



## **WATER RESOURCES RESEARCH GRANT PROPOSAL**

**Title:** Elucidation of sources and fluxes of suspended solids and anthropogenically derived heavy metals in streams of small subtropical watersheds, Oahu, Hawaii

**Focus Categories:** NPP, HYDGEO, G&G

**Keywords:** Contaminant Transport, Geochemistry, Heavy Metals, Land Use, Mountain Lakes/Streams, Lead, Non-point Source Pollution, Pollutants, Rainfall-Runoff Processes, Saline-Freshwater Interfaces, Sedimentation, Soil Erosion, Solute Transport, Storm Water Streams, Suspended Sediments, Toxic Substances, Trace Elements, Tropics, Urban Drainage, Water Chemistry, Water Quality, Water Quality Management, Watershed Management

**Duration:** 9/1/99-8/31/01

**Federal Funds Request:** \$88,787

**Non-Federal Matching Funds Pledged:** \$88,789

**Principal Investigator:**

Eric Heinen De Carlo, University of Hawaii

**Co-Investigator:**

Khalil J. Spencer, University of Hawaii

**Abstract**

Although Hawaii is referred to as the "Paradise of the Pacific" and perceived as unpolluted, many surface waters in Hawaii are listed by the State Department of Health (DOH) as water quality limited segments (WQLS). Listing is often due to heavy TSS loads that carry NPP to coastal areas during short duration intense rain episodes. Previous work revealed that anthropogenic activity in watersheds influences the nature and of such loads, yet, much uncertainty remains regarding the magnitude of contributions from natural processes and anthropogenic activity. Because particle flocculation in estuaries may lead to pollutant retention, bioaccumulation and biomagnification are of concern and high priority is given by various agencies to elucidating linkages between surface water inputs of TSS and the health of the receiving coastal ecosystems.

In this study we propose to quantitatively assess variations in the composition and magnitude of loads in surface waters during storms as a function of land use through the instrumentation of a network of nested sites in two small but significantly different watersheds. Automatic samplers and continuous monitoring devices will complement

manual sampling. This work will expand ongoing research by our group as well as complement efforts by the USGS NAWQA Oahu study unit and other agencies. Sources of TSS/NPP in surface waters from different land uses in watersheds will be elucidated and natural and anthropogenic contributions to the TSS loads at each station in each of the two watersheds will be quantified. Seven surface water stations will complement work by our group currently underway in the receiving saline waters. Principal objectives are: to quantify relationships between land use and storm-derived TSS and heavy metals transport, to determine concentrations of heavy metals and Pb-isotopic signatures in surface waters so as to elucidate, as a function of time and space, anthropogenic contributions carried with the TSS, to calculate relative proportions of natural and anthropogenic materials transported during storms, and to quantify relative contributions of base- and storm-flow to the mobilization and transport of heavy metals from coastal watersheds to the near-shore ocean.