LEG N: ALTERNATE WESTERN APPROACH TO MOUNT RAINIER

Yelm to Eatonville via State Routes 507 and 702

This approach, which starts from the city of Yelm about 16 mi (~26 km) southeast of Olympia, is an alternative to parts of Leg A and can be accessed from Interstate 5 (I-5) via State Routes (SR) 507 or 510 near Olympia (Fig. N-1). With excellent views of Mount Rainier, the 27-mi (43 km) leg crosses the Nisqually River and follows an historic wagon road route (SR 702) as it rises and descends over topography streamlined by movements of the Puget lobe of the Vashon glacier during the last Ice Age. Not far east of SR 7, andesite boulders and southwest-trending valleys that cut into the drift deposits mark the passage of at least one large late-glacial flood caused by the emptying of a network of ice-dammed lakes near the Carbon River valley (see Fig. A-3, p. 55). Near Eatonville, you begin to see outcrops of Cascade Range bedrock. The trip leg then rejoins SR 7 at its junction with SR 706, about 5 mi (8 km) northwest of the town of Elbe.

Distances along the route are given in miles, followed by kilometers in italics. If you take any of the optional side trips, you'll have to keep track of and add those miles to all the remaining mileages in the leg. Having a pencil and paper handy, and even a calculator will be helpful.

Mileage

0.0 *0.0* Yelm city center. Junction of SR 510 with SR 507. Proceed east on SR 507.

1.0 *1.6* Bald Hill Road intersection. Stay on SR 507. Between here and the Nisqually River, note the piles of grayish andesite cobbles and some boulders that landowners have stacked near fence rows. These rocks, most of which originate in the Cascade Range near Mount Rainier, may be downstream deposits of the late-glacial Tanwax Creek–Ohop Valley flood or a subsequent late-glacial flood caused by the sudden draining of an ice-dammed lake during recession of Puget lobe ice some 16,000 years ago. While the Puget lobe glacier itself did carry a minor component of andesite rocks, its deposits are typically characterized by diverse lithologic types that include abundant metamorphic and intrusive rocks picked up by the glacier as it moved south from Canada and across the igneous and metamorphic rocks of the North Cascades and other northern terrains. The fact that most surface boulders in this area are andesite indicates that the flow that deposited them likely originated in the Cascade Range.

2.4 *3.8* Nisqually River at McKenna. Several postglacial lahars or laharic floods from Mount Rainier have reached this area and extended as far as the Nisqually River delta, about 21 mi (34 km) flow distance north-northeast of here. A tree buried in deposits of andesitic sand in the Nisqually River flood plain upstream of McKenna yielded a radiocarbon age of 585 yr B.P. (Scott and others, 1995). Sandy deposits that may be lahar-derived sand have been documented in the modern Nisqually delta; those sediments contained buried wood that yielded radiocarbon ages of about 2,320 and 540 yr B.P. (Barnhardt and others, 2000).

The low area adjacent to and north of the river in this area was severely flooded by the Nisqually River rain-on-snow flood in the winter of 1996.

