



Evaluation of the water suitability of floating net cages aquaculture in Kedung Ombo Reservoir, Central Java

Prameshti Mustikaning Bawono¹, Arif Rahman^{1,*}, Churun Ain¹, Haeruddin¹, Kukuh Prakoso¹, Atika Arifati¹

¹Department of Aquatic Resources, Faculty of Fisheries and Marine Sciences, Universitas Diponegoro, Jalan Prof. Jacob Rais, Tembalang, Semarang, Jawa Tengah 50275

ARTICLE INFO

Keywords:

Dissolved oxygen
Floating net cage
Kedung Ombo Reservoir
Suitability
Water quality

DOI: 10.13170/depik.14.1.44159

ABSTRACT

Kedung Ombo Reservoir is one of the reservoirs in Central Java which is used for irrigation, tourism, and aquaculture activities. Common problems in reservoir waters are nutrient enrichment by organic waste from fish feed and other sources. The aim of this study was to evaluate the level of water suitability based on water quality. This study was conducted in June-August 2023. Sampling was carried out at three stations with different floating net cage densities. The water quality variables measured included dissolved oxygen (DO), temperature, pH, transparency, turbidity, ammonia, biochemical oxygen demand (BOD), nitrate, phosphate, and chlorophyll-a. Evaluation of the water suitability for floating net cage waters in Kedung Ombo Reservoir was determined by a weighting matrix and water suitability index. The water suitability evaluation of floating net cages in three stations was categorized as suitable. All variables were suitable except BOD at all stations and DO in stations 1 and 3.

Introduction

Kedung Ombo Reservoir is a multipurpose reservoir located in 3 districts, namely Grobogan, Boyolali, and Sragen. The main function of this reservoir is as a source of irrigation, electricity provider, tourism, and floating net cages. Intensive fish cultivation in floating net cages in Kedung Ombo Reservoir has increased every year (Simanjuntak and Muhammad, 2018). The problem in reservoir waters is the enrichment of nutrients by organic waste from floating net cages, agriculture, and households. Eutrophication is one of the most important reservoir problems worldwide (Finlay *et al.*, 2013; Mammides, 2020; Vasistha and Ganguly, 2020).

Eutrophication causes major disturbances to aquatic ecosystems, including decreased water quality, loss of biodiversity, and changes in ecosystem structure and function, as well as impacts on related ecosystem services, human health, and economic activities (Alexander *et al.*, 2017; Heino *et al.*, 2021; Le Moal *et al.*, 2019; Akbar & Rahayu, 2023).

Aquaculture activities can cause environmental changes by accumulating waste, increasing organic matter, and decreasing oxygen levels (Boyd *et al.*, 2020; Komala *et al.*, 2019).

The continuous decline in water quality greatly affects the success of fish farming in the Kedung Ombo Reservoir. Farmers in floating net cages must adjust the location of the cages to avoid crop failure due to waste accumulation. Many farmers get unsuitable locations, resulting in the death of their farmed fish and crop failure. Intensive fish farming that does not consider carrying capacity generally results in decreased water quality (Portinho *et al.*, 2021).

This study was conducted to determine the level of water suitability for aquaculture activities based on the water quality of the Kedung Ombo Reservoir.

* Corresponding author.

Email address: arifbintaryo@live.undip.ac.id

Materials and Methods

Time and location

This study was conducted for three months in June, July, and August 2022 at Kedung Ombo Reservoir, Central Java.

Research materials

Tools used during sampling in the field include a Global Positioning System (GPS), sample bottle, cool box, thermometer, modified Secchi disk, and Water Quality Checker (WQC) with LAQUA brand 200 series PD210/220 for pH and dissolved oxygen measurements.

Research design

An evaluation of the suitability of aquaculture water in floating net cages is to determine the suitability and ability of an area to support floating net cages. The method used is the weighting or scoring method through the regional suitability matrix. This method considers each variable with different weights by making the physical parameters of water chemistry a reference in aquaculture.

Sampling method

Sampling was carried out at three stations where floating net cages were located. Station 1 is in the Kemusu Subdistrict, which is closest to tourist access and has a moderate level of floating net cages density. Station 2 was in the Miri Subdistrict, near residential areas with a low level of floating net cages density. Station 3 was in the Sumberlawang Subdistrict, near the upstream dock of Kedung Ombo Reservoir, with the highest density of floating net cages (Figure 1).

