

Federally Owned Coal and Federal Lands in the Northern Rocky Mountains and Great Plains Region

Federally owned coal and coal from land that is federally managed, particularly from the Northern Rocky Mountains and Great Plains region, plays a major role in the energy supply of the United States. Federally owned coal is coal that is located in an area where the Federal Government has subsurface ownership of oil, gas, and coal; coal only; or all minerals. Federal coal may or may not underlie areas where the land surface above is managed by the Federal Government (see U.S. Geological Survey Fact Sheet FS-012-98). In 1997, about 1,100 million short tons of coal were produced from coal basins (fig. 1)

in the United States. More than 30 percent of that year's production (about 330 million short tons) was produced from Federal lands. Most Federal coal production comes from coal basins in the Northern Rocky Mountains and Great Plains region (fig. 2 and table 1).

The Northern Rocky Mountains and Great Plains region is an area that was defined by the National Coal Resource Assessment project of the U.S. Geological Survey (Fort Union Coal Assessment Team, 1999). The area consists of portions of the Northern Great Plains and Rocky Mountains coal provinces of Trumbull (1960) (fig. 1). The region consists of about 313 million acres of land, of which about 32 percent is federally surface-managed (fig. 3), and about 80 percent contains federally owned coal (as defined previously).

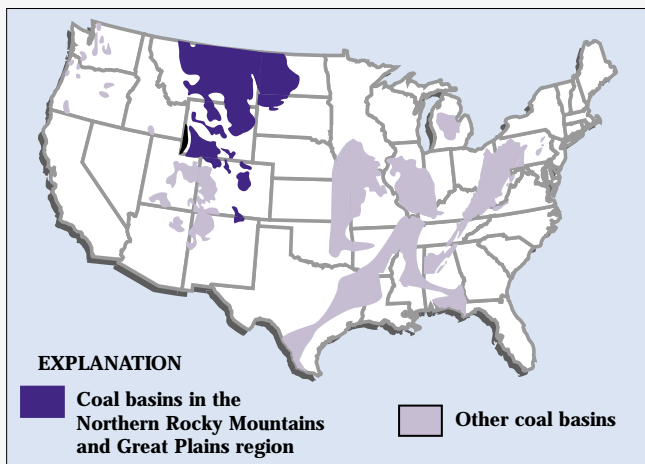


Figure 1. Major coal basins in the contiguous United States. (Modified from Trumbull, 1960).

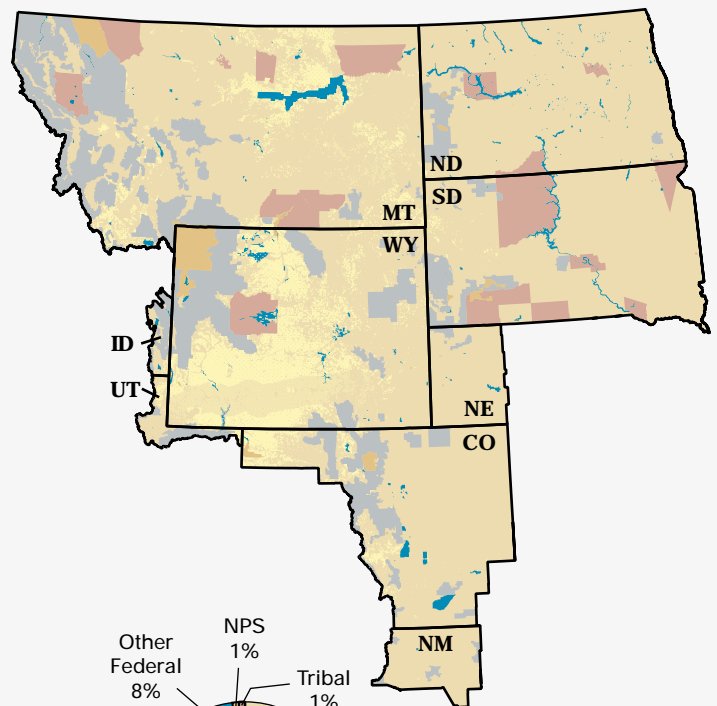


Figure 3. Land-management status in the Northern Rocky Mountains and Great Plains region and chart showing land management in percent.



Figure 2. Map showing the location of coal basins in the Northern Rocky Mountains and Great Plains region.

