



Lode Mines and Prospects in the Elkhorn 7.5' Quadrangle, North Santiam Mining District, Marion County, Oregon – Lidar Base

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Lode Mines and Prospects in the North Santiam Mining District, Marion and Clackamas Counties, Oregon
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PLATE 8 of 8

DISCUSSION

The purpose of this map is to show the locations of 64 abandoned mine land (AML) features on a lidar base of the upper half of the Elkhorn 7.5' quadrangle, Marion and Clackamas Counties, Oregon. A digital raster graphic (topographic) base is used to display the same AML features in a companion map (Plate 7).

These plates are part of an exchange-of-technology project related to how lidar-derived terrain data can be confidently and practically applied to the inventory of mine openings and other features associated with abandoned mine land. Using lidar to inventory AML features has a large potential for cost savings as a tool to aid field surveys. Lidar cannot completely replace field inspection of AML features, but the technology does provide a screening tool that will makes field surveys more accurate and efficient.

For this project, the North Santiam Mining District (NSMD) in the Cascade Range of Oregon was used as an example locale. This district is one of five gold/base metal mining districts that occur throughout the Cascade Range from the Columbia River to the California line, and the only one with full lidar coverage. The NSMD lies near the northeast corner of Marion County (Figure 1), within the Willamette National Forest, with dimensions roughly 17 km (~11 mi) long from east to west, and as much as 8 km (5 mi) at its widest (Figure 2). The primary access route is via the North Fork Road to Forest Road 2209. As can be seen in Figure 2, the Little North Santiam River flows westward through a fairly precipitous valley, the course of which serves to bisect the district and as the boundary between the Opal Creek Wilderness to the north and the Opal Creek Scenic Recreation Area to the south.

Topography in the district is characterized by rugged mountains that rise 914 to 1,524 m (3,000 to 5,000 ft) above sea level and by steeply incised valleys. Most of the area is densely forested with Douglas fir, Pacific silver fir, and Western Hemlock plant associations. Only rock cliffs are barren of timber. Lidar is capable of producing remarkably fine-scale bare earth (ground) scenes, even through this kind of tall, obscuring forest canopy and rugged topography. This quality gives lidar imagery as an application for AML inventory work real value because it can show where mine features were poorly documented or mapping inaccurate, and where openings are unknown.

After five periods of known mining in the NSMD at least 226 AML features (by this study's count) in the form of adits and open cuts/exploration pits, waste rock areas, etc. remain. Table 1 lists AMLs indexed to map number and name. The first mineral claims were made in the 1860s immediately west of this map area, near the confluence of Gold Creek and the North

Santiam River. Placer gold was first discovered there and an ensuing rush was short-lived. However, early prospectors also found well-defined fissure veins that carried copper with zinc and lead. By 1903, most claims for those minerals had been located. When Callahan and Buddington (1938) and Leever (1941) visited the district, the mines were inactive. It was not until 1977 that mining in the district resumed when the Shiny Rock Mining Corporation reopened the Ruth Mine and several other claims were developed. By 1992, all mining activity in the district ceased with the closing of the Ruth Mine.

The Oregon Department of Geology and Mineral Industries (DOGAMI) compiled the important mines in the district in Bulletin 14-D (Oregon Department of Geology and Mineral Industries, 1951) and Bulletin 61 (Brooks and Ramp, 1968). The work of Olson (1978), Pollock and Cummings (1985, 1986), Cummings and Pollock (1984), and Ma and others (2009) put the district in its regional context with Cascade Range stratigraphy and structure. Cox (1985) and George (1985) provided cultural property inventories and historical surveys of the district. Niewendorp and Gettgey (2010) compiled those sites into Mineral Information Layer for Oregon, release 2.

