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Toxicity of parking lot runoff after simulated rainfall

Darrin J. Greenstein, Liesl L. Tiefenthaler and Steven M. Bay

ABSTRACT

Stormwater runoff is an important source of toxic substances to the marine environment, but the effects of antecedent dry period, rainfall intensity, and duration on the toxicity of runoff are not well understood. In this study, simulated rainfall was applied to parking lots to examine the toxicity of runoff while controlling for antecedent period, intensity, and duration of rainfall. Parking areas were divided into high-use and low-use, and into maintained and unmaintained treatments. The parking stalls were cleaned by pressure washing at time zero. Simulated rainfall was then applied to the parking lots at monthly intervals for three months with all of the runoff being collected for analysis. Runoff samples were tested for toxicity using the purple sea urchin fertilization test. Every runoff sample tested was found to be toxic. Mean toxicity for the sea urchin fertilization test ranged from 2.0 to 12.1 acute toxic units (TUa). The toxicity increased rapidly during the first month, but then dropped approximately to pre-cleaning levels and remained there. No difference in toxicity was found between the different levels of use or maintenance treatments. The intensity and duration of rainfall were inversely related to the degree of toxicity. For all of the intensities tested, toxicity was always greatest in the first sampling time interval. Dissolved zinc was most likely the primary cause of toxicity, based on toxicant characterization of selected runoff samples.

Full Text

ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2001_02AnnualReport/20_ar36-darrin.pdf