

Original Research Article

Mapping The Distribution of Fish Caught In The Jatigede Reservoir

Comment [DM1]: 1. What is the importance of mapping since it is a reservoir?
2. Please compare and contrast with additional references.
3. A more detailed explanation of the introduction and hypothesis is important.

ABSTRACT

This research aims to map the structure of the fish community that lives living in the floodplain of the Jatigede reservoir based on the catch in the Jatigede Reservoir inundation area catch. This research uses the field observation method by method, taking fish samples every 14 days and carried out doing 6 times. The results of the research survey show that the number of fish caught during the research survey was 799 individuals individuals, and the types of fish species identified at 6 stations of Jatigede Reservoir stations consisted of 9 families consisting of 18 species. The type of fish that had species with the highest abundance was pepetek Pepetek fish at station 1. At stations 2, 3, 4, 4, and 5, the fish that had the highest abundance was hampal fish, and at station 6 the fish with the highest abundance was boboso Hampal fish, and at station 6, the fish with the greatest abundance was Boboso fish. The distribution of native fish is more dominant than introduced fish with a comparison of 11 native fish species and 7 introduced fish species. The water quality at each station still meets the requirements of environmental quality standards based on according to Government Regulation (Indonesia) Number No. 22 of 2021 concerning water quality standards on Water Quality Standards and is suitable for fish life

Keywords: Jatigede Reservoir; mapping; abundance; water quality

1. INTRODUCTION

The waters-water of the Jatigede Reservoir at the time it reservoir was inundated in 2015 experienced a undergoing an ecosystem change in the ecosystem, from a river ecosystem with flowing-running waters (lotic) (Lotic) to a reservoir ecosystem with stagnant-standing waters (lentic). There change (Lentic) at the time of its flooding in 2015. The shift from the a lotic ecosystem to a lentic ecosystem can affect changes in the abundance and composition of fish species and have an impact on the fish habitat, behavior, behavior and food habits of fish feeding habits. This is to Jubaedahs consistent with Jubaedah's (2006) statement that changes in the ecosystem from

flowing to inundated flooded are thought likely to cause changes in the composition of species and fish populations-population composition [1].

At the beginning of the inundation-flooding of the original fish species of the Cimanuk River, which increased quantitatively in quantity and spread evenly, namely Lalawak fish and Hampal fish. According to fishermen, catches in 2016 reached 25 kg to 50 kg per day. Meanwhile, in 2017 day, according to fishermen. In 2017, it decreased-has now dropped from 2 kg to 3 kg per day. The decline-decrease in catches was due to the increase in the number of fishermen, the number and types-type of catches, catches and the absence-lack of institutions that regulate-regulating fishing activities in the Jatigede Reservoir-reservoir [2]. If excessive fishing activities continue to be carried out-continues and there is no management of capture fisheries resources, the catch resources are not managed, the fish in the Jatigede Reservoir-reservoir will eventually experience extinction-become extinct.

To-In order to support capture fisheries-trap fishing activities, it is necessary to manage natural fisheries through restocking-stocking, introduction of fish introduction, and conservation. This management is one of the efforts to increase the stock of caught fish to be stocked in the waters of the Jatigede Reservoir. However, management for adding-to add fish stocks cannot be done arbitrarily because haphazardly as the presence of new fish or introduced fish does not directly have a positive-has no direct beneficial impact on Indonesian-Indonesia's aquatic ecosystems. This introduced fish is known to be aggressive and potentially invasive to native Indonesian fish [3].

Based on these conditions, it is necessary to conduct research-on-study the distribution of fish by-through mapping. Mapping-The mapping analysis required a system called the Geographic Information System (GIS). Arcview is one of the GIS tools that can visualize, investigate-examine (explore), answer (query)-(query), and analyze data geographically related to spatial and non-spatial data, and analyze data geographically-nonspatial data. The combination of GIS and studies of-on several ecological aspects of the fish community, such as B. distribution patterns, the composition of fish species-species and structure of fish community structure, community, will be very useful in providing-to provide information on the fish existence and sustainability of fish [4]. In line-Consistent with this statement, this research aims to map the structure of the fish community that lives based on the catch-living in the inundation-area-floodplain of the Jatigede Reservoir-reservoir based on the catch.

