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Measuring Scour and Fill of Gravel Streambeds with Scour Chains and Sliding-Bead Monitors

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Abstract. -In the Pacific Northwest, scour and fill of streambed sediments is an often-overlooked cause of mortality of incubating salmonid eggs and developing alevins. Natural levels of scour and fill can be exacerbated by changes in watershed and channel stability caused by human disturbance. We evaluated the use of scour chains and a new device, the sliding-bead monitor, to measure scour and fill that occurs during peak flow periods. During 1987-1991, we designed and implanted 95 scour chains and 44 sliding-bead monitors in streams of western Oregon. Recovery rates of scour chains and sliding-bead monitors were 87 and 88%, respectively. Both kinds of scour devices allowed accurate, direct measurement of maximum scour depth and subsequent deposition, information that cannot be obtained from crosssectional surveys or other conventional methods for monitoring stream habitat. flows, which causes premature removal and transport of developing embryos and alevins. Investigators have measured various aspects of egg-tofry survival (Chapman 1988) but direct studies of mortality are difficult, costly, and not always successful. Therefore, physical measurements have been used to indirectly assess sediment effects on salmonid eggs and developing alevins. These methods are of three general types: (1) measurement or monitoring of spawning substrate texture; (2) measurement of suspended sediment; and (3) measurement of local streambed scour and fill related to bed-load movement. To date, most studies have focused on the quantification of fine sediment