

Analysis of Ichthyofauna and Water Quality of Situ Bagendit Post-Revitalization

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Abstract – Abstract Situ Bagendit is a natural lake in Garut Regency that has experienced environmental degradation. Therefore, a revitalization program was implemented from November 2020 to April 2022 to restore the ecosystem and enhance its tourist appeal. Two years and seven months after the revitalization, a study was conducted to assess the program's effectiveness on aquatic ecosystem quality. Sampling was conducted at three observation stations based on water characteristics. The parameters observed included biotic factors (fish diversity) and abiotic factors (physical and chemical parameters of the waters). The Shannon-Wiener diversity index was used to assess the stability of the fish community, while water quality was analyzed based on water quality standards according to Government Regulation No. 22 of 2021 and lake trophic classification. The results showed that water quality data that did not meet the threshold according to Government Regulation No. 21 of 2021 were water clarity (75-136 cm), chemical oxygen demand (COD) (21-31 mg/L), total nitrogen (1.22-1.59) and conductivity (506-588 μ scm). Fish diversity was at a moderate level with an index of 1.22. Abundance values ranged from 4-55% with the highest abundance value being the zebra tilapia (*Hemichromis elongatus*). The fish species found as an indicator of pollution was the janitor fish (*Pterygoplichthys pardalis*) due to its high adaptability to polluted water. This is related to the presence of Abiotic factors that do not comply with Government Regulation No. 21 of 2021. The waters of Situ Bagendit, based on abiotic and biotic factors, indicate eutrophication due to organic pollution. Fish diversity in Situ Bagendit after revitalization includes five species, four of which are invasive. The ecosystem of Situ Bagendit still requires sustainable management to maintain water quality and biodiversity.

Keywords: fish diversity, water quality, Situ Bagendit, revitalization, bioindicators

INTRODUCTION

Introduction Lakes have high attention due to the damage that occurs in the Water Catchment Area (DTA) and uncontrolled utilization of lake space. The number of lakes in Indonesia in 2024 is 68 lakes. These lakes consist of 1,022 natural lakes, 1,314 artificial lakes, and 3,471 lakes that have not been identified as natural lakes or artificial lakes (Indonesian Institute of Sciences, 2020). The existence of lakes can guarantee sufficient water for the surrounding community area, the fulfillment of water needs for the community and its surroundings makes community activities run well, this has an impact on income or can increase economic growth in the surrounding area which makes the community sufficient (Surtikanti, 2014). Situ Bagendit is one of the iconic tourist attractions in Garut Regency which is still beautiful. One of the lakes in West Java Province. Situ Bagendit is a natural lake with a water supply that comes from residents' rice fields, rainwater, and the flow of the Copong Dam. Water that enters through the inlet, exits again through the outlet and flows into the Cimanuk and Parigi watersheds (Amelia et al., 2012). Although the tourist attraction has various challenges that threaten its sustainability, in recent years Situ Bagendit has faced various environmental problems that have a negative impact on the ecosystem and health of the surrounding community. The decline in the quality of Situ Bagendit's waters was also stated in a study conducted by Kurniawan and Surtikanti (2019) before the revitalization of Situ Bagendit, including as a lake with hypereutrophic status, to answer these challenges Situ Bagendit has been infrastructure revitalization in 2020 to 2022 as part of efforts to maintain

environmental sustainability and increase its economic value (Nontji, 2006). The revitalization carried out only prioritizes tourism in its development in accordance with Regional Regulation Number 1 of 2019. New infrastructure built after revitalization in the form of development includes the construction of a 6 km jogging track, lotus garden, playground, culinary center, restaurant, floating mosque, and selfie bridge (Ministry of Public Works and Public Housing, 2022). This makes the revitalization concept into ecotourism by adding new facilities and buildings that can attract tourists. However, with the presence of buildings, human activities can get closer to the lake, and the construction of new tourist attractions can pollute the waters and disrupt the aquatic ecosystem.

