Asian Journal of Aquatic Sciences, August 2024. Vol 7, Issue (2) 267-273
e-issn: 2716-4608
p-issn: 2655-366X

INVENTORY OF FISH SPECIES IN OXBOW TELUK BENDERAS, RANTAU BARU VILLAGE, PANGKALAN KERINCI DISTRICT PELALAWAN REGENCY RIAU PROVINCE

Khoirunisyah[1*], Ridwan Manda Putra[1], Efawani[1]
[1]Department of Aquatic Resources Management, Faculty of Fisheries and Marine, Universitas Riau, Pekanbaru, 28293 Indonesia
*khoirunisyah5672@student.unri.ac.id

ABSTRACT

Teluk Benderas Lake is an oxbow lake formed because the Kampar River's flow was cut off. This lake is a habitat for various types of fish. However, information on fish species in the area is still limited. To find out the kinds of fish in Teluk Benderas Lake, a study was conducted in March-May 2023 using the survey method. Fish sampling was performed once a week for two months. The fish were caught using a trawl measuring 150 m long and 4,5 m wide with 1-inch mesh size. Water quality parameters measured were temperature, brightness, depth, pH, DO, and CO_2. The results showed that 1.398 fish were caught, consisting of 4 orders, 13 families, 25 genera, and 32 species. Based on the results of water quality measurements, it was concluded that Teluk Benderas Lake can still support fish life in the waters.

Keywords: Oxbow Lake, Identification, Cyprinidae, Water Quality

1. INTRODUCTION

Teluk Benderas Lake is located in Rantau Baru Village, Pangkalan Kerinci District, Pelalawan Regency, Riau Province. Teluk Benderas Lake is an oxbow lake formed due to the interruption of the Kampar River flow. This lake has an area of 5.74 ha with a surface not covered by aquatic plants 5,66 ha and aquatic plant cover (water hyacinth, *Eichhornia crassipes*) 0,08 ha and a depth of ±4 m.

Teluk Benderas Lake is a fishing area for the people of Rantau Baru Village, most of whom work as fishermen. The people of Rantau Baru Village are very concerned about their environment, as evidenced by the regulation of the auction of creeks and lakes in the Rantau Baru Village Area, Pangkalan Kerinci Subdistrict, Pelalawan Regency. The auction in this lake is held once a year. The group that wins the highest auction value has the right to take fish in Teluk Benderas Lake for a year. If the time limit has passed, the auction will be held again.

Only the winning group has the right to fish in one year of the auction period. The winning fishermen fish continuously from normal water conditions to low tide, while the fishermen cannot fish during floods. Fishing continues if the flood conditions do not exceed the size of the fishermen's chest height, fishing continues. This can certainly affect the diversity of fish resources in Teluk Benderas Lake. If the fish in Teluk Benderas Lake continue to be harvested, it is possible that the fish in the lake can decrease in number and even run out. Overfishing also decreases the abundance of fish, and the number of fishermen caught also decreases.

The fishing gear the winning fishermen use is a trawl (circle net) measuring 150 m long and 4,5 m wide with a mesh size of 1 inch. The use of fishing gear of this size causes small fish to be caught, which makes fish in Teluk Benderas Lake unable to develop. The use of trawl gear can also affect the hue of the water bottom because the operation of the fishing gear is pulled along the bottom of the water.

Received: 25 June 2024
Accepted: 20 July 2024

Meanwhile, fish life depends on the condition of their environmental habitat.

The above descriptions are factors that affect the presence of fish in Teluk Benderas Lake. Therefore, it is necessary to inventory the types of fish in this oxbow so that the oxbow lake remains in good condition and essential aspects of oxbow management can run to support fish diversity and improve the welfare (income) of fishing communities in Rantau Baru Village.

This study aims to determine the types of fish in the Oxbow Teluk Benderas Rantau Baru Village, Pangkalan Kerinci District, Pelalawan Regency, Riau Province, to anticipate the loss of information about the richness of fish species in these waters. The benefit of this research is to provide information about the types of fish that exist in the Benderas Bay Oxbow, Rantau Baru Village, Pangkalan Kerinci District, Pelalawan Regency, Riau Province, so that it can be used as a basis for regulating the utilization of waters, especially in the Benderas Bay Oxbow.