Most of the 1997 Federal coal production was from the States of Wyoming and Montana (table 1). Coal from the Northern Rocky Mountains and Great Plains region is of particular interest for future development not only because of its great quantity, but also because it is low in total sulfur and ash yield (table 2) and is therefore generally compliant with emission standards for coal to be used in electric power plants.

Table 1. 1997 Federal coal production from States in the Northern Rocky Mountains and Great Plains region.

[Results given in millions of short tons (1 short ton = 2,000 pounds). Data shown to two significant figures. Modified from U.S. Department of Energy (1998, p. 21). Federal coal production figures from Colorado, New Mexico, and Utah are not included in this table although portions of these States are in the Northern Rocky Mountains and Great Plains region. Production from those States is reported in the Colorado Plateau region Fact Sheet (U.S. Geological Survey Fact Sheet FS-145-99, 1999)]

State	1997 coal production (millions of short tons)
Wyoming	250
Montana	25
North Dakota	3.0
TOTAL Federal coal from region	280

Table 2. Average percent sulfur content and ash yield for coal included in this study.

[Coal quality values for assessment units in the Powder River Basin include only the Wyodak-Anderson coal. Modified from Stricker and Ellis (1999a, 1999b, 1999c, and 1999d)]

Coal basin containing priority coal assessment units	Average total sulfur (percent)	Average ash yield (percent)
Powder River Basin	0.48	6.44
Williston Basin	0.84	7.96
Greater Green River Basin	0.56	11.18
Hanna and Carbon Basins	0.96	12.48

The assessment units and coal resource calculations in this report are modified from assessment units and data generated by the Fort Union Assessment Team (1999) for the 1999 National Coal Resource Assessment project. The priority coal assessment units are comprised of coal beds and coal splits that were combined into coal zones that were determined to have a high potential for development in the next 20 to 30 years (table 3). The stratigraphic correlation of coal beds and zones in each of the priority coal assessment units is given in Flores and others (1999). The boundaries in which the coal resources were calculated were limited to project-defined study areas determined by the availability of reliable data and the mapped extent of the coal being assessed (fig. 4).

The assessed coal in this region represents a huge potential source for coal development in the future. A total of about 660,000 million short tons were calculated for assessed coal in the region. Of this total, about 520,000 million short tons of coal are federally owned. The production of Federal coal generates more than a quarter billion dollars in royalties annually, about half of which is disbursed to the States in which the coal was produced (U.S.

Department of the Interior, 1996). More than 70 percent of the State royalties in 1996 (about \$75,000,000 in royalties) were disbursed to the States of Wyoming, Montana, and North Dakota. Additionally, many of the coal-bearing areas of the region occur in federally managed land that is administered by the Department of the Interior and the Bureau of Land Management (fig. 3). These agencies determine what areas can be leased for coal development. Knowing where the Federal coal is located, how much Federal coal exists, and the geologic setting of the coal helps land managers, planners, and mineral developers to make informed land-use decisions.

Table 3. Coal beds included in the priority coal assessment units for this study.