Water sampling was conducted at surface depths in three stations. Environmental variables measurements include DO, temperature, pH, transparency, turbidity, ammonia, BOD, nitrate, phosphate, and chlorophyll-a.

Data analysis

The determination of weighting and scoring is done by giving values to criteria that support cultivation activities based on the contribution of each criterion to the final result. The suitability value for each location is calculated based on the following formula by (Mustofa and Mulyo, 2020):

Total value at location = weight on variable-i × score on variable-i class-j

The weighting is divided into 3 categories based on the score. Score 3 for the highly suitable category (S1), score 2 for the suitable category (S2), and score 1 for the not suitable category (N). The determination of the weight and score for each variable is adjusted to the magnitude of the variable's influence on the suitability value (Table 1). The total maximum value obtained, and the minimum value

were grouped based on the suitability interval using the formula (Hidayah and Marson, 2019):

$$\text{Class interval} = \frac{\sum \text{total maximum value} - \sum \text{total minimum value}}{3}$$

The suitability index is calculated based on the percentage comparison between the score weight value and the total maximum value. The calculation of the Suitability Index (SI) uses the equation used by Wahdaniar (2019).

Suitability Index (SI) = $(\sum \text{value on variable-i}) / (\sum \text{maximum class value}) \times 100\%$

The maximum total value obtained is 45, and the minimum total value is 15. The suitability class provisions can be defined as follows, according to Yunus et al. (2019).

S1 = Highly Suitable, this suitability class has no severe limiting factors for a particular use in a sustainable manner or only has limitations that are not too influential.

S2 = Suitable, this suitability class has rather severe limiting factors for a particular sustainable use. These limiting factors will affect satisfaction with tourism activities and the benefits obtained, as well as increase the input to cultivate the fishery activities.

N = Not Suitable, this suitability class has severe or permanent limiting factors, making it impossible to develop this type of activity sustainably.

The water suitability class for floating net cages is divided into 3 classes which can be seen in Table 2.

Table 2. Water suitability class criteria.

No.	Value	Suitability Index	Suitability Class
1	>35	78 – 100%	Highly Suitable (S1)
2	25<S2≤35	55 – 77%	Suitable (S2)
3	≤25	>33 – 54%	Not Suitable (N)

Results

Water quality

The water quality variables measured in Kedung Ombo Reservoir, Central Java, can be seen in Table 3. The oxygen concentration at the three stations was relatively low (<4 mg/L). The temperature ranged from 29.37-29.47°C. Temperature can increase the rate of chemical reactions in water, including pH. The average pH is neutral (7.48-7.86) and still in good condition. Transparency was relatively high (75-90.5) which can be influenced by the low levels of turbidity (4.11-4.66 NTU).

Ammonia and BOD concentrations ranged from <0.13-0.17 mg/L and 22.09-22.48 mg/L, respectively. Nitrate concentration ranged from 0.27-0.33 mg/L with an average nitrate value that was not too high. Phosphate and chlorophyll-a concentration

ranged from 0.14-0.48 mg/L and 7.51-9.61 mg/L, respectively.

Water suitability

The weight value obtained from the variables at Stations 1-3 is 33-35 with the water suitability index being 73.33%, 77.78%, and 75.56% respectively. The water suitability index of the three stations is classified as suitable (S2) (Table 4). Station 2 has 1 not suitable variable, namely BOD, while Stations 1 and 3 have 2 not suitable variables, namely DO and BOD. The results of water suitability can be seen in Figure 1.

