

Federal Coal in the United States

A Digital Database of Coal Ownership Status

As United States coal resources continue to be examined for potential development, a critical need exists for a digital database containing locations and status of all Federal coal resources. This Fact Sheet describes the development of such a digital database and presents examples of how the U.S. Geological Survey (USGS) has used these coal ownership data. This database and its products are designed to help policy makers and land-use planners make wise decisions regarding Federal land use while maintaining a healthy domestic energy industry. Although the State of Alaska has vast coal resources, much of which is Federally owned, digital data for Alaskan coal ownership are not currently available. Therefore, information presented here refers only to coal in the conterminous United States.

Federally owned coal plays a major role in the energy supply of the United States. A great increase in coal production from Federal lands began in the 1970's (fig. 1), resulting from a high demand for low-sulfur coal. Large reserves of this low-sulfur coal are located in Wyoming, Utah, Montana, Colorado, and New Mexico, where the Federal Government owns the rights to the majority of coal reserves (fig. 2). Today, more than one-third of the Nation's coal production comes from coal on Federal leases.

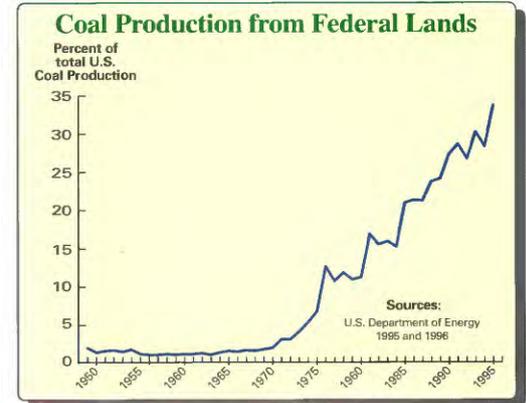


Figure 1.

