ABSTRACT

Field research is a necessary component of many realms of ecological and geoscientific practice since it provides the primary data crucial to understand the characteristics of an object, phenomenon, or process. Unlike work in an office or laboratory, fieldwork has additional cost related to travel, lodging, and per diem expenses. Field scientists must therefore ensure they make efficient and effective field navigational decisions that result in expedient execution of field campaign objectives. Technologies and analytical approaches such as decision analysis, path modeling, and geographic information systems offer assistance to navigational decision making while in the field as do the analytical techniques of weighted linear combination and analytical hierarchy process. These tools are often underutilized, however. This thesis describes a methodology by which these technologies and analytical procedures may assist field scientists with navigational decision making. Specifically, the thesis documents development of a model that uses a spatial multicriteria decision evaluation to derive favorability values. These values are then used to determine the placement of traverse paths that are suggested routes to be taken by field researchers. The thesis includes a description of concepts behind the methodology, a demonstration of the methodology for a hypothetical geologic campaign, and an analysis of resulting traverse paths.