

HABITAT FOR THE FUTURE

Monitoring Riparian Vegetation Response to Climate Conditions within the Upper Gila River Watershed to Inform Tribal Restoration Priorities: A Focus on Tamarisk Vegetation

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Over the past century, many riparian systems in the southwestern United States have been invaded by non-native tamarisk (*Tamarix* spp), which forms dense thickets of monoculture vegetation that alter the structure and functioning of the riparian corridor. In prior research, we have shown that tamarisk is more vulnerable to drought conditions than native riparian vegetation, leading it to amplify the risk of catastrophic fires which have damaged valuable infrastructure. Our research evaluates the potential for restoration of such riparian ecosystems within a climate adaptation framework, which structures efforts to respond positively to climate drivers and mixed native and non-native vegetation composition. We focus on the floodplains of the Upper Gila River watershed in southern Arizona, where tamarisk is well-established. In partnership with the San Carlos Apache Tribe, our goals are to: (i) quantify the characteristic climate and hydrologic conditions of the watershed, (ii) improve our capacity to map riparian vegetation composition using optical multispectral satellite (e.g., 30-meter Landsat) and LiDAR data, with an emphasis on tamarisk, (iii) identify trends in riparian vegetation condition, and (iv) develop products that illustrate the response of riparian vegetation to recent climate fluctuations and hydrologic extremes. Results will improve our capacity to map tamarisk vegetation and measure its response to a series of climate and hydrologic stimuli. The San Carlos Apache Tribe is actively engaged in restoration of their riparian vegetation, focusing on replacing tamarisk with native species. Overall, we hope to augment the Tribe's ability to effectively manage the riparian vegetation in response to changing climate conditions and to identify areas most vulnerable to projected climate change and in need of more immediate management actions.