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Dissolved inorganic nitrogen, soluble reactive phosphorous, and microbial pollutant loading from tropical rural watersheds in Hawai'i to the coastal ocean during non-storm conditions

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ABSTRACT

This study quantifies dissolved inorganic nitrogen (DIN), soluble reactive phosphorous (SRP), and microbial pollutant inputs to a tropical embayment, Hanalei Bay, Kaua'i, Hawai'i from rural watersheds during two field excursions during non-storm conditions. We employ land cover analysis and a suite of nucleic acid fecal source tracking markers (host-specific Bacteroidales and human enterovirus) to identify sources of pollutants to the bay. The highest concentrations of DIN and SRP are in streams draining watersheds with large areas of cultivated land, suggesting fertilizer is a source of these nutrients to the streams and coastal waters. Pollutant areal loading correlates with the fractions of urban and cultivated land cover. Microbial source tracking indicates the presence of human, pig, and ruminant feces in the streams. This work provides preliminary evidence that human development affects loading of DIN, SRP, and microbial pollutants to tropical coastal waters; further study is needed to confirm this. Additionally, results point to a mix of microbial pollutant sources.

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