

Fine Sediment Intrusion, Framework Size, and Permeability in Spawning Riffles, Prairie Creek, Northwestern California

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Prairie Creek, a 100 km² predominantly old-growth redwood basin in coastal northern California, contains some of the highest quality salmonid spawning gravels in the Redwood Creek watershed. In response to erosion and sedimentation from a highway construction project in the headwaters, a study to monitor effects of fine sediment on streambed gravels was begun in 1989. Reported here are results from monitoring which spanned the egg incubation period in 1991. Gravel framework size, amount of fines intrusion, and permeability were measured in 20 artificial redds which were cleansed of sediment finer than 4.7 mm. Water discharge and suspended sediment flux were measured at three locations along the study reach. Despite the relative mildness of the runoff season encompassing the study period, newly intruded fines (<4.7mm) composed up to 16% of sample weights from the redds. A high degree of the variability (83%) in percent fines was explained by a regression equation using geometric mean diameter (D_g) and sediment flux as independent variables. Systematic spatial trends were observed in fines intrusion which suggest greatest impacts occur immediately downstream of confluences with affected tributaries. Contrary to theory, a significant negative correlation was not exhibited between permeability and percent fines. Because permeability measurement errors appeared to be greatest in highly permeable gravels, the expected relationship may have been masked in this study.

1. 1991 Fall Meeting
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4. H
5. (a) H25 The Effects of Fine
Sediment Intrusion on
Spawning Gravels
(b) 1815 Erosion and Sedimentation
1803 Anthropogenic Effects
6. N/A
7. 10% at 1990 Fall Meeting
8. U.S. Govt. Purchase Order: \$60.
9. C
10. N/A
11. No.