2. RESEARCH METHOD

Method

This research will use the survey method, with the Benderas Bay Oxbow in Rantau Baru Village as a survey location and the fish caught by fishermen in the Benderas Bay Oxbow as the object of research.

The data collected are primary data and secondary data. Primary data is obtained from direct survey activities for sampling, observing environmental conditions, and observation data from samples analyzed in the laboratory. Secondary data is from the results of journals, theses, discussions from related agencies, or information obtained from the internet.

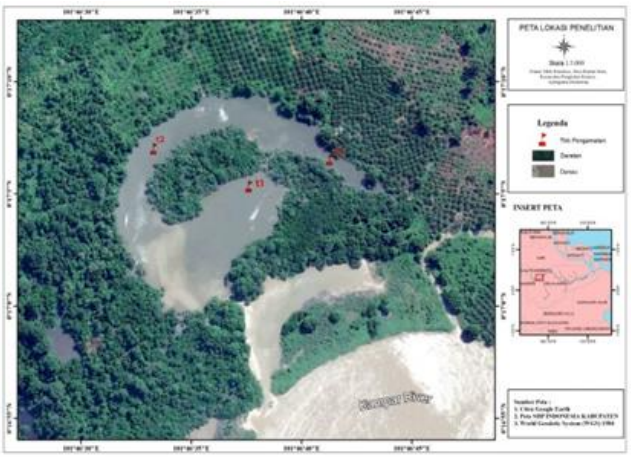

Figure 1. Research sampling points

Procedures

Determination of Sampling Locations

Sampling points were divided into three with different characteristics and considered representative of the research water location (Figure 1), with each sampling point as follows: Sampling Point 1: Point 1 is located at the inlet of the Kampar River into Teluk Benderas Lake. Sampling Point 2: Point 2 is the curve of the lake or in the center of Teluk Benderas Lake. Sampling Point 3: Point 3 is at the end of Teluk Benderas Lake.

Fish Sampling

Fish sampling was conducted once a week or until no new fish species were found for two months. Fish samples were obtained from the catch of fishing management groups (auction winners) in Teluk Benderas Lake during the study. Fish samples were caught directly using fishing gear commonly used by local fishermen. The fishing gear used is a circle net with a length of 150 m, a width of 5 m, and a mesh size of 1 inch. The fish catch will be collected and put into a cool box to avoid further damage to the morphology of the fish and to keep the fish

fresh before being identified at the Aquatic Biology Laboratory.

Fish Morphometric and Meristic Measurements

Fish caught in Teluk Benderas Lake were then identified at the Aquatic Biology Laboratory. Fish samples were separated according to their species and varying sizes. Each fish sample was labeled to facilitate the process of morphometric measurements and meristic calculations of fish samples. Morphometric and meristic measurements on the fish body followed instructions[1,2].

Water Quality Measurement

Measurement of physical and chemical water quality parameters is done directly in situ. Water quality parameters are temperature, depth, brightness, pH, DO, and CO_2.

Data Analysis

The data analysis used in this study is descriptive. This descriptive analysis determines the type of fish by knowing the order, family, genus, and species of each fish found, which is then grouped in graphs and tables. Fish identification and classification guidelines are based on the book by Saanin[1], Kotellat et al.[2] and other supporting identification books.

3. RESULT AND DISCUSSION

Catch Result

From the research results in Benderas Bay Lake, the catch amounted to 1,398 fish consisting of 4 orders, 13 families, 25 genera, and 32 species. For analysis and identification, three fish per species were taken. Fish species caught in Teluk Benderas Lake during the study can be seen in Table 1.

The most common fish species caught in Banderas Bay Lake were the Cyprinidae family, 12 species (38%); the Channidae family, four species (13%); Clariidae and Siluridae families, three species (10%); Bagridae family two species (6%), and Anabantidae, Belontiidae, Helostomitidae, Notopteridae, Osphronemidae, Pristolepididae, Pangasidae and Eleotridae families one species each (3%). For more details, please see Figure 2.

