

Water quality and fish diversity in the Brantas River, East Java, Indonesia

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Abstract

This research aimed to determine the water quality and fish diversity in Brantas river. Three station for sampling locations were in the upstream (one station on Karangates reservoir) and downstream (two stations on the Surabaya and Jagir river). Water quality parameters were BOD, COD, DO, pH, temperature, and the levels of heavy metals (Pb, Cr, Cu, and Cd). Fish specimens was identified using fish identification book. The results of this research indicated that there was a difference in the water quality of upstream and downstream of the Brantas river. On the upstream, the source of pollution was mostly from fish catching, agriculture, and industrial activities. While on the downstream of the river it mostly dominated by industrial waste and domestic waste. The water quality in both stations had far exceeded the quality standards that was included in the polluted category. The concluded that Brantas river has been contaminated by waste (heavy metals), exceeded the water quality standard. The diversity of fish in the downstream (Surabaya river) has the highest diversity values, followed Jagir river and in the upstream (Karangkates reservoir) has the lowest value of diversity. Brantas river water was included in the category of moderate diversity.

Keywords: Brantas river, water quality, heavy metal, fish

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Introduction

Brantas river is the second longest river in Java island after Bengawan Solo (Usman,-). The downstream of Brantas river branches off to become Surabaya river and Porong river. Surabaya river branched into Kali Mas and Jagir river, then it flows into the Java Sea. Brantas river has very important role for east Java's rice cultivation, it provides water for irrigation and also domestic water supply for the cities along the stream. Located on the upstream side of Brantas river is Karangates reservoir. The ecosystem on the upstream and downstream of Brantas river is highly effected by anthropogenic pressure. This anthropogenic pressure comes from the number of residential buildings, agriculture, and industries which build along downstream Brantas river Surabaya river (Begum et al., 2008; Nugrahadi et al., 2011).

The number of residential buildings along the river has increased the pollution load of Brantas river, there are also many industrial activities contribute in increasing the pollution by disposing the waste directly into the river. The Brantas river watershed which flows in Surabaya has many uses, both directly and indirectly. The direct uses of the river are as clean water source for domestic uses, provides water for local water company, and support livelihood of local fisherman. The indirect use is as the habitat of aquatic biotas that serves as food source for the people in Surabaya city and as bio-indicator of the

ecosystem such as fish. River pollution is generally caused due to high levels of heavy metals. Heavy metals contained in the river was toxic and disrupt aquatic ecology. These pollutants have a negative impact on water quality and biota of water as a source of animal protein (Akobundu, 2012).

Fish is one of aquatic biotas that plays important role in the stabilization of water ecosystem and also for the people along the stream (Pracheil, 2010). High levels of fish diversity indicates high quality of waters ecosystem, so that the level of fish diversity can be used as indicator to estimate water quality and level of pollution presents in the waters (Ngodhe et al., 2013).

Method

The materials used in the measure-ment of water quality were samples of water which directly taken from Brantas River, titration solution, digital camera (Canon EOS 550 D and Sony), Fish Identification Guidebook (Kottelat et al, 1993).

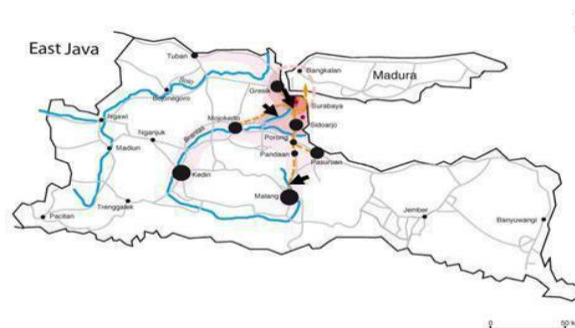


Figure 1. Sampling station was in the upstream and the downstream of Brantas river (arrow)

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