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FINAL REPORT FACT SHEET

USDOI Office of Surface Mining Reclamation and Enforcement

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A METHOD FOR IDENTIFYING CRITICAL WILDLIFE HABITATS AND OUTSTANDING NATURAL AREAS BY ASSESSING VEGETATION THROUGH SPACIAL ANALYSIS UTILIZING REMOTE SENSING AND AERIAL SURVEY DATA IN COMBINATION WITH EXISTING GIS COVERAGES OF ECOLOGICAL DATA.

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Project Description and Objectives:

This project demonstrated a method to quickly inventory rare species and natural areas; an economically feasible way of identifying important elements of biodiversity within a larger survey area. Access to this data inventory can streamline the permitting process, while avoiding impacting natural resources.

Applicability to Mining and Reclamation:

This methodology would be a useful tool to natural resource agencies and private companies that extract and/or manage resources. This study developed a method for identifying critical wildlife habitats and natural areas by assessing vegetation through remote sensing and aerial survey data. Using spatial analysis in combination with existing GIS coverages of ecological data enables quick assembly of relevant information including historic and recent records of rare species.

Through the use of a tablet computer and mobile GIS during aerial surveys and ground-truthing, information can be entered into a database directly, and made available to permit reviewers. Resulting information can be used for the development of habitat models for federally listed species, such as Indiana bats.

ABOVE PHOTO: Example of an aerial view of acid mine drainage in Muhlenberg County, Kentucky.

ABOVE PHOTO: Maturing bottomland hardwood forest in McLean County, Kentucky.

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Methodology:

The study area included three counties in Kentucky; one in Eastern Kentucky Coalfields characterized by the rugged topography of the Appalachian Plateaus and two in western Kentucky coalfields. These areas have been intensively mined and are highly agricultural, with numerous wildlife habitats, particularly wetlands.

All three counties contain known occurrences of rare species and natural communities, and encompass a wide geographic spread ensuring that the proposed methodology was tested in a variety of environments and is applicable in a wide range of areas and ecological regions. Important ecological features include habitat for endangered Indiana and gray bats, as well as extensive forest tracts that are habitat for many interior forest species, i.e. Cerulean warbler and black bear.

Highlights:

Preliminary data analysis/remote imagery analysis

An Arc View project was created in which currently available data for rare species and communities was combined for preliminary landscape analysis. These data include locational information for rare species and wildlife habitats. Other data sources include vegetation data, topography, geology, soils. Current and older imagery, including color aerial photos and 1 meter satellite imagery was carefully analyzed to check the status of known occurrences and to identify new potential natural areas (PNAs). PNAs identified included tracts of mature or old-growth forest, forested or open wetlands, such as bottomland hardwood forests, wet meadows or seeps, intact watersheds, natural openings and grasslands, rock outcrops and other unusual natural communities that are characterized by high biodiversity and provide habitat for wildlife including rare species, particularly in the vicinity of known occurrences.

Aerial surveys gave important details needed for vegetation assessment identified through aerial surveys and a mobile GIS. Sites, as well as know location of rare species occurrences and critical wildlife habitats, were surveyed by helicopter. The mapping program was connected to a GPS allowing for easy tracking during the flight, and accurate locational data recording. During aerial surveys of each PNA, data regarding ecological condition, structure, and composition were recorded. Any disturbance such as mining, logging, conversion to agriculture, grazing, changes in hydrology or water quality, development, roads, power lines, and presence of exotic species was noted.

Ground Truthing. PNAs were ground checked by a qualified biologist and included examples of a variety of vegetation types. During the site visits, detailed data regarding composition, structure, and signs of anthropogenic or natural disturbance was recorded.

Results/Findings:

The study demonstrates a methodology to conduct wildlife habitat assessment through remote sensing techniques. Besides time efficiency, the use of remote sensing in remote hard to access areas garners additional data that ordinarily would not be obtainable.

An instructional manual is provided in the final report to assist in developing an assessment plan.

ABOVE PHOTO: Intact limestone slope glade viewed from helicopter. Irregular shape, patches of warm season grasses, and scattered cedars are evident.

Website Information:

The final project report can be found at **http://www.techtransfer.osmre.gov/NTTMainSite/appliedscience/2006appscience/CompletedProjects/KYNaturePreserveCWalker2006.pdf**

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