

Chapter 4
**The GIS Project for the Geologic
Assessment of In-Place Oil Shale
Resources of the Piceance Basin,
Colorado**

By Tracey J. Mercier, Gregory L. Gunther, and Christopher C. Skinner

Chapter 4 of 7
**Oil Shale and Nahcolite Resources of the Piceance
Basin, Colorado**

By U.S. Geological Survey Oil Shale Assessment Team



*Click here to return to
Volume Title Page*

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Contents

Introduction.....1
References Cited.....1

The GIS Project for the Geologic Assessment of In-Place Oil Shale Resources of the Piceance Basin, Colorado

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Introduction

A geographic information system (GIS) focusing on the Piceance Basin of northwest Colorado was developed as an analysis tool for the U.S. Geological Survey's (USGS) 2009 assessment of in-place oil shale resources in the Eocene Green River Formation. The Energy Resources Science Center of the USGS has also developed an internet mapping service (IMS) to deliver the GIS data to the public. This mapping tool utilizes information from a database about the oil shale endowment of the Western United States and converts the data into geospatial layers for analysis. The ability to view and query geologic features on an interactive map facilitates understanding domestic oil shale resources for strategic planning, formulating economic and energy policies, evaluating lands under the purview of the Federal Government, and developing sound environmental policies.

Several different types of data are included in the GIS project. Oil shale assessment unit models contain the oil shale zone boundaries, borehole locations, isopachs, oil shale assay results, and the resource assessment results in tabular and geospatial data formats. Specialized maps, created by the USGS Oil Shale Assessment Team, referred to as "raster maps" or "models," illustrate the distribution of oil shale data and the richness of the oil shale for each assessment zone. Models for 17 oil shale zones are included in the Piceance Basin GIS Project. The IMS integrates these data with generic geospatial content or layers for geographic reference and context using a web service based architecture. The layers or map services available through ArcGIS Online (ESRI, 2009), may include themes formally named Imagery, Streets, Shaded Relief, and Topography. Each formal theme can contain additional geospatial content, examples of which include:

- Highways
- Major and minor roads
- Railways
- Water features

- Administrative boundaries
- Cities, parks, and landmarks
- Public Land Survey System (PLSS)
- Surface ownership
- Surface and outcrop geology

To access the IMS and to download spatial data that formed the basis of the GIS for the Piceance Basin, click on the following USGS Oil Shale Assessment Web site link: (http://energy.cr.usgs.gov/other/oil_shale/). Several data formats are provided, including Environmental Systems Research Institute (ESRI, 2006) shapefiles, cell-based GRIDs, and Triangular Irregular Network (TIN) models. These data are also exposed as web services based on a variety of industry-standard encodings including Keyhole Markup Language (KML), Web Mapping Service (WMS), and ArcGIS Server REST. Additional encodings will be added based on technological need. Information for accessing these services is also available at the web site.

All content is well documented based on standard metadata requirements. Access to this metadata is provided in a variety of formats that are incorporated into the downloadable datasets and can be viewed using the IMS.

References Cited

- Environmental Systems Research Institute (ESRI), 2006, ArcGIS, ver. 9.2: ESRI, Redlands, California., <http://www.esri.com/software/arcgis/index.html> (last accessed August 20, 2009).
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Click here to return to
Volume Title Page