WASHINGTON STATE DEPARTMENT OF
Natural Resources
Brian Boyle - Commissioner of Public Lands
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Division of Geology and Earth Resources
Raymond Lasmanis, State Geologist

WASHINGTON DIVISION OF GEOLOGY AND EARTH RESOURCES
OPEN FILE REPORT 88-5
PLATE 3

STRUCTURAL GEOLOGY ALONG THE NORTHWESTERN COLUMBIA RIVER BASALT MARGIN, WASHINGTON

by Newell P. Campbell

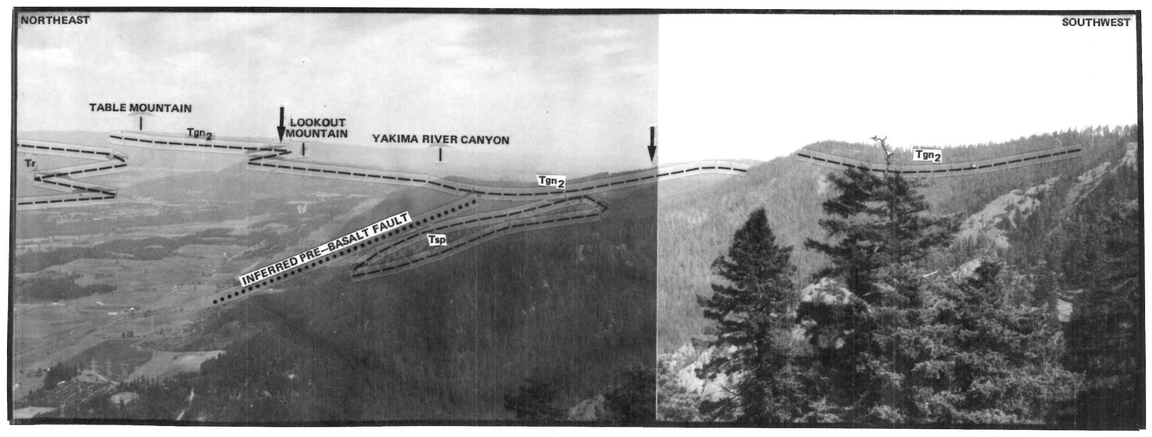


Figure 32 Loc. CE-1. 10-19N-15E. View looking northeast at the basalt margin at the Kittitas Valley syncline. The photo (and Fig. 33) clearly shows no major vertical offset of the basalt, but dips exceeding 30 degrees occur on either side of the syncline (arrows). These monoclines are probably associated with pre-basalt faulting under the basalt and may mark the boundaries of the Roslyn Formation. Tsp, Silver Pass volcanics; Tr, Roslyn Fm.; Tgn_2, Grande Ronde basalt.

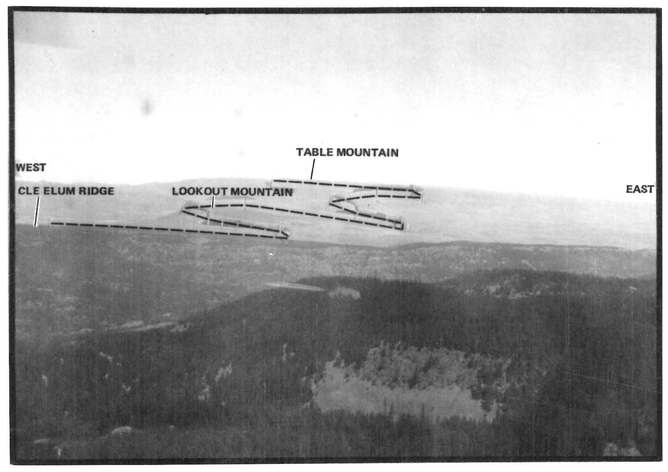


Figure 33 Aerial view from above Manastash Ridge looking northeast at the basalt margin (dotted line). This view shows no major vertical offset of basalt due to faulting from Cle Elum Ridge to Table Mountain. Note also the lack of steep dips at the margin unlike folds toward the Columbia Basin center.