Analysis of ichthyofauna and water quality parameters is an effective method in assessing the water quality conditions of a body of water, because the presence and diversity of fish is greatly influenced by the environmental conditions of the water (Effendi, 2003; Karr, 1981). Before revitalization, nine types of fish were found in the Situ Bagendit lake, namely *Oreochromis niloticus* (tilapia), *Oreochromis mossambicus* (tilapia), *Anabas testudineus* (betok), *Tricogaster pectoralis* (sepat), *Channa striata* (snakehead), *Amphilophus citrinellus* (oskar), *Cyclocheilichthys Apogon* (nilem), *Dermogenis pussilus* (julung-julung), *Rasbora argyotaenia* (reges) (Nurfiarini & Purnowo, 2009). Fish are one of the organisms that are widely used as bioindicators to observe the level of pollution in the aquatic environment (Ismail & Yusof, 2011). Fish can absorb minerals from water, either directly through their gills or indirectly through their food consumption (Sow et al., 2012). Because of its position as the main consumer in the aquatic food chain, fish have the potential to accumulate heavy metals that can affect human health through the food chain (Authman et al., 2015). Therefore, examining the chemical and physical properties of the water and the fish population provides important insights into the water quality of Situ Bagendit. This fish study is the first to determine the fish diversity in Situ Bagendit Lake after revitalization. Revitalization is expected to improve water quality and increase fish diversity.

MATERIALS AND METHODS

1. Materials

Observation points and sampling using essential digital GPS tools. pH, Total Dissolved Solid (TDS), conductivity, and water temperature testing tools using multifunction tools, namely water quality testers. DO meters are used to measure dissolved oxygen in water. Secchi disks are used to measure water clarity. Measurements such as chlorophyll-a, total nitrogen, total phosphate and Chemical oxygen demand (COD) use national standards tested through third parties at the Bandung City Hydrology and Water Environment Laboratory. Fish sampling uses a cast net with a mesh size of one meter and a length of two meters and is identified using an identification key book.

2. Methods

The research location was in Situ Bagendit Lake, Banyuresmi District, Garut Regency, West Java. The research was conducted in December 2024. The research was conducted using a purposive sampling technique by dividing the lake into three sampling stations determined based on revitalization efforts and human activities. This research was conducted in December 2024. Purposive sampling was used, dividing the lake into three sampling stations based on revitalization efforts and human activity. Station 1's coordinates are S 07°09.687'E 107°56.838', station 2's coordinates are S 07°09.737'E 107°56.500', station 3's coordinates are: S 07°09.751'E

107°56.204'. Station one is located in a recreation area, station two is located in the waters of aquatic plants and station three is located at the floating mosque. Stations 1 and 3 are stations with areas affected by revitalization, the area of station one is the construction of an amphitheater and station 3 is the construction of a floating mosque. The geographical layout of each research station will be shown in Figure 1.