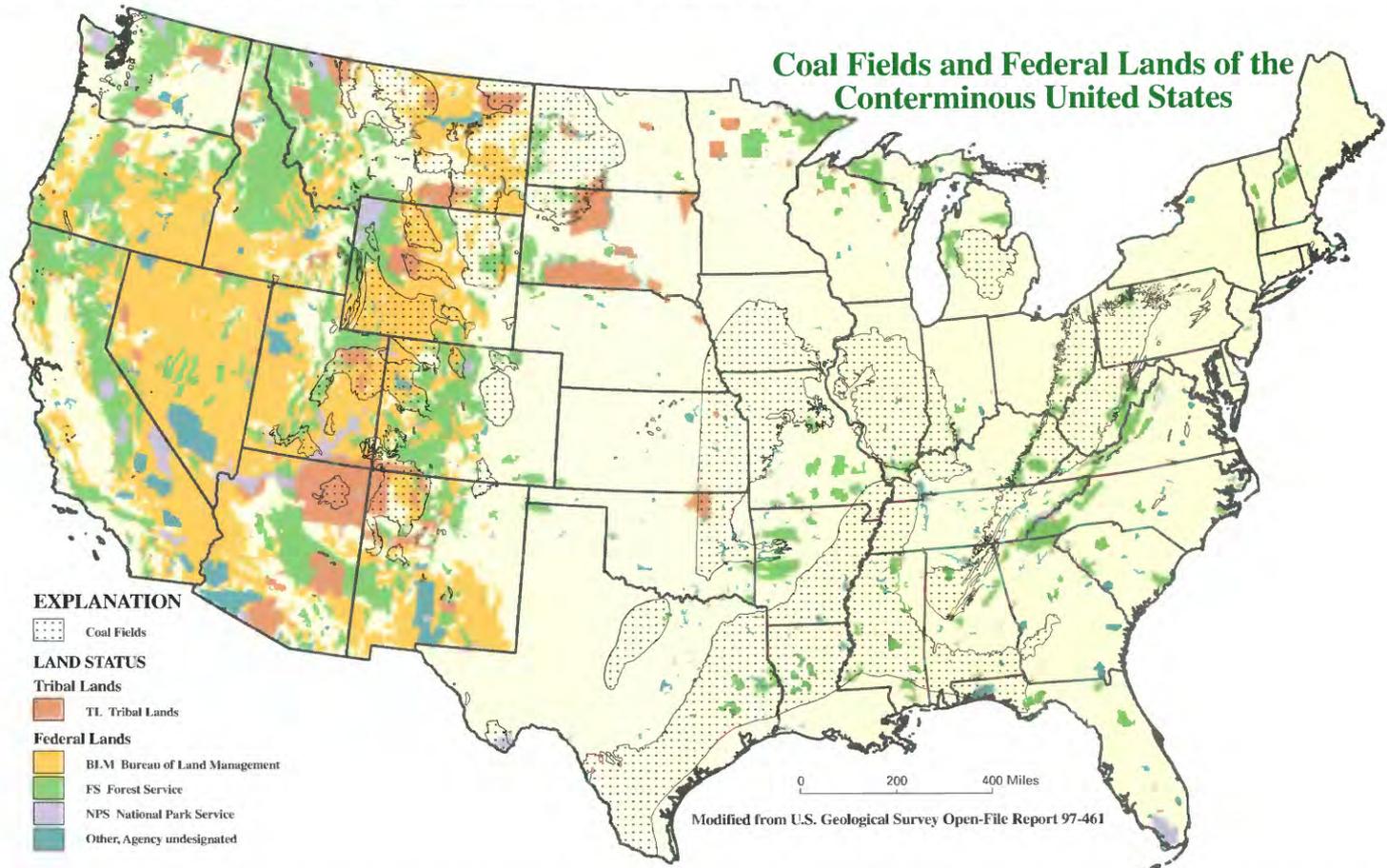


Figure 2. Coal fields are found throughout the United States. Large portions of the coal fields in the Western States occur on Federally owned lands. This map is the first digital compilation showing the Nation's coal fields combined with the distribution of Federally managed lands. (This map is available separately as USGS Open-File Report 97-461; see Biewick, 1997.)

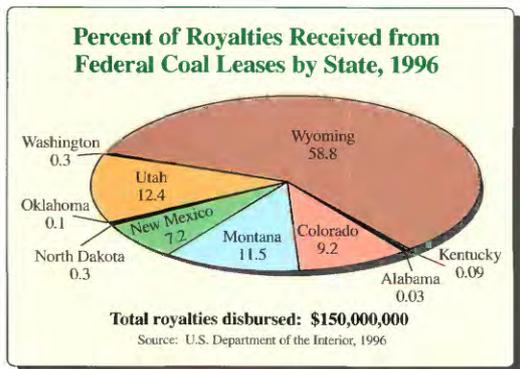


Figure 3.

Federally owned coal also plays an important part in the U.S. economy: more than a quarter of a billion dollars in royalties are generated annually from production of Federal coal. Of that amount, about half is disbursed to the States in which the coal was produced (fig. 3).

To develop a standardized digital library of Federal coal ownership data, the USGS in cooperation with the U.S. Bureau of Land Management (BLM) is collecting files of surface and mineral ownership and compiling them in ARC/INFO coverages. Before this project was undertaken, these ownership files existed only in specific BLM offices, in different formats, and

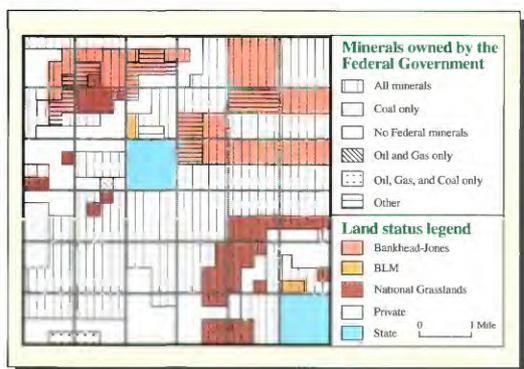


Figure 4.