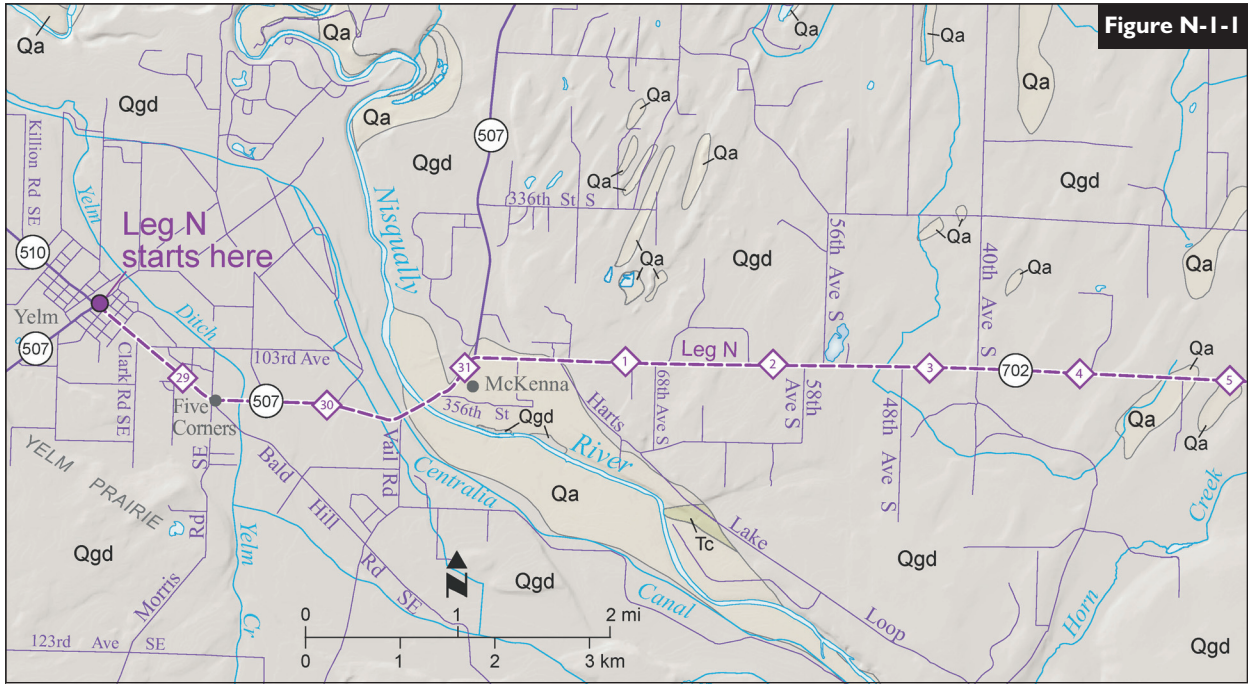


Figure N-1. Geologic map for Leg N (four consecutive panels). The geology was adapted from 1:100,000- and 1:500,000-scale digital versions of Schasse (1987a) and Schuster (2005) and has been draped over a shaded relief image generated from 10-m elevation data. The leg maps were constructed using source-map data whose scale is smaller than the leg map scale, thus minor exposures may not appear on leg maps. The numbers in diamonds indicate mileposts. The map explanation is on the inside back cover.

2.8 *4.5* Milepost (MP) 31.

2.9 *4.6* Junction of SR 702 with SR 507. Go right onto SR 702. Excavations into this flat surface in 2002 exposed a sandy, 3-ft (1 m)-thick lahar-derived deposit that may be correlative with lahars as old as 2.5 ka that are exposed near the town of National farther upstream.

3.8 *6.1* MP 1. Small area of Mima Mounds north of the road. The causes of these mounds have long been a subject of intense interest and scientific debate. Washburn (1988) wrote an excellent compilation that describes the Mima Mounds of the Puget Lowland area and summarized various hypotheses about their formation. The classic example of a mounded prairie, as well as interpretive information, can be found at Mima Mounds Natural Area, administered by the Washington State Department of Natural Resources. The preserve is located about 10 mi (16 km) south of Olympia, several miles west of I-5 on SR 121.

From here to SR 7, the road follows the undulating surface of some classic glacially fluted topography. The north-northeast-trending hills are drumlins, streamlined landforms created by the passage of glacial ice over fragmental material. From the air, or as viewed on a shaded relief map, they are dramatic evidence of the direction of glacial movement (Fig. N-2). Near the terminus of a glacier, even low topographic irregularities will guide the ice flow. Thus, not all drumlins are oriented north–south, the main flow direction of the Puget lobe. The drumlins have as much as 33 ft (10 m) of vertical relief (Booth and Goldstein, 1994). Also note the many glacial erratics throughout the area.

12.1 *19.4* Junction SR 702 with SR 7. Continue with this leg by carefully going straight ahead, then bearing right on Eatonville Cutoff Road. You are now entering another floodway of the Tanwax Creek–Ohop Valley late-glacial flood (Pringle and others, 2000a).

Alternatively, you can begin Leg A here by turning right onto SR 7. Remember to adjust your odometer if you do.