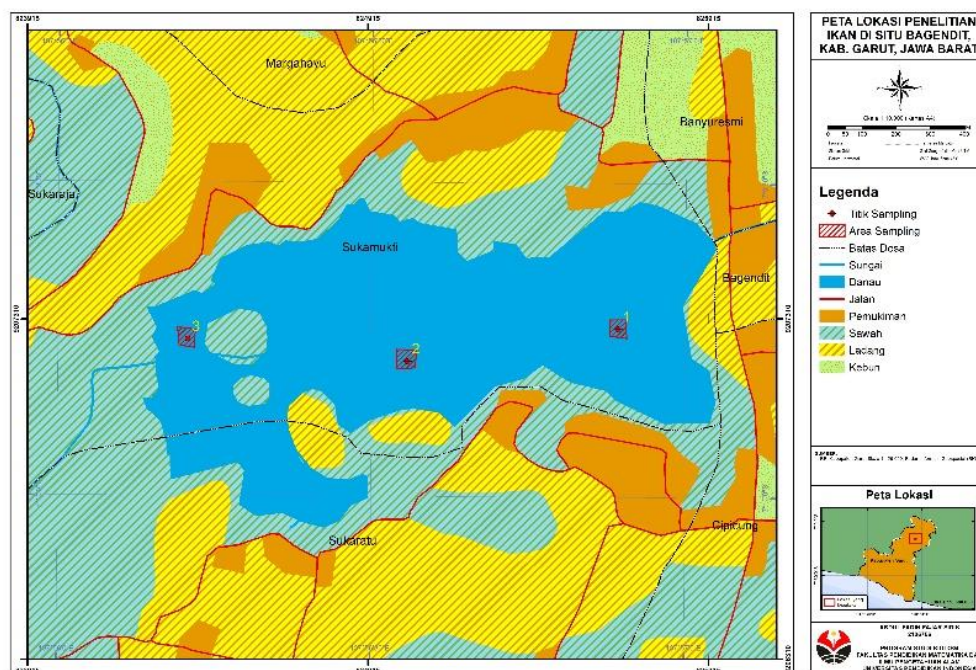


Figure 1. Sampling station point map

Fish sampling using one cast net with a mesh size of one meter and a length of two meters, fish retrieval is carried out at station one at the recreation point (outlet), station two at the water plant water point, station three at the floating mosque point (inlet). Sampling was carried out at a specified time of 2 hours for each station, so fish sampling was carried out several times during the 2 hours of fish sampling (Modification of research by Tjakrawidjaja & Haryono, 2001). Sampling is carried out at 06.00-12.00. Fishing is carried out when the temperature is low or the weather is not too hot. During this time, sunlight is still optimal and recreational activities are still low (Kurniawan, 2019). Fish activity is higher in the morning because in the morning fish tend to be close to the water surface to look for food (Nugroho & Santoso, 2014). After being successfully caught, the fish are identified by morphology, scientific name, local name and level of extinction. Identified by looking at the morphological structure, namely by looking at the shape of the fish body, the shape of the fish head, the mouth of the fish, the fins of the fish, the tail of the fish and the scales of the fish and taxonomy and counting the number caught (Saainin, 1984 & Kottelat et al., 1993). Fish identification uses the book "fish identification key guide" by Hasanuddin Saainin, the book "animal biosystematics" and can be identified through online literature sources.

3. Data Analysis Diversity and Calculation of relative abundance fish.

The data obtained needs to be analyzed to obtain complete results regarding a study. According to Mulyadi (2013) data analysis is an effort to examine in detail the data obtained in a study. Data analysis is needed so that raw data can be converted into important information.

a. Fish Diversity Index

The fish diversity index is a value used to describe the diversity of species in an ecosystem, the diversity index can describe the good or bad of the ecosystem, Analysis of the fish diversity of Situ Bagendit using the Shannon-Wiener diversity index in Odum (1993) as follows:

$$H' = - \sum p_i \times \ln \times p_i$$

The Shannon-Wiener diversity index (Odum, 1993) analyzes species diversity into three values or criteria:

- a) $H' < 1$ = Low diversity, unstable community stability
- b) $1 < H' < 3$ = Moderate diversity, moderate community stability
- c) $H' > 3$ = High diversity, good community stability

b. Calculation of relative abundance

Relative abundance is a measure that can describe the comparison of the number of individuals of a species with the total number of individuals of all species in a community. Analysis of the abundance of Situ Bagendit fish uses provisions based on Kartamihardja and Hendra (2000), namely:

$$Kr = n_i / N \times 100\%$$

The relative abundance index (Katamihardja and Satria, 2000) has three values or criteria for species:

If the total catch is <25%, the relative abundance is rare.

If 25-50%, the relative abundance is moderate.

And >50%, the relative abundance is high.

c. Aquatic sampling.

The measured water samples not only serve as additional data for fish, but also as a means to determine the water quality of Situ Bagendit. Sampling was carried out at each observation station point with three repetitions for each parameter, except for parameters analyzed at the Bandung Hydrology and Aquatic Environment Laboratory (PUSAIR), where only one sample was taken at each station. The measured water parameters include physical and chemical parameters with a depth of 1-3 meters at the time of sampling. Physical parameters measured in situ before fish sampling at 6 am to 12 pm include water temperature, dissolved particles, clarity, and conductivity. Chemical parameters measured in situ include dissolved oxygen and acidity. The tools used for in situ water quality measurements include a water quality meter, DO meter, and Secchi disk. Several other parameters were analyzed at the Bandung Hydrology and Aquatic Environment Laboratory (PUSAIR), namely Chemical Oxygen Demand (COD), chlorophyll-a, total nitrogen, and total phosphorus. Two liters of samples were taken for chemical analysis at each station using a 1 liter sample bottle.

d. Water quality.

Analysis was carried out by comparing abiotic water factor data with water quality standards in Government Regulation No. 22 of 2021 concerning the implementation of environmental protection and management with additional data on the level of nutrient content in lake waters as determined by the Ministry of Environment and Forestry in 2009 and the trophic classification of lakes based on chlorophyll-a levels as stated by Carlson & Simpson (1996).

