



Geology of a portion of the Pine Creek Quadrangle, Teton and Lincoln counties, Wyoming
by Robert Arthur Lunceford

A thesis submitted in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE
in Earth Sciences

Montana State University

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Abstract:

The Pine Creek Quadrangle lies in western Wyoming in the transition between the Wyoming and Snake River ranges at the north end of the Wyoming overthrust belt.

Roughly twenty-six Holocene landslides were mapped in the central and western parts of the area, which are almost exclusively associated with the shale and mudstone of the Cretaceous Bear River and Aspen formations. The Pleistocene Bailey Creek landslide lies in the northeastern corner of the map area; the development was a complex event involving at least two separate sliding episodes.

The older landslide dammed Bailey Creek and the Snake River causing the bed loads to be deposited upstream.

Approximately 12,250 feet of Mississippian through Lower Cretaceous strata crop out in the map area. Paleozoic strata consist of limestone of the Mississippian Mission Canyon Limestone of the Madison Group; shale and quartzitic sandstone of the Mississippian, Pennsylvanian, and Permian Wells Formation; and chert, sandstone, and phosphatic mudstone of the Permian Phosphoria Formation. Triassic age strata include, in ascending order, siltstone and limestone of the Dinwoody Formation; sandy siltstone and shale of the Woodside Formation; sandstone and limestone of the Thaynes Formation; siltstone and sandstone of the Ankareh Formation; and sandstone of the Triassic (?) - Jurassic (?) Nugget Sandstone. Strata of Jurassic age comprise the Twin Creek Limestone, chiefly consisting of shaly limestone; sandstone and siltstone of the Preuss Sandstone; and limestone and sandstone of the Stump Sandstone, in ascending order. Lower Cretaceous strata consist of, in ascending order, sandstone, limestone, and shale of the Gannett Group; shale and sandstone of the Bear River Formation, and overlying Aspen Shale. Conglomerate also occurs in the upper Aspen which is interpreted to be a tongue of the overlying Frontier Formation exposed to the north and south of the map area.

Mississippian through Early Triassic age strata were deposited in a transitional area that included the overthrust belt between a miogeosyncline on the west and a shelf area that covered most of Wyoming. The miogeosyncline began to be deformed in Late Triassic time and a high area on the west rose and shed detritus eastward into the marginal basin in southeastern Idaho and western Wyoming.

The map area is situated between the eastward moving Absaroka and Darby thrusts which lie just off the western and eastern margins, respectively. The Little Greys fault has a minimum displacement of 1,500 feet of Aspen Shale and resulted from overturning along the associated Little Greys anticline. The central part of the map area, consisting of 7,000 feet of Aspen Shale, is probably further deformed by overturned folding not evident in the outcrop.

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QUADRANGLE, TETON AND LINCOLN
COUNTIES, WYOMING

by

ROBERT ARTHUR LUNCEFORD

A thesis submitted in partial fulfillment
of the requirements for the degree

of

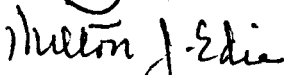
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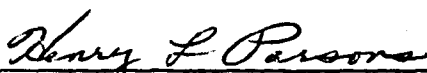
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1. Geologic map of a portion of the Pine Creek
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ABSTRACT

The Pine Creek Quadrangle lies in western Wyoming in the transition between the Wyoming and Snake River ranges at the north end of the Wyoming overthrust belt.

Roughly twenty-six Holocene landslides were mapped in the central and western parts of the area, which are almost exclusively associated with the shale and mudstone of the Cretaceous Bear River and Aspen formations. The Pleistocene Bailey Creek landslide lies in the northeastern corner of the map area; the development was a complex event involving at least two separate sliding episodes. The older landslide dammed Bailey Creek and the Snake River causing the bed loads to be deposited upstream.

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INTRODUCTION

Location and Access

The map area lies in western Wyoming between the Wyoming and Snake River ranges which compose part of the Wyoming overthrust belt. It is bordered on the north by the Snake River and on the south by the Little Greys River and comprises the central three-fifths of the Pine Creek Quadrangle including portions of T. 36 and 37 N. and R. 117 and 118 W., Teton and Lincoln counties, Wyoming (Fig. 1). Most of this area is generally inaccessible with few roads present. The Little Greys River road borders the southern margin of the map area, and with permission of the landowner, access can be gained to the northeastern corner by a private road on the east side of the Snake River. A major part of the area is accessible by the use of pack and game trails. Additionally, relatively easy access to the northern margin is attainable by crossing the Snake River in a boat or raft.

Procedure

Mapping of the Pine Creek area was done on U.S.G.S. 1:24,000 topographic maps, and black and white aerial photographs of approximately the same scale. Field work began in June 1975 and continued to September. An additional week was spent in the field in August of 1976. Traverses were made every one-half to one-fourth mile along ridge tops, although this spacing varied somewhat with the amount of tree cover and available outcrops.