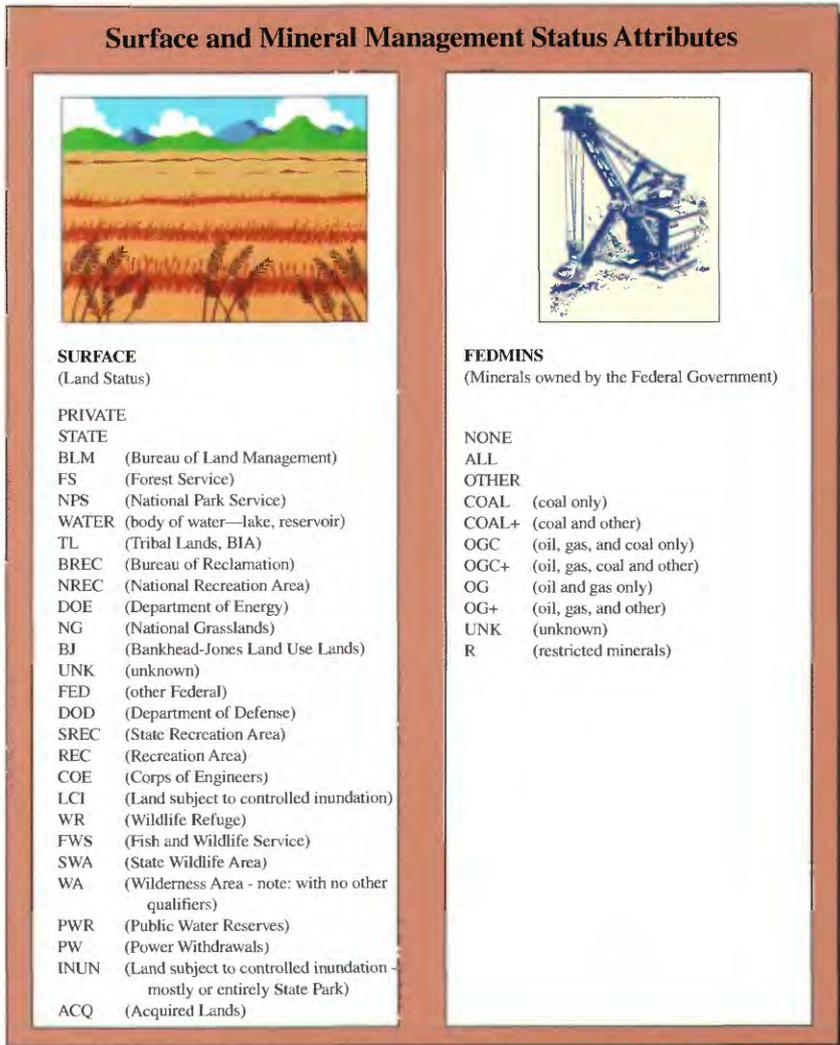


Figure 5.

with varying scales. For some areas, no digital ownership coverage existed; for those areas, we are constructing digital files. Once the ownership coverages are generated and standardized, they are combined with digital maps of coal deposits. This combination of digital data enables the user to answer complex geospatial questions about coal quantity, quality, availability, and recoverability.

Figure 4 is a hypothetical township as an example of the original source data. The complex combination of colors and patterns represents mineral and surface ownership. When these source data are digitized in ARC/INFO, we apply attributes to the polygons to indicate whether the surface is Federal, State, or privately owned, and which energy minerals, if any, are Federally owned (fig. 5).

