PREDICTIVE PROBABILITY MODEL FOR AMERICAN CIVIL WAR FORTIFICATIONS USING A GEOGRAPHIC INFORMATION SYSTEM

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ABSTRACT

Predictive models have established a niche in the field of archaeology. Valued as tools in predicting potential archaeological sites, their use has increased with development of faster and more affordable computer technology. Predictive models highlight areas within a landscape where archaeological sites have a high probability of occurrence. Therefore, time and resources normally expended on archaeological exploration can then be more efficiently allocated to specified locations within a study area.

In addition to the resulting predictive surface, these models also identify significant variables for site selection by prehistoric or historic groups. Relationships with the environment, whether natural or social, are extremely pertinent to strengthening the resource base. In turn, this information can be utilized to better interpret and protect valuable cultural resources.

A predictive probability model was generated to locate Union Civil War fortifications around Petersburg, Virginia. This study illustrated the ease with which such analysis can be accomplished with the integrated use of a Geographic Information System with statistical analysis. Stepwise logistic regression proved effective in selecting significant independent variables to predict probabilities of fortifications within the study area, but faired poorly when applied to areas withheld from the initial building stage of the model. Variation of battle tactics between these two separate areas proved great enough to have a detrimental effect the model's effectiveness.