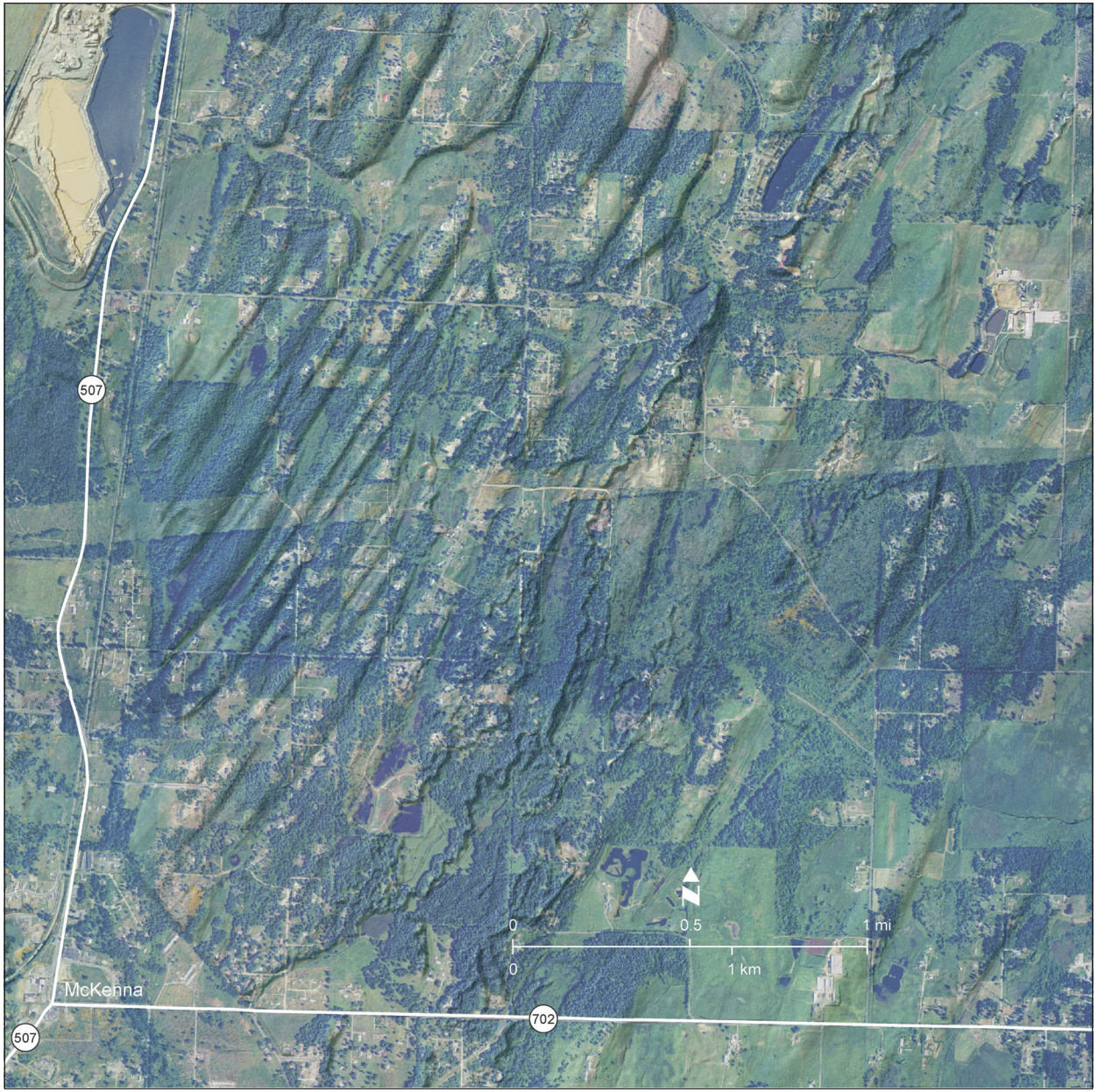
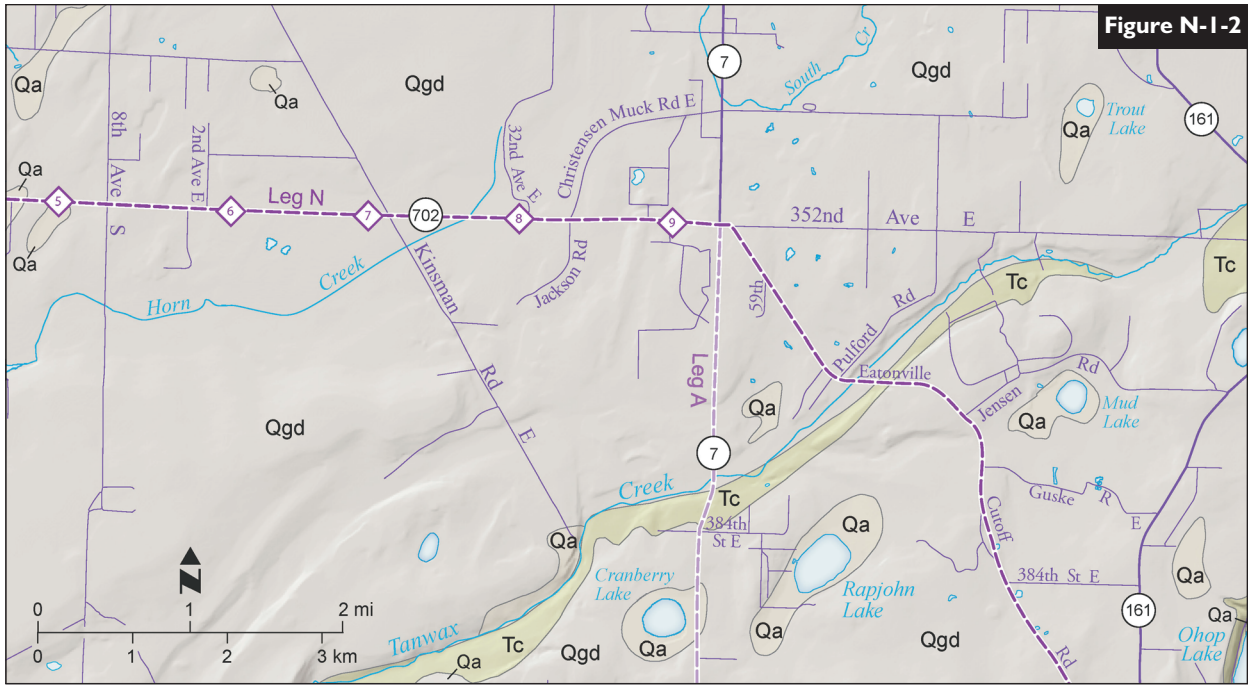