RESULT AND DISCUSSION

1. Water Quality Data

Based on the water quality measurement results in Table 1, there were no significant differences in the range of values between stations, so the range of differences was not too large. Table 4.1 shows that six physical and chemical water factors meet and three factors do not meet Class II quality standards. Class II standards are intended for aquatic recreation facilities/infrastructure, freshwater fish farming, livestock farming, crop irrigation, and other uses requiring similar water quality, as stipulated in Government Regulation No. 22 of 2021. The abiotic factors that meet these standards are: pH, water temperature, Total Dissolved Solids (TDS), Dissolved Oxygen (DO), total phosphate, and chlorophyll-a. Abiotic factors that do not meet the quality standards stipulated in Government Regulation No. 21 of 2021 include: water clarity, Chemical Oxygen Disulfide (COD), and total nitrogen. Conductivity values range from 506-588 $\mu\text{S}/\text{cm}$, potentially affecting the physical and chemical properties of the water and fish diversity. A freshwater body with healthy mixed fisheries has an EC range of 150 to 500 $\mu\text{S}/\text{cm}$ (Munni et al., 2015).

Table 1. Water Quality Data

Factors	Second class quality standard Government regulation no. 22 of 2021	Value of Each Station		
		1	2	3
pH	6-9	6,5-7,3	6,9-7,25	6,2-7,1
Water temperature ($^{\circ}\text{C}$)	Dev 3 (3 digits different from the air temperature above the water surface)	27,8-28,8	26,9-27,2	26,1-27,3
Total Dissolved Solid (ppm)	1000	271-288	258-278	265-279
Dissolved Oxygen (DO) (mg/L)	4 (minimum limit)	6,8-7,2	7,6-8,6	7,3-8
COD (mg/L)	25	31	21	25
Konduktivitas ($\mu\text{S}/\text{cm}$)	-	569-588	506-531	560-568
Total phosphate (mg/L)	0,03	0,03	0,012	0.012
Total nitrogen (mg/L)	0,75	1,22	1,59	1,17
Water clarity (cm)	400 (minimum limit)	75-86	122-136	92-115
Chlorophyll-a (mg/m ³)	50	6,8	11	4,3

COD is Based on the results of measurements carried out including the physics and chemistry of lake water in Table 1 COD is a chemical factor that indicates the need for chemical oxygen which functions as a breaker of organic substances in waters. It can be seen in Table 1. Where station 1 has a high COD with a value of 31 mg/L. The high COD is likely caused by the content of chemical compounds, especially the high nitrogen content which is estimated to come

from waste generated by tourists. Then there are the latest facilities as part of the revitalization program built on waters that make it easier for tourist waste to enter the waters. Tourists who litter such as cigarette butts, leftover food, plastic and raft tours which increase the organic content of the waters. Kusuma and Putri, (2017) stated that the organic load from waste and waste generated by tourists and the surrounding community results in polluting the surrounding waters. This condition is in accordance with research conducted by Muthifah et al., (2018) which stated that high COD values were caused by the discharge of organic compounds from domestic waste. COD is one of the key parameters as a detector of water pollution levels. High COD is likely to have poor physics and chemistry so that it can affect the diversity of fish and other biota. Research by Andara et al., (2014) The higher the COD, the worse the physics and chemistry. Research conducted by Listyaningrum, (2022) High COD will have an impact on oxygen deficit in river water so that it can cause death to fish and aquatic plants. This condition is in accordance with the results obtained in Table 4.1 where station 1 which has high COD has the fewest number of species, namely 16 species with 3 types of fish, this makes station 1 the station with the fewest types and number of individuals found between stations 2 and 3. COD at points 2 and 3 is still on the threshold of the quality standard class 2 Government Regulation. No. 22 of 2021.

Conductivity value is one of the indicator factors of high COD values. Water conductivity refers to the ability of water to conduct electricity which depends on the amount of dissolved ions, good physics and chemistry may have low conductivity because of the few dissolved ions. High COD values are directly proportional to conductivity values (Hertika et al., 2022). Waste in the waters is likely one of the causes of high conductivity, besides high salt content can cause high conductivity. According to research by Arlindia (2015), increased electrical conductivity in lake waters is an indicator of pollution from domestic waste and agricultural waste. The conductivity value measured at Situ Begendit is classified as high conductivity with a value of (506-588 μ S/cm) compared to other lakes, such as Lake Maninjau with conductivity (87 μ S/cm and 90 μ S/cm) (Arlindia, 2015) and Lake Situ Kuru (207.2-216, 43 μ S/cm) (Haribowo et al., 2023). High conductivity values can have a negative impact on fish because excess organic compounds can threaten the survival of fish which results in decreased habitat quality, decreased growth, increased disease in fish, and can even cause death in fish.

