Modeling the Effects of Natural Infrastructure in Dryland Streams in Baja California Sur, Mexico

***Alma Anides-Morales**, Laura M. Norman*
U.S. Geological Survey, Western Geographic Science Center, Tucson, AZ, USA

The Los Planes coastal watershed (961 km2) in Baja California Sur, Mexico has an arid climate whose water supply challenges are related to agricultural activity, increasing water demand, and threats of saltwater intrusion. Since the early 2010s partners at Rancho Ancón, a working ranch within the Los Planes watershed, have implemented sustainable management practices including the installation of natural infrastructure in dryland streams (NIDS). NIDS are natural or anthropogenic made structures that use earth, wood, debris, or rock, to promote restoration of degraded landscapes by slowing water flow and creating soil-water-carbon sinks that support vegetation and other life-forms. The U.S. Geological Survey (USGS) has extensive experience documenting and studying the impact of NIDS in the Southwestern United States and Northern Mexico. In 2022, the USGS was hired to provide technical assistance in understanding the hydrogeological cycle in Rancho Ancón in response to NIDS. This presentation describes the application of a watershed model (Soil & Water Assessment Tool, SWAT) to estimate model parameters before and after NIDS were installed. A first model iteration utilized currently available data, but the larger project involves field instrumentation and monitoring using remotely sensed data to develop high resolution land cover, vegetation, and hydroclimate datasets that will assist in the refinement and validation of subsequent model iterations. Preliminary results of the baseline SWAT model portray areas in the Los Planes watershed that have high water yield, infiltration, and evapotranspiration. Using locations of the NIDS installations, a "treated scenario" will be developed to quantify how these restorative structures will impact the water budget. Results will be disseminated with local partners in Science, Technology, Engineering, Arts, and Mathematics (STEAM) to assist in creating community-relevant curricula for local families that highlight the link between best management practices and watershed management in the North American Southwest.

Contact Information: Alma Anides Morales, U.S. Geological Survey, 520 N. Park Avenue, Tucson, AZ, USA 85719, Phone: 858-231-7710, Email: aanidesmorales@usgs.gov