



Channel erosion in a rapidly urbanizing region of Tijuana, Mexico: Enlargement downstream of channel hardpoints

Kristine Taniguchi (1), Trent Biggs (1), Eddy Langendoen (2), Carlos Castillo (3), Napoleon Gudiño (4), Yongping Yuan (5), and Douglas Liden (5)

(1) San Diego State University, California, US (taniguch@rohan.sdsu.edu, tbiggs@mail.sdsu.edu), (2) USDA ARS (eddy.langendoen@ars.usda.gov), (3) University of Córdoba, Spain (ccastillo@uco.es), (4) CICESE (ngudino@cicese.edu.mx), (5) US Environmental Protection Agency (Yuan.Yongping@epa.gov, Liden.Douglas@epa.gov)

Urban-induced erosion in Tijuana, Mexico, has led to excessive sediment deposition in the Tijuana Estuary in the United States. Urban areas in developing countries, in contrast to developed countries, are characterized by much lower proportions of vegetation and impervious surfaces due to limited access to urban services such as road paving and landscaping, and larger proportions of exposed soils. In developing countries, traditional watershed scale variables such as impervious surfaces may not be good predictors of channel enlargement. In this research, we surveyed the stream channel network of an erodible tributary of the Tijuana River Watershed, Los Laureles Canyon, at 125 locations, including repeat surveys from 2008. Structure from Motion (SfM) and 3D photo-reconstruction techniques were used to create digital terrain models of stream reaches upstream and downstream of channel hardpoints. Channels are unstable downstream of hardpoints, with incision up to 2 meters and widening up to 12 meters. Coordinated channelization is essential to avoid piece-meal approaches that lead to channel degradation. Watershed impervious area is not a good predictor of channel erosion due to the overriding importance of hardpoints and likely to the high sediment supply from the unpaved roads which prevents channel erosion throughout the stream network.