High total nitrogen can cause eutrophication of excessive aquatic plant growth which can disrupt the aquatic biota ecosystem. The impact of high total nitrogen can have an impact on water where the water will become cloudy and cause an unpleasant odor. This is related to the high growth of water hyacinth in the waters of Situ Bagendit, which can be seen at station two which is a place where aquatic plants are filled with water hyacinth so that the total nitrogen at station two has a higher nitrogen value than stations one and two. Water hyacinth can actually help reduce the nitrogen levels of water, but with the high levels of water hyacinth growth, it becomes a water pest so that the decay of water hyacinth settles in the sediment which makes the nitrogen value high. The decay of water hyacinth in waters can increase nitrogen levels again which can cause ecosystem toxicity (Putri et al., 2020). The use of fertilizers for agriculture around Bagendit can increase nitrogen levels, fertilizers used excessively, especially fertilizers with urea containing high nitrogen and entering the waters of Situ Bagendit through the inlet, increase nitrogen levels. Lake classification based on nutrients referring to the Ministry of Environment and Forestry in 2009, total water nitrogen with a value of less than or equal to 1.9 mg/L is included in eutrophic waters (fertile waters).

The factors that have been explained can affect the water quality in Situ Bagendit, thus affecting fish diversity because water quality is related to fish life. The clarity of the water in Situ Bagendit ranges from 75-136 cm, which makes the water clarity not meet the minimum limit contained in the quality standards of PP No. 22 of 2021 which has a minimum value of 400 cm. Water clarity can affect the diversity of fish and plankton, with sufficient sunlight, plankton growth is faster, the growth of plankton will affect the diversity of fish where plankton is one of the foods for fish. The low water clarity in Situ Bagendit is influenced by shallowing and high water turbidity, these two things are likely caused by the decay of lotus and water hyacinth plants which become pests then rot on a large scale in the waters of Situ Bagendit. When water hyacinth and lotus die they begin to decompose, this process involves the activity of microorganisms that decompose the organic material of the plants during the process the small particles produced can dissolve in water, thereby increasing turbidity, this turbidity has the potential to reduce water quality and affect other organisms (Sihombing, 2011). When plants die and begin to decompose, the accumulated organic matter will settle at the bottom of the waters, causing sediment and other organic material to settle which contributes to shallowing and reduced water depth (Sukmawati, 2013). The presence of factors that do not meet the threshold for class II water quality standards include: COD (chemical oxygen demand), total nitrogen, and water clarity, indicating that Situ Bagendit is not yet suitable for use as a recreational facility/infrastructure, freshwater fish farming or other uses that require similar water quality (class II). The inconsistency of these factors can cause health problems for living things, including humans. Water with high COD and total nitrogen content can cause dermatitis and eye irritation (Hertika et al., 2022).

2. Fish Diversity and Abundance Data

The diversity and abundance of fish in the waters of Situ Bagendit contains 5 different species, namely *Oreochromis niloticus*, *Andinoacara rivulatus*, *Hemichromis elongatus*, *Pterygoplichthys pardalis*, *Channa striata* in table 2 explains the value of diversity and abundance and identification of fish. Species distribution across station is presented in the abundance discussion, as shown in Figure 2.

Tabel 2. Fish Diversity and Abundance Data

Ordo	Family	Species	Local name	Abundance	Diversity
Cichliformes	Cichlidae	<i>Oreochromis niloticus</i>	Nila	5,2	1,22
		<i>Andinoacara rivulatus</i>	Golso m	15,7	
		<i>Hemichromis elongatus</i>	Nila zebra	55,7	
Siluriformes	Loricariidae	<i>Pterygoplichthys pardalis</i>	Sapu-Sapu	18,9	
Perciformes	Channidae	<i>Channa striata</i>	Gabus	4,2	

Fish diversity based on Table 2. The diversity value of 1.22 illustrates that the diversity of fish in the waters of Situ Bagendit is moderate diversity, moderate community stability. Where only five types of fish were found in the waters of Situ Bagendit. High tilapia populations can

indicate eutrophication because they are able to survive in environments with high nutrients and increased primary productivity.