2. MATERIAL AND METHODS

2.1 Time and Place

This research was carried-out-conducted from August to October 2021 in Jatigede Reservoir-reservoir with fish sampling intervals every 14 days, 6 samples were

taken, sampling was carried out performed at 6 stations (Figure 1).

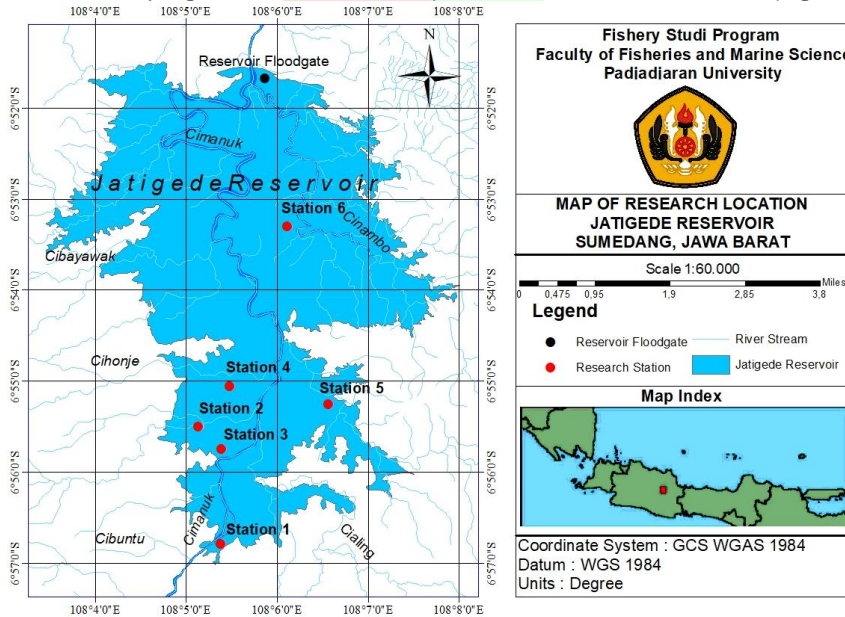


Figure 1. Research Location Map

- Station 1 : The main inlet is sourced from the Cimanuk River, this station is a riverine zone. With coordinates 6°55'48,9"S & 108°5'24,0"E
- Station 2 : The riverine zone that flows from the cialing river. With coordinates 6°55'50,2"S & 108°5'42,3"E
- Station 3 : The location where water comes from two small rivers, namely the Cimuja River and the Cijaway River. This station is *riverine zone*. With coordinates 6°55'59,3"S & 108°5'01,2"E
- Station 4 : The transition zone with water supply comes from the Cihonje River, Cimuja River, and Cacaban River. At station 4 there is a catch fishery activity. With coordinates 6°55'02,9"S & 108°5'28,3"E
- Station 5 : The estuary of the Cacaban River and the beginning enter the flooded zone. At station 5 there are fishing activities using gillnets. With coordinates 6°55'18,0"S & 108°6'45,6"E
- Station 6 : The location of station 6 is a flooded zone. At this station, there is rarely catch fishery activity because of the strong winds. with coordinates 6°54'23,6"S & 108°6'19,9"E

2.2 Research Methods

The research method used in the sampling of fish is a field observation method with a purposive targeted sampling technique. The fish caught were identified descriptively identified to obtain provide a complete description of each species of fish species at each station.

2.3 Data Analysis

Data analysis used the quantitative-descriptive method by providing an overview of the species and abundance of fish. Furthermore, in addition, the data from the analysis is depicted displayed on a map with using the help of ArcMap GIS 10.3 software and Microsoft Excel. Analysis of catch composition, Catch composition analyses, water quality measurements, measurements and physical and chemical measurements such as temperature, light transparency, transmittance, carbon dioxide (CO₂), acidity (pH), (pH) and dissolved oxygen (DO) were carried out in the Jatigede Reservoir. For fish identification and chemical measurements, ammonia (NH₃) was analyzed at the Laboratory of Aquatic Water Resources Management, Faculty of Fisheries and Marine Sciences, Padjadjaran University.

3. RESULTS AND DISCUSSION

The composition of fish caught in the Jatigede Reservoir was 799 individuals, covering 18 species from 9 families. The following is the composition of caught fish during the research (Table 1).