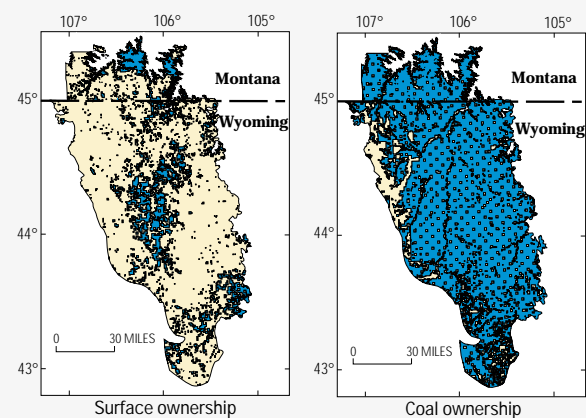
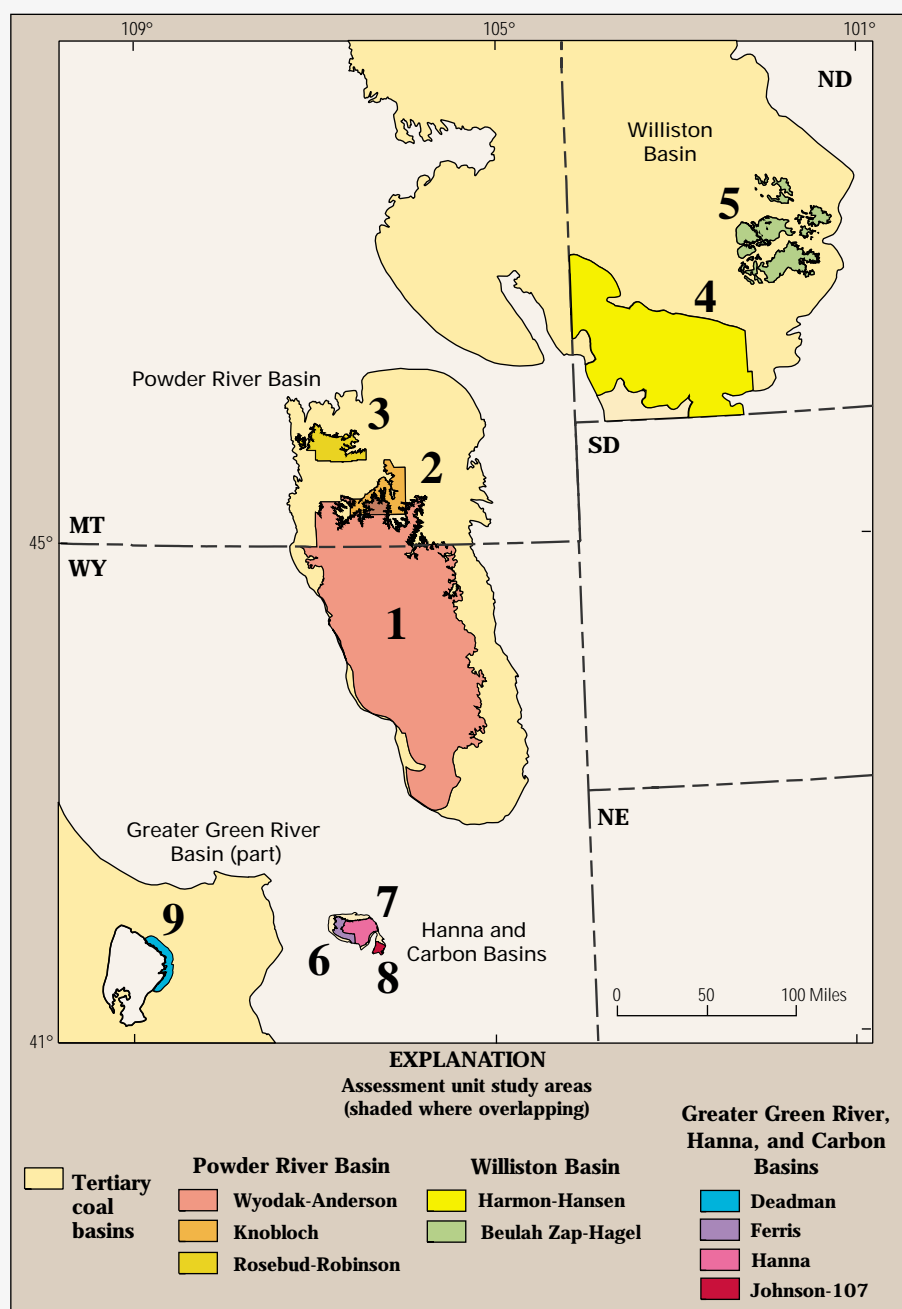
[Coal splits of the indicated coal beds are also included in the assessment unit]

Priority coal assessment unit	Coal beds in assessment unit
Powder River Basin, Wyoming	
Wyodak-Anderson	Anderson, Dietz, Canyon, Monarch, Werner Wyodak, Smith, Swartz, Sussex, School, and Badger
Powder River Basin, Montana	
Knobloch	Knobloch
Rosebud-Robinson	Rosebud, McKay, and Robinson
Williston Basin, North Dakota	
Harmon-Hansen	Harmon and Hansen
Beulah Zap-Hagel	Beulah-Zap and Hagel
Greater Green River Basin, Wyoming	
Deadman	Deadman 1-5 and A-C
Ferris	Ferris 23, 25, 31, 50, and 65
Hanna	Hanna 77, 78, 79, and 81
Johnson-107	Johnson, Finch, C106, and C107

