



Impacts of Aquaculture and Domestic Wastewater on the Water Quality of Santubong River, Malaysia

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Abstract: Developments along the Santubong River basin may have an impact on the aquatic ecosystem. To determine the impacts of activities on the water quality, ten stations were selected for water quality study over 9 months. Results show that salinity increases from 14.0 PSU upstream to 30.4 PSU downstream. Lowest DO range was 2.3-4.1 mg/L. TSS ranged was 20-135 mg/L and the highest was observed near construction and residential areas, the second and third highest near shrimp culture discharge areas. BOD₅ was the highest near construction and residential areas. BOD₅ of a station near shrimp culture was not significantly different from the residential areas. Two stations near shrimp culture site also recorded the highest Chl-a. The highest ammonia-nitrogen, nitrite-nitrogen and reactive phosphorus were observed at stations near shrimp farm sites whereas nitrate-nitrogen was the highest near construction and residential areas. Cage culture site showed the highest phosphorus and second highest nitrite-nitrogen and ammonia-nitrogen. This study showed that TSS and BOD₅ were elevated near residential and construction areas and nutrients were elevated near shrimp farm sites resulting in algal bloom. Therefore, it is recommended that residential and shrimp farm discharge be treated to acceptable quality before discharge to protect the aquatic resources.

Key words: Shrimp aquaculture, household wastewater, water quality, Santubong River.

1. Introduction

Maintaining the water quality of rivers is essential due to the sensitivity of the aquatic species in the river ecosystem. Factors that contribute to the quality of river water are geologic, climatic and anthropogenic [1] and among those, anthropogenic factor can be controlled to protect the river water quality. The

Santubong River is an important river as it is located near Kuching city and with the growing demand of protein by the urban population; it is an important site for cage aquaculture. However, other developments in the watershed such as residential areas, construction works, and shrimp culture may contribute to degradation of the water quality and thus impact the survival of aquatic organisms. To date there is no report in literature on the water quality of this river.

Domestic wastewater was reported to be a major factor in water pollution of Jinshui River in China [2]. Greywater from a residential area in Kuching City was reported to be high in oxygen demand and high in nutrients such as ammonia-nitrogen, total nitrogen, total phosphorus and reactive phosphorus and low in dissolved oxygen [3]. Shrimp aquaculture has been reported to contribute nutrients and organic matter to coastal environment through regular water exchange

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