Family	Local Name	Common Name	Scientific Name	Based On Origin		Based On Biodiversity			Station						
				Native	Introduced	Invasive	Protected	Prohibited	1	2	3	4	5	6	
Cyprinidae	Gengehek	Beardless barb	<i>Mystacoleucus marginatus</i> (Valenciennes, 1842)	√			√L C		1						
	Paraya	Silver rasbora	<i>Rasbora argyrotaenia</i> (Hubbs & Brittan, 1954)	√			√L C		1						
	Goldfish	Common carp	<i>Cyprinus carpio</i> (Linnaeus, 1758)		√	√V U			5		3	4	8		
	Hampal	Hampala barb	<i>Hampala macrolepidota</i> (Kuhl & Van Hasselt, 1823)	√			√L C		4 3	3 0	1 7	3 0	6 5		
	Lalawak	Barbodes / Java barb	<i>Barbodes baleroides</i> (Valenciennes, 1842)	√			√L C		2 7	1 7	1 2	6	2 1		
Cichlidae	Nila	Nile tilapia	<i>Oreochromis niloticus</i> (Linnaeus, 1758)		√	√L C			3	1	5	3			
	Mujair	Mozambique Tilapia	<i>Oreochromis mossambicus</i> (Peters, 1852)		√	√V U			5			4			
	Marinir	Jaguar guapote	<i>Parachromis managuensis</i> (Günther, 1867)		√	√L C			1			3			
	Oscar	Midas cichlid	<i>Amphilophus citrinellus</i>		√	√L C			5		1	4	4		

		(Gunther, 1864)												
Bagridae	Senngaringan	<i>Bagrus singaringan</i>	<i>Mystus Singaringan</i> (Bleeker, 1846)	√			√LC		1					1
	Keting	<i>Twospot catfish</i>	<i>Mystus nigriceps</i> (Valenciennes, 1840)	√			√LC		5					
	Tagih	<i>Asian redtail catfish</i>	<i>Hemibagrus nemurus</i> (Valenciennes, 1840)	√			√LC		3			2	2	
Eleotridae	Boboso	<i>Marble goby</i>	<i>Oxyeleotris marmorata</i> (Bleeker, 1852)	√			√LC		13			1		12
Gobiidae	Bungo	<i>Tank goby</i>	<i>Glossogobius Giuris</i> (Hamilton, 1822)	√			√LC		136					1
Ambassidae	Pepetek	<i>Ponyfishes</i>	<i>Parambassis siamensis</i> (Fowler, 1937)	√			√LC		233			1		
Loricariidae	Sapu-Sapu	<i>Common pleco</i>	<i>Liposarcus pardalis</i> (Castelnau, 1855)		√			√LC	32	4	4	6	2	
Pangasiidae	Patin	<i>Silver catfish</i>	<i>Pangasius hypophthalmus</i> (Valenciennes, 1840)		√		√LC		1		3	3	3	
Hemirhamphidae	Julung-Julung	<i>Wrestling half beak</i>	<i>Dermogenys maxillus</i> (Kuhl & Van Hasselt, 1823)	√			√DD		1					
Presentase (%)				61%	39%	33%	61%	6%						

Table 1. Types of Fish Caught in Jatigede Reservoir

Source : IUCN Redlist and Fishbase.org
Description : LC= Least Concern, VU= Vulnerable, DD= Data Deficient

The results showed that the distribution of native fish in the Jatigede Reservoir was more dominant than the that of introduced fish in the Jatigede Reservoir with Reservoir, identifying a ratio of 11 native fish species and 7 introduced fish species identified. At all stations, there are fish species. 18 species of fish caught, are caught at all stations, the fish that were included in the red list Red List status were boboso, senggaringan, genggohok, paray, pepetek, capu-sapu, nila, hampal, lalawak, patin, koting, marinir, Boboso, Senggaringan, Genggohok, Paray, Pepetek, Sapu-Sapu, Nila, Hampal, Lalawak, Patin, Keting, Marinir, oskar, tagih, tagih and bungo with the category of Least Concern (LC). (LC) category. Meanwhile, goldfish and mujair fish are included in the Vulnerable (VU) category and Julung-Julung Julung Julung fish are included in the Data Deficient (DD) category.