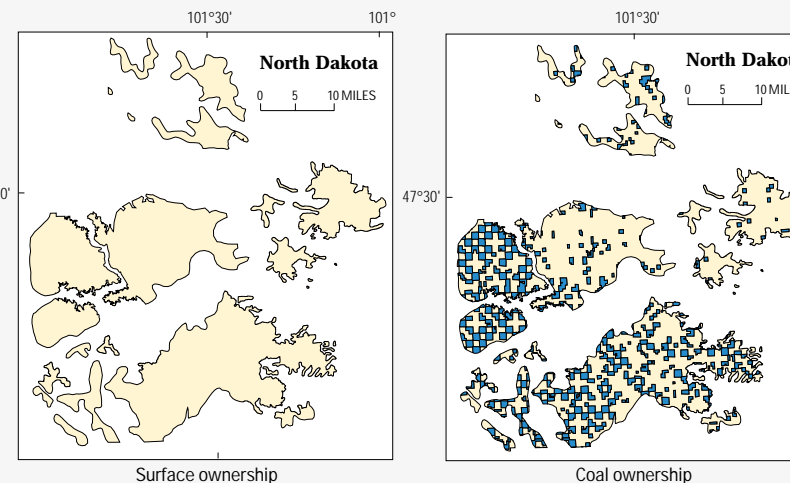
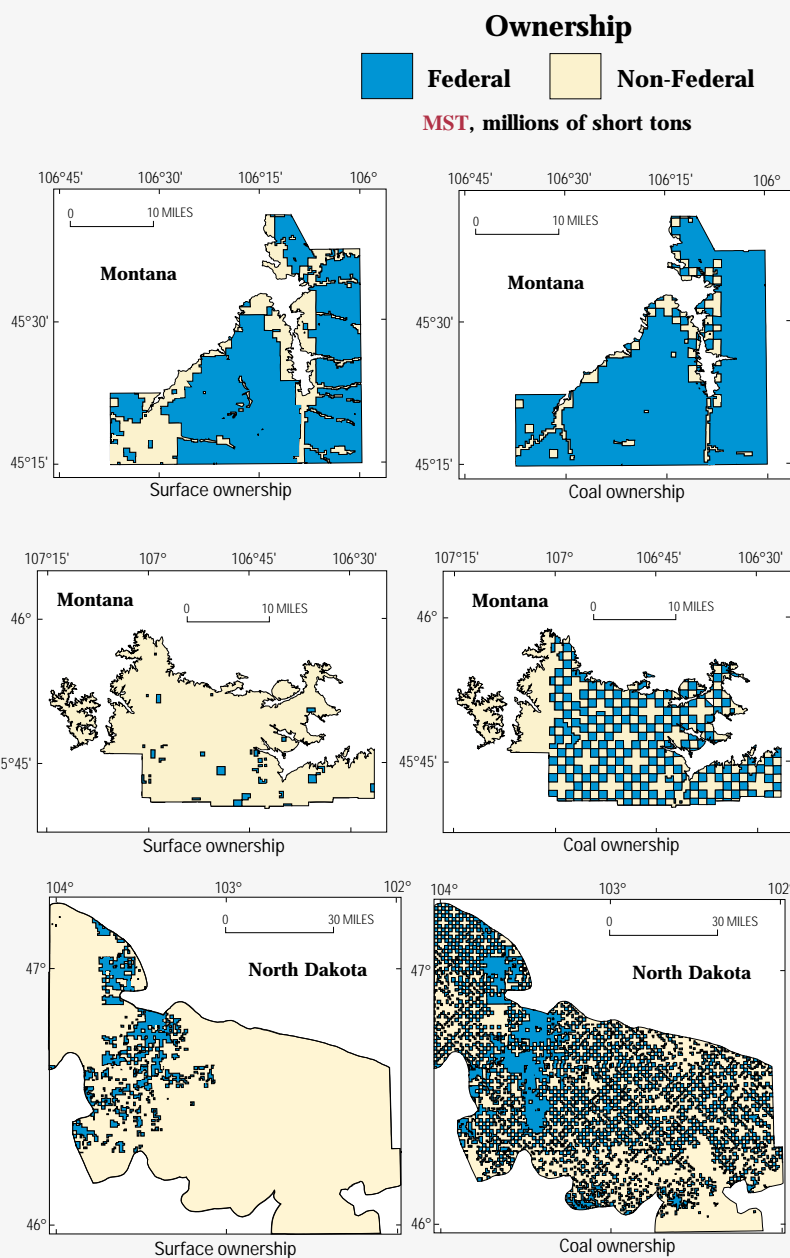
Federal Coal Resources

This report includes information on 9 priority coal assessment units within the Powder River, Williston, Greater Green River, Hanna, and Carbon Basins. Federal and non-Federal surface and coal ownership was determined for the area of each of the study areas, and coal resources were calculated for each of the ownership categories.

