

# *Analysis of the Effects of Bendway Weir Construction on Channel Cross-Sectional Geometry*

## *Executive Summary*

Bendway weirs are submerged rock river training structures pioneered by the St. Louis District to reduce the scouring of exterior bend slopes while simultaneously widening the navigable channel. Since their development, bendway weirs have been installed throughout Corps waterways. Recently, St. Louis's environmental partners have been concerned that the bendway weirs are having an undocumented effect on channel geometry. To investigate the effects of the bendway weirs on cross-sectional bed geometry, a study was undertaken in which area, width, wetted perimeter, and slope were compared pre- to post-weir installation. The inner bend longitudinal slope was of particular interest, as there were concerns that the slopes were increasing, threatening shallow water habitat. Because of this, inner slope was calculated both for the entire cross section and using 10 ft vertical segments. For the study, 22 weir fields were examined over 5 time periods using 197 cross sections. Cross sections were established before the first weir, between each weir, and after the last weir in each weir field. The post-weir periods (2007 and 2005) and pre-weir periods (1986, 1982, and 1976) were chosen because nearly every weir field had been surveyed in each period.

When complete, the study revealed that the width at LWRP increased for 77% of the cross sections with an average increase of ~330 ft. The average slope decreased for 59% of all cross sections, with an average decrease of 1.27 ft. per 100 ft. The 10 ft vertical segment slopes were roughly even between decreases and increases, with ~70% of the slope changes falling within natural variation as defined by the study methodology. These results indicate the bendway weirs are largely achieving their primary goal of widening the navigable portion of the channel without a serious detrimental effect on the inside bar slope.