide information regarding cougar habitat in the Midwest.

Our methods will include obtaining expert opinion regarding cougar habitat, evaluating the responses through a multi-criteria evaluation, and then transforming these data into numerical form, where it can be implemented in a GIS. Use of expert-opinion models has been

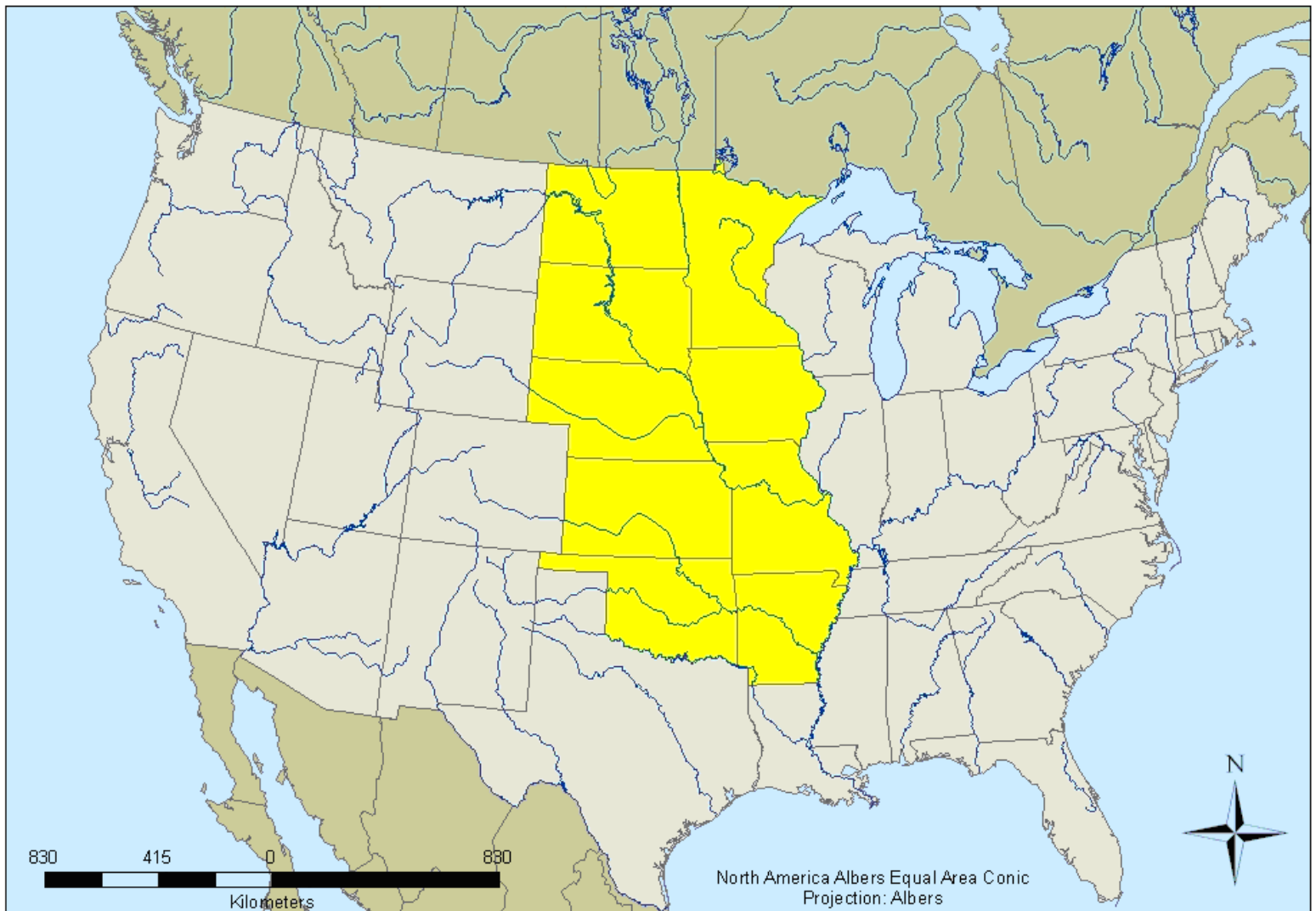
evaluated by biologists studying the habitat needs of other large carnivores and has shown that expert opinion closely reflected data gathered by radio-telemetry. GIS applications will be used to produce maps of cougar habitat by combining the expert opinion surveys and spatial analysis of existing landscape information.

Potential cougar habitat and dispersal corridors over a large portion of the Midwest are being modeled, including the states of North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Arkansas, Missouri, Iowa, and Minnesota (Figure 1). These states were selected because of the number of cougar confirmations in the region, proximity to existing western cougar populations, and potential dispersal corridors, such as rivers.

Expert Opinion Survey

To gain expert knowledge, literature and expert assistance will be used to develop a survey regarding potential habitat requirements of cougars in the Midwest. The survey consists of several questions regarding pair-wise comparisons of the following habitat factors: human density, distance to water, distance to roads, slope, and cover type (Figure 2). Survey participants will be asked to score habitat variables in order of importance to cougars in the Midwest, based upon personal experience and expert knowledge of cougar ecology. The survey will be sent to 29 western cougar biologists and furbearer biologists with knowledge of Midwestern landscapes.