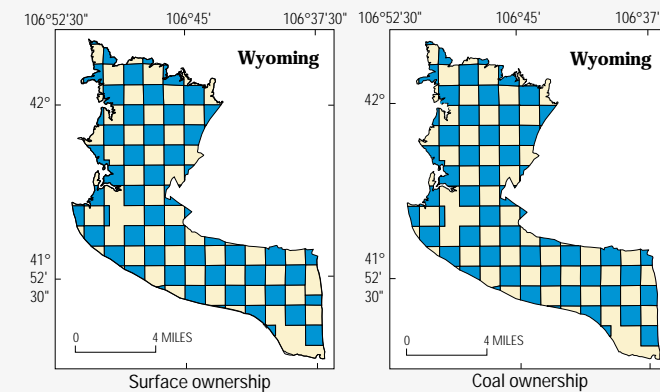
Coal resources were calculated using the net coal thickness of each assessment unit. The net coal thickness is the sum of the thickness of each of the coal beds in the unit that were greater than 2.5 ft thick at a given location. The net-thickness values were used to calculate a grid containing coal-thickness values that were evenly spaced throughout each study area. These values, in conjunction with the area of the study, were used to calculate the volume of the coal in acre-feet. To determine the tonnage of coal, the volume was multiplied by a conversion factor of 1,770 short tons of subbituminous coal per acre-foot or 1,750 short tons of lignite per acre-foot. The coal resource tonnages do not include coal in parts of the study area that contained an extrapolated coal thickness of less than 2.5 ft, clinker, coal mines, or lease areas. Federal surface management and Federal coal ownership for each of the assessment units, as well as coal-resource calculations and percentages for different ownership categories, are shown in figure 4. The Federal land and coal status, combined with other information from the assessment, can provide essential information for those making management decisions concerning specific plots of land in the region.



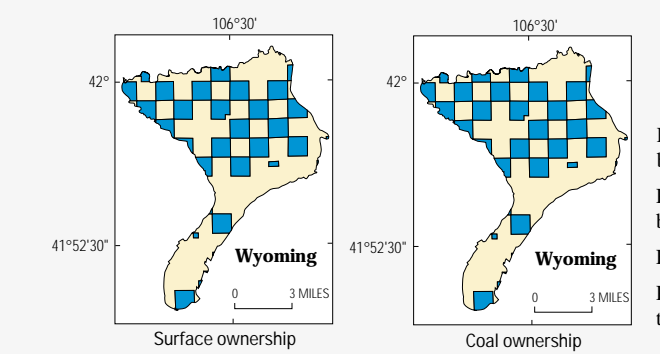
1
Wyodak-Anderson coal assessment unit
Percent land surface managed by the Federal Government: **13%**
Percent of study area underlain by federally owned coal: **87%**
Federal coal tonnage: **480,000 MST**
Percent of total coal tonnage that is federally owned: **87%**



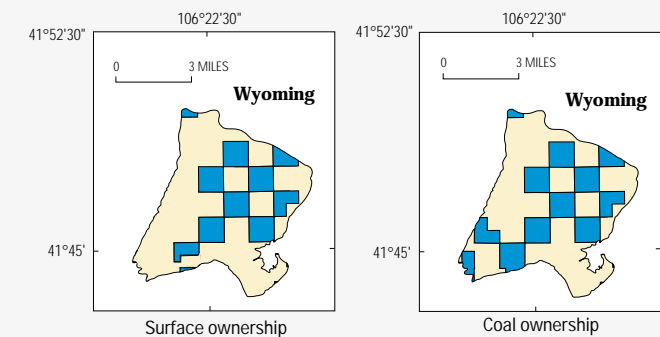
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Beulah Zap-Hagel coal assessment unit
Percent land surface managed by the Federal Government: **0%**
Percent of study area underlain by federally owned coal: **22%**
Federal coal tonnage: **2,200 MST**
Percent of total coal tonnage that is federally owned: **24%**



