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To: Johnathon S. Bishop
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Tracy Patterson of the Los Angeles Regional Water Quality Control Board contacted me on December 5, 2001 asking if I could determine whether the Malibu Creek watershed was impaired by excessive sedimentation based on a set of biological and physical/habitat data presented to her by Heal the Bay. The data set was produced using the California Stream Bioassessment Procedure (CSBP), developed by the California Department of Fish and Game (DFG), to evaluate the creek's benthic macroinvertebrate community (Harrington 1996). The CSBP is a regional adaptation of the U.S. Environmental Protection Agency (EPA) Rapid Bioassessment Protocols (Barbour et al. 1999) and is recognized by the EPA as California's standardized bioassessment procedure (Davis et al. 1996).

I was confident that the data set contained sufficient, high quality information. They used the CSBP, adequately covered the watershed with monitoring sites and included samples from both spring and fall index periods. Assessing the stream's benthic macroinvertebrate (BMI) community and its physical/habitat structure is essential to determine sediment pollution. BMIs can have a diverse community structure with individual species residing within the stream for a period of months to several years. They are also sensitive, in varying degrees, to temperature, dissolved oxygen, sedimentation, scouring, nutrient enrichment and chemical and organic pollution (Resh and Jackson 1993). Together, biological and physical assessments integrate the effects of water quality over time, are sensitive to multiple aspects of water and habitat quality, and provide the public with more familiar expressions of ecological health (Gibson 1996).

All of the monitoring sites within the Malibu Creek watershed (except for the upper reaches of Cold Creek) show typical signs of ecological impairment due primarily to sediment (and nutrient

enrichment). Low physical habitat scores primarily reflect the influence of heavy sediments in causing reduced habitat availability and reduced habitat quality for macroinvertebrates. The dominant taxa in these sites are all sediment tolerant, rapid colonizers which are adapted to collecting organic matter and algae as a food source. The low diversity of substrates and simplicity of the physical environment are primarily responsible for the overall low bioassessment scores in this watershed. Aquatic organisms can respond as negatively to inorganic sediment as they do to other environmental contaminants (Newcombe and MacDonald 1991). Healthy communities of benthic macroinvertebrates that depend on diverse substrate particle size, available interstitial spaces and a complex habitat can be significantly affected or eliminated by excessive sediment deposition (Waters 1995). Benthic macroinvertebrates can be killed directly by suffocation or affected indirectly through the loss of food sources and habitat (Johnson et al. 1993).

An Index of Biological Integrity (IBI) is the preferred evaluation tool to measure the biological condition of water resources (Davis and Simon 1995, Karr and Chu 1999). Lacking an IBI specific to the southern coast region of California, the report relied on scoring criteria from a regional IBI for first to third order tributaries to the Russian River (DFG 1998). All sites in the Malibu Creek watershed (except for the upper reaches of Cold Creek and Malibu Creek Station 12) would be assigned a rating of poor biological integrity.

Based on the information provided to me by Tracy Patterson, it is my opinion that Malibu Creek is impaired by excessive sedimentation.

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