

Gallery of geology - Stream capture, southern Brokeoff Mountains

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New Mexico Geology, v. 27, n. 1 pp. 24-25, Print ISSN: 0196-948X, Online ISSN: 2837-6420.
<https://doi.org/10.58799/NMG-v27n1.24>

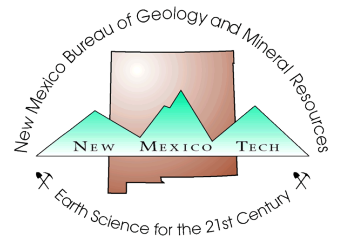
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Gallery of Geology

Stream capture, southern Brokeoff Mountains



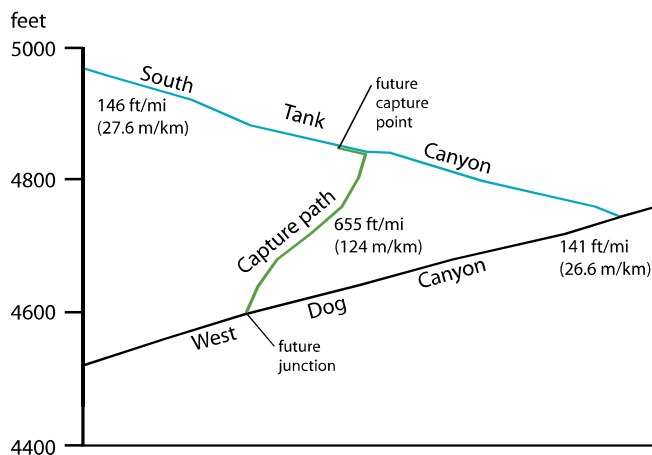
South Tank Canyon in southern Brokeoff Mountains. View is upstream, N65°W. The photograph shows the locale of an imminent stream capture. The stream in the foreground is presently flowing in South Tank Canyon. It enters the photograph at the far right (the shadowed cliff at far right is the west wall of South Tank Canyon), and just above the center of the photograph it turns and flows toward the camera. The canyon whose upper walls are seen in the far left distance has been cut by a tributary to West Dog Canyon. This West Dog Canyon tributary is flowing southwest at a much lower level than the stream in South Tank Canyon. Just above the center of the photograph a dark patch of creosote bushes occupies a low terrace where the South Tank Canyon stream turns toward the camera. The extremely low divide between the two streams is visible just beyond this dark patch of creosote bushes. The tributary to West Dog Canyon will eventually capture the South Tank Canyon stream. The divide will be breached by downward cutting by the West Dog Canyon tributary or, perhaps more likely, by lateral cutting or overflow by the South Tank Canyon stream. The low divide, the site of imminent capture, is in the

NW¼ sec. 7 T26S R20E. South Tank Canyon is presently a tributary of West Dog Canyon. The gradient of South Tank Canyon is 27.6 m/km, and that of West Dog Canyon is 26.6 m/km. The current path of water from the future capture point to the future junction of South Tank Canyon and West Dog Canyon is 3,045 m (1.9 mi). After capture the gradient will increase to 124 m/km over a distance of 625 m (0.4 mi). It will rejuvenate that portion of the South Tank Canyon stream that is upstream from the point of capture, resulting in renewed deepening of South Tank Canyon. Similar stream captures have undoubtedly occurred many times in the confused fault-block topography of the Brokeoff Mountains. The resulting episodes of canyon deepening and terrace formation would not, of course, be synchronous with climatic change, complicating attempts to decipher the Quaternary history of the Brokeoff Mountains. Camera station is in NE¼ sec. 7 T26S R20E about 10.5 km (6.5 mi) west-southwest of El Paso Gap. Altitude is approximately 1,480 m (4,856 ft). W. Lambert photograph No. 85L115. November 16, 1985, 3:06 p.m. MST.

—Wayne Lambert



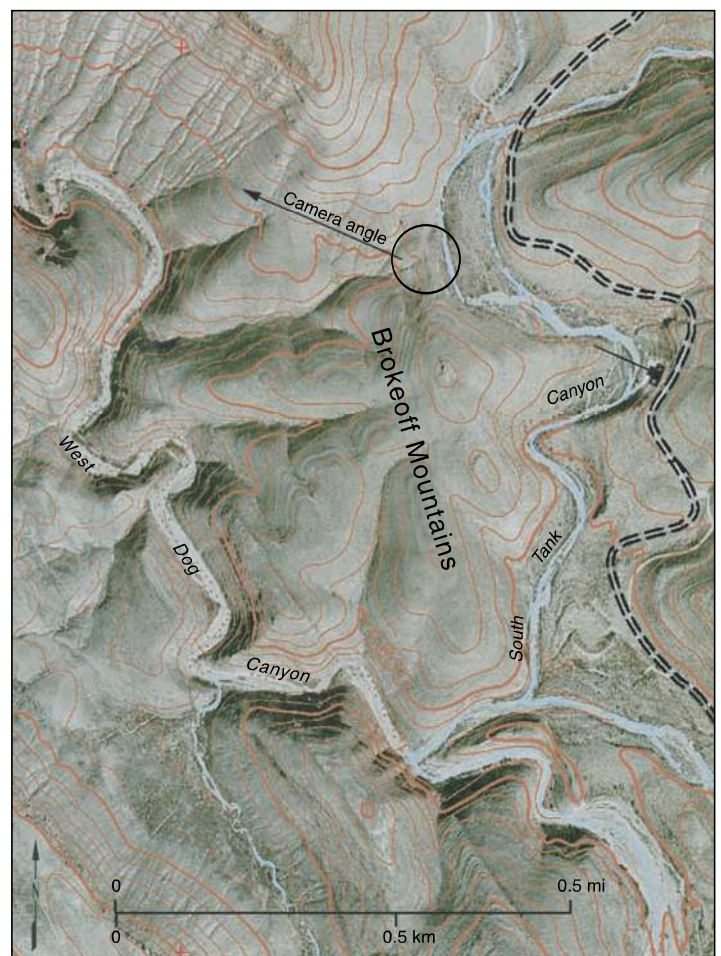
View northeast looking up a tributary of West Dog Canyon toward the South Tank Canyon channel. The locale of the imminent stream capture is circled. The extremely low divide between the two streams is the site of headward erosion by the tributary and lateral cutting and eventual overflow by the South Tank Canyon stream, leading to capture of the South Tank Canyon drainage. This oblique image was formed by draping the December 1996 digital aerial orthophotograph over a digital elevation model. The image was prepared by Lewis Gillard.



Schematic diagram showing stream gradients and relative distances along South Tank Canyon, West Dog Canyon, and capture tributary.

Acknowledgments

W. Lambert photograph No. 85L115 reprinted by permission of the New Mexico Geological Society. The editors would like to thank Lewis Gillard and Glen Jones of the bureau's Computer and Internet Services group and Leo Gabaldon for creating the oblique and vertical images of the southern Brokeoff Mountains. We thank David Love and Leo Gabaldon for illustrating the stream gradients.



Vertical digital orthophotograph from December 1996 of the area of stream capture in the southern Brokeoff Mountains with 40-ft contour lines from the U.S. Geological Survey Panther Canyon 7.5-min quadrangle superimposed on the photo. The locale of the imminent stream capture is circled. The image was prepared by Lewis Gillard.