Changes in fish community structure associated with cage aquaculture in Lake Malawi, Africa

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Abstract

Local fishermen claim that introduction of a commercial cage aquaculture farm in Lake Malawi resulted in low fish catches as fish take refuge within the farm. Fish specimens were caught in three fishing sites, one at the farm and two 5 km southeast and northwest of the farm in February, April, June, and August 2012 using four experimental multi-mesh gillnets with similar dimensions to catch different fish species and sizes. Data was used to determine changes of fish community composition, abundance, biomass, and fish diversity. Site 2 located at the farm and 3 to the southeast were dominated numerically by many small bodied fishes which often is an indication of disturbance by fishing; therefore, they were classed as disturbed while site 1 in northwest was classed as undisturbed site. A near field impact of the farm on fish community structure was detected as revealed by significantly different fish community structure from site 2 compared with that found at sites 1 and 3, but with similar number of fish species and diversity as the remote sites. Overall community structure and the abundance of the fish community in the vicinity of the cage site were improved primarily through providing protection from fishing while incidence of large number of small bodied fish at site 3 resulted from removal of large fish by fishing pressure. This study suggests that protected areas such as the cage site can be a practical strategy to reduce fishing pressure in Lake Malawi and allow recovery of native fish stocks.

Key words: cage aquaculture, wild fish community, fish diversity, fisheries management