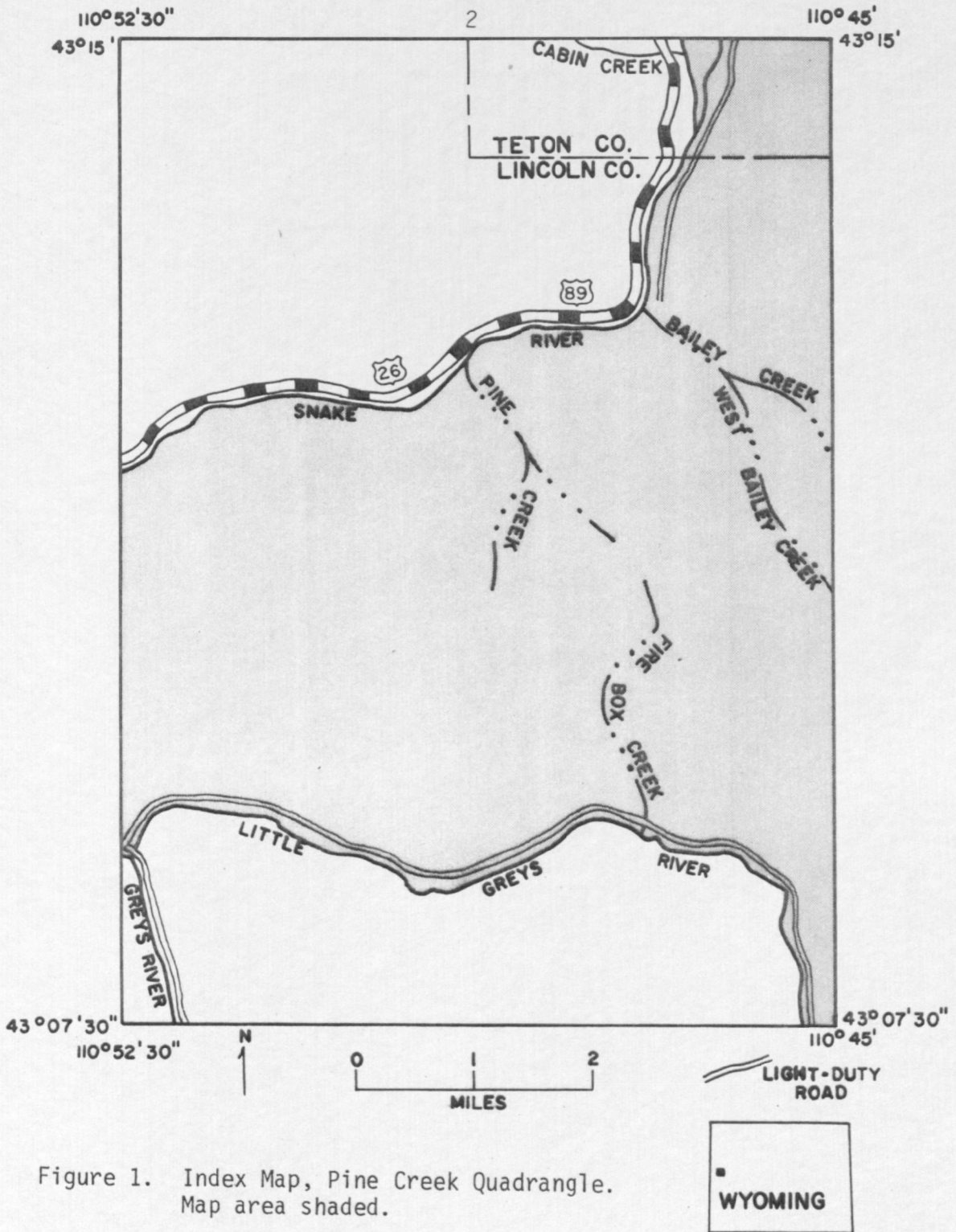


Figure 1. Index Map, Pine Creek Quadrangle. Map area shaded.

Purpose

The primary purpose of this study is to provide a detailed geologic map of the area. The need for the map is twofold: (1) to provide information on the geology of the Pine Creek Quadrangle which represents a significant gap in the previously mapped portions of the surrounding overthrust belt (Fig. 2) and (2) to continue the ongoing U.S.G.S. investigation into the coal and phosphate resources of this region. A second purpose is to provide a detailed summary of stratigraphic work in the region of the overthrust belt.

Previous Work

The geology of the Pine Creek Quadrangle was first described by geologists of the Hayden surveys in the latter part of the 19th century (see Schultz, 1914.) This area was later investigated in greater detail by Schultz (1914), Boeckerman and Eardley (1956), and by Ross and St. John (1960). In addition, numerous theses on the geology adjacent to the Pine Creek Quadrangle have been completed by students at the University of Michigan (see Wanless, et al., 1955, and Boeckerman and Eardley, 1956). Reports on the economic resources and geology of the nearby region, useful because of the included stratigraphic information, were published by Veatch (1907), Mansfield (1927), and Staatz and Albee (1966). The stratigraphy of the map

