

**Integration of GIS Analysis Methods, Visualization and Landform Manipulation
Tools for Land Reclamation Within the Watershed Characterization
and Modeling System (WCMS)**

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Abstract: Technical advances in a number of computer based areas, as well as new developments in and acceptance of geomorphic landform and stream design now provide opportunities for implementing improved land reclamation on coal mined sites both in the Eastern and Western United States. GIS analysis methods coupled with very high resolution data such as LIDAR and Hyperspectral remote sensing can provide data suitable for detailed site planning and engineering. Likewise, advances in environmental visualization research now provide software suitable for iterative development and testing of alternative reclamation schemes (both landform and vegetation), developing improved understanding of reclamation alternatives prior to final site engineering. Lastly, a number of software development organizations and researchers are focused on developing and testing tools for landform manipulation, testing and refinement prior to final site engineering. In addition, changes in regulatory climates (particularly in the eastern mountaintop mining region) now appear to support innovative reclamation methods development and implementation.