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**Effects of sewage discharge, fishing pressure and habitat complexity on coral ecosystems and reef fishes in Hawaii**

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**Abstract:**

The major factor controlling the abundance of reef fishes in Hawaii (USA) appears to be habitat complexity (bottom topographic relief and interstitial space). Fishes aggregate in areas of high habitat complexity at biomass levels which, in areas protected from fishing, may significantly (by 2 to 5 times) exceed levels supported by primary production within the ecosystem. High relief natural areas "act" like artificial reefs in terms of aggregating fishes. Reef fish abundance is also affected by fishing pressure in the main Hawaiian Islands. Areas protected from fishing (Marine Life Conservation Districts, MLCDs) support standing crops of reef fishes that average about 45 g m<sup>-2</sup> higher than areas open to fishing. In areas unprotected from fishing, reef fish abundance has significantly declined in recent years. Conservation and management of reef fishes would be improved if more high relief areas were protected from fishing. Thus far, 11 MLCDs have been established in such areas in Hawaii. The discharge of primary or secondary treated sewage effluent into the ocean in Hawaii through deep ocean outfalls causes no apparent negative environmental impact to coral reef ecosystems.