



Lode Mines and Prospects in the Battle Ax 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 2 of 8

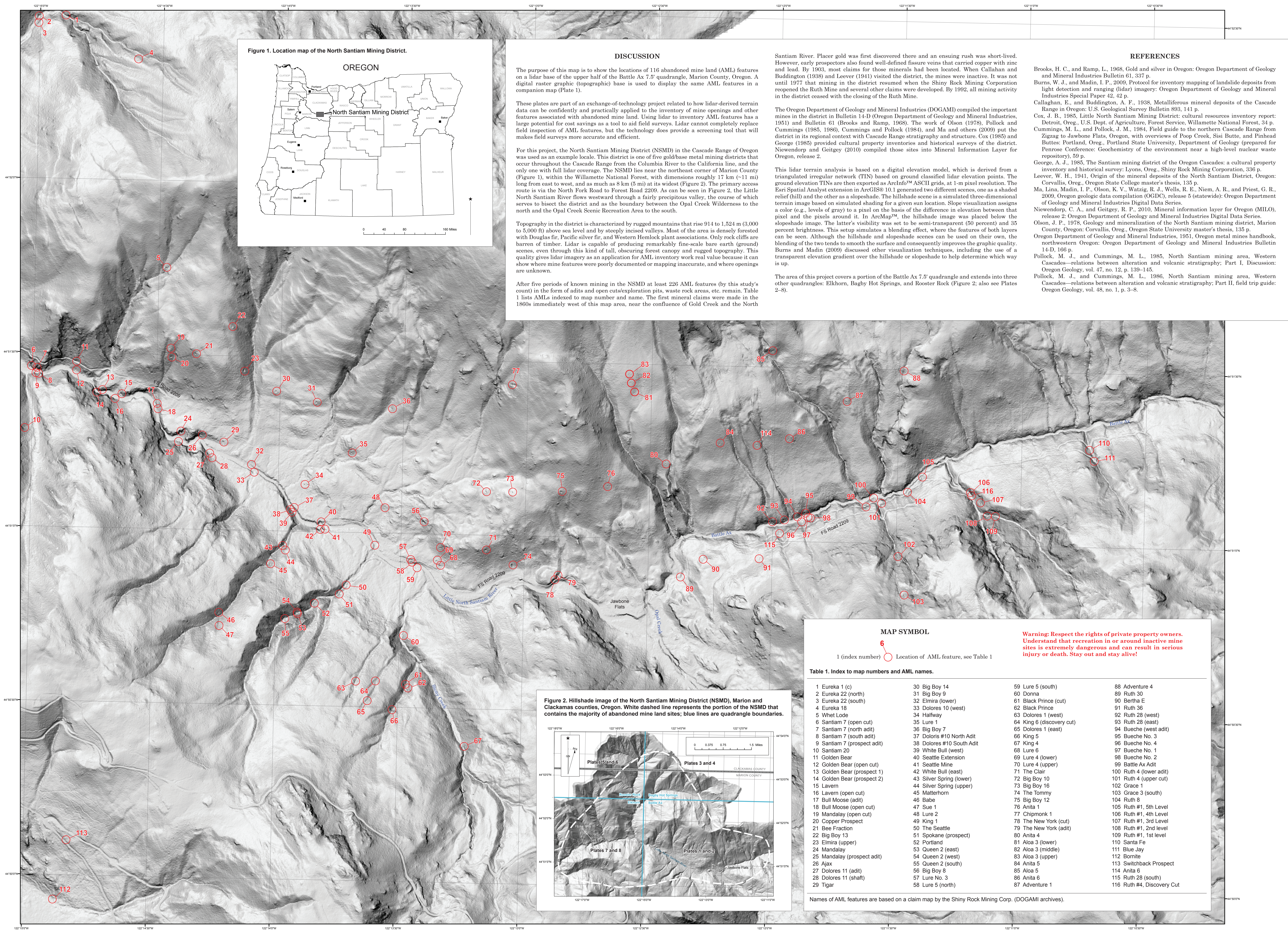
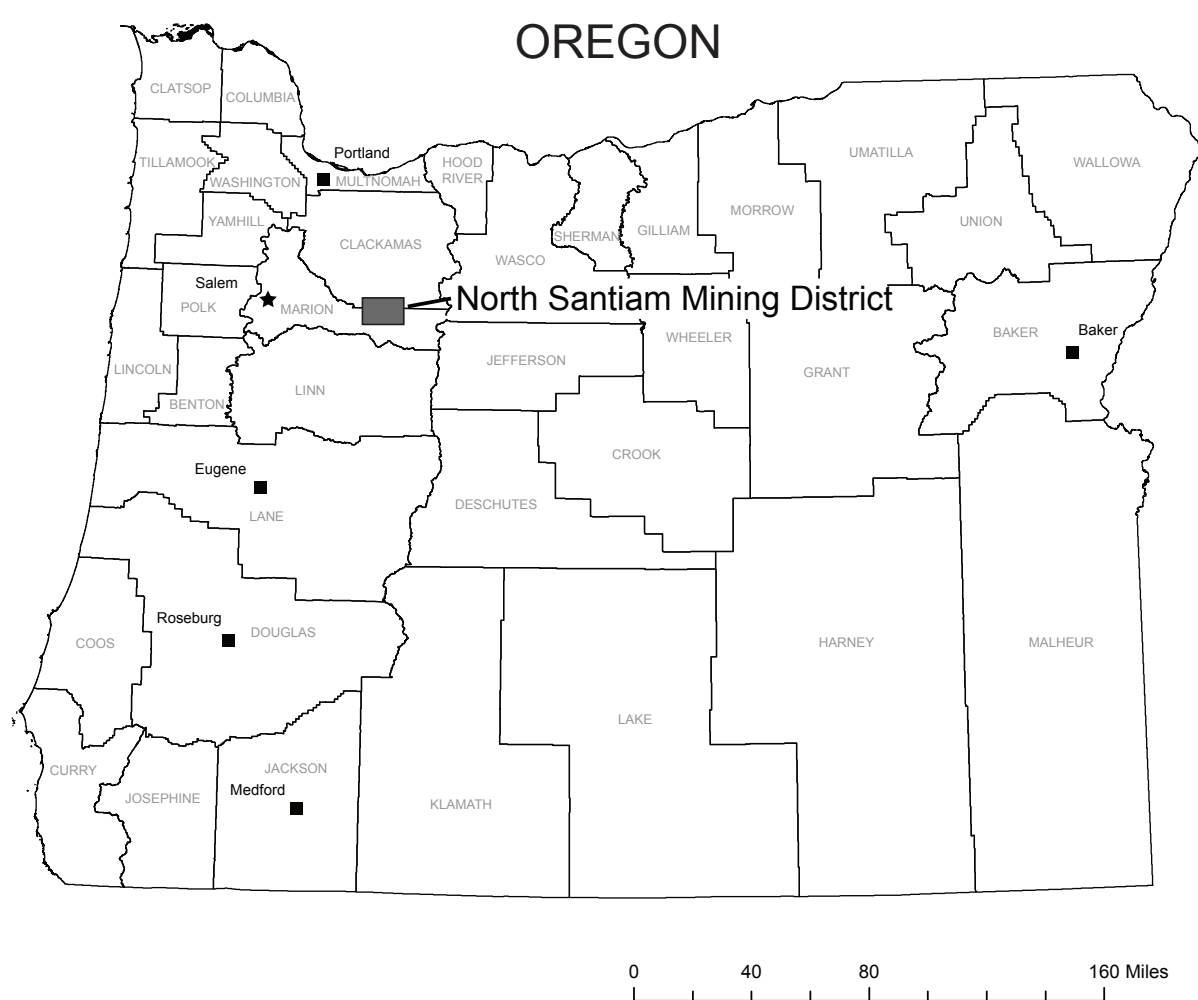


Figure 1. Location map of the North Santiam Mining District.



