

RESTORATION OF GRAVE CREEK: APPLICATIONS, RESULTS AND LESSONS LEARNED^{AFS}

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The Grave Creek watershed in northwest Montana has been identified as a core bull trout (*Salvelinus confluentus*) recovery watershed. Subject to a century of land use activities including agriculture, grazing, logging, road construction, and rural development, Grave Creek is currently functioning below its probable geomorphic and biological potentials. In conjunction with the Montana Department of Fish, Wildlife & Parks, the USDI Fish and Wildlife Service, and the Kootenai River Network, we restored approximately one mile of channel corridor with primary emphasis on re-establishing migratory habitat for threatened bull trout in fall 2002. The pre-construction channel was over-widened and shallow with bankfull widths ranging from 45-240 feet, and a mean width to depth ratio of 93.5. Restoration techniques included reactivating abandoned meanders and installing bank stabilization and fish habitat structures that incorporate large diameter woody debris. The designed channel reduced the mean bankfull width and width to depth ratio to 52 and 22 ft, respectively. Post-construction project monitoring indicated an almost nine fold increase in the total number of pools present in the restored section of Grave Creek, increasing critical pool habitat for adult migratory bull trout by 230 percent relative to baseline conditions. Maximum pool depths were increased by 152 percent from pre-restoration conditions. Eighty-two percent of the structures performed as designed following spring runoff 2003. We measured less than optimal performance on 18 percent of the structures. Factors affecting structure performance included the location of the individual structures along the meander arc and detachment of the Mirafai fabric from the vane logs.