Coastal areas are heavily influenced by river basins in their vicinity. Coastal and watershed management requires an integrated approach. Several factors should be considered. Among them: water quality, silt, erosion, land use, forest cover, legislation, and human impact. The coral reef at Cahuita National Park and the surrounding communities are of great value in biological, economical and ethical grounds. La Estrella river basin seems to play a key role affecting this coastal area. Potential factors for erosion were determined in the basin and several parameters of water quality were analyzed, placing emphasis on the silt discharge at six stations along the main river and on six of its tributaries. The stations were selected along a gradient representing different natural conditions and levels of human impact. We sampled silt from September to December 2003 and from January to May 2004, at approximately 22 day intervals. In each occasion, three water samples (a liter each) were taken per sampling site in a traverse section of the river. In the main river bed, the Vesta station (higher altitude, larger forest cover, bigger percentage of protected area and less human impact) presented the smallest silt discharges (close to 9 000g/s in a rainy day). Meanwhile, the stations of Bonifacio and Pandora (lowlands, lesser forest cover and higher intensity of land use) presented the largest discharges (around 16 000g/s in a rainy day). For the tributaries, the stations at river Hitoy Cerere (biological reserve) and river Bitey (the smallest basin) contributed the lowest silt values. The stations at the other tributaries (characterized by less forest and less protected area) presented the largest values. About 25% of the basin soils were over-used. We also found large patches of land with no forest cover, in protected areas, or in areas where some sort of forest management or natural restoration were supposed to take place. The generalized absence of riparian forests in the low basin was the norm. These results show a severe lack of environmental law enforcement. The residents of La Estrella River Valley have the perception that deforestation exists due to illegal pruning and that there is significant pollution from solid waste, pesticides, and served and soapy waters. They have little knowledge of the coral ecosystem associated with the river. Law enforcement and education are strongly needed in the area.

Abstract

Coastal areas are heavily influenced by river basins in their vicinity. Coastal and watershed management requires an integrated approach. Several factors should be considered. Among them: water quality, silt, erosion, land use, forest cover, legislation, and human impact. The coral reef at Cahuita National Park and the surrounding communities are of great value in biological, economical and ethical grounds. La Estrella river basin seems to play a key role affecting this coastal area. Potential factors for erosion were determined in the basin and several parameters of water quality were analyzed, placing emphasis on the silt discharge at six stations along the main river and on six of its tributaries. The stations were selected along a gradient representing different natural conditions and levels of human impact. We sampled silt from September to December 2003 and from January to May 2004, at approximately 22 day intervals. In each occasion, three water samples (a liter each) were taken per sampling site in a traverse section of the river. In the main river bed, the Vesta station (higher altitude, larger forest cover, bigger percentage of protected area and less human impact) presented the smallest silt discharges (close to 9 000g/s in a rainy day). Meanwhile, the stations of Bonifacio and Pandora (lowlands, lesser forest cover and higher intensity of land use) presented the largest discharges (around 16 000g/s in a rainy day). For the tributaries, the stations at river Hitoy Cerere (biological reserve) and river Bitey (the smallest basin) contributed the lowest silt values. The stations at the other tributaries (characterized by less forest and less protected area) presented the largest values. About 25% of the basin soils were over-used. We also found large patches of land with no forest cover, in protected areas, or in areas where some sort of forest management or natural restoration were supposed to take place. The generalized absence of riparian forests in the low basin was the norm. These results show a severe lack of environmental law enforcement. The residents of La Estrella River Valley have the perception that deforestation exists due to illegal pruning and that there is significant pollution from solid waste, pesticides, and served and soapy waters. They have little knowledge of the coral ecosystem associated with the river. Law enforcement and education are strongly needed in the area.

Keywords

Caribbean coast, coastal management, erosion factors, sediments, river basin, water quality, La Estrella river, Costa Rica.