Title: Channel delineation datasets associated with "River channel response to invasive plant treatment across the American Southwest"

Authors: Celeste Wieting, Jonathan M. Friedman, Sara Rathburn

Abstract: Invasive riparian plants were introduced to the American Southwest in the early 19th century and contributed to regional trends of decreasing river channel width and migration rate in the 20th century. More recently efforts to remove invasive riparian vegetation (IRV) have been widespread, especially since 1990. To what extent has IRV treatment reversed the earlier trend of channel narrowing and reduced dynamism? In this study, paired treated and untreated reaches at 15 sites along 13 rivers were compared before and after IRV treatment using repeat aerial imagery to assess long-term (~10 year) channel change due to treatment on a regional scale across the Southwest U.S. We found that IRV treatment significantly increased channel width and floodplain destruction. Treated reaches had higher floodplain destruction than untreated reaches at 14 of 15 sites, and IRV treatment increased the rate of floodplain destruction by a median factor of 1.9. The effect of treatment increased with the stream power of the largest flow over the study period. Resolving observations of channel change into separate measures of floodplain destruction and formation provided more information on underlying processes than simple measurements of channel width and centerline migration rate. Restoration practitioners who perform IRV treatment projects often focus on wildlife or vegetation response; however, geomorphic processes should be considered in restoration planning because they drive aquatic habitat and vegetation dynamics, and because of the potential for damage to downstream infrastructure. Depending on the restoration goal, management practices can be used to enhance or minimize the increase in channel dynamism caused by IRV removal.

Contact: Celeste Wieting

celeste.wieting@colostate.edu

Recommended data citation: Wieting, C., Friedman, J., Rathburn, S. L. (2022). Channel delineation datasets associated with "River channel response to invasive plant treatment across the American Southwest." Colorado State University. Libraries. http://dx.doi.org/10.25675/10217/235749

Associated article citation: Wieting, C., Friedman, J.M. & Rathburn, S. (2022) River channel response to invasive plant treatment across the American Southwest. *Earth Surface Processes and Landforms*, 1– 13. https://doi.org/10.1002/esp.5503

Format of data file: .shp (ArcGIS Pro shapefile)

File information: This repository includes one file that contains polygon data for river channel delineations for study sites across the American Southwest.

Attributes:

- Shape_Area = Area of polygon

- Site_Name = Name of study site

- Aerial_YR = Year of aerial imagery used for delineation

- Pre_Post = Pre-treatment or post-treatment delineation

- Treatment = Treated or untreated delineation

- WP_CS = Whole-plant or cut-stump treatment method

Methods: Data were collected by delineating channel boundaries using aerial imagery before and after invasive riparian vegetation treatment.

Software: ArcGIS Pro 2.6.0

Limitations to reuse: Uncertainty in channel boundary delineations arise from the presence of dense or overhanging vegetation, seasonal differences of imagery showing differing vegetation canopies, shadows along the river bank, user inconsistency, and the scale and resolution of the image during delineation.