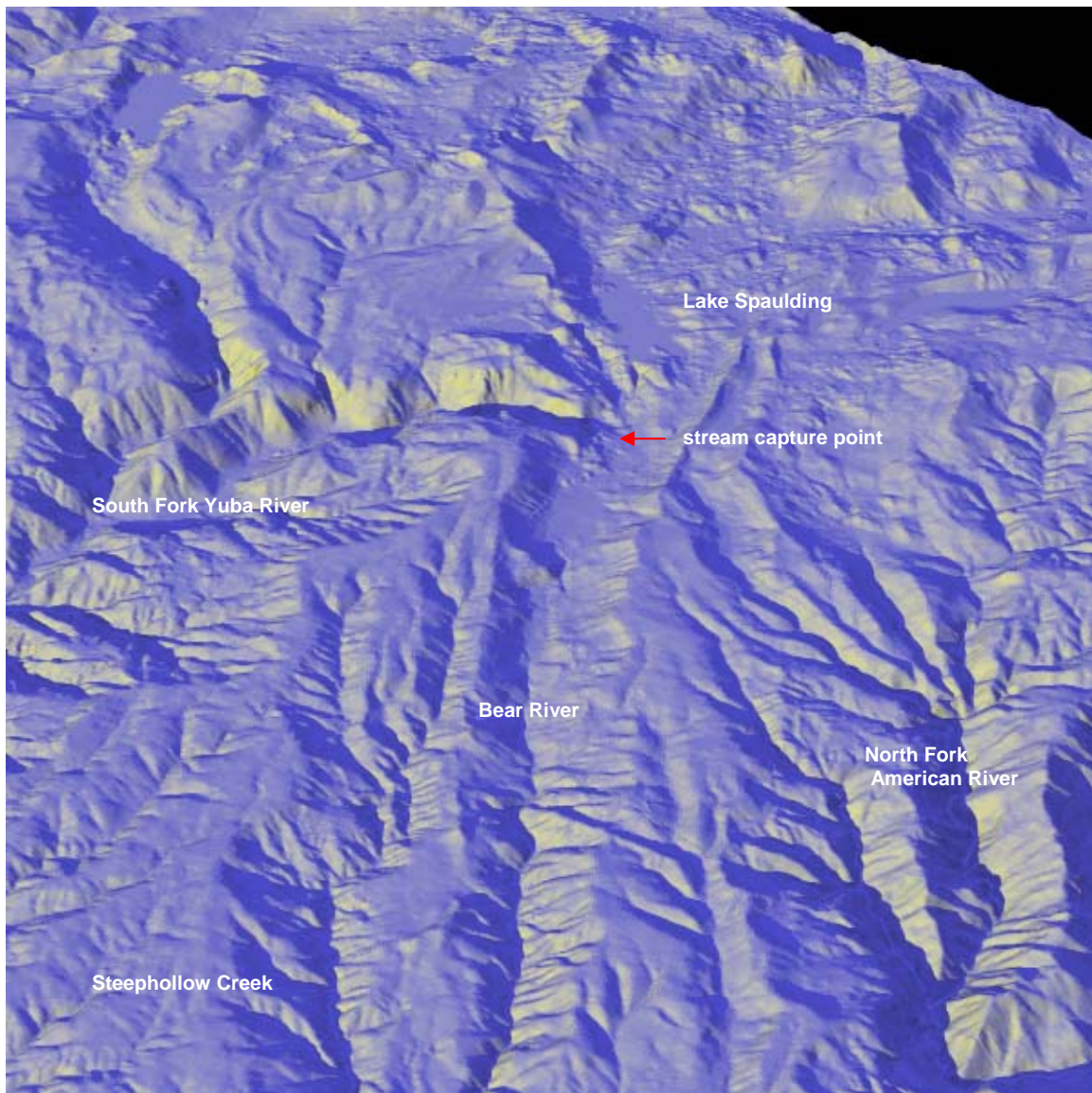


## Bear River Geomorphology<sup>i</sup>

Two historical effects set the Bear River apart from other Sierra watersheds. The first is the “capture” of the Bear’s upper watershed during a recent glacial period, discussed herein. The second, discussed in *bear mining legacy*, is the extensive impact of hydraulic mining, perhaps more intense here than in any other watershed in the range, and its legacy of mercury contamination.

### Stream capture

The Bear River is a classic example of an “underfit” stream—a stream whose channel was formed by a larger flow than presently exists. The deep V-shaped canyon of the Bear reflects the work of a much larger river at some point in the past.



*Topographic view looking northeast up the Bear River canyon, with the South Fork Yuba River to the left. The arrow indicates the point of stream capture. Graphic by Russel Towle, <http://personal.newworld.net/~rtowle/Topography/topography.html>*

“Stream capture” is an event in fluvial geomorphology that occurs when stream channels from adjacent watersheds meet after eroding headward over time. The headwaters from both streams then flow down one of the channels, “capturing” the water from the upper watershed of the other stream channel.

Researchers have studied glacial stratigraphy of the Bear River using the present-day evidence of lateral moraines, glacial erratics, and striae on rocks. These features indicate that at least two and probably three glacial advances occupied both the South Yuba and Bear valleys. These advances are believed to have ground through a narrow ridge separating the South Fork of the Yuba from the Bear River, just downstream of what is now Lake Spaulding (see graphic). Water from the upper watershed of the Bear River then began to flow into the Yuba drainage (James 1995). This capture reflects a structural advantage to the Yuba drainage, such as a lower base level and softer material that is less resistant to erosion.

The present-day ecological effects of this historical event are difficult to assess. The event certainly decreased peak water flows greatly, since the river lost the snowmelt from its original upper watershed, and these decreased flows no doubt altered habitat parameters. Habitats on the North Fork of the American River just to the south, whose flows remains largely unregulated, serve as a model for a more typical Sierra watershed (Lehr 2002).

### References

- James, L.A. 1995. Diversion of the Upper Bear River: Glacial Difffluence and Quaternary Erosion, Sierra Nevada, California. *Geomorphology* 14(2): 131-148.
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<sup>i</sup> Based on Doug Johnson original, Spring 2002