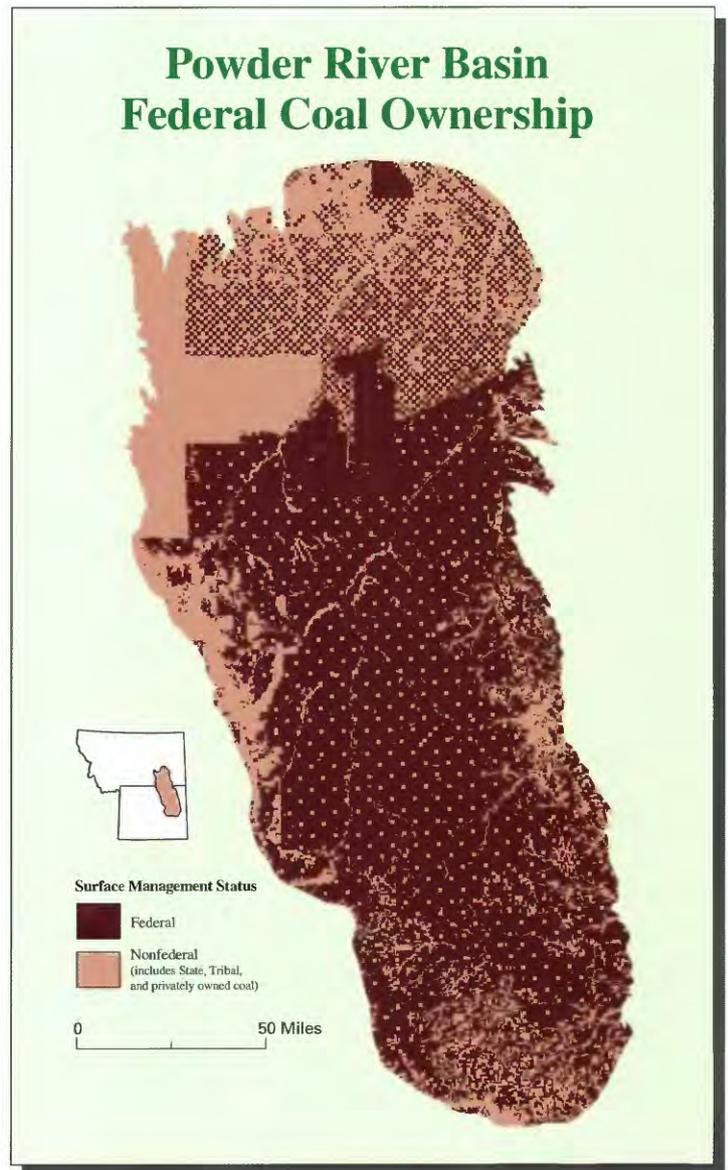
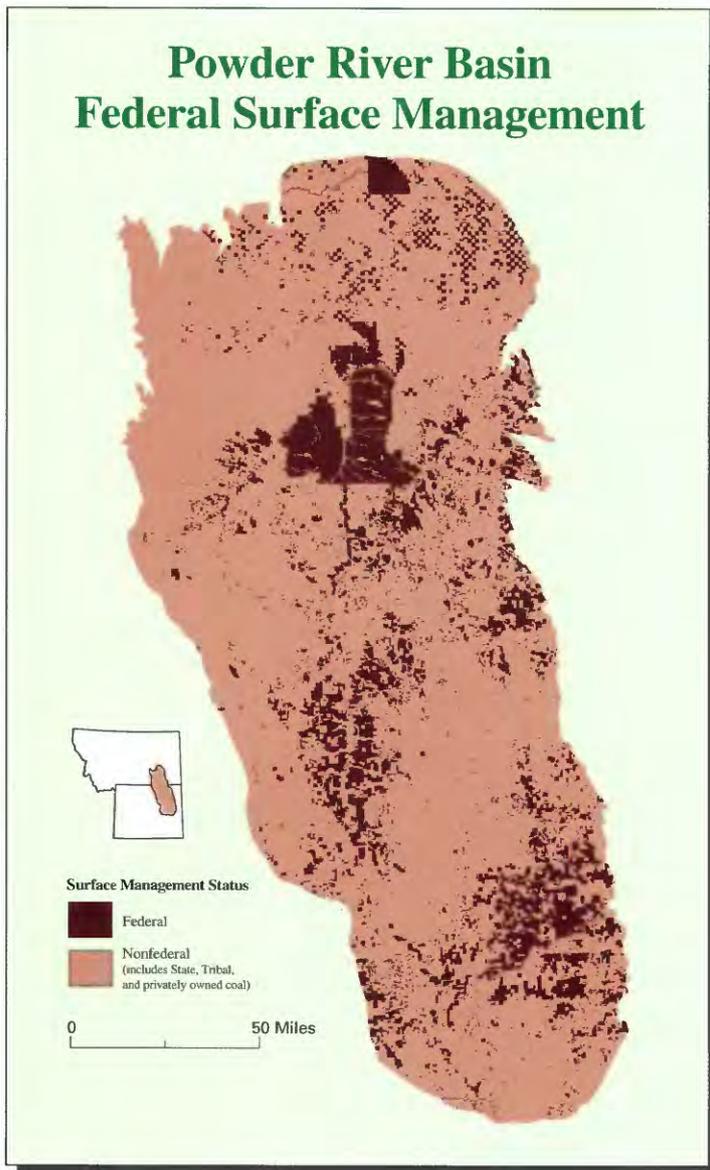


Figure 6.

