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## Rocky Mountain Section - 72nd Annual Meeting - 2020

Paper No. 7-20

Presentation Time: 8:30 AM-4:30 PM

### UNRAVELING THE GEOMORPHIC HISTORY OF BLACKTAIL DEER CREEK

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Wolves were eradicated from the Yellowstone ecosystem in the early 20th century and were subsequently reintroduced in 1995. There are a variety of ecological effects stemming from the loss and reintroduction of wolves that have been observed in Yellowstone. Ecologists state that the loss of wolves triggered an increase in elk populations and thus an increase in the amount of herbivory on willows along streams. Fewer willows means fewer roots anchoring a stream's sediments in place, and thereby allowing incision to occur. Along streams in northern Yellowstone, these ecological effects potentially have altered stream dynamics by causing incision during the latter half of the 20th century. Our research objectives were to determine the Holocene fluvial history of both the east and west forks of Blacktail Deer Creek to provide context for stream behavior in the 20th century. We focused on surficial geologic mapping of valley floor landforms in the drainage basin. We identified kame terraces, active channels, paleo channels, alluvial fans, and floodplains. We identified and mapped these features via field mapping, RTK GPS surveyed cross sections, orthographic imagery, and a LiDAR-derived high-resolution DEM. Vegetation mapping was used to differentiate kame surfaces from fluvial deposits. Both streams are superimposed on meltwater channels associated with the retreat of the northern Yellowstone outlet glacier. The highest terrace (1.0-1.5m above the modern channel) is preserved along the margins of both valley floors. Terrace ages were constrained with a series of volcanic ash and radiocarbon dates. An ash layer, 1m below the surface of the highest terrace, is attributed to a Glacier Peak eruption ca. 11.2 ka. A radiocarbon date higher in the stratigraphy produced a date of 3.3ka. Thereby, the uppermost terrace was aggraded between 11-3.3ka. Another fan/terrace deposit on the west fork aggraded between 8.0-5.8 ka. Fluvial deposits inset within the high terrace date to the late Holocene, 1.0-1.4 ka. Thus, incision of the highest terrace and subsequent deposition of the inset material occurred between 1.4-3.3ka. Therefore, the channel incision in the study area predated the removal of wolves by a significant amount of time.

Session No. 7--Booth# 56

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Monday, 4 May 2020: 8:30 AM-4:30 PM

Ballroom A (Utah Valley Convention Center)

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