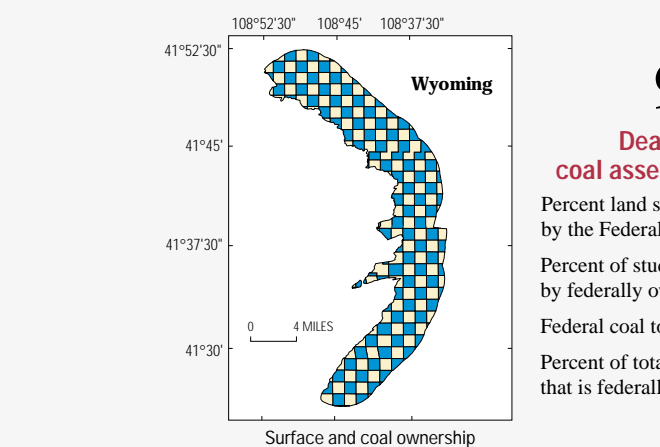
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Ferris coal assessment unit
Percent land surface managed by the Federal Government: **38%**
Percent of study area underlain by federally owned coal: **33%**
Federal coal tonnage: **640 MST**
Percent of total coal tonnage that is federally owned: **38%**



7
Hanna coal assessment unit
Percent land surface managed by the Federal Government: **25%**
Percent of study area underlain by federally owned coal: **28%**
Federal coal tonnage: **1,500 MST**
Percent of total coal tonnage that is federally owned: **35%**



8
Johnson-107 coal assessment unit
Percent land surface managed by the Federal Government: **18%**
Percent of study area underlain by federally owned coal: **22%**
Federal coal tonnage: **210 MST**
Percent of total coal tonnage that is federally owned: **19%**



9
Deadman coal assessment unit
Percent land surface managed by the Federal Government: **51%**
Percent of study area underlain by federally owned coal: **47%**
Federal coal tonnage: **1,200 MST**
Percent of total coal tonnage that is federally owned: **46%**

Figure 4. Index map showing the priority coal assessment unit study areas within Tertiary coal basins and maps showing Federal coal and surface ownership.

Table 4. Statistics on Federal land, coal ownership, and coal resources in study areas for the coal assessment units in the Northern Rocky Mountains and Great Plains region.

PRIORITY ASSESSMENT UNITS	FEDERAL LAND AREA (Percent of the surface administered by the Federal Government)	FEDERAL COAL AREA (Percent of the surface underlain by Federally owned coal)	FEDERAL COAL PERCENTAGE (Percent of coal the tonnage that is Federally owned)	FEDERAL COAL TONNAGE (In millions of short tons rounded to two significant figures)
Wyodak-Anderson	13	87	87	480,000
Knobloch	14	65	57	3,400
Rosebud-Robinson	2.7	38	39	5,000
Harmon-Hansen	8	36	37	25,000
Beulah Zap-Hagel	0	22	24	2,200
Ferris	38	33	38	640
Hanna	25	28	35	1,500
Johnson-107	18	22	19	210
Deadman	51	47	46	1,200

Table 4 shows a summary of statistics concerning Federal land and federally owned coal for each of the priority assessment units, within the defined study areas. Federally owned coal tonnage was calculated for the first time as part of this study. Within the study areas, land that is federally administered ranges from 0 to 51 percent; land underlain by Federal coal ranges from 22 to 87 percent; and federally owned coal tonnage for the assessed units ranges from 19 to 87 percent.

The coal assessment report for the Northern Rocky Mountains and Great Plains region (Fort Union Coal Assessment Team, 1999) includes additional information on surface and mineral ownership, coal resource tonnages, coal quality, net coal thickness, overburden, and the geology and structure of rocks in and around each study area. A detailed description of the coal resources for each of the assessment units is given in Ellis and others (1999a, 1999b, 1999c, 1999d, and 1999e) and Roberts and others (1999a and 1999b).

About 80 percent, 520,000 million short tons of the total 660,000 million short tons, of the coal from priority assessment units in the region is federally owned (fig. 5). About 15 percent of coal in the assessment units occurs beneath

federally managed land surface; the rest of the coal occurs beneath State, Tribal, or privately owned land.

The federally owned coal deposits in this region currently play an important role in supplying energy to the Nation. About 25 percent (about 280 million short tons) of the national total of coal produced in 1997 (about 1,100 million short tons) was developed from Federal coal in the Northern Rocky Mountains and Great Plains region. Even with cultural and mining restrictions that limit the amount of coal that can actually be developed, the total of 660,000 million short tons of Federal coal, just for these 9 priority assessment units, represents a very large source of coal for development in the future. United States coal resources continue to be evaluated, and there is sustained interest in the development of federally owned coal resources and in the potential of new leasing of federally managed land in the Northern Rocky Mountains and Great Plains region. Detailed information on Federal surface and coal ownership, and other data included in this and other reports, will assist policy makers and planners in making crucial decisions concerning the multiple use of Federal lands and the scope of future Federal coal development.

