

عنوان مقاله:

A new approach for designing a hypolimnetic oxygenation system to improve the water quality in tropical reservoirs

محل انتشار:

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خلاصه مقاله:

Background: One of the most important problems of dams is thermal layering which directly affects the water quality. This study was performed to propose a solution to increase the water quality of the Esteghlal Dam reservoir in Minab, Hormozgan. Methods: The water quality of Esteghlal Dam was evaluated from 2016 to 2018. During this period, 18 samples were collected from three different points of the dam. The parameters of water temperature, electrical conductivity, total dissolved solids, total suspended solids, dissolved oxygen (DO), pH, nitrate, phosphate, turbidity, biochemical oxygen demand, chemical oxygen demand, total hardness, anions and cations, total phosphorus, physicochemical, and microbial parameters were measured according to the method recommended in the standard method book. The obtained data were used as the input for the model of reservoir water quality (CE-QUAL-W2) to simulate reservoir water quality and predict the thermocline cycle. Finally, by plotting hypolimnion oxygen content against time and finding the slope of regression line using the data, the hypolimnetic oxygen demand (HOD) was obtained. Results: The findings showed that the anaerobic condition occurred in the hypolimnion layer during summer. Furthermore, it was revealed that the HOD of Esteghlal Dam is about 6 g of oxygen per square meter per day in the current situation. Conclusion: Considering the dam's conditions and its anaerobic problems, a hypolimnetic oxygenation system is proposed as a structural solution for this reservoir. Then, conductivity-temperature-depth (CTD) profiles and monitoring data were used for the oxygen supply model of plume. The reservoir was predicted after calculating the amount of oxygen required using the equations governing linear oxygen supply systems and the plume model.

کلمات کلیدی:

Anaerobiosis, Oxygen consumption, Water quality, Phosphorus, Ammonia