Channa striata, a predatory fish and active swimmer, is generally found in waters of moderate to good quality. *Channa striata* prefers waters with submerged aquatic plants. In this study, *Channa striata* was only found at station 2, which is characterized by aquatic plants. Amornsakun et al. (2005) stated that *Channa striata* is tolerant of low oxygen levels and is often found in swamps or semi-flooded areas.

The species *Pterygoplichthys pardalis* is often used as an indicator of physical and chemical water degradation due to its high adaptability to polluted water, identifying the *Pterygoplichthys pardalis* as an indicator of poor water quality. *Pterygoplichthys pardalis* was found at every station. This aligns with existing research, which suggests that the presence of a dominant *Pterygoplichthys pardalis* species can indicate physical and chemical water degradation, especially since this fish is often found in waters high in organic matter (Wikramanayake, 1990). *Hemichromis elongatus* is a freshwater ornamental fish native to West Africa but has spread to various regions. This fish is known for its aggressiveness and tolerance to various environmental conditions. *Hemichromis elongatus* was found at every station. *Oreochromis niloticus* is an omnivorous fish that is relatively tolerant of environmental conditions. In this study, *Oreochromis niloticus* was found at stations 2 and 3. Station 2 had a higher nitrogen content than points 1 and 3. The fish were found at point 3 because points 2 and 3 were close together, allowing the tilapia to migrate to location 3. At location 1, there was significant human activity, preventing the fish from moving to point 1. A high population of *Oreochromis niloticus* (tilapia) may indicate eutrophication, as it can survive in environments with high nutrients and increased primary productivity (Amornsakun et al., 2005). The *Andinoacara rivulatus* species was found at all stations. This species is able to survive in waters with mild to moderate levels of pollution due to its adaptive physiological mechanisms, including the ability to adapt to pH fluctuations, low dissolved oxygen (DO), and ammonia concentrations. Kullander (2003) explained that *Andinoacara rivulatus* has a tolerance to a wide range of temperatures and water quality, allowing it to survive in suboptimal waters. Therefore, the presence of *Andinoacara rivulatus* in polluted waters can be an indicator that the ecosystem remains in a condition that allows life, despite experiencing anthropogenic pressures.

Freshwater fish species from the Cichlidae family have high environmental tolerance, especially to changes in water quality. According to Barlow (2000), many cichlid species demonstrate resilience to unstable environmental conditions due to their efficient respiratory and excretory systems. The presence of fish can signal changes in fish communities due to the introduction of foreign species or environmental conditions that favor invasive species. The presence of fish indicates that the water quality at the study site can be categorized as lightly to moderately polluted (Courtenay & Williams, 2004).

Abundance Data, The stations with the largest number of individuals found include station 2, which is the station where the largest number of fish species was found with 54 individuals, then station 2 with 25 species found, then the lowest or least number is station 1, where only 16 individuals were found. The abundance of fish in Situ Bagendit ranges from 5-55%, the highest abundance of fish species from all stations is *Hemichromis elongates* with an abundance value of 55.7, then followed by the species *Pterygoplichthys pardalis* with an abundance value of 18.9, the next species *Andinoacara rivulatus* with a value of 15.7, then the species *Oreochromis niloticus* with an abundance value of 5.2, and the smallest abundance value is owned by the species *Channa striata* with an abundance value of 4.2%.

