

## **Mapping of Holocene River Alluvium along the Verde River, Central Arizona**

By Philip A. Pearthree and Joseph P. Cook

Arizona Geological Survey

In 2010, the Arizona Geological Survey (AZGS) released geologic maps showing the extent of Holocene channel and floodplain deposits along the Verde River and 5 large tributaries – Oak Creek, Wet Beaver Creek, West Clear Creek, Fossil Creek, and the East Verde River. The 2-mile-wide strip maps depict river and tributary deposits of various ages, as well as older basin deposits and bedrock along the river, at a scale of 1:24,000 (standard scale for USGS topographic maps). These maps provide basic information on the geology of the river corridors that may be used in the process of differentiating between appropriable water (surface water and subflow associated with it) and groundwater, as well as defining the physical setting of the river systems.

Our recent mapping efforts on along the Verde River and its tributaries have been funded by the Arizona Department of Water Resources, as part of their efforts to provide unbiased technical assistance to the court that is overseeing the Gila River stream adjudication program. The rules that govern this process have been developed through a series of court rulings beginning in the 1930's. In the current adjudication of the San Pedro River in southern Arizona, the lateral extent of Holocene (less than 10,000 year old) river deposits is a key component of the process for distinguishing between appropriable water and groundwater, and a similar process may eventually be applied to the Verde River and its larger tributaries. We undertook this mapping effort because previous geologic and soils mapping along the rivers was uneven in quality and detail.

We will provide an overview of our mapping efforts along the Verde River and its large tributaries. We will review our mapping strategy, discuss criteria used to distinguish river deposits from deposits derived from smaller tributary drainages, and summarize the various indicators that we used to estimate deposit ages. We will show examples of the various river deposits ranging from active channels to high Pleistocene river terraces. We will show examples of the varying lateral extent of Holocene river alluvium at a number of places along the river, including broad valley reaches and bedrock canyons. We will discuss the uncertainties involved mapping boundaries between river deposits and other deposits or bedrock. Finally, we will consider the implications of our recent mapping for historical changes along the Verde River and the longer-term evolution of the Verde River system.