DISCUSSION

The purpose of this map is to show the locations of 116 abandoned mine land (AML) features on a lidar base of the upper half of the Battle Ax 7.5' quadrangle, Marion County, Oregon. A digital raster graphic (topographic) base is used to display the same AML features in a companion map (Plate 1).

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 make 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 236 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. Niewendorf and Geitgey (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 Battle Ax 7.5' quadrangle and extends into three other quadrangles: Elkhorn, Raghy Hot Springs, and Rooster Rock (Figure 2; also see Plates 2–8).

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MAP SYMBOL


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

Table 1. Index to map numbers and AML names.

1 Eureka 1 (c)	30 Big Boy 14	59 Lure 5 (south)	88 Adventure 4
2 Eureka 22 (north)	31 Big Boy 9	60 Donna	89 Ruth 30
3 Eureka 22 (south)	32 Elmira (lower)	61 Black Prince (cut)	90 Bertha E
4 Eureka 18	33 Dolores 10 (west)	62 Black Prince	91 Ruth 36
5 Whet Lode	34 Halfway	63 Dolores 1 (west)	92 Ruth 28 (west)
6 Santiam 7 (open cut)	35 Lure 1	64 King 6 (discovery cut)	93 Ruth 28 (east)
7 Santiam 7 (north adit)	36 Big Boy 7	65 Dolores 1 (east)	94 Bueche (west adit)
8 Santiam 7 (south adit)	37 Dolores #10 North Adit	66 King 5	95 Bueche No. 3
9 Santiam 7 (prospect adit)	38 Dolores #10 South Adit	67 King 4	96 Bueche No. 4
10 Santiam 20	39 White Bull (west)	68 Lure 6	97 Bueche No. 1
11 Golden Bear	40 Seattle Extension	69 Lure 4 (lower)	98 Bueche No. 2
12 Golden Bear (open cut)	41 Seattle Mine	70 Lure 4 (upper)	99 Battle Ax Adit
13 Golden Bear (prospect 1)	42 White Bull (east)	71 The Clair	100 Ruth 4 (lower adit)
14 Golden Bear (prospect 2)	43 Silver Spring (lower)	72 Big Boy 10	101 Ruth 4 (upper cut)
15 Lavern	44 Silver Spring (upper)	73 Big Boy 16	102 Grace 1
16 Lavern (open cut)	45 Matterhorn	74 The Tommy	103 Grace 3 (south)
17 Bull Moose (adit)	46 Babe	75 Big Boy 12	104 Ruth 8
18 Bull Moose (open cut)	47 Sue 1	76 Anita 1, 5th Level	105 Ruth #1, 5th Level
19 Mandalay (open cut)	48 Lure 2	77 Chipmunk 1	106 Ruth #1, 4th Level
20 Copper Prospect	49 King 1	78 The New York (cut)	107 Ruth #1, 3rd Level
21 Bae Fraction	50 The Seattle	79 The New York (adit)	108 Ruth #1, 2nd level
22 Big Boy 13	51 Spokane (prospect)	80 Anita 4	109 Ruth #1, 1st level
23 Elmira (upper)	52 Portland	81 Aloa 3 (lower)	110 Santa Fe
24 Mandalay	53 Queen 2 (east)	82 Aloa 3 (middle)	111 Blue Jay
25 Mandalay (prospect adit)	54 Queen 2 (west)	83 Aloa 3 (upper)	112 Bornite
26 Ajax	55 Queen 2 (south)	84 Anita 5	113 Switchback Prospect
27 Dolores 11 (adit)	56 Big Boy 8	85 Aloa 6	114 Anita 6
28 Dolores 11 (shaft)	57 Lure No. 3	86 Anita 6	115 Ruth 28 (south)
29 Tiger	58 Lure 5 (north)	87 Adventure 1	116 Ruth #4, Discovery Cut

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

NOTICE
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