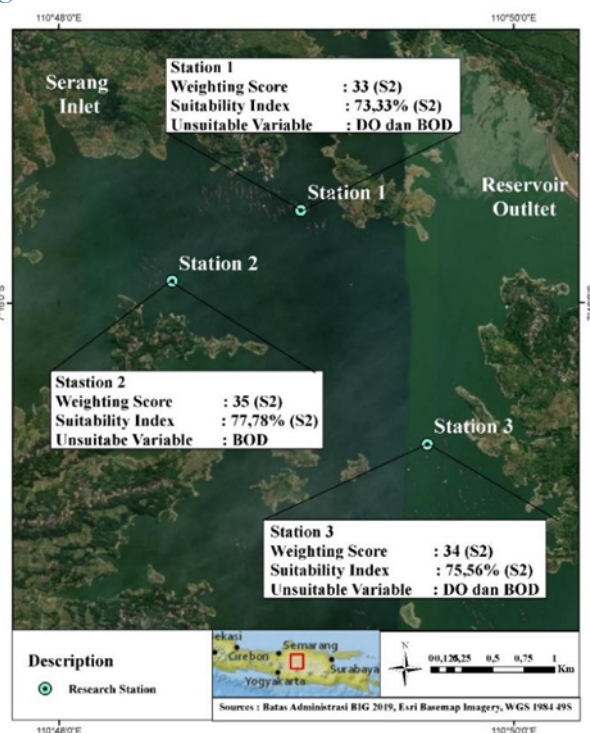


Figure 1. Water suitability map for floating net cages in Kedung Ombo reservoir.

Discussion

Dissolved oxygen (DO) is the most important variable because it affects the survival of fish. The dissolved oxygen concentration was relatively low and did not even exceed 6 mg/L, which is a good oxygen concentration for fisheries activities in the reservoir (Kendarto and Nuryadin, 2021). Dissolved oxygen plays a role in the respiration process in fish. Feeding activity decreases as the concentration of dissolved oxygen decreases. Low dissolved oxygen harms fish growth and feed intake (Ali et al., 2022). Low DO is associated with high BOD concentration. DO is the basic requirement for the reduction of BOD by oxidation of organic matter (Sahu et al., 2023).

The BOD concentration was quite high. This condition is not recommended for aquaculture activities because the waters in Kedung Ombo

Reservoir were polluted. High BOD concentrations can be caused by organic materials from fish feed and feces. A study showed that fish feed eaten by fish is only 20%, while 80% will be wasted in the water (Yashni et al., 2020). BOD can be used as an indicator of the level of pollution in a water body. According to Government Regulation Number. 22 of 2021, the BOD concentration in this study does not meet the requirements for freshwater fish farming, the recommended BOD quality standard for fisheries activities is less than 6 mg/L. A high BOD concentration indicates a low dissolved oxygen content in the waters, which can cause death in fish due to a lack of oxygen (anoxia) (Mavraganis et al., 2021).

Aeration is an effort to increase dissolved oxygen in waters to prevent fish deaths (Astuti et al., 2014). Oxygen concentration will affect the pH and nitrification of bacteria (Wang et al., 2022). pH plays an important role in water quality and has significant implications for aquatic life, human health, and environmental sustainability (Dewangan et al., 2023).

The temperature indicates that the water conditions are suitable for aquaculture activities (Table 3). Water temperature affects metabolic rate, energy balance, and fish behavior, especially in obtaining food (Volkoff and Rønnestad, 2020). The water temperature was influenced by the time of sampling when the weather was sunny with little cloud cover. Temperatures that are too high in water, especially freshwater waters, will cause significant bacterial growth, which has an impact on health risks for fish (Suzzi et al., 2023).

Transparency in Kedung Ombo Reservoir was relatively high, which can be influenced by the low levels of turbidity. Low water transparency can disrupt the photosynthesis system, which will affect phytoplankton abundance (Wulandari et al., 2022). Turbidity has an inverse relationship with transparency, where the higher the turbidity, the lower the transparency. The recommended water turbidity for freshwater fish is no more than 50 NTU (Trebitz et al., 2007).

Ammonia is a product of fish metabolism and the decomposition of organic compounds such as feed residues and fish waste by bacteria into nitrogen in the form of dissolved ammonium (Edwards et al., 2024). Ammonia concentration was quite suitable for aquaculture activities according to Government Regulation Number. 22 of 2021, but regular monitoring of ammonia is needed because ammonia levels can increase significantly due to updrafts. High ammonia concentrations can cause fish gill disease and circulatory disorders (Vaage and Myrick, 2021).

Nitrate in water plays a role in stimulating the growth of plankton and algae as natural food for fish (Kobari et al., 2022). Nitrate concentration is not too high and is still suitable for aquaculture activities (Table 3). High nitrate can reduce oxygen absorption in fish gills, reducing fish growth and inhibiting their survival (Papadopoulos et al., 2024). Besides nitrate, phosphate also affects the presence and growth of phytoplankton. Phosphate acts as a nutrient supplier in the growth of phytoplankton and algae as a natural food for fish. Changes in phosphate concentration in floating net cages are influenced by fish feed and feces (Garno et al., 2024). The growth rate and production of fish reared in fish net cages culture are influenced by chlorophyll-a because it describes the phytoplankton biomass in the waters, which is the natural food of farmed fish and determines the tropic status in the reservoir (Pujiastuti et al., 2021).

