

A SITE SUITABILITY ANALYSIS OF WIND FARMS IN ILLINOIS

An Abstract of

A Thesis

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by

Chase Pelletier

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## ABSTRACT

Energy is an essential and increasingly important element in our modern world. Our reliance on non-renewable energy resources will not suffice because of the simple fact that they are finite and will eventually be gone. The purpose of this thesis is to explore alternative ways to produce energy, especially electricity that is relatively safe, clean, and renewable. Such forms of electricity include: hydro, solar, and the focus of this thesis—wind.

This thesis identifies areas in Illinois that are potential sites for future wind farms. Determining the most suitable site for wind farms cannot be done by relying only on statistical methods such as extrapolation or interpolation. Site selection is an inherently spatial problem, so it was done using a cartographic model which took eight limiting factors as well as wind speed into consideration. The eight limiting factors were: towns, transmission lines, roads, land cover, topography, airports, water bodies, and parks. The procedures for modeling these variables varied depending on the type of variable, but the result from each of the variables is a raster suitability grid. The suitability grids were combined together creating the best possible location for wind farms.

This thesis has been very successful in producing a site suitability analysis for wind farms in Illinois. Locations in Illinois have been identified as strong sites based off of suitability values that were subjectively assigned. As hypothesized, this thesis created a cartographic model to determine the suitable sites for wind energy in Illinois. This thesis is just one step in the larger wind farm procedure. Wind is a viable source of energy in Illinois; finding the most suitable location is the key to making wind energy successful. Wind energy will help lead to a more environmentally friendly future.