Figure N-2. Dramatic drumlinoidal topography shaped by passage of the Vashon Glacier, as seen on a shaded relief map. These streamlined, elongate hills of glacial drift are built and (or) shaped under flowing glacial ice. The axis of individual drumlin features is parallel with the direction of ice movement.

Figure N-3. Megaripples? 6 to 9 ft (2–3 m) high in gravelly soils along Eatonville Cutoff Road slightly west of Tanwax Creek. They are oriented approximately perpendicular to the flow direction. The megaripples were probably deposited by the Tanwax Creek–Ohop Valley flood, which likely resulted when an ice-dammed lake in the Cascades breached its dam. View is to the northeast.

Figure N-4. Lag deposit of large boulders (to 6 ft [2 m] in diameter) in the valley of Tanwax Creek that was deposited by the late-glacial (~16 ka) Tanwax Creek–Ohop Creek valley flood, a jökulhlaup (see Fig. A-3, p. 55, and Fig. L-2, p. 154). This flood(s?) resulted from the partial draining of glacial Lake Carbon, which was dammed by the Puget lobe ice about 17 mi (~27 km) northeast of here (Pringle and others, 2000a). The rocks consist mostly of andesites and some granodiorites that likely originated in rivers draining Mount Rainier or in deposits of the Lily Creek Formation and Wingate Hill Drift. Both of the latter units are rich in andesite rocks because they originated in the Cascade Range near the present location of Mount Rainier. View is to the northeast toward the source area of the late-glacial flood.



13.3 *21.3* Possible megaripples deposited by the Tanwax flood are on the northeast side of the highway slightly west of Tanwax Creek (Fig. N-3).

13.5 *21.7* Cross Tanwax Creek. Note flood-deposited boulders in the valley bottom in the distance to the left (Fig. N-4).

16.9 *27.1* Junction of Eatonville Cutoff Road with SR 161. Turn right and continue south on SR 161.