The suitability of water is needed to determine the potential for the development and evaluation of floating net cage aquaculture in Kedung Ombo Reservoir. Stations 1, 2, and 3 are categorized as suitable (S2). Three stations do not have a significant difference in scores and indexes, with the highest level of water suitability at station 2. Stations 1 and 3 have 2 not suitable variables, namely DO and BOD. Both variables were variables that had a major influence on the success of fisheries activities in KJA, especially the DO variable. Poor DO levels will have a direct impact on the lives of cultured fish. This is because fish need dissolved oxygen for breathing and food combustion, which produces energy for swimming, growth, reproduction, and others (Caesar et al., 2021).

The development of floating net cages in this study is not suitable because of the low DO and high BOD concentrations. One of the impacts that will occur is that in certain seasons there will be an increase in the amount of organic matter which is quite a lot due to the process of reversing the flow which causes mass death of fish in the Kedung Ombo Reservoir as has happened in recent years. The results of the calculation and evaluation of the suitability of the waters in Kedung Ombo Reservoir show that the waters are suitable. Further research is needed to determine the environmental carrying capacity so that information on the maximum number of floating net cages allowed is obtained.

The sustainability of fish farming in reservoir waters is largely determined by the level of utilization of these resources, which does not exceed their carrying capacity. Depth is one of the determining factors in fish farming with floating net cages. Floating net cages should not be placed in waters

with depths that are too shallow. Waters with depths too close to the bottom are prone to the accumulation of dirt from the rest of the feed and metabolic products of the fish. The depth of the KJA should also not be less than 10 m, this is to increase the submerged weight of the KJA so that it can reduce cage deformation and maintain the cultivation volume (Cheng and Ong, 2022).

Conclusion

The water suitability evaluation of floating net cages in three stations was categorized as suitable. All variables were suitable except BOD at all stations and DO in stations 1 and 3.

Acknowledgments

Thanks to the Faculty of Fisheries and Marine Sciences, Universitas Diponegoro with Decree Number: 64/UN7.5.10.2/HK/2022 for the funding provided to the team so that this research can be carried out.

References

- Akbar, S. A., H. K. Rahayu. 2023. Tinjauan literatur: bioakumulasi logam berat pada ikan di perairan Indonesia. *Lantanida Journal*, 11(1): 51–66.
- Alexander, T.J., P. Vonlanthen, O. Seehausen. 2017. Does eutrophication-driven evolution change aquatic ecosystems? *Philos. Trans. R. Soc. B* 372: 20160041.
- Ali, B., Anushka, A. Mishra. 2022. Effects of dissolved oxygen concentration on freshwater fish: A review. *International Journal of Fisheries and Aquatic Studies*, 10(4): 113-127.
- Astuti, L.P., E.M. Adiwilaga, B.I. Setiawan, N.T.M. Pratiwi. 2014. Effect of Aeration on the Rate of Biochemical Oxygen Demand (BOD) in Floating Net Cages in Ir. H Djuanda Reservoir, West Java, Indonesia. *Journal of Applied Biotechnology*, 2(2): 82-90.
- Boyd, C.E., L.R. D'Abramo, B.D. Glencross, D.C. Huyben, L.M. Juarez, G.S. Lockwood, A.A. McNevin, A.G.J. Tacon, F. Teletchea, J.R. Tomasso Jr, C.S. Tucker, W.C. Valenti. 2020. Achieving sustainable aquaculture: Historical and current perspectives and future needs and challenges. *J World Aquacult Soc* 51, 578-633.
- Caesar, N.R., U. Yanuhar, D.K.W.P. Raharjo, N.S. Junirahma. 2021. Monitoring of water quality in the catfish (*Clarias* sp.) farming in Tuban Regency. *IOP Conference Series: Earth and Environmental Science*, 718(1), 12061.
- Cheng, H., M.C. Ong. 2022. Comparative study of five commonly used gravity type fish cages under pure current conditions. *Ocean Engineering*, 250: 1-21.
- Dewangan, S.K., S.K. Shrivastava, V. Tigga, M. Lakra, Namrata, Preeti. 2023. Review paper on the role of pH in water quality implications for aquatic life, human health, and environmental sustainability. *International Advanced Research Journal in Science, Engineering and Technology*, 10(6): 215-218.
- Edwards, T.M., H.J. Puglis, D.B. Kent, J.L. Durán, L.M. Bradshaw, A.M. Farag. 2024. Ammonia and aquatic ecosystems - A review of global sources, biogeochemical cycling, and effects on fish. *Science of the Total Environment*, 907: 1-23.
- Harmilia, E.D., I. Ma'ruf. 2022. Analysis of the suitability of fish cultivation locations using floating net cages in the Ogan Ilir River Tributaries. *Sainmatika*, 19(1): 28-40.
- Finlay, J.C., G.E. Small, R.W. Sterner. 2013. Human influences on nitrogen removal in lakes. *Science* 342(6155): 247-250.