This lidar terrain analysis is based on a digital elevation model, which is derived from a triangulated irregular network (TIN) based on ground classified lidar elevation points. The ground elevation TINs are then exported as ArcInfo™ ASCII grids, at 1-m pixel resolution. The Esri Spatial Analyst extension in ArcGIS® 10.1 generated two different scenes, one as a shaded relief (hill) and the other as a slopeshade. The hillshade scene is a simulated three-dimensional terrain image based on simulated shading for a given sun location. Slope visualization assigns a color (e.g., levels of gray) to a pixel on the basis of the difference in elevation between that pixel and the pixels around it. In ArcMap™, the hillshade image was placed below the slopeshade image. The latter's visibility was set to be semi-transparent (50 percent) and 35 percent brightness. This setup simulates a blending effect, where the features of both layers can be seen. Although the hillshade and slopeshade scenes can be used on their own, the blending of the two tends to smooth the surface and consequently improves the graphic quality. Burns and Madin (2009) discussed other visualization techniques, including the use of a transparent elevation gradient over the hillshade or slopeshade to help determine which way is up.

The area of this project covers a portion of the Elkhorn 7.5' quadrangle and extends into three other quadrangles: Bagby Hot Springs, Rooster Rock, and Battle Ax (Figure 2; also see Plates 1–7).

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MAP SYMBOL

1 (index number)  Location of AML feature, see Table 1

Warning: Respect the rights of private property owners. Understand that recreation in or around inactive mine sites is extremely dangerous and can result in serious injury or death. Stay out and stay alive!

Table 1. Index to map numbers and AML names.

1 Santiam #1	33 04-08-24c
2 Santiam 2	34 Redwing No. 2
3 Santiam 5 (south prospect adit)	35 Silver Star and Helvetia
4 Santiam 4 (east prospect adit)	36 Wolz (east open cut)
5 Santiam 5 (north prospect adit)	37 Wolz (short adit)
6 Riverside North	38 Wolz (long adit)
7 Riverside South	39 Wolz (upper adit)
8 Santiam 4 (Gold Creek prospect)	40 Capital
9 Santiam 5 (Gold Creek prospect adit)	41 Capital (open cut)
10 Santiam 8 (prospect 1)	42 Capital (adit 2)
11 Santiam 8 (prospect 2)	43 Capital (adit 3)
12 Santiam 8 (prospect 3)	44 Silver King (shaft)
13 Santiam 8 (prospect 4)	45 Silver King (prospect)
14 Santiam 8 (north adit)	46 Silver King (open cut)
15 Mayday	47 Silver King Group
16 Eureka 21 (west prospect adit)	48 Silver King (upper east adit)
17 Josephine crosscut	49 Silver King (upper west adit)
18 Shilo	50 Deer Trail prospect
19 Lower Granger	51 Crown Mine (prospect 1)
20 Santiam 11a	52 Crown Mine (prospect 2)
21 Santiam 11b	53 Crown Mine
22 Eureka 20	54 Crown Mine (open cut)
23 Eureka 19	55 Crown Mine (prospect 3)
24 Eureka 16 (south)	56 Crown Mine (prospect 4)
25 Eureka 16 (north)	57 Crown Mine (prospect 5)
26 04-08-24b	58 Crown Mine (prospect 6)
27 04-08-24a	59 08-04-34
28 08-04-24 prospect	60 Hazel No. 1
29 Black Eagle (south prospect)	61 Hazel No. 2
30 Black Eagle (north prospect)	62 Hazel No. 3
31 Black Eagle	63 Hazel No. 3a
32 04-08-24d	64 08-04-33

Names of AML features are based on a claim map by the Shiny Rock Mining Corp. (DOGAMI archives).

Figure 1. Location map of the North Santiam Mining District.