Surface ownership can differ from mineral ownership for the same area. Figure 6 shows the Powder River Basin, Wyoming and Montana, which has the largest in-place coal resources of any coal field in the contiguous U.S. (Keystone, 1997) and produces over one-fourth of the Nation's total coal (The Mining Record, 1997). Most of the surface of the basin is privately owned, yet almost all of the coal is Federally owned. This separation of jurisdiction may become a legal issue that results in Federally owned coal resources not being developed. Our digital database identifies areas where surface ownership differs from mineral ownership.

Figure 7 shows areas where digital compilation of coal ownership data is completed or well underway. With the exception of the Kaiparowits Plateau, Utah, a large part of which was recently designated a National Monument, the detailed maps represent areas where coal is, has been, or likely will be produced in the Western United States. These coal ownership data become the basis for complex spatial analyses when combined with information on coal quality, coal thickness, structure, and other parameters generated from geologic investigations.

Digital Ownership Coverages

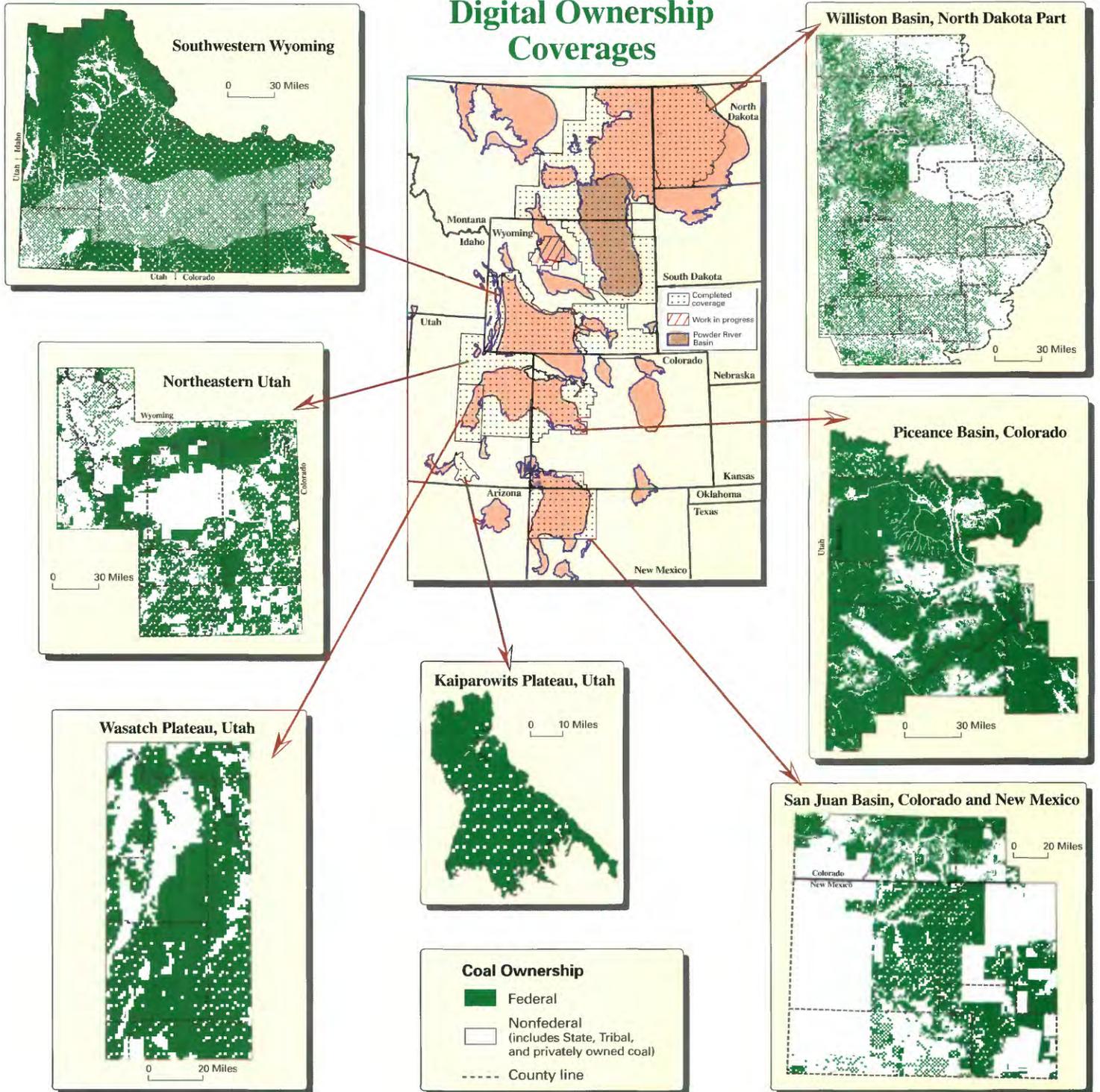


Figure 7.

Maps are generated by combining digital ownership data with geologic resource estimates and other spatial coal data in a geographic information system (GIS). For example, we merged the newly compiled Federal coal ownership files with resource calculations from the 1970's for the Powder River Basin (Trent, 1986). For the first time, we are able to visually display the location of Federally owned coal in each 7.5' quadrangle along with the published coal resource estimates for those areas (fig. 8). Figure 9 is another example where we have highlighted areas of Federal coal resources under specific geologic conditions, as part of an analysis of the Kaiparowits Plateau, Utah (Hettinger and others, 1996).

The digital database of coal ownership status is a component of the USGS Energy Resources Program's Federal Lands Assessment project. The project's objective is to develop GIS coverage of coal resources on Federal lands, which in turn allows for an accurate, reliable, and timely analysis of the quantity, quality, and availability of those resources.