17.1 *27.5* Mount Rainier viewpoint at Dogwood Park. If the weather is clear, this is a good place to see the west face of the volcano, some 26 mi (~42 km) to the east (Fig. N-5). A historical marker at this site incorrectly claims the three peaks of Mount Rainier are cinder cones. The youthful Columbia Crest cone, the middle peak, is capped by two craters. Liberty Cap, the northern peak, and Point Success, the southern peak, are erosional remnants of the large crater created about 5600 years ago by the eruption that produced the Osceola Mudflow.

18.0 *29.0* MP 5. Miocene Mashel Formation sediments are exposed on the north side of the road along this curve as you descend into the Ohop valley. The valley is a late-glacial spillway of the Puget lobe of the Vashon Glacier. The Mashel Formation consists of poorly consolidated fluvial and lacustrine

Figure N-5. Chiseled west face of snowclad Mount Rainier with Cascade Range foothills in the foreground from Dogwood Park along SR 161. View is to the east from about 26 mi (42 km) west of the volcano.

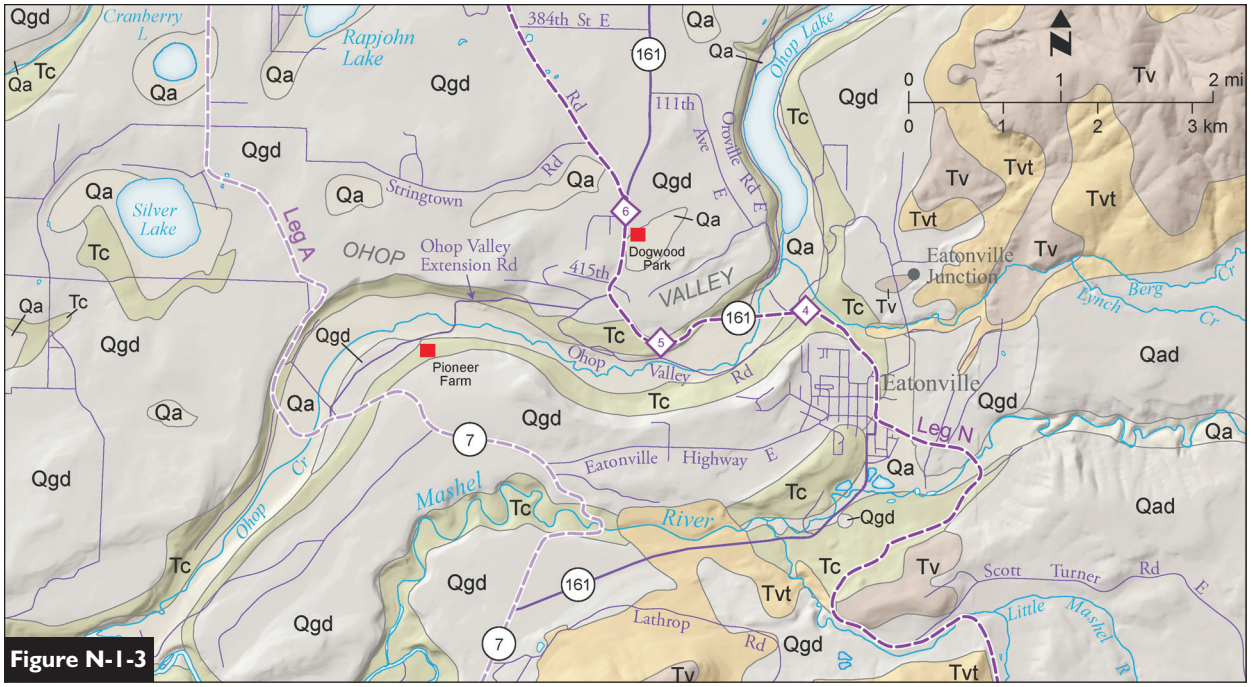


Figure N-1-3

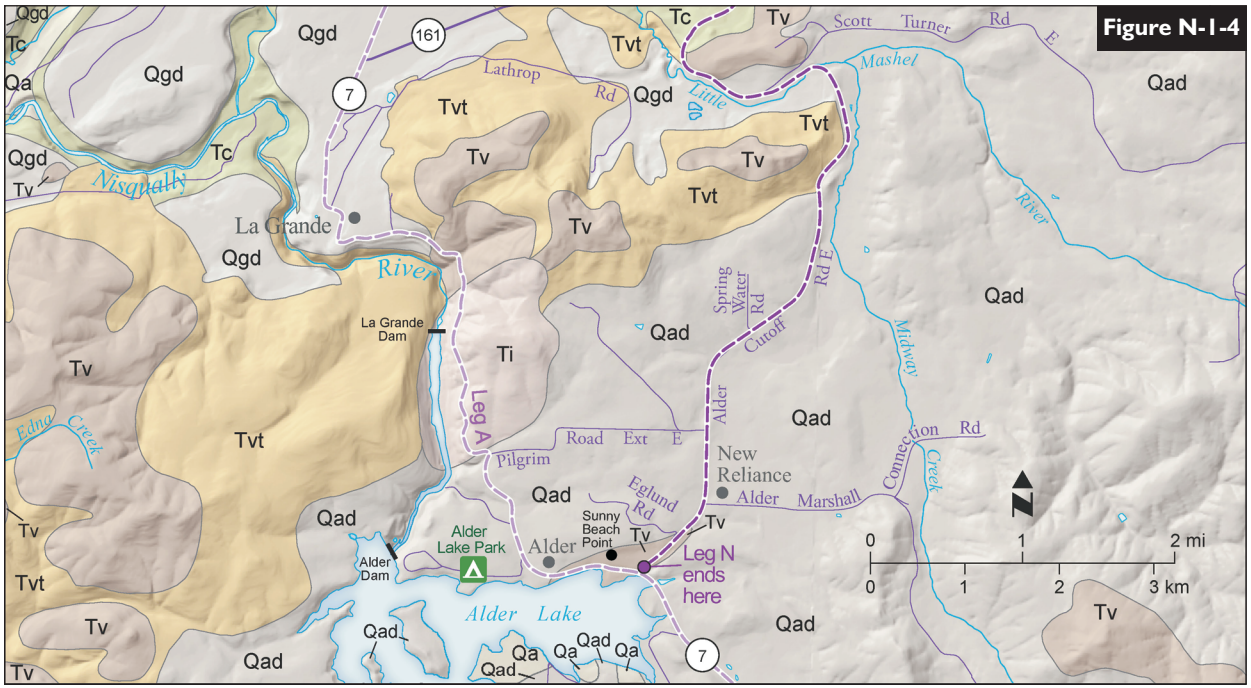


Figure N-1-4

sediments that in many places contain dacite clasts.

18.7 30.1 Cross Ohop Creek, a puny remnant of the great river of glacial meltwater that flowed through this valley about 16,000 years ago.

19.9 31.8 City of Eatonville. Turn left on to Center Street at the junction of SR 161/Center Street/Washington Street with Eatonville–Alder Cutoff Road in the center of town. (SR 161 continues straight ahead for about 3 mi (4.8 km) to SR 7.)