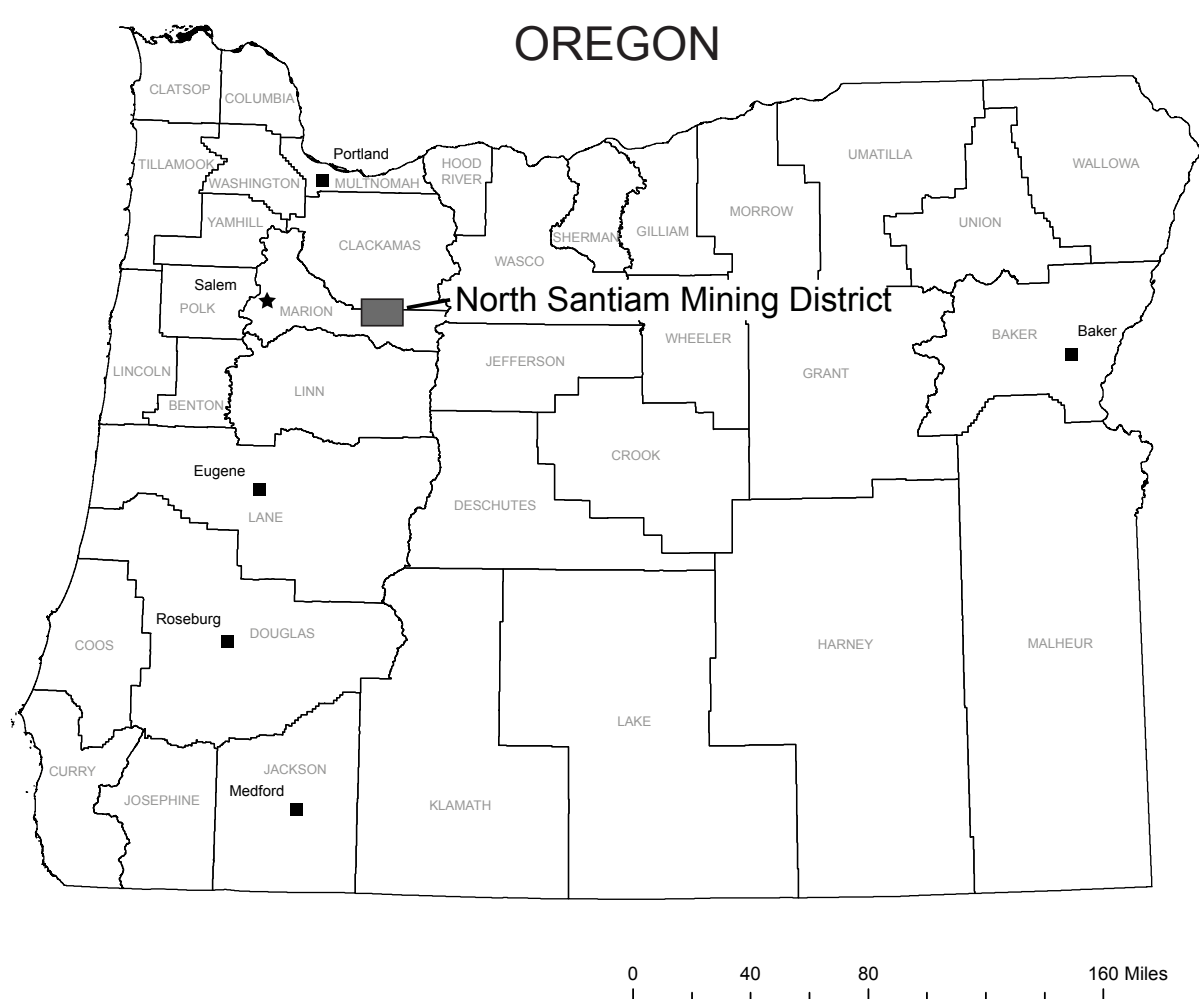
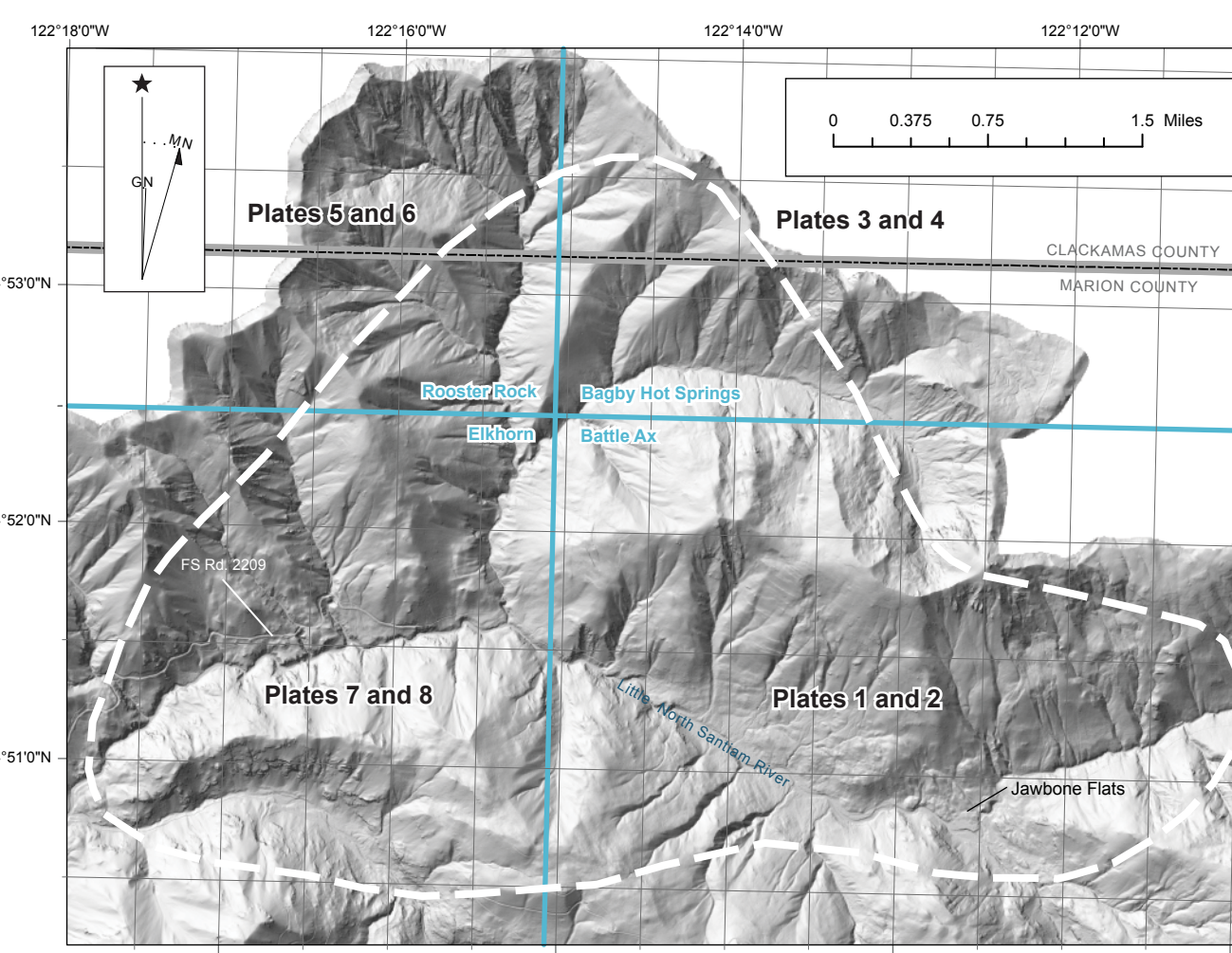


Figure 2. Hillshade image of the North Santiam Mining District (NSMD), Marion and Clackamas counties, Oregon. White dashed line represents the portion of the NSMD that contains the majority of abandoned mine land sites; blue lines are quadrangle boundaries.



NOTICE

This product is for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information. This publication cannot substitute for site-specific investigations by qualified practitioners. Site-specific data may give results that differ from the results shown in the publication. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. government.



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