The LC category is a category given to for species that have been evaluated assessed but do not fall into any category. Meanwhile, While the VU category is vulnerable-Vulnerable or near endangered, Near Vulnerable, this category is given to species that are facing the risk of threatened with future extinction in the wild in the future, wild. And the DD category is a taxon that is declared uninformed when the available information is insufficient to estimate its risk of extinction risk based on the distribution and status of the population [5].

3.1 Fish Abundance

The abundance of fish at each station in the waters of the Jatigede Reservoir during the research can be seen in Figure 2.

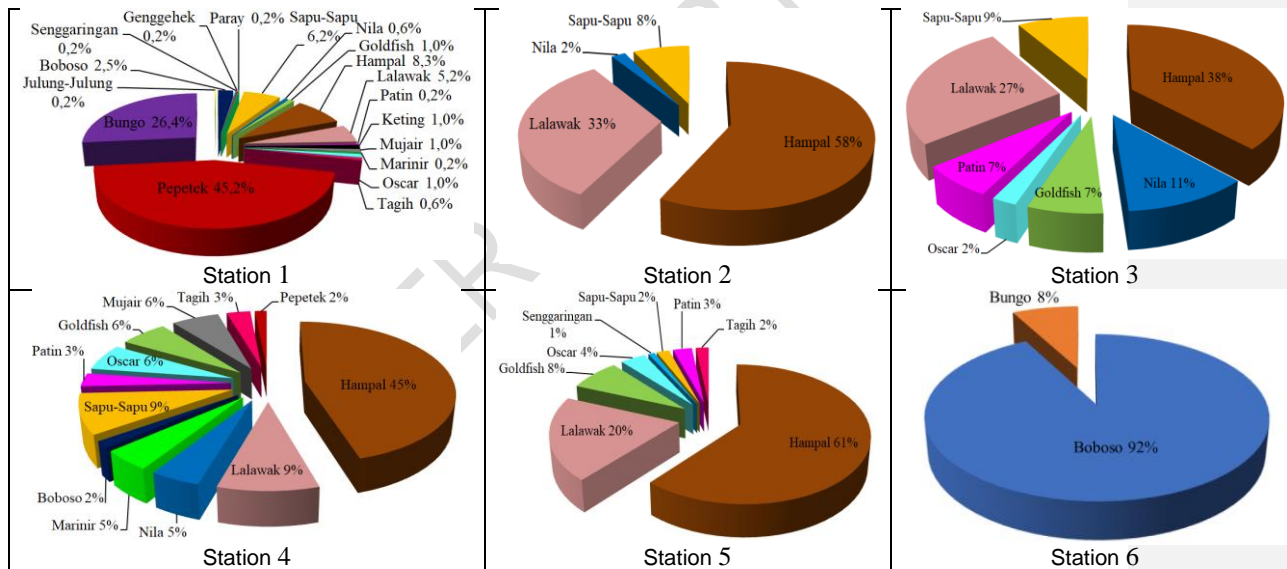


Figure 2. Graph of Fish Abundance Caught at Stations 1,2,3,4,5, and 6

The fish that had with the highest abundance frequency at station Station 1 was pepetek-Pepetek fish, stations Stations 2, 3, 4 and 5 were hampal-Hampal fish, and at station Station 6 boboso-Boboso fish. Fish species that have a high abundance value are due to rely on their ability to adapt to the surrounding environment and utilize use the potential of existing resources to carry

out-meet their necessities of life. living needs. According to Gonawi (2009) Individuals (2009), individuals who are in groups or schooling schools and have large numbers can affect the high abundance because frequency, since they are usually found in very abundant quantities in amounts with each identification [6].

3.2 Mapping The Distribution of Fish Species

The mapping of the distribution of fish species in the Jatigede Reservoir based on fish abundance can be seen in (Figure 3).

