

1959

The mainline road was already established up the Tioga Creek valley to the confluence of the South Fork of Tioga Creek and Tioga Tributary 18L and part-way up 18L. The splash dam was no longer in use and in the **lower mile of Tioga Creek**, a great deal of woody debris and sidecast boulders were evident in the channel, and very little riparian vegetation remained (Photos 20-43--20-44) (Figure 4). The depositional patterns in this reach showed diagonal bars and had a high width-depth ratio indicating a channel whose sediment supply exceeded the competency of the stream to transport it. A huge pile of debris filled in the main channel immediately below Hatcher Creek (Photos 20-43--20-44). Most of the hillslopes of lower **Hatcher Creek** were actively being *logged* at this time (Photos 20-43--20-44).

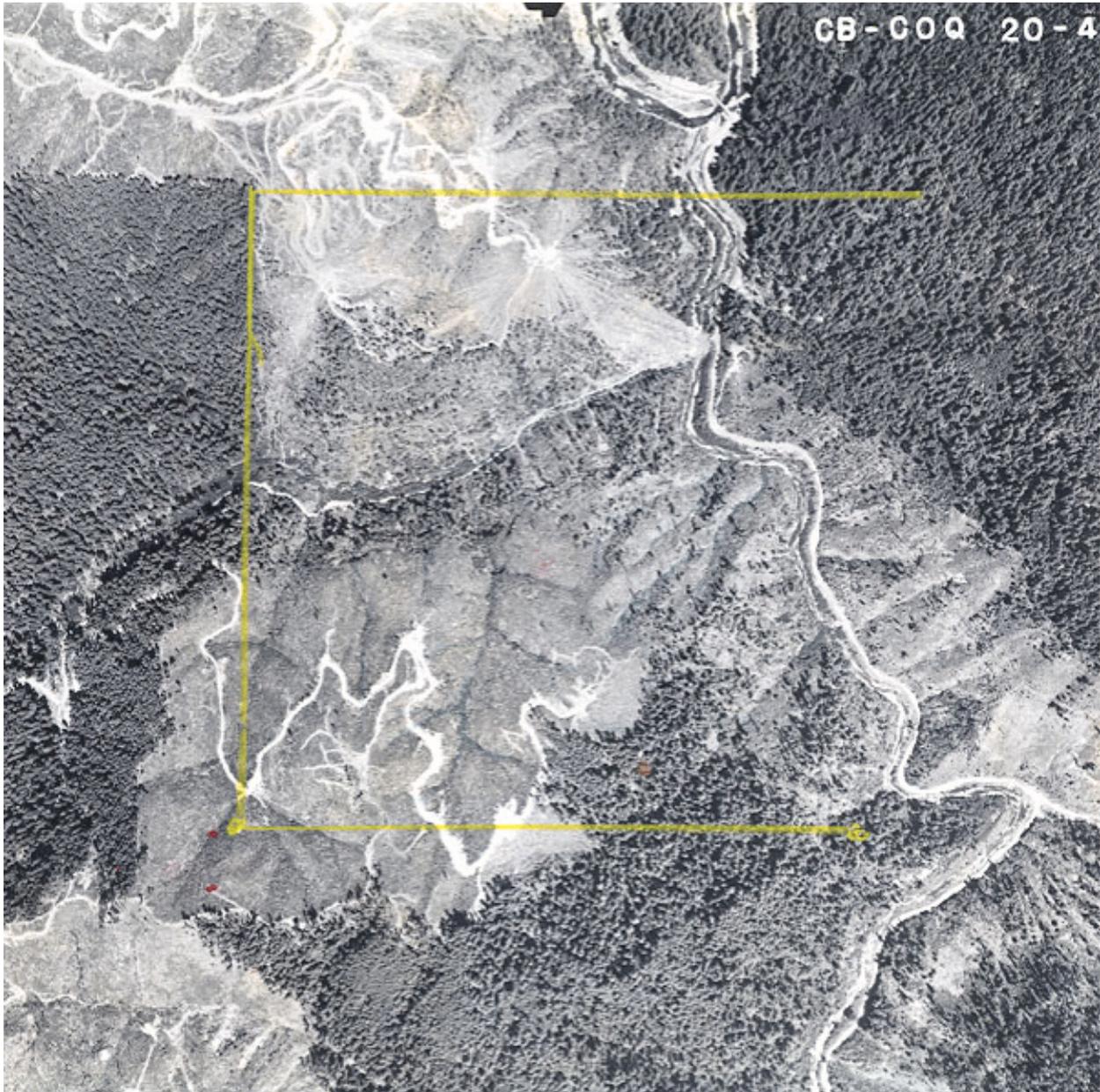


Figure 4: The 1959 photo, CB-COQ 20-43 showing the lower mile of Tioga Creek. Note the extensive diagonal bars in lower Tioga Creek and the recent intensive logging on the hillslopes of Hatcher Creek.



Figure 5: The 1959 photo, 21B-6 showing Tioga Tributary 17R which showed evidence of a recent (< 5 years) riparian stand-replacement disturbance. Most of its length was unvegetated and the lower end had a young, even-aged stand of red alder.

