

QUANTIFYING HUMAN IMPACTS ON RIVER BAR MORPHOLOGY USING DIGITAL PHOTOGRAMMETRY

Historically, the study of fluvial geomorphology has been dominated by the field method of surveying using a level and surveying rod. Beginning in the 1980s, the use of ground based and aerial LiDAR increased in popularity as a surveying method. However, LIDAR is expensive and requires significant training to operate. In recent years there has been an increase in the applicability of digital photogrammetry in the field of fluvial geomorphology. Lower costs, streamlined training and an increased accuracy all make digital photogrammetry a promising tool for the field geomorphologist. A study of the morphologic changes of four river bars on the Browns Canyon section of the Arkansas River, Colorado is used to explore the potential of digital photogrammetry by attempting to quantify the impacts of recreation river users on bar morphology. By creating high resolution digital elevation models (DEMs) at time intervals from 24 hours to several days, DEMs of difference (DoDs) were created and analyzed using the open-source 3D data processing software CloudCompare. DoDs were correlated with historical, daily commercial river user data to derive a relationship. Verification concerning the validity of CloudCompare was done using a simple experiment simulating erosion and deposition of a known volume of material.