Assessment of water quality and pollutant loading of the Rajang River and its tributaries at Pelagus area subjected to seasonal variation and river regulation

ABSTRACT

Other than seasonal variation, river regulation due to hydropower generation can influence the water quality downstream. Therefore, the objectives of this study were to determine the water quality and estimate the pollutant loading of the Rajang River and its tributaries at the Pelagus area downstream of the Bakun hydroelectric Dam. The study was conducted at 11 stations three times, in July 2015 during dry season (spillway opened), in January (spillway closed) and March 2016 (spillway opened) during wet season. Results of the water quality classification show deterioration from 91% Class II in dry season to 64–82% Class III in rainy season mainly due to an increase in total suspended solids caused by soil erosion in the river basin. The pollutant loads were high particularly during wet season with TSS reaching 945,763 Mg/day, and hence, mitigation measures to reduce the pollutant loads in the river are essential. Nevertheless, two tributaries, Mela River and Kapit Hulu River where stations 4 and 5 are located, are recommended for the conservation of sensitive aquatic organisms as they are classified as Class II throughout the seasonal variation indicating good quality freshwater. The Bakun dam turbine discharge affected the downstream river water quality as shown by the low dissolved oxygen content of < 5 mg/L extending beyond 204 km downstream of the dam when the spillway was closed. Thus, raising the level of dissolved oxygen downstream of the dam during closed spillway and reducing suspended solids are recommended for the benefits of sensitive aquatic organisms.