

## **Effects of cage culture on dissolved inorganic nutrient and surface sediment composition in Sulaman Bay Lagoon, Sabah, Malaysia**

### **Abstract**

The major nutrient inputs into Sulaman Bay lagoon are wastes from a nearby village together with particulate organic matter and surface sediment as runoff from mangrove area, as well as from aquaculture activities. The main objective of this study was to determine the dissolved inorganic nutrients (DIN) of water and nutrients of surface sediment in Sulaman Bay lagoon. The data could be used in developing management strategies for the sustainable aquaculture activity in lagoon ecosystem. Water sample and surface sediment were collected from six stations: five located inside the lagoon and one station at a point that connected the lagoon with South China Sea. The parameters determined included ammonium-nitrogen (mg/L), nitrate (mg/L) and phosphate (mg/L) in water, and particle size, total nitrogen (mg/g), total phosphorus (mg/g), total organic carbon (%) and total inorganic carbon (%) as carbonate equivalent in sediment samples. The highest concentrations of 0.072 mg/L nitrate, 0.121 mg/L of ammonium-nitrogen and 0.058 mg/L of phosphate were obtained from the sea opening point, station nearby village with mollusk culture and village waste drainage areas respectively. Sediment in the Sulaman Bay lagoon was mainly in the form of silt, sand and gravel. The values of total nitrogen and total phosphorus (mg/100g of sediment) were observed to be higher than the values obtained in all stations located inside lagoon. No significant ( $p > 0.05$ ) differences was observed in the total nitrogen of sediment among the stations located inside the lagoon. The highest total organic carbon (TOC) of 22.5% was observed in stations near to the village and cage culture area. The highest value of TOC from the aforesaid stations were significantly different ( $P < 0.05$ ) from the TIC values at other stations. However, the concentration of organic carbon, total nitrogen and total phosphorus in the sediment was higher not only due to commercial cage culture, but also from other human induced activities such as discharge waste from the village, and leafy material with surface sediment as runoff from nearby mangrove vegetation.