EVALUATION OF ENVIRONMENTALLY IMPACTED FEATURES FROM TRADITIONAL APPROACHES VERSUS REMOTE SENSING AND GIS BASED APPROACHES FOR EIA STUDY ON TRANSPORTATION PLANNING

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ABSTRACT

Environmental Impact Assessment (EIA) involves technical approaches to estimate positive and/or negative impacts of a proposed project. In transportation, the EIA process typically considers areas within a buffer zone that parallels the alternative segments being considered to select the location of the proposed roadway. Within the buffer zones, all environmental-related features of interest such as wetlands, rivers, settlements, archeological sites and cemetery are identified for consideration in the EIA study. Despite being functional and well understood, traditional approaches to transportation corridor planning are usually based on manual methods to extract environmental features of interest using existing survey or field acquired data and imagery as simple background upon which they digitize features, rather than conducting cost-effective automated analysis.

Recent results indicate that improved data integration methods, analysis techniques, and leading-edge technologies streamline EIA processes, in part by automating approaches to estimating environmental impacts. To reduce costly delays in roadway projects, this study addresses the integration of remote sensing and spatial information technologies to pool information essential for EIA study. The research considered selected segments of I-269 which will be constructed to bypass Memphis, TN. The alignments considered in the Final Environmental Impact Statement (FEIS) were used to provide baseline information for alternatives and used in the buffering and analysis process. For the corridor, 1m NAIP-2007 multispectral image data, USGS-NED-10m DTM, and existing road and hydrograph vector databases were employed to perform object-based classification to extract features of interest which were stored in a GIS. By quantifying the features within the buffer zones, an "impacts matrix" of features impacted per alignment was generated and compared with the impacts matrix (obtained using traditional methods) presented in the FEIS document. The results show close similarity to results generated by use of traditional methods, but were generated using automated processing and computational location selection methods.