- Garno, Y.S., A. Riyadi, I. Iskandar, D.R. Kendarto, S.I. Sachoemar, J.P. Susanto, L. Widodo, N. Suwedi, T. Prayogo, R.P. Dewa, T.A. Adibroto, R.S. Aliah, H. Haryanti, S. Syaefudin, R.P. Adhi. 2024. The impact of aquaculture in floating net cages exceeding the carrying capacity on water quality and organic matter distribution: the case of Batur Lake, Indonesia. *Polish Journal of Environmental Studies*, 33(4): 3651-3663.
- Heino, J., J. Alahuhta, L.M. Bini, Y.J. Cai, A.S. Heiskanen, S. Hellsten, P. Kortelainen, N. Kotamaki, K.T. Tolonen, P. Vihervaara, A. Vilmi, D.G. Angeler. 2021. Lakes in the era of global change: moving beyond single-lake thinking in maintaining biodiversity and ecosystem services. *Biological Reviews*. 96: 89-106.
- Hidayah, T., Marson. 2019. Analysis of location suitability for floating net cage cultivation in Batuteji Reservoir, Tanggamus Regency, Lampung. *Fiseries*, 8(1): 1-8.
- Kendarto, D.R., R. Nuryadin. 2021. A suitability analysis for aquaculture and maritime tourism designation of Cirata Reservoir based on reservoir's water quality. *Teknotan: Journal of the Agricultural Technology Industry*, 15(1): 1-8.
- Kobari, T., T. Honma, D. Hasegawa, N. Yoshie, E. Tsutsumi, T.T. Matsuno, T. Nagai, T. Kanayama, F. Karu, K. Suzuki, T. Tanaka, X. Guo, G. Kume, A. Nishina, H. Nakamura. 2020. Phytoplankton growth and consumption by microzooplankton stimulated by turbulent nitrate flux suggest rapid trophic transfer in the oligotrophic Kuroshio. *Biogeosciences*, 17(9): 2441-2452.
- Komala, P.S., A. Nur, I. Nazhifa. Distribution of organic contamination based on depth stratification in Maninjau Lake, Indonesia, *IOP Conf. Ser. Mater. Sci. Eng.* 602: 012057.
- Le Moal, M., C. Gascuel-Odoux, A. Menesguen, Y. Souchon, C. Etrillard, A. Levain, F. Moatar, A. Pannard, P. Souchu, A. Lefebvre, G. Pinay. 2019. Eutrophication: a new wine in an old bottle? *Sci. Total Environ.* 651: 1-11.
- Linne, E.R., A. Suryanto, M.R. Muskananfolo. 2015. Water quality feasibility level for fisheries activities in Pluit Reservoir, North Jakarta. *Management Of Aquatic Resources Journal (Maquares)*, 4(1): 35-45.
- Mammides, C. 2020. A global assessment of the human pressure on the world's lakes. *Global Environ. Change*, 63.
- Mavraganis, T., M. Tsoumani, M. Kolygas, M. Chatziefstathiou, C. Nathanailides. 2021. Using seasonal variability of water quality parameters to assess the risk of aquatic pollution from rainbow trout fish farms in Greece. *International Journal of Energy and Water Resources*, 5: 379-389.
- Mustofa, A., H. Mulyo. 2020. Analysis of the distribution pattern of seawater physics parameters as a support for fishpond aquaculture business in Jepara Regency, Central Java. *Enggano Journal*, 5(1): 40-52.
- Papadopoulos, D.K., A. Lattos, I. Chatzigeorgiou, A. Tsaballa, G.K. Ntinas, I.A. Giantsis. 2024. The influence of water nitrate concentration combined with elevated temperature on rainbow trout *Oncorhynchus mykiss* in an experimental aquaponic setup. *Fishes*, 9(2): 74.
