Analisis Temporal Perubahan Produktivitas Primer dan Kualitas Air (COD dan BOD) Akibat Keberadaan Solar Panel Terapung = Temporal Analysis of Changes in Primary Productivity and Water Quality (COD and BOD) Due to Floating Photovoltaic

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Abstrak

Teknologi panel surya terapung yang diterapkan di Danau Mahoni Universitas Indonesia merupakan panel surya bifacial. Namun penutupan badan air oleh solar panel terapung dapat menyebabkan perubahan kualitas air secara temporal. Sejauh ini, belum terdapat penelitian lebih lanjut mengenai pengaruh solar panel terapung di perairan Indonesia. Maka dari itu, penelitian ini bertujuan untuk mencari pengaruh penutupan permukaan danau terutama pada produktivitas primer, COD, dan BOD serta hubungan produktivitas primer dengan BOD dan COD. Pengambilan sampel air dilakukan pada permukaan air, sedangkan perhitungan produktivitas primer menggunakan metode botol terang-gelap dan dilakukan inkubasi selama 3 jam. Secara temporal, nilai BOD, COD, dan produktivitas primer di bawah solar panel terapung, yang selanjutnya akan disebut titik 1, memiliki nilai kosentrasi yang lebih rendah dibandingkan dengan yang berada di lokasi yang terbuka, yang selanjutnya akan disebut titik 2. Rata-rata kosentrasi BOD di titik 1 yaitu 4.25 mg/l dan titik 2 yaitu 1.56 mg/l. Adapun rata-rata kosentrasi COD di titik 1 adalah 31.875 mg/l dan titik 2 adalah 33.125 mg/l. Sementara itu, rata-rata produktivitas primer titik 1 yaitu 36.46 mg C/m3/jam dan titik 2 yaitu 114.58 mg C/m3/jam. Hasil analisis uji independen t menunjukkan adanya penurunan yang signifikan pada nilai BOD dan produktivitas primer di area yang tertutup solar panel. Sedangkan, nilai COD tidak memiliki perbedaan yang signifikan antara kedua titik. Adapun hasil uji korealasi Pearson’s menunjukkan bahwa produktivitas primer tidak memiliki hubungan yang signifikan terhadap parameter BOD dan COD. Maka dari itu penutupan area badan air dengan solar panel terapung menurunkan kualitas air Danau Mahoni terutama pada parameter BOD, COD, dan produktivitas primer. .....The technology of floating photovoltaic applied at Lake of Mahoni, University of Indonesia were bifacial photovoltaic. However, its body of water which was covered by the floating photovoltaic could cause temporal changes in water quality. To date, there had been no further research on the effects of floating photovoltaic in the waters of Indonesia. Therefore, this research aimed to explore the effects of the covered lake surface especially on primary productivity, COD and BOD, also examined how primary productivity was related to BOD and COD. Water sampling was carried out on the surface of the water, meanwhile the primary productivity was calculated utilizing the method of light-dark bottle and incubated for 3 hours. Temporarily, the values of BOD, COD, and primary productivity under the floating photovoltaic, hereinafter referred to as station 1, had lower concentration values compared to those in open areas, hereinafter referred to as station 2. The average BOD concentration at station 1 was 4.25 mg/l and at station 2 was 1.56 mg/l. As for the average COD concentration at station 1 was 31.875 mg/l and at station 2 was 33.125 mg/l. Meanwhile, the average primary productivity at station 1 was 36.46 mg C/m3/hour and at station 2 was 114.58 mg C/m3/hour. The results of independent t test showed a significant decrease in the values of BOD and primary productivity in areas covered by floating photovoltaic. Meanwhile, the values of COD did not show a significant difference between the two stations. As for the results of the Pearson's correlation test suggest that primary productivity

did not have a significant relationship with the parameters of BOD and COD. Therefore, covered body of water by floating photovoltaic reduced the water quality at Lake of Mahoni, especially in the parameters of BOD, COD, and primary productivity.