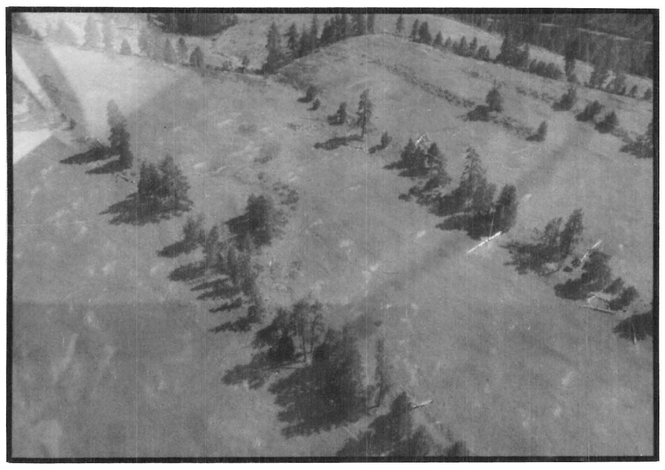


Figure 35 Aerial view of linear depressions in the Columbia River Basalt Group on Manastash Ridge. Trees and sagebrush occupy the loess-filled depressions and bedrock is seldom exposed. See Loc. CE-10 for discussion of these features.

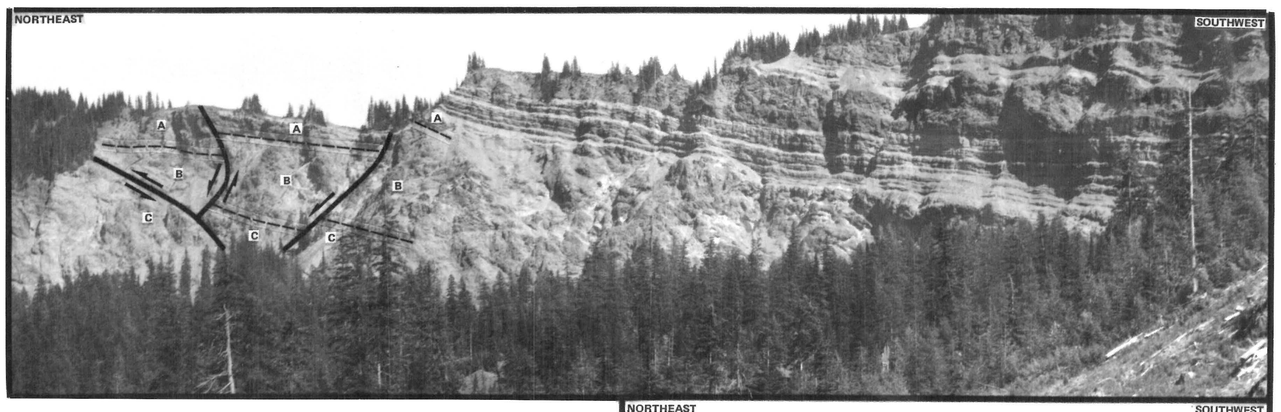
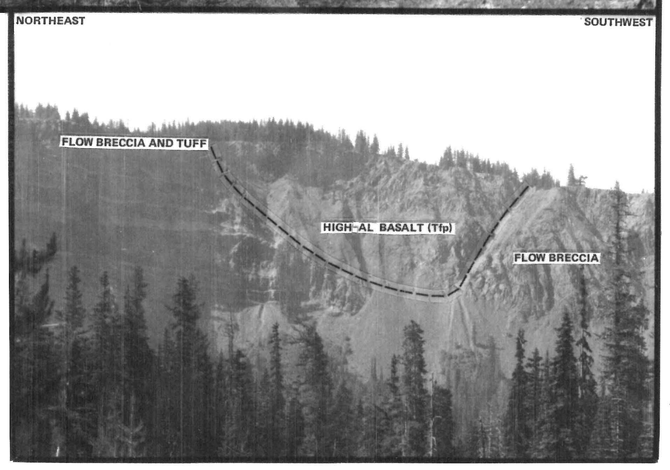


Figure 37 Devils Slide and exposures of the Fifes Peak Formation from upper Milk Creek. No major fault cuts this slide although several small faults (1-2 m) cut the volcanics along the east edge. A, B, and C are local units within the Fifes Peak Formation used to show offset of the faults. A channel fill of high-Al basalt cuts across the Edgar Rock cone facies here.