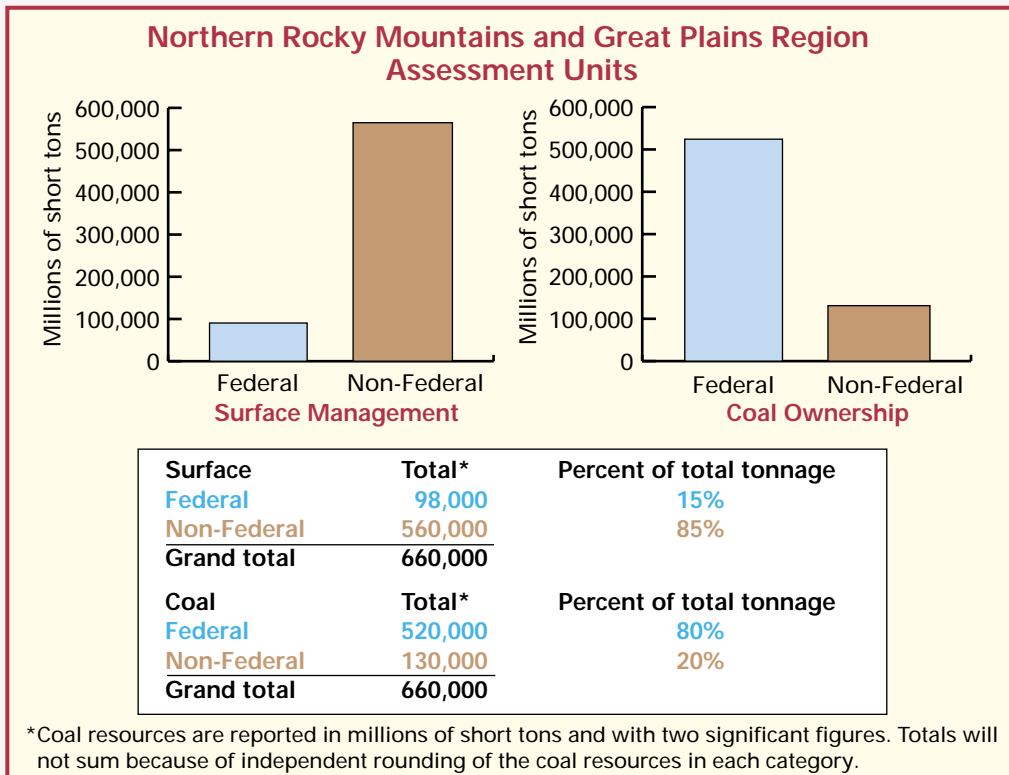


Figure 5. Percentages of Federal and non-Federal assessed coal in the Northern Rocky Mountain and Great Plains region.

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For further information on Federal coal resources, contact:

Margaret S. Ellis (USGS, This Region)	mellis@usgs.gov	(303) 236-7775
Carol L. Molnia (USGS, Colorado Plateau Region)	clmolnia@usgs.gov	(303) 236-7769
Laura H. Biewick (USGS, U.S. Federal Surface Management)	lbiewick@usgs.gov	(303) 236-7773
Laura N.R. Roberts (USGS, Project Leader)	lroberts@usgs.gov	(303) 236-7777

U.S. Geological Survey, P.O. Box 25046,
Denver Federal Center, MS 939, Denver, CO 80225

Information about the National Coal Assessment can be found at:

<http://energy.cr.usgs.gov/coal/index.html>

This fact sheet can be viewed on the Web at:

<http://greenwood.cr.usgs.gov/pub/fact-sheets/fs-011-00/>

For information on the geology of the priority assessment units, contact:

Romeo M. Flores (USGS, Project Leader)	rflores@usgs.gov	(303) 236-7774
Margaret S. Ellis (USGS, Coal Resources)	mellis@usgs.gov	(303) 236-7775
Stephen B. Roberts (USGS, Montana)	sroberts@usgs.gov	(303) 236-7788
Gary D. Stricker (USGS, Geochemistry)		(303) 236-7763
Allan M. Ochs (Consultant, Data Management)	alochs@usgs.gov	(303) 236-0104