

Pima County Regional Flood District Monthly Brown Bag Series

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Hydrologic Research Pre- and Post- Low Impact Development in an Ephemeral Drainage

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In Fiscal Year 2017, Reclamation's Science & Technology Program approved a study to conduct hydrologic research pre- and post-Low Impact Development (LID) installations in ephemeral drainages at the Boy Scouts of America Heard Scout Pueblo, located on the north side of South Mountain Park/Preserve, Phoenix, Arizona. Reclamation completed a Categorical Exclusion Checklist to meet National Environmental Policy Act requirements, with U.S. Army Corps of Engineers identifying channels as non-jurisdictional Waters of the United States. U.S. Geological Survey installed one surface water flow monitoring station, a video camera, sediment scour chains to quantify erosion and deposition in the channel and piloted a small Unmanned Aircraft System (sUAS; aka drone) for pre- and post- LID channel surveys. Reclamation also installed weather stations provided in-kind by Northern Arizona University and installed two groundwater wells equipped with water level and soil moisture sensors. A two-dimensional (2D) mobile-bed hydraulics and sediment transport model for river systems (SRH-2D), was used as a predictive tool to model impacts of GCS on the infiltration and sediment transport. Simulations were run on the varying digital terrain models (elevation) acquired from analysis of sUAS stereo-pair image data, to compare steady and unsteady flow events pre- and post- construction. Preliminary results depict increased surface water depths during rainfall from standing water and backwater effects above structures upstream; and due to erosive pooling downstream. These increased surface-water residence times provide for infiltration to increase at each structure. The effects of the experiment on the riparian microclimate were also analyzed.