

# Ancient Colorado river flowed backwards

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(PhysOrg.com) -- Geologists have found evidence that some 55 million years ago a river as big as the modern Colorado flowed through Arizona into Utah in the opposite direction from the present-day river. Writing in the October issue of the journal *Geology*, they have named this ancient northeastward-flowing river the California River, after its inferred source in the Mojave region of southern California.

Lead author Steven Davis, a post-doctoral researcher in the Department of Global Ecology at the Carnegie Institution, and his colleagues discovered the ancient [river system](#) by comparing sedimentary deposits in Utah and southwest Arizona. By analyzing the uranium and lead isotopes in sand grains made of the mineral zircon, the researchers were able to determine that the sand at both localities came from the same source -- igneous bedrock in the Mojave region of southern California.

The river deposits in Utah, called the Colton Formation by geologists, formed a delta where the river emptied into a large lake. They are more than 400 miles (700 kilometers) to the northeast of their source in California. "The river was on a very similar scale to the modern Colorado-Green River system," says Davis, "but it flowed in the opposite direction." The modern Colorado River's headwaters are in the [Rocky Mountains](#), flowing southeast to the river's mouth in the Gulf of California.

The deposits of the Colton Formation are approximately 55 million years old. Recently, other researchers have speculated that [rivers](#) older than the Colorado River may have carved an ancestral or "proto" Grand Canyon

around this time, long before Colorado began eroding the present canyon less than 20 million years ago. But Davis sees no evidence of this. "The Grand Canyon would have been on the river's route as it flowed from the Mojave to Utah, he says. "It stands to reason that if there was major erosion of a canyon going on we would see lots of zircon grains from that area, but we don't."

The mighty California River likely met its end as the Rocky Mountains rose and the northern Colorado Plateau tilted, reversing the slope of the land surface and the direction of the river's flow to create the present Colorado-Green River system. Davis and his colleagues have not determined precisely when the change occurred, however. "The river could have persisted for as long as 20 million years before the topography shifted enough to reverse its flow," he says.

Provided by Carnegie Institution

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