- Portinho, J.L., A.C.C. Gomes, A. Koga-Vicente, F.C.C. Milani, R.B. Pentean, C.V. Manzatto, L. Spinelli-Araujo, L.E. Vicente. 2021. The pathways influence of agricultural expansion on water quality of fish farming in Ilha Solteira reservoir, São Paulo, Brazil. *Aquaculture*, 536: 736405.
- Pujiastuti, P., R.J. Putri, Suseno. 2021. Determination of the tropical status of floating net cage water based on the distribution of nitrogen, phosphorus and chlorophyll-a. *BIOLINK (Journal of Health Industry Environmental Biology)*, 7(2): 172-184.
- Sahu, P., S.N. Londhe, P.S. Kulkarni. 2023. Modelling dissolved oxygen and biochemical oxygen demand using data-driven techniques. *Environmental Engineering Research*, 28(3): 210541.
- Simanjuntak, I.C.B.H., F. Muhammad. 2018. Carrying capacity of Kedungombo reservoir for net cage culture. *E3S Web of Conferences*, 73(48):1-5.
- Suzzi, A.L., M. Stat, T.F. Gaston, N. Siboni, N.L. Williams, J. Seymour, M.J. Huggett. 2023. Elevated estuary water temperature drives fish gut dysbiosis and increased loads of pathogenic vibriaceae. *Environmental Research*, 219: 1-10.
- Trebitz, A.S., J.C. Brazner, V.J. Brady, R. Axler, D.K. Tanner. 2007. Turbidity tolerances of great lakes coastal wetland fishes. *North American Journal of Fisheries Management*, 27(2): 619-633.
- Vaage, B., C. Myrick. 2021. The effects of acute and chronic exposure of ammonia on juvenile burbot (*Lota lota*) growth and survival. *Aquaculture*, 542: 1-10.
- Vasistha, P., R. Ganguly. Water quality assessment of natural lakes and its importance: an overview, *Mater. Today: Proc.*, 32: 544-552.
- Volkoff, H., I. Rønnestad. 2020. Effects of temperature on feeding and digestive processes in fish. *Temperature*, 7(4): 307-320.
- Wang, Y., H. Xu, Z. Shen, M. Ding, R. Xue, T. Lin. 2022. Effects of dissolved oxygen on water quality and biofilms in the raw water distribution pipeline for a reserved water source. *Environmental Science: Water Research & Technology*, 8(10): 2277-2288.
- Wahdaniar, J.W. Hidayat, F. Muhammad. 2019. Carrying capacity and land suitability of tongke-tongke mangrove ecotourism, Sinjai Regency, South Sulawesi. *Environmental Sciences Bulletin*, 17(3): 481-485.
- Wulandari, P., R.Y. Nugroho, F. Agutriani, A. Agussalim, F. Supriyadi, Iskandar. 2022. Assessment distribution of the phytoplankton community structure at the fishing ground, Banyuasin Estuary, Indonesia. *Acta Ecologica Sinica*, 42(6): 670-678.
- Yashni, G., A. AlGheethi, R.M.S.R. Mohamed, V.A. Shanmugan, N.H.M. Nayan, J.A. Bakar, S.N.A.M. Salleh. 2020. Physical properties of fish feed containing household waste as an alternative substitute in newly developed soft-dry fish feed for red tilapia. *Materials Today: Proceedings*, 31: 65-68.
- Yunus, A.R., S. Budi, S. Salam. 2019. Feasibility analysis of floating net cage cultivation location in the waters of Pulau Harapan Village, Sinjai. *Journal of Aquaculture and Environment*, 2(1):1-5.