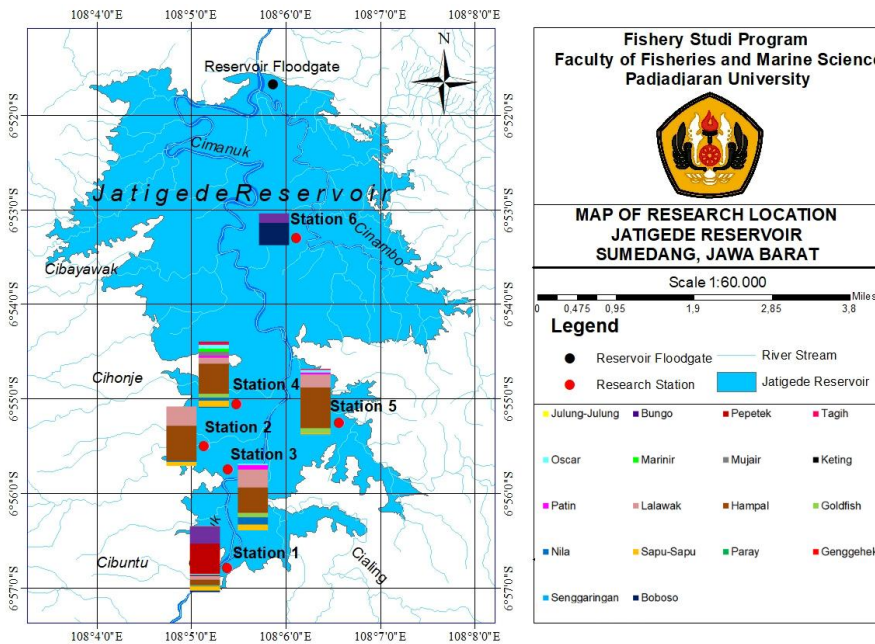


Figure 3. Map of Fish Species Distribution of Jatigede Reservoir

The distribution of fish species in Jatigede Reservoir can be distinguished based on origin, namely native fish (indigenous) and introduced fish, and differentiated based on protected fish species based on data from the IUCN (International Union for Conservation of Nature and Natural Resources) Redlist. The results showed that the distribution of native fish in the Jatigede Reservoir was more dominant than the introduced fish in the Jatigede Reservoir with a ratio of 11 native fish species and 7 introduced fish species.

At station-Station 1, the fish identified were boboso, senggaringan, genggehek, paray, pepetek, sapu-sapu, nila, goldfish, hampal, lalawak, patin, koting, mujair, marinir, oscar, tagih, pepetek, bungo, Boboso, Senggaringan, Genggehek, Paray, Pepetek, Sapu-Sapu, Nila, Goldfish, Hampal, Lalawak, Patin, Keting, Mujair, Marinir, Oscar, Tagih, Pepek, Bungo, and Julung-Julung. There are 11 native fish species and 7 introduced fish. At station-Station 2, the fish-identified fish were hampal, lalawak, nila, Hampal, Lalawak, Nila and sapu-sapu, Sapu-Sapu. There are 2 native fish species and 2 introduced fish. At station-Station 3, the fish-identified fish were hampal, nila,

goldfish, oscar, patin, lalawak, Hampal, Nila, Goldfish, Oscar, Godmother, Lalawak, and sapu-sapu, Sapu-Sapu. There are 2 native fish species and 5 introduced fish. At station Station 4, the fish identified were hampal, lalawak, nila, marinir, boboso, sapu-sapu, patin, oscar, goldfish, mujair, tagih, Hampal, Lalawak, Nila, Marinir, Boboso, Sapu-Sapu, Godmother, Oscar, Goldfish, Mujair, Tagih, and pepetek. Pepetek. There are 5 native fish species and 7 introduced fish. At station Station 5, the fish identified were hampal, lalawak, goldfish, oscar, senggaringan, sapu-sapu, patin, Hampal, Lalawak, Goldfish, Oscar, Senggaringan, Sapu-Sapu, Patin, and tagih. Tagih. There are 4 native fish species and 4 introduced fish species. At station 6 Station 6, the fish identified fish were boboso Boboso and bunge Bunge. There are 2 species of native fish fish species.

3.3 Water Quality of Jatigede Reservoir

The results of observations of physical and chemical parameters can be seen in (Table 2).