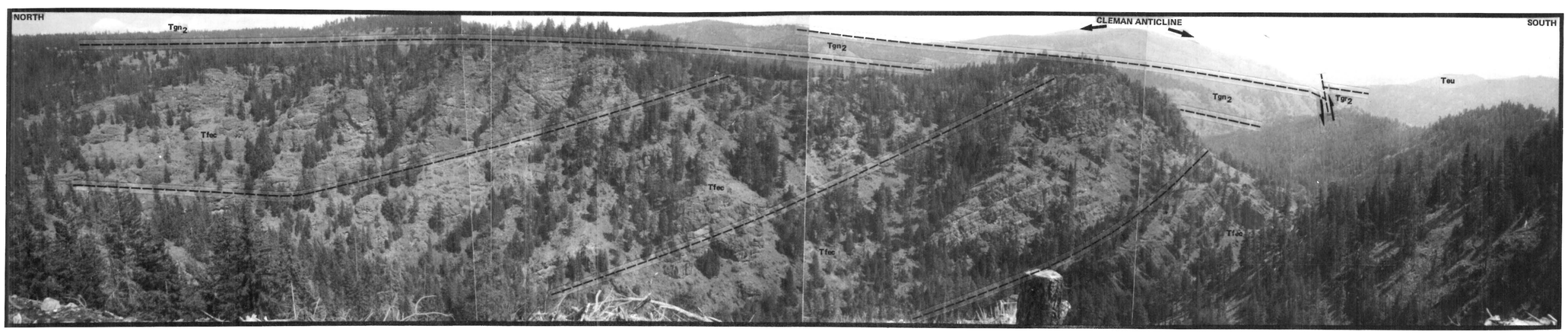


Figure 38 Loc. ML-7. 32-16N-15E. Folding in the Fifes Peak Formation and Columbia River basalt viewed from Rock Creek. The angular unconformity between the Edgar Rock cone facies of the Fifes Peak Formation and the Columbia River basalt is clearly visible. The Naches River fault zone is to the right and the Cleman Mountain anticline plunges toward the observer, dying out before reaching the basalt margin. Tfec, Edgar Rock cone facies; Tgn_2, Grande Ronde "N_2"; Tgr_2, Grande Ronde "R_2". Teu, upper Ellensburg Formation.

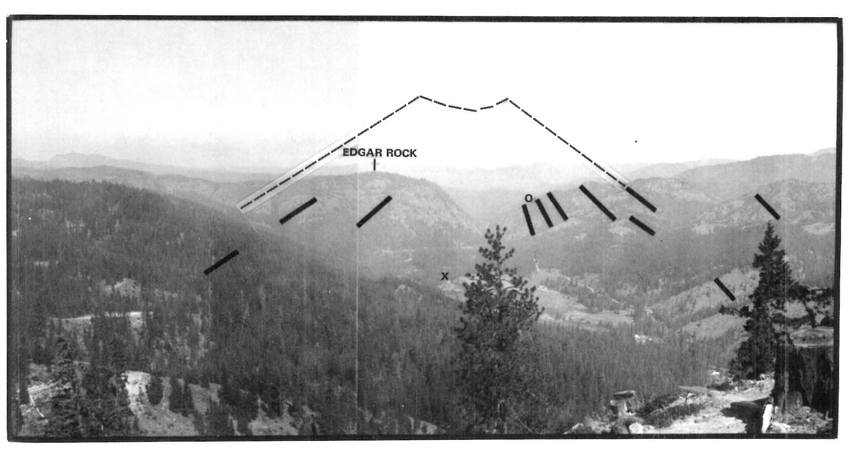


Figure 39 Looking northwest up the Naches River at the approximate location (X) of the Edgar Rock Volcanic cone. Dips on the cone facies (Tfec) average 35° but oversteepened dips up to 60° occur north of Cliffdell (O) suggest either a fault or an upwarp in Fifes Peak volcanics after deposition of the cone. The oversteepened dips align with faulting of the Naches River fault zone.

