

12.2 **Building a GIS-based water resource geospatial infrastructure for oil shale development in the Piceance Basin, Colorado**

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The increasing demand for fossil energy development calls for solutions to oil shale development with minimal cost and environmental impact. In this on-going project funded by NETL/DOE, we are working to develop an integrated basin/regional baseline for surface and ground water data and GIS-based analytical tools/models for analyzing that data. More specifically, we are building a Geographic Information Systems (GIS)-based and web-based regional/basin-wide water resource geospatial infrastructure for storing, managing, analyzing, visualizing, and disseminating oil shale related data. Customized analytical toolsets and models will also be developed to address water availability (quality and quantity) and environmental issues surrounding potential development of oil shale resources in the Piceance Basin. Databases are the foundation of the geospatial infrastructure. These databases contain the baseline data of the study area which form the bases of several analytical models, including a three-dimensional (3D) geological model, a watershed-based surface water model, a groundwater model, and a system dynamic model. The ultimate goal of this research effort is to develop a GIS system that can provide spatial and temporal solutions to evaluate environmental and water resource issues and data management related problems for potential oil shale development in the Western United States. The initial study area focuses on the Piceance Basin in Colorado; other potential sites, such as Uinta Basin in Utah and Green River Basin in Wyoming have also been identified to ensure that the results of this effort are sufficiently robust, flexible, and reusable.