Demonstration Project to Test a New Interdisciplinary Approach to Rehabilitating Salmon Spawning Habitat in the Central Valley

Winter 2005

This was the tenth quarter of this CALFED project to demonstrate the utility of the Spawning Habitat Integrated Design Approach (SHIRA). In the previous quarter, post-project monitoring, data analysis, report writing, and web programming were the major activities that were performed. An important finding from post-project monitoring has been that the proportion of all redds on the Lower Mokelumne River that were located on the reach of the 2003-2004 SHIRA project increased from 7 % in 2002 (pre-project baseline) to 11 % in 2003 (mid-project) to 20 % in 2004 (post-project). In addition it was found that spawners consciously selected areas of rehabilitated high-quality habitat over areas of lower quality habitat with a statistical confidence >99.9%, as demonstrated by comparison of the actual redd distributions for 2003 and 2004 to those for 100 hypothetical random redd distributions. These and other analyses support the value of SHIRA in providing biologically useful and geomorphically-sustainable spawning habitat rehabilitation.

During this quarter all activity focused on data analysis, report writing and outreach. One manuscript is being written for later peer review in which we compare the efficacy of different tools for evaluating competing design scenarios for spawning habitat rehabilitation. In that study we delineate the conditions under which 2D modeling is essential for project evaluation. Another manuscript documenting a design and implementation methodology for rehabilitating a regulated river's longitudinal profile through gravel augmentation and slope creation was written. Data analyses were also performed in support of a third pending manuscript that will assess the propagation of errors inherent in constructing habitat suitability curves and inferring habitat quality types on SHIRA's design process. We have been able to quantify the uncertainty in our biological datasets that drive predictive, mechanistic modeling of physical habitat. Using that information we are assessing the significance of that uncertainty on predictive power and post-project outcomes.

Two methods of outreach were undertaken this quarter. A poster presentation was made at the Hydrology Days conference in Fort Collins, CO. The poster presented a new framework for prioritizing rivers for potential rehabilitation, using some concepts drawn from SHIRA as well as some newer formulas we have developed. A CALFED Science proposal was written and submitted for consideration in order to test these newly developed ideas. Also, a class of 11 students was taken to the Mokelumne River and taught about the science and management of regulated rivers. The class performed hydrologic and geomorphic data collection and then analyzed the data in a homework assignment.

Finally, long-term monitoring of the SHIRA demonstration projects is an important necessity in order to see their cost-effectiveness and self-sustainability. At this time there is no apparent funding for continuing our independent monitoring beyond September 2005.