

<b>Table 15: Historical Fuels Treatments</b>		
<b>Year</b>	<b>Prescribed Fire</b>	<b>Mechanical Treatments</b>
1995	2411	
1996	450	
1997	2445	
1998	673	
1999	1034	
2000	725	
2001	12247	
2002	3915	63
2003	17488	100
2004	16656	2291
2005	14665	1500
<b>TOTAL</b>	<b>55221</b>	<b>3954</b>

## MINERAL USES

Mining for gold and other metal ores have been important activities during the settlement and development of the John Day Basin. The quarrying of mineral material for construction purposes remains an important activity in the John Day Basin.

### LOCATABLE MINERALS

Presently, there are 80 active mining claims within the planning area.

The Canyon Mining District includes the area surrounding John Day and Canyon City. Notable placer deposits were mined in the John Day River and in Canyon Creek. Lode deposits in quartz veins were mined on Little Canyon Mountain and on Miller Mountain. Between the discovery in Canyon Creek in 1862 and 1908, an estimated 600,000 ounces of gold were produced from the Canyon Mining District (Thayer and others, 1981). Dredges in Canyon Creek and the John Day River produced 124,000 and 13,000 ounces of gold and silver respectively from 1916-1942 (Brooks and Ramp, 1968; Thayer and others, 1981). Relatively small amounts of gold have been produced from the Canyon Mining District since the last dredge was dismantled in 1942.

The Quartzburg Mining District includes Prairie City and the Dixie Creek drainage basin. Placer deposits are found both in Dixie Creek and the John Day River and six lode mines were also worked in the area. Reliable production figures prior to 1930 are not available. Dredges in Dixie Creek and the John Day River produced more than 22,500 ounces of gold from 1930-1941 (Brooks and Ramp, 1968).

The Spanish Gulch Mining District is relatively small and is located near Antone in southwest Wheeler County. Mining in the district began in 1864 (Willingham, 1982).

Placer deposits in Rock and Birch Creeks were worked and some quartz veins were mined (Brooks and Ramp, 1968). According to Collier (1914), at least 5,000 ounces of gold were produced from the placer mining. This district has been designated as the Spanish Gulch ACEC for the historic mining structures that remain (USDI BLM, 1986).

Other productive areas included the Granite, Greenhorn, and Susanville Mining Districts (Brooks and Ramp, 1968). All of these districts are located in northeastern Grant County.

Mining claims are still held in many of the historical mining districts, though most operations are small-scale (casual use). Present operations mainly involve small adits and reworking of tailings left by the larger operations of the past.

### **Copper**

In the Granite District, the Cougar, Independence, and La Belleview mines collectively produced 16,275 pounds of copper (Brooks and Ramp, 1968). Another notable producer of copper was the Standard mine in the Quartzburg District. A total of 57 tons of ore containing 20% copper were mined and smelted (Brooks and Ramp, 1968). Copper ore was also produced from other mines in other mining districts but reliable production figures are unavailable.

All known copper deposits in the area are either too small or have an insufficient grade for production under current economic conditions.

### **Lead**

The only notable recorded lead production was from the Cougar, Independence, and La Belleview mines in the Granite District; 34,598 pounds of lead were produced (Brooks and Ramp, 1968). Some lead was probably produced from the sulfide ores of other mines in other mining districts, but reliable production figures are not available.

### **Chromium**

Historically, the chromite deposits of Grant County have not been able to compete with foreign sources with the exception of the three time periods of war (Thayer and others, 1981). Mining of the chromite deposits began in 1916 when World War I cut off chromium imports and continued until the war's end in 1918. Production resumed in 1939 and continued through most of World War II, ending in 1944. The last phase of production occurred from 1951 to 1958 as the U.S. government stockpiled strategic minerals during the Korean War (Thayer et al., 1981; Orr et al., 1992). In all, chromite production in Grant County reached 30,000 tons. Some claims are held on chromite deposits in the planning area in anticipation of more favorable economic conditions in the future.

### **Mercury**

The Horse Heaven Mine, located in eastern Jefferson County, was the largest producer of mercury (quicksilver) in the planning area. Mining began in 1934 and continued intermittently until 1958 (Brooks, 1963). During this time, 17,214 flasks of mercury were produced, placing the Horse Heaven Mine among the top 5 producers in Oregon (Orr, et al., 1992). Other prospects and smaller mines are present in the area around Horse Heaven. The only other notable production was 150 flasks from the Axehandle mine (Brooks, 1963).