Table 2. Water Quality Parameters

Parameters	Unit	Station 1	Station 2	Station 3	Station 4	Station 5	Station 6	Class II*	Class III*
Physical									
Temperature	°C	28,0	28,3	28,4	28,2	28,4	28,6	Dev 3	Dev 3
Light transparency	cm	45	47	43	65	69	81	-	-
Chemical									
pH	-	6,0	6,6	7,1	6,8	6,1	6,3	6-9	6-9
CO ₂	mgL ⁻¹	33,3	23,3	23,3	20,0	26,7	20,0	-	-
DO	mgL ⁻¹	5,50	4,63	5,13	5,43	4,53	5,53	4	3
NH ₃	mgL ⁻¹	0,0025	0,0023	0,0030	0,0025	0,0018	0,0028	0,2	0,5

The results of the temperature measurements in the Jatigede Reservoir ranged from 28,0°C to 28,6°C. reservoir were between 28.0 °C and 28.6 °C. The temperature range showed that the Jatigede reservoir's water conditions of the Jatigede Reservoir were still good in supporting to support fish life. Aquatic organisms such as fish and shrimp are able to can live well in the temperature range between 20°C to 30°C 20 °C and 30 °C [7]. The range of temperature values is is in accordance with Government Regulation Number Decree No. 22 of 2021, the temperature value in class II and class III waters is a deviation of 3. So that Thus, the temperature value in the Jatigede Reservoir reservoir has met the water quality standards. The results of measuring the measurement of light transparency transmittance in the Jatigede Reservoir reservoir ranged from 43 cm to 81 cm. The value level of transparency is influenced affected by suspended materials, matter in the form of fine particles and colloids which that can cause turbidity and result in a lack of light penetration into entering the waters water. High turbidity can cause disruption of disturbances in the osmoregulation system such as breathing respiration and disrupt the life of fish in when foraging because of impaired vision due to visual impairment and can cause stress and even death in of fish

The results of the pH measurements in the Jatigede Reservoir ranged from 6.0 to 7.1. The pH value obtained in the water of the Jatigede Reservoir is still good enough to support the life of aquatic organisms such as fish. According to the Government Regulation- Decree No. 22 of 2021, the pH value in class II and class III waters is 6 to 9. Thus, the pH value in the Jatigede Reservoir has met the quality standard for fisheries. The results of the CO₂ measurements in the Jatigede Reservoir at each station ranged from 20.0 to 33.3 mgL⁻¹. In general, the carbon dioxide levels in the water range from 10 to 30 mgL⁻¹, this range is very good for aquatic plants and not harmful to fish. However, if when it is more than that, it will become very dangerous because it inhibits the binding of oxygen (O₂), and if when the CO₂ level has exceeded 40 mgL⁻¹, the fish will die [8]. The range of CO₂ values in the water of the Jatigede Reservoir is therefore still quite good for aquatic organisms such as fish.

The results of measuring the measurement of dissolved oxygen in the Jatigede Reservoir at each station ranged from 4.53 to 5.53 mgL⁻¹. When the concentration of dissolved oxygen concentration decreases, it will affect aquatic organisms, especially organisms such as fish. According to Government Regulation- Decree No. 22 of 2021, the DO value in class II waters is 4 mgL⁻¹ and class III is 3 mgL⁻¹. So the DO value in the Jatigede Reservoir at each station still meets the fish life quality standards for fish life. The results of the analysis showed that the ammonia value in the water of the Jatigede Reservoir ranged from 0.0018 to 0.0030 mgL⁻¹. This value is determined by the water quality standards set according to the Government Regulation no. 22 Decree No. In 2021, the Year 2021 the value of ammonia in class II waters is 0.2 mgL⁻¹ and class III is 0.5 mgL⁻¹. So Thus, the ammonia levels in the water of the Jatigede Reservoir at each station still meet the quality standards for fish life. According to Makmur et al. (2012) Ammonia in the aquatic environment generally comes originates from the decomposition of residual organic matter residues and the results of fish metabolism [9]. The higher the organic matter in the water, also water, the higher the concentration of ammonia in the water.

4. CONCLUSION

Fish species identified at 6 stations in Jatigede Reservoir consisted of 9 families, namely Cyprinidae, Cichlidae, Bagridae, Eleotridae, Ambassidae, Loricariidae, Pangasiidae, Gobiidae, and hemiramphidae which consisted of 18 species. The distribution of native fish in the Jatigede Reservoir is more dominant than the introduced fish in the Jatigede Reservoir with a ratio of 11 native fish species and 7 introduced fish species. The water quality at each station still meets the requirements of environmental quality standards based on Government Regulation Number 22 of 2021 concerning water quality standards and is suitable for fish life.

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UNDER PEER REVIEW

