



## Evaluating Channel-Forming Flows in the Desert Southwest: Implications for River Restoration Approaches

<b>Products</b>	A technical note and report will document the procedures used to assess channel-forming flows in the Desert Southwest. Diversity of landscapes and fluvial systems in this region suggests that there will not be a single methodology applicable in all circumstances, but instead there will likely be a group of techniques or approaches that can be used depending on the specific setting of a fluvial system or reach and its hydrology. The technical report will include an extensive literature survey and documentation of the various techniques and approaches to define channel-forming flows in the Desert Southwest.
<b>Benefits</b>	This study is expected to provide an alternative methodology for estimating channel-forming flows in dryland fluvial systems. Although the concepts of bankfull and effective discharge are generally applicable to stable alluvial channels, the observation that many dryland channels adjust their morphology to each major flood suggests that a new approach is needed to estimate channel-forming discharges for fluvial systems in the Desert Southwest. The goal of this study is to develop such a methodology to help improve and ensure successful restoration designs are implemented.
<b>Issue</b>	Stream and river restoration projects commonly involve stabilization of existing channels or extensive reconfiguration of channels including designing channels with morphologies compatible with expected discharge as well as stabilizing banks and bed. Accepted industry standard methods and techniques for perennial river systems have been used for many years in such settings. Application of these techniques to dryland river systems is problematic in that our knowledge of channel forming flows in arid regions is limited. Additionally, channel morphology, including bank characteristics in dryland river systems is commonly different from perennial river systems. Furthermore, channel morphology and bank characteristics in dryland regions are a direct result of the long-term history and behavior of these river systems. Consequently, restoration designs in dryland regions based on perennial stream discharge data run the serious risk of grossly misrepresenting potential discharge for a given system and failure to consider dynamic channel responses and the history of the river system, which can lead to flawed design.
<b>Description</b>	The goal of this study is to develop a general procedure applicable to dryland fluvial systems in the Desert Southwest to determine the types and frequencies of flows that control the morphology of those streams. Preliminary review of the literature suggests that in many dryland systems, the less frequent but higher magnitude flows (i.e., floods) control channel shape. This concept may apply to both large and small channels, as well as perennial and ephemeral systems. It is also recognized that different types of floods affect the Desert Southwest that are caused by snowmelt, rain on snow events, winter frontal rainfall, and summer thunderstorms. In this study, the long-term morphology of channels will be integrated with the properties of their bed and bank materials and catchment hydrology to determine controls on their development and maintenance.
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