

# GEOLOGY OF THE GROS VENTRE PROJECT, TETON COUNTY

Location: - Sec. 4, 5, and 8, T. 42 N., R. 114 W.

Date Examined: - September 8, 1956.

Project: - To increase the storage capacity of Lower Slide Lake.

## Introduction

The history of the Lower Gros Ventre Slide is undoubtedly well known to all who are concerned with the project. It is desirable, however, to review the salient aspects since the conclusions of this report are, in part, based on them.

On June 23, 1925, a section of earth approximately 2,000 feet wide and approximately a mile long, on the north end of Sheep Mountain, slid over a mile and a half into Gros Ventre canyon in approximately three minutes. Debris from the slide dammed the Gros Ventre River and eventually impounded the water in a lake four to five miles long. It was also noted that seepage through the porous debris of the dam kept pace with the inflow of water.

In May, 1927, following a winter of heavy snows, a quick thaw occurred which filled the Gros Ventre River and its tributaries to the overflow point. The seepage of water through the dam began to increase with the eventual initiation of the Kelly flood.

It should be noted here that earthquakes had been felt in Jackson Hole during the spring of 1925 and a few days prior to the slide. In addition, the month of June had been rainy, with numerous small slides occurring on the north end of Sheep Mountain on the same day as the main slide.

## Geology

The rocks involved in the lower Gros Ventre rock slide are the Tensleep sandstone and Amsden formations of Pennsylvanian age. In the vicinity of the slide, these formations strike approximately east-west (essentially parallel to the Gros Ventre River) and dip about 20° north. The slide occurred when the Tensleep sandstone slid down the dip of the water-saturated shales of the Amsden formation. Other factors that contributed to the slide are: (1) oversteepening of the lower slopes of the valley by glaciation, (2) sliding potential greatly increased by the river which had eroded completely through the Tensleep sandstone and produced one free side to the rock mass, (3) a period of exceptionally heavy precipitation prior to the slide, and (4) the possibility of the earthquakes helping to trigger-off the slide.

As mentioned earlier in this report, seepage took place through the dam soon after the slide. In August, 1925, this was estimated at 500 sec.-ft. (Alden, 1928, p. 352). Although the dam did not fail as a whole during the 1927 flood, rocks 5 to 20 feet in diameter were swept out of the cut in the landslide dam.

Finally it should be noted that there are many smaller and larger slides upstream from the lower slide. This in itself would indicate the geological instability of the area.

## Conclusion

The landslide dam is probably sufficiently stabilized now so that it could be built up to impound more water in Lower Slide Lake. The writer,

however, does not recommend this because of the possibility of excessive leakage. To prevent this leakage a required core wall through the entire slide mass would have to be at least several thousand feet long and deep enough to encounter bedrock. Further, since this general area is geologically unstable, it is not unlikely that another slide could occur nearby thus destroying the new dam. The latter, of course, may never happen, but assuming a recurrence of the 1925 conditions it is a distinct possibility.

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February 20, 1957

#### References

- Alden, W. C., 1928, "Landslide and Flood at Gros Ventre, Wyoming", AIME., Trans., Vol. 76, pp. 347-361.
- Keefer, W. R., and Love, J. D., 1956, "Landslides along the Gros Ventre River, Teton County, Wyoming", Wyo. Geol. Assoc., Eleventh Annual Field Conference Guidebook, pp. 24-28.