The Use of the Palmiter Method of Stream Restoration, Adapted to Protect Infrastructure, and its Effect on Streams¹

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Abstract: This study was designed to analyze the effect of the Palmiter method of stream restoration, adapted for infrastructure protection. Many roads and most bridges in the U.S. were built along or across rivers and streams. Rivers and streams are morphologically dynamic and naturally alter their channel over time, leading to bank erosion that can impact the stability of nearby infrastructure, requiring intervention in some cases, commonly by dumping riprap along the erosional surface. Riprap does not halt the problem and in some cases can exacerbate it. The Palmiter method uses mostly on-site material and manual labor to relocate the channel away from the erosion issue by shifting the stream power away from the erosional area. Over time, the stream will erode the opposite bank and aggrade the restored bank. Eight sites, including three target reaches where the Palmiter method was used, three control reaches upstream of their respective target reaches, and two reference streams, were sampled four separate times (late July 2021, early September 2021, late October 2021, and late January 2022). Data on total suspended solids (TSS), flow, water chemistry (field parameters), pebble size distribution, bank retreat, habitat quality, and the macroinvertebrate community were collected and analyzed statistically to determine associations between the Palmitter method and stream health. Most measures of stream health in this study were found to not be significantly different between target, reference, and control reaches. The exception was in stream cover assessed as part of the habitat evaluation and some of the smaller grain sizes in the pebble counts. This suggests that the Palmiter method can protect infrastructure without impairing stream health and can be applied to bank erosion leading to nonemergent infrastructure damage.³

Additional Key Words: Engineering, Watershed Management, Geomorphology.

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- 3. Work reported here was conducted near 39.3292° N, 82.1013° W.