How to cite this paper:

Bawono, P. M., A. Rahman, C. Ain, Haeruddin, K. Prakoso, A. Arifati. 2025. Evaluation of the water suitability of floating net cages aquaculture in Kedung Ombo Reservoir, Central Java. *Depik Jurnal Ilmu-Ilmu Perairan, Pesisir dan Perikanan*, 14(1): 104-110.

Table 1. Area suitability matrix for floating net cages.

No.	Variable	Water Quality Range	Score (S)	Weight (W)	Value (V)
1	DO (mg/L) ⁽¹⁾	>6	3	3	9
		3-6	2		6
		<3	1		3
2	Temperature (°C) ⁽¹⁾	28-32	3	2	6
		26-<28	2		4
		<26 and >32	1		2
3	pH ⁽¹⁾	7.5-8.0	3	2	6
		7-<7.5 or >8.0-8.5	2		4
		<6 or >8.5	1		2
4	Transparency (cm) ⁽¹⁾	>50	3	2	6
		30-50	2		4
		<30	1		2
5	Turbidity (NTU) ⁽²⁾	0-10	3	1	3
		10-20	2		2
		>20	1		1
6	Ammonia (mg/L) ⁽¹⁾	0-0.02	3	1	3
		>0.02-0.5	2		2
		>0.5	1		1
7	BOD (mg/L) ⁽¹⁾	<3	3	1	3
		3-5	2		2
		>5	1		1
8	Nitrate (mg/L) ⁽³⁾	0.9-3.5	3	1	3
		0.2-0.9	2		2
		0.01-0.2	1		1
9	Phosphate (mg/L) ⁽³⁾	>0.21	3	1	3
		0.1-0.21	2		2
		0.051-0.1	1		1
10	Chlorophyll-a (mg/L) ⁽³⁾	>3.5-10	3	1	3
		1.71-3.5	2		2
		0.71-1.70	1		1

Source: modified results from ⁽¹⁾Kendarto and Nuryadin (2021), ⁽²⁾Harmilia and Ma'ruf (2022), ⁽³⁾Linne et al. (2015).**Table 3.** Water quality variables in floating net cages in Kedung Ombo Reservoir.

No	Variables	Station 1	Station 2	Station 3	Standards
1	DO (mg/L)	2.92±0.27	3.26±0.62	2.88±0.46	6 ⁽¹⁾
2	Temperature (°C)	29.37±0.29	29.47±0.45	29.4±0.44	28-32 ⁽¹⁾
3	pH	7.86±0.72	8.06±0.34	7.76±0.2	7.5-8.0 ⁽¹⁾
4	Transparency (cm)	81.17±9.7	90.5±13.61	75±8.66	50 ⁽¹⁾
5	Turbidity (NTU)	4.66±1.26	4.31±1.02	4.11±0.51	10 ⁽²⁾
6	Ammonia (mg/L)	0.21±0.14	0.13±0.02	0.14±0.03	0.02 ⁽¹⁾
7	BOD (mg/L)	16.34±12.22	16.18±11.06	15.32±10.3	3 ⁽¹⁾
8	Nitrate (mg/L)	0.3±0.1	0.27±0.06	0.33±0.06	0.9 ⁽³⁾
9	Phosphate (mg/L)	0.14±0.03	0.48±0.37	0.4±0.41	0.21 ⁽³⁾
10	Chlorophyll-a (mg/L)	7.66±1.61	7.51±0.16	9.01±0.55	10 ⁽³⁾

Source: ⁽¹⁾Kendarto and Nuryadin (2021), ⁽²⁾Harmilia and Ma'ruf (2022), ⁽³⁾Linne et al. (2015)

Table 4. Water suitability value for floating net cages in Kedung Ombo Reservoir.

No	Variable	Station 1			Station 2			Station 3		
		Score (S)	Weight (W)	Value (V)	Score (S)	Weight (W)	Value (V)	Score (S)	Weight (W)	Value (V)
1	DO (mg/L)	1	3	3	2	3	6	1	3	3
2	Temperature (°C)	3	2	6	3	2	6	3	2	6
3	pH	3	2	6	2	2	4	2	2	6
4	Transparency (cm)	3	2	6	3	2	6	3	2	6
5	Turbidity (NTU)	2	1	2	2	1	2	2	1	2
6	Ammonia (mg/L)	2	1	2	2	1	2	2	1	2
7	BOD (mg/L)	1	1	1	1	1	1	1	1	1
8	Nitrate (mg/L)	2	1	2	2	1	2	2	1	2
9	Phosphate (mg/L)	2	1	2	3	1	3	3	1	3
10	Chlorophyll-a (mg/L)	3	1	3	3	1	3	3	1	3
Score		33			35			34		
Suitability Index		73,33%			77,78%			75,56%		
Suitability Class		Suitable (S2)			Suitable (S2)			Suitable (S2)		