Shoreline Environmental Water Quality in South Maui

By JENNÉ SHIMKO

GIS 180 – Ecosystem Management

Introduction

The near shore water quality of Maui is an extremely important economic and community resource that is being degraded by uncontrolled polluted storm water runoff. Although a large data gap exists for the implementation of a thorough management plan, affordable low technology controls can be implemented quickly in parallel to the detailed plan development. Kihei/Wailea has a population of ~20,000 permanent residents. Since 2000, Kihei/Wailea population has increased ~30%. South Maui is also the second largest tourism destination for visitors to Maui, with the island of Maui receiving over 7 million tourists a year.

Problem Statement

Lack of an implemented and fully funded comprehensive storm water runoff control plans has inhibited the protection of shore line water. How can we improve protection immediately? Figure 2 shows the results sediment run-off and how it affects water quality.

Methodology

Using Esri’s ArcGIS software and spatial data collected mainly from the State of Hawaii, Office and Planning and Department of Health and Environmental Planning, I was able to layer various hydrology dataset, consisting of: watersheds, wetlands, stream division resources, critical natural habitat, water quality sites, ponds and reservoirs. The hydrology dataset was layered over land use and land cover and a topography raster map to analyze the water infrastructure for South Maui. The data was projected Coordinate System UTM Zone 4N.

I utilized spatial analysis tools to clip, intersect and dissolve, to reduce to input dataset and aggregate the data outputs; to review the information results.

The question what measures can be taken to improve the water quality of the Kihei shoreline and study what wetlands currently exist. In my map in Figure 4 – Wailea Watershed, this information can be used as a foundation to continue to explore hydrologic factors and land use to understand where the counties, developers, and community organizations can identify and plan areas to increase sustainable wetlands, reservoirs, and other water bodies.

Results & Discussion

SouthWest Maui 31.9 square miles, with almost 70% of the area is shoreline. The three watersheds, Hapapa, Wailea, and Mo‘olea, that services this area covers 49,688 acres; however, I analyzed that there is only 24 acres of wetlands and ponds sustaining the environment.

Of the 24 acres most were located in the Hapapa watershed, most were located in the older sections of South Maui. I observed that over the years, there as has been a steady decrease in the wetlands and ponds. See Figure 3 - 1991 map showing wetlands in Kihei Area. I selected a single water shed in the south Maui area to study where Detained Storm Water Infiltration using Low Technology (DSILT) could be implemented quickly and maintained inexpensively. Figures 5 and 6. Therefore, to demonstration that through community and volunteer efforts, we can restore ecosystems and water quality and conservation; I focused on a current thriving wetland as an example. Within the Hapapa watershed is the sustainable wetland named Laie. The Laie wetland, located on South Kihei road near “downtown” Kihei, See Figure 5 and 6.

References

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