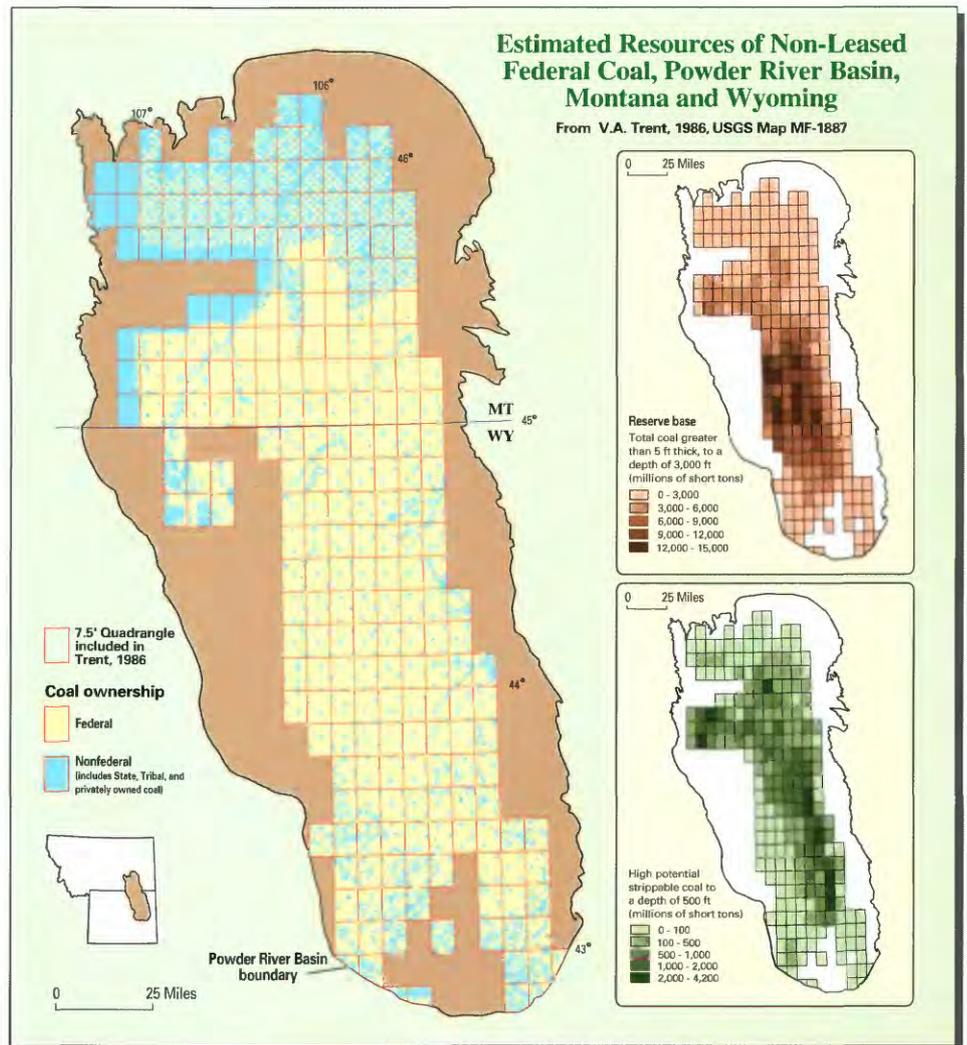
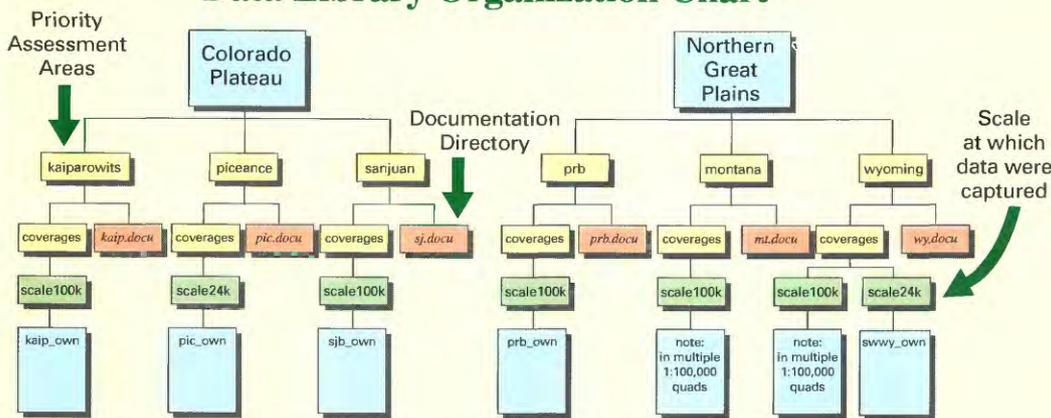


Figure 8.

Data Library Organization Chart



To the left is an example of the directory structure used by the USGS Energy Resources Program's Federal Lands Assessment project to catalog and archive the many files and ARC/INFO coverages generated by the project. Top-level directories contain work areas arranged by USGS energy resource regions. Subdirectories include metadata documents that describe the data sources and processing history for each coverage and files with information on map projection parameters. Scale and resolution of the data are important factors in the arrangement of the hierarchy of a spatial data repository and identify the level of detail and accuracy of the data. Names given to directories and files are designed to be intuitive and describe the basic contents of the file.

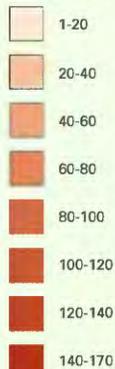
Kaiparowits Plateau Assessment Area

Area shaded red meets the following criteria:

- Identified Federal coal
- Overburden < 3,000 feet
- Dip < 12 degrees

⚡ Kaiparowits Plateau

Total coal thickness in feet



Area where coal-bearing strata are eroded

0 10 Miles

Modified from Hettinger and others, 1996

Figure 9.

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Note: Use of trade names is for descriptive purposes only and does not imply endorsement by the U.S. Geological Survey.

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