

## **Building a Physical Effectiveness Monitoring Protocol for Design Channels at Road-Stream Crossings**

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**Abstract.** Two U.S. Forest Service draft monitoring protocols are used to assess the effectiveness of design channels at road-stream crossings by comparing their physical channel dimensions to those in the natural channel. Our premise is that if the constructed channel dimensions are similar in gradient, length, and channel type to those within a representative natural reach, the design will be effective at providing geomorphic function, ecological continuity, and aquatic organism passage through the crossing for a wide range of flows. Level II physical monitoring is a time intensive, quantitative and statistically based procedure for assessing effectiveness at a few selected sites. Level I monitoring is a less detailed, rapid procedure limited to a few simple measurements and observations for assessing effectiveness at a large number of sites.

Channel metrics analyzed include channel width at different flow elevations, bank margin irregularity at different flow elevations, maximum flow depth, lateral bed variability, and bed-material size distribution. Level I and level II data are compared to ensure that although less detailed, the level I measurements and observations fall within the distribution of data collected in level II, ultimately arriving at the same conclusion. The channel metrics for level I and level II data are summarized for an overall score to indicate if the design channel at the road-stream crossing effectively simulates the adjacent natural channel. Expected results will demonstrate that level I data adequately represent level II data, summary rubrics for each protocol, and finalized field protocols.