Figure 1: Study area for modeling potential cougar habitat in Midwestern North America.



Multi-Criteria Evaluation and Habitat Modeling

To model potential cougar habitat, raw data will be transformed into GIS layers, which is done through evaluating the multiple criteria in the survey. Upon receipt of completed surveys, responses will be evaluated by determining the relative importance of each habitat factor. Responses for each factor will be averaged and assigned a weight. These weights will subsequently be used in the modeling process within a GIS to create a spatial map of potential habitat suitability for cougars. The map will clearly classify areas of good versus poor potential habitat along a gradient of classified values, which will be the most important product of the research.

Importance of Our Research

A land cover map will display areas of potential habitat for cougars should they eventually re-colonize the Midwest. Nobody knows for sure whether this will happen. However, given that other large carnivores are successfully re-colonizing their former range in North America, this research will provide an important planning tool for the future. For example, white-tailed deer would likely be the primary prey for cougars. Given the importance of deer to humans, knowledge of potential distribution of cougars relative to deer will be essential. Second, because cougars are top predators, they will likely compete with wolves, coyotes, and bobcats, which could alter population characteristics, behaviors, and distribution of prey. Analyses will provide an important assessment of areas where significant overlap with sympatric carnivores may occur. Finally, potential cougar presence in the Midwest will most

Arkansas Land Cover

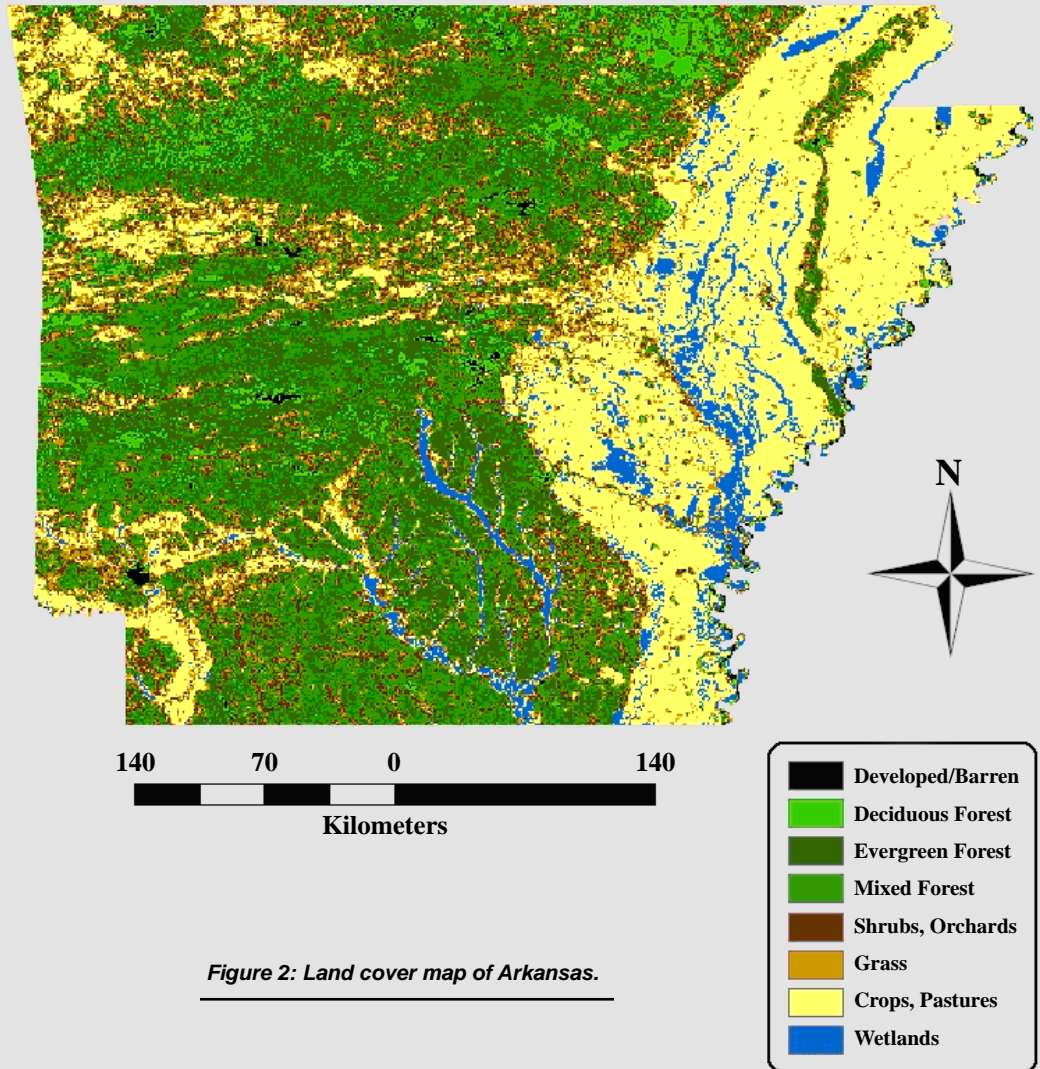


Figure 2: Land cover map of Arkansas.

certainly concern the public. Data interpretation will indicate where cougars may become established near centers of human populations or areas of livestock operations, thereby proving an important educational and planning tool to address human-cougar conflicts.

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