A notable mercury deposit was discovered in 1963 near the confluence of the East Fork of Canyon Creek and Canyon Creek (Thayer et al., 1981). Production from the Canyon Creek Mine totaled 3,830 kg between 1963 and 1968. Currently, mercury is not being mined anywhere in the planning area.

Cinnabar is also present in the Diadem mine in the Greenhorn Mining District (Brooks and Ramp, 1968). No production records are available.

### **Bentonite**

Bentonite clay is another locatable mineral found within the planning area. Active mining claims are located in the area about 1.5 miles northwest of Clarno.

### **Other Minerals**

Deposits chrysotile asbestos, nickel, and platinum-group metals (platinum, palladium, and rhodium) (Thayer et al., 1981), zinc, iron, arsenic, antimony, cobalt, bismuth, molybdenum, and manganese are all present in one or more of the mining districts in the planning area (Brooks and Ramp, 1968). Like copper and lead, these minerals are present in the same veins that were mined for gold and silver. Thus, minor amounts of these metals may have been produced from the gold and silver mines.

## **SALEABLE MINERAL MATERIALS**

Common variety mineral materials such as sand, gravel, rock, and cinders may be purchased at fair market value or acquired by free use permits from the BLM. Free use permits are generally limited to government agencies and non-profit organizations. Mineral materials may also be mined under a material site right of way (ROW).

Currently, there are 15 mineral material sites (quarries) in the planning area, some of which have never been developed. Over the next 10 years, approximately 5,000 to 7,500 cubic yards of mineral materials are expected to be mined annually, mostly by Grant County. The Oregon Department of Transportation (ODOT) has 8 existing material site ROWs; only 2 of these sites have been developed. See Table 16)

## **MINERAL LEASING**

Fluid mineral resources including oil, gas, and geothermal and some solid mineral resources such as coal and oil shale are obtained from BLM-administered lands by leasing. Presently, no areas within the planning area are leased and no exploration is occurring. This situation could change as technology improves or if energy prices rise notably.

## **OIL AND GAS**

Several exploratory or "wildcat" wells have been drilled in the planning area, mostly near Clarno and Mitchell. One well, located near Clarno, produced 4 million cubic feet of gas (MMCFG) (Tennyson, 1995). Oil and/or gas shows were reported in at least 12 wells, but none represented commercial accumulations (DOGAMI, 1989; Tennyson, 1995). Other evidence of oil/gas accumulations comes from numerous water wells that have encountered asphalt-filled fractures and cavities and small amounts of gas.

**Table 16: Existing Mineral Material Sites in the Planning Area**

Site Name	Site Number	Owner/Operator	Instrument
Big Creek	OR-037135	BLM-Grant County	Community Pit
Bridge Creek	N/A	BLM	Unknown
Magic Lantern	OR-037134	BLM	
Meyers Canyon	N/A	BLM	Unknown
Meyers Canyon Hwy 207	N/A	BLM	Unknown
Monument Pit	OR-58539	BLM-Grant County	Free Use Permit
Smokey Creek	OR-036867	BLM	Common Use Area
Unnamed	OR-02126	BLM-ODOT	Material Site ROW
Unnamed	TD-029897	BLM-ODOT	Material Site ROW
Unnamed	TD-030633	BLM-ODOT	Material Site ROW
Unnamed	TD-030673	BLM-ODOT	Material Site ROW
Unnamed	TD-031358	BLM-ODOT	Material Site ROW
Unnamed	TD-031780	BLM-ODOT	Material Site ROW
Unnamed	TD-031811	BLM-ODOT	Material Site ROW
Willow Creek Quarry	OR-013350	BLM-ODOT	Material Site ROW

## GEOTHERMAL

Available information on existing geothermal resources comes from 8 natural hot springs and 18 exploratory geothermal wells in the planning area. Data from other wells adjacent to the planning area were used to interpolate the geothermal energy potential to the planning area boundaries.

All of the hot springs are scattered throughout the southeast part of the planning area. It is not known if any of these hot springs represent geothermal reservoirs capable of supporting a geothermal power plant.

The geothermal exploratory wells are somewhat evenly distributed across the planning area. Only four of these wells have temperatures exceeding 30° C (86° F).

Minimum temperatures of 100° C (212° F) are required for geothermal power plant development. No temperatures in wells or hot springs in the planning area have temperatures sufficient for electricity generation. However, temperatures of about 20° C (68° F) and higher have direct use applications such as aquaculture, therapeutic bathing, melting ice and snow, and heating homes, buildings and greenhouses. All but 4 of the wells and 2 of the hot springs have temperatures that are marginally into the lower limits of direct use.