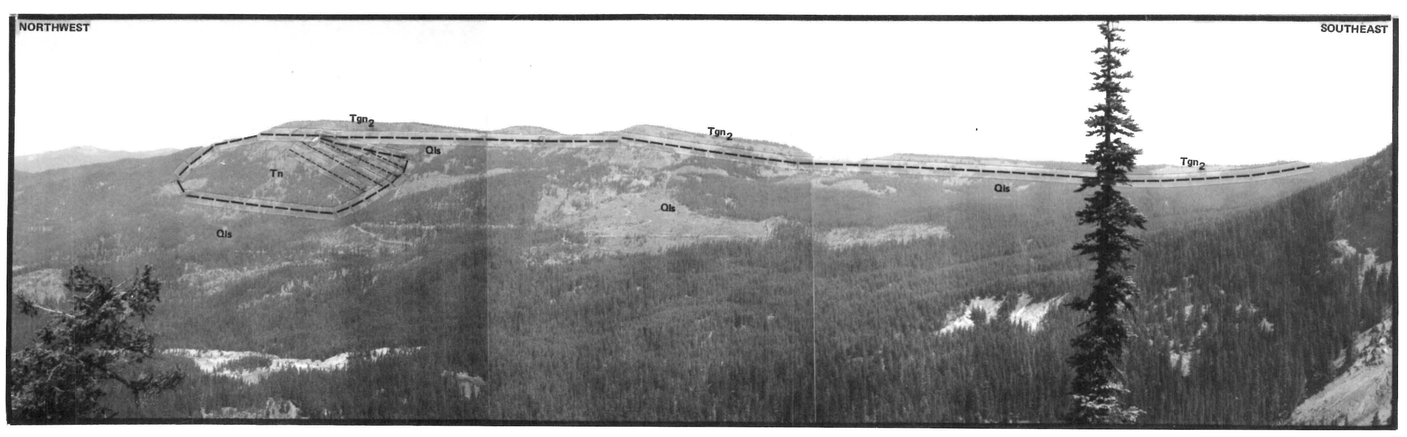


Figure 40 Loc. CD-3. 8-17N-15E. View looking north at upper Umtanum Ridge showing unfaulted Columbia River basalt and an unconformity with the Naches Formation. Basalt along the ridge crest is the remaining north limb of the Umtanum anticline in the Columbia River Basalt; the south limb is removed by sliding. The fold axes in Columbia River basalt and Naches rocks clearly do not align. Tn, Naches Fm.; Tgn_2, Grande Ronde basalt "N_2"; Qls, landslides.

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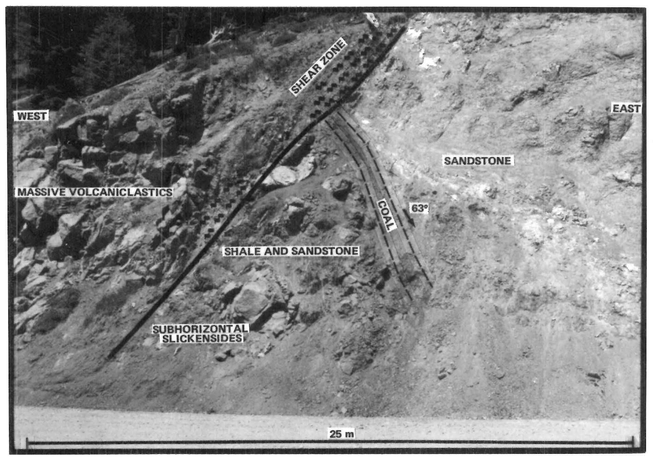

Figure 41 Loc. CD-8. 1-17N-18E. Small fault in the Naches Formation on Road 173, Milk Creek Road. The fault places volcaniclastics against coal, shale and sandstone--amount of offset is unknown.

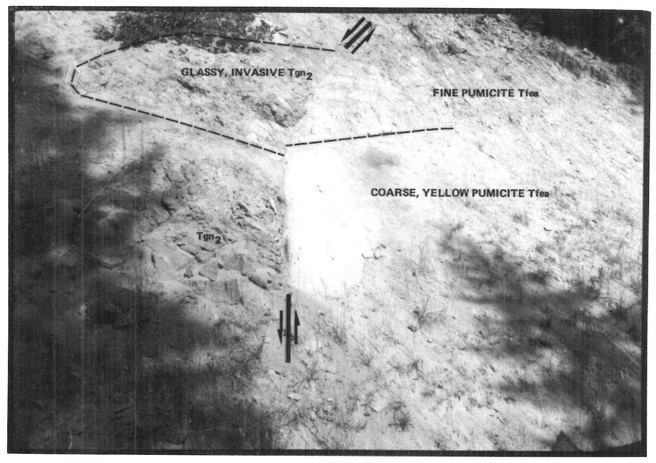

Figure 42 Loc. CD-13. 17-16N-14E. Small fault (?) juxtaposing Columbia River basalt and apron facies of the Fifes Peak Formation (Edgar Rock cone) on Road 166, upper Nile Creek.

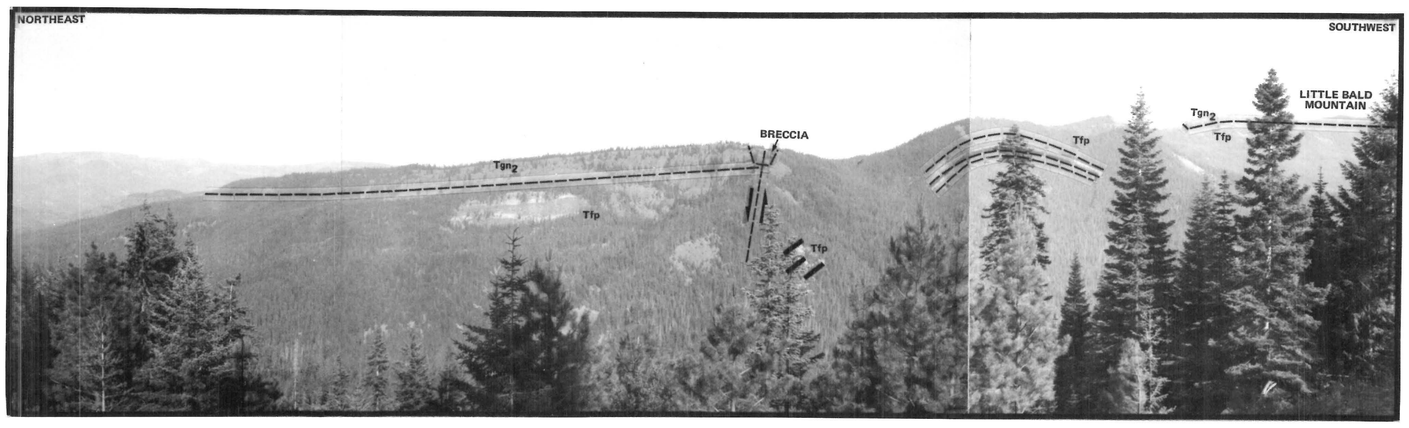

Figure 44 Loc. OS-2. 22-17N-13E. Looking southeast at fault offset of the Columbia River basalt and folding in Fifes Peak formation at Little Bald Mountain. This fault is the only fault of consequence that cuts basalt south of the Naches River fault zone. This fault dies out within 5 km. Tfp, Fifes Peak Fm.; Tgn_2, Grande Ronde basalt "N_2".

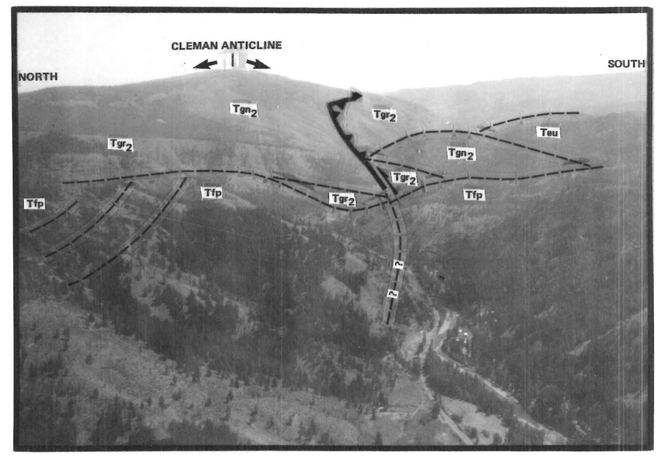

Figure 45 Aerial view (looking east) of the White River-Naches River fault zone. This fault extends across the Cascade crest and down the Naches River as far as the town of Naches. The fault is more visible in the Columbia River basalt than Fifes Peak rocks due to the rubbly nature of the Edgar Rock cone. The Cleman Mountain anticline clearly dies out before reaching the basalt margin. Tfp, Fifes Peak Fm. (Edgar Rock cone facies); Tgn_2, Grande Ronde "N_2"; Tgr_2, Grande Ronde "R_2"; Teu, upper Ellensburg Fm.

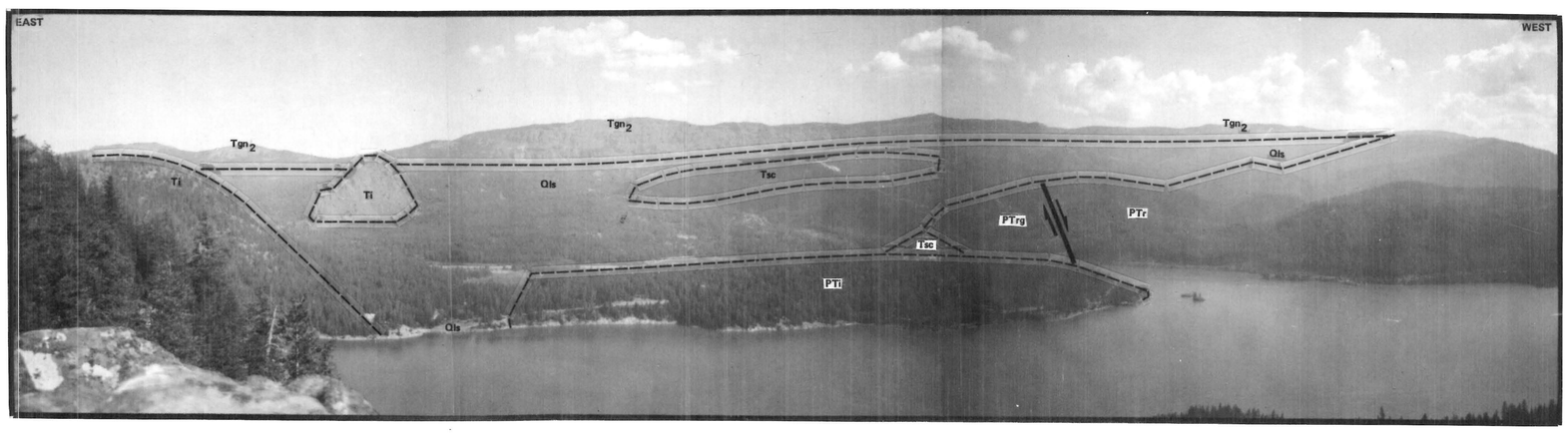

Figure 46 Loc. RL-2. 1-13N-13E. Looking south across Rimrock Lake at Divide Ridge and unbroken Columbia River basalt of the Divide Ridge syncline. Note the basalt thinning against pre-Tertiary Russell Ranch Formation to the west and lack of fluvial-clastic rocks under the basalt. PTi, Indian Creek gneiss; PTr, Russell Ranch Formation; PTrg, Russell Ranch clastics; Tsc, Spencer Creek volcaniclastics; Tgn_2, Columbia River basalt; Qls, landslides; Ti, intrusives.

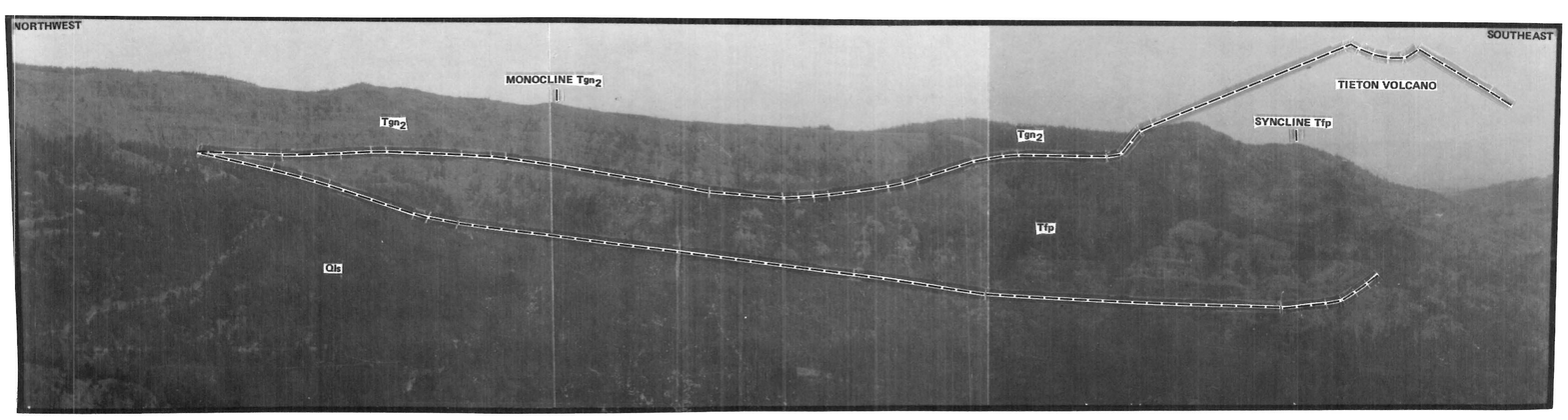

Figure 47 Aerial view from above Wildcat Creek at Bethel Ridge showing dissimilar folds in Columbia River basalt (Tgn_2) and the Fifes Peak Formation (Tfp). Note apparent thinning of basalt against the old Tieton volcano. Qls, landslide.

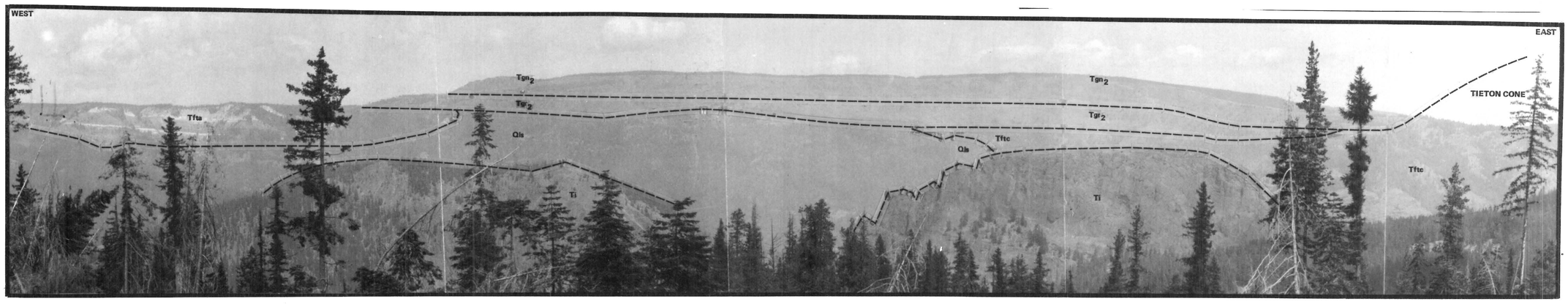

Figure 48 Aerial view looking northeast at Bethel Ridge anticline in Columbia River basalt. Note the variation in thickness of Tgr_2 while Tgn_2 remains constant. The westward extent of basalt along ridges such as Bethel is probably due to thicker basalt filling inverted valleys. The basalt probably flowed around the old Tieton volcano as the lava thins against the old cone. Note obvious differences in cone and apron facies of this volcano. Tftc, Fifes Peak Fm. cone facies; Tfta, apron facies; Tgr_2, Grande Ronde basalt "R_2"; Tgn_2, Grande Ronde basalt "N_2"; Qls, landslides; Ti, intrusives.

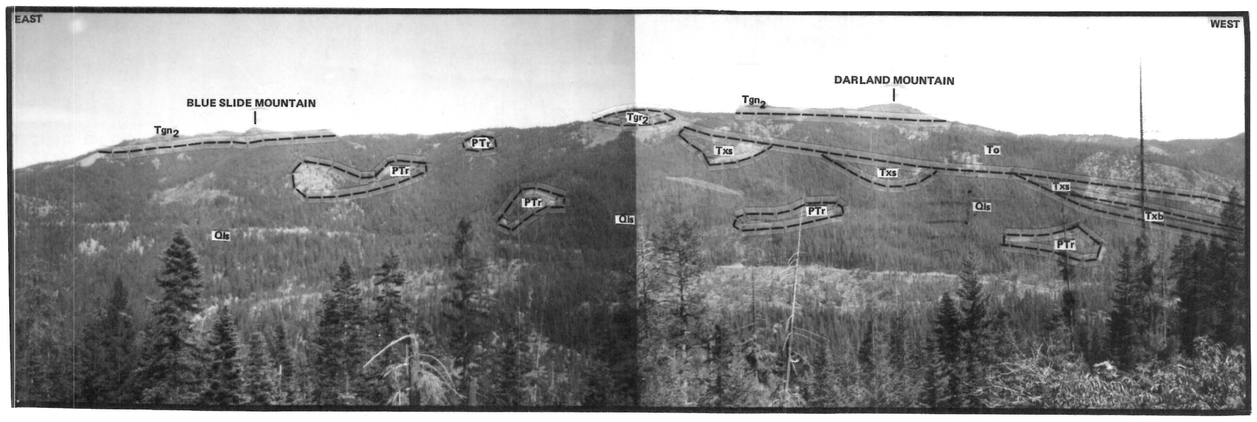

Figure 49 Loc. RL-2. 1-13N-13E. Looking south at Darland Mountain and Blue Slide Mountain on Divide Ridge. The fault mapped here by Swanson (1978) does not exist. Pre-Tertiary rocks are in direct contact with basalt here. PTr, Russell Ranch Fm.; Txb, basalt, age unknown; Txs, arkosic sediments, age unknown; To, Ohanapecosh Fm.; Tgr_2, Grande Ronde basalt "R_2"; Tgn_2, Grande Ronde basalt "N_2"; Qls, landslides.

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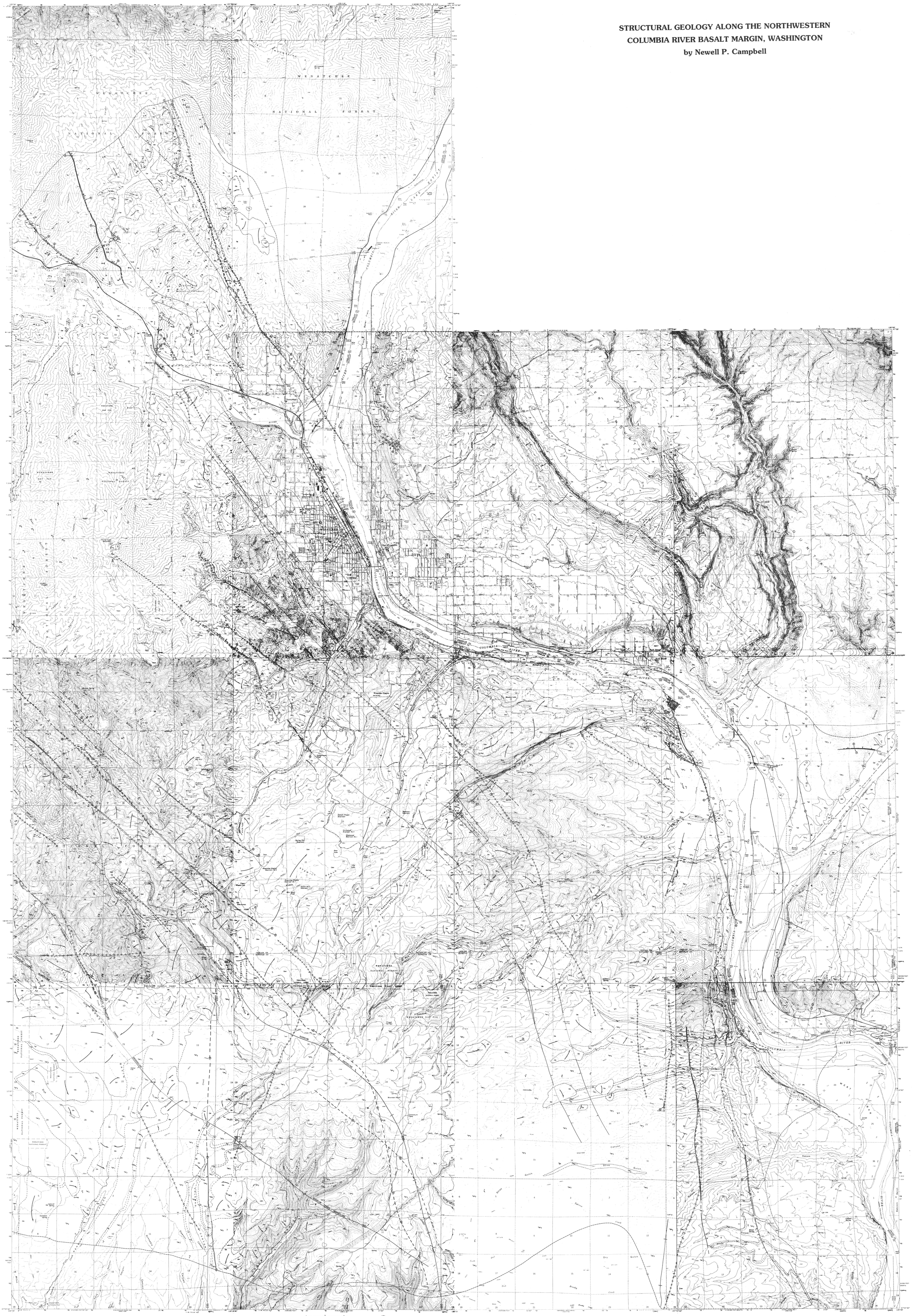

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