20.6 33.0 Cross the Mashel River, whose headwaters drain a portion of the Cascade Range foothills between the Puyallup and Nisqually River basins.

22.1 35.5 Slightly after the railroad bridge there is a pullout to the right. An outcrop of Oligocene or Eocene basaltic andesite is on the left. Snavely and others (1958) believe that these rocks are likely correlative with those of the Northcraft Formation farther to the south.

22.8 36.7 Scott Turner Road on the left.

23.0 37.0 Cross over the Little Mashel River.

23.3 37.5 An outcrop of red and black tuffs of Oligocene/Eocene age is on the left.

26.7 43.0 Pass an outcrop of glacial drift, Wingate Hill Drift, on the right (west). The great extent of the Wingate Hill deposits shows that it was one of the most extensive alpine glaciations in the southwest Washington Cascades. Dethier (1988) estimated its age to be 600 to 300 ka; thus it could have been deposited during the extensive marine isotope stage 12 glaciation, about 450 ka (see Fig. 25, p. 29).

27.0 43.4 Andesite of Oligocene/Eocene age crops out on the right.

27.1 43.4 Junction of Eatonville–Alder Cutoff Road with SR 7. Here you can turn left to continue east on SR 7 (Leg A) and connect with SR 706 to Mount Rainier National Park. This is a dangerous intersection, so please use caution.

Remember to reset your odometer when you start another leg. ■