Photos 7-13--7-14 showed fresh slides that were not present in 1950, extending from four draws coming off the south ridge of **Water Tank Creek** and one from the north ridge- an area that had been recently logged (NW 1/4 Sec. 19, T 26 S, R 9 W and NE 1/4 Sec.24, T 26 S, R 10 W). It also appeared that logging-related failures occurred on east-flowing tributaries in upper **Hatcher Creek** (NE 1/4 Sec.23, T 26 S, R 9 W).

Tioga Tributary 17R showed evidence of a recent riparian *stand-replacement disturbance* (Photos 21B-5--21B-6). Most of its length was unvegetated and the lower end had a young, even-aged stand of red alder (Figure 5). The Tioga reach between Tributaries 18L and 15R (Mi.13.5-11.5), appeared thickly forested with mature trees, indicative of a relatively stable channel- a condition that would change in the years to come. A *debris flow/ torrent* apparently occurred on the lower end of Tributary 17R. The lower 3,940 ft of this tributary showed recent scour and the lower 800 ft, where the valley broadened from 100 to 260 ft in width was uniformly vegetated with early successional alder. Two small clusters of mature conifers were spared the torrent, but a debris jam formed at the confluence with Tioga Creek (mi. 12.4). Although a road ran along the headwaters of 17R and the freshly eroded valley bottom could be traced to within a few hundred feet of the headwaters, there was no evidence from the photo that a mass wasting event originated from the road.

1963

Tioga Tributaries **13R** and **14R** and the Tioga Creek reach in this vicinity (**Mi.11.5-10.5**) showed young, even-aged stands of red alder in the valley bottoms (Figure 6), evidence of a recent (<8 years) stand-replacement disturbance events (**15-22--15-23**). These events did not appear to be related to land use activities. Road networks and logging had clearly expanded in the 8 years since the last aerial photograph, most notably up Tioga Tributaries **10R** and **12R** and throughout much of the central part of the Subwatershed (Sec. 36, T 26 S, R 10 W, Sec. 31, T 26 S, R 9 W) seen in photos **15-22--15-27**. Photos **19-18** and **20-15--20-16** show that logging was also occurring in the flat headwaters in the southeast corner of the Subwatershed (Sec. 15 & 23, T 27 S, R 9 W). Little evidence of failures was visible at this time.



Figure 6: The 1963 photo, **15-23** Tioga Creek around mi. 11.5 to 10.5. Note the young, even-aged stands in the valley bottoms of Tributaries **13R** and **14R** indicative of a recent riparian stand replacement event. Note the intensive logging in Tributaries **10R** and **12R** where logs were being skidded down the hillslopes to the roads that had been cut in the valley bottoms.

1964-65

These photo sets were compared to evaluate the hillslope and channel responses to the December 1964 storm event.

In 1964, the **lower 2 miles of Tioga Creek** (I-9--I-10) showed some large logs in the channel, mostly from logging operations. The depositional patterns in this reach still showed diagonal bars and had a high width-depth ratio. Tioga Creek was contributing large amounts of coarse sediments to Williams River as evidenced by a deltaic fan at the mouth and tightly spaced point bars in Williams River a short way downstream of the Tioga Creek mouth (1964, I-11--I-12 and 1965, 5-9--5-10). The east side draws to lower Tioga Creek around Shotgun Creek were steep, recently logged and an apparent source of a portion of these sediments. Comparison of the '64 and '65 photos (I-11 vs. 5-10) showed very little differences in channel-bar morphology and riparian vegetation suggesting that Tioga Creek adjusted minimally to the December, 1964 flood (Figures 7 & 8).

In 1964, the draws draining the west side of Tioga Creek between Water Tank and Hog Ranch Creeks (NE 1/4 Sec. 30, T26S, R9W) showed fresh failures from headwalls to the recently-constructed roads (I-7--I-9).

The 1964 photos showed failures originating immediately below landings constructed at the headwaters of two SW-flowing tributaries of **Hog Ranch Creek** in the W 1/2 Sec. 30, T26S, R9W. These failures denuded the riparian vegetation of the tributaries and deposited debris in the mainstem of Hog Ranch Creek. Two log jams were seen in the mainstem, one at the base of the lower failure and the other on the mainstem about 1900 ft downstream of it. These jams and others would be identified by BLM fish surveys in 1970 and removed in the mid to late 1970's (BLM Tioga Creek Stream Surveys, 1982).

In 1965, the newly-logged south side of **upper Water Tank Creek** showed some reactivated failures (5-7--5-9). **South Fork Burnt Creek**, also recently logged, showed active land slides and a debris torrent that extended 2/3 mile from the SW 1/4 Sec. 4, T 27 S, R 9 W (5-5--5-6).

The riparian vegetation in lower Tioga Tributary 17R appeared to be in further state of regrowth since the debris torrent event of the early 1950's.

The 1965 photo showed several small, active slides on first and second order tributaries in the following locations:

- One in the NW 1/4, Sec. 12, T 27 S, R 10 W
- Three in the E 1/2, Sec. 2, T 27 S, R 10 W
- One in the NW 1/4, Sec. 1, T 27 S, R 10 W
- One in the SW 1/4, Sec. 4, T 27 S, R 9 W- the upper mid section of Burnt Creek.