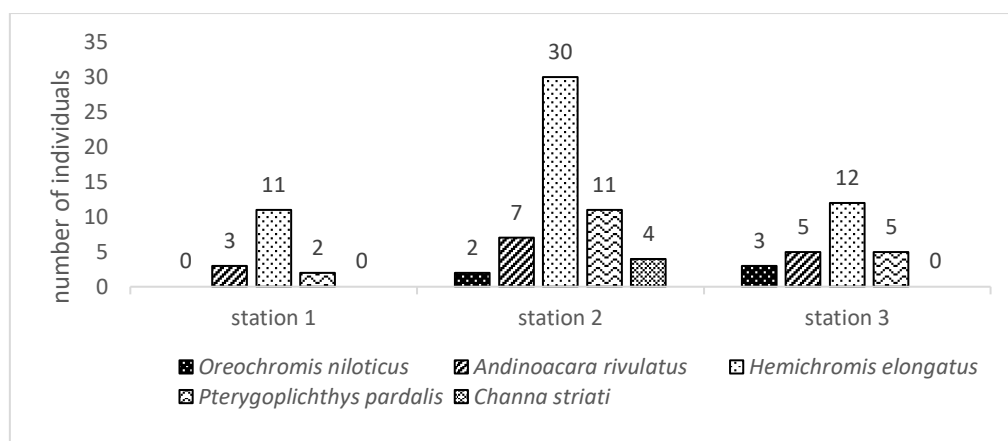


Figure 2. number of individuals per sampling point

Based on Figure 2. Station 2 is the station where the most fish were found with the number of fish found 54 fish and 5 types of fish were found at this station, station 2 is an aquatic plant station where the station has the highest number of chlorophyll-a (11 mg/m²) compared to stations 1 and 3, then COD at station 2 is the COD with the lowest value compared to stations 1 and 3 with a COD value of 21 mg/l. This shows that station 2 has a low organic pollutant content which indicates that physics and chemistry are better than stations 1 and 3. Aquatic plants may have an effect on the growth and reproduction process of fish where fish can store their larvae in aquatic plants, this causes the growth of fish with aquatic plant characteristics to produce high fish abundance. This is in accordance with Iskandar's research, (2019) the highest abundance of fish is caused by waters that have many aquatic plants that are used as shelter for fish larvae. In the waters of Situ Bagendit, many aquatic plants with species of water hyacinth, lotus, kiambang and water spinach are found which are likely to be used as a place of protection for fish larvae from predators. This is in line with the research of Samuel & Makmur (2012) that plants that live in lakes such as water hyacinth, kiambang, and water spinach can function as a place of protection for fish seeds. In contrast to station 1 which is the station with the least fish and fish species, the fish obtained at station 2 amounted to 16 individuals with the fewest fish species found only 3 species. Station 1 is a recreation area where station 1 is affected by revitalization and station 1 is a recreation area so there are many tourist activities that can potentially disrupt physics and chemistry and the existence of fish, the station is a station with a lower chlorophyll-a value than station 2 (6.8 mg/m²) and the highest COD value compared to stations 2 and 3 with a COD value of 31 mg/l, the high COD indicates the amount of oxygen needed to decompose organic matter and chemical compounds in the water to be large so that it is possible that pollution at station 1 is higher and has the potential to cause negative impacts on the environment and station 1 is a station close to the outlet. This may affect the catch obtained. At station 3, 25 fish species were found with 4 types of fish. At station 3 is an inlet where station 3 is a station with more fish catches than station 1. This is likely because the COD factor is lower than point 1 even though chlorophyll-a at point 3 is smaller than station 1 but individual fish at station 3 are more than station 3, this is likely a transfer of fish species seen from the COD factor where at station 3 the COD value is lower than station 1. Based on Table 4.5 The highest abundance value of fish in Situ Bagendit is the *Hemichromis elongatus* species with an abundance value of 55.7%, based on this value the *Hemichromis elongatus* species is included in the relatively high abundance. The fish with the lowest abundance value is the

Channa striata species with an abundance value of 4.2% with this value the *Channa striata* species is included in the species with relatively rare abundance. The abundance index describes the comparison of the number of individuals of a species with the total number of individuals of all species in a community. The analysis of fish abundance in Situ Bagendit uses provisions based on Kartamihardja and Hendra (2000). The other four species are included in the relatively rare abundance with abundance values of less than 25%. The *Hemichromis elongatus* species is the only species with a relatively high abundance, this is likely because the reproduction process of the species is very fast from the species found in the waters of Situ Bagendit so that the *Hemichromis elongatus* species has abundant individuals in the waters of Situ Bagendit.

CONCLUSION

Based on the results of the research analysis, there are three physical and chemical factors of water that do not comply with the class II water quality standards used for water recreation and fish farming in accordance with Government Regulation No. 22 of 2021, namely water clarity, COD, and total water nitrogen. Fish diversity is in the moderate category (1.22). The highest fish abundance was found in the *Chiclidae* family with the largest number of individual species, namely *Hemichromis elongatus* (zebra tilapia) with a high relative abundance index (55%), and the *Channa striata* (snakehead) species was the least species with a relative abundance index of 4.2%. The physical and chemical conditions of the waters of Situ Bagendit are still able to support the diversity and stability of the fish community with the discovery of 5 species of fish with a total of 95 species. There is a fish species with indicators of polluted waters, namely the *Pterygoplichthys pardalis*. The physical and chemical conditions of Situ Bagendit's waters still support the diversity and stability of its fish community. Based on biotic and abiotic factors, Situ Bagendit's waters were categorized as eutrophic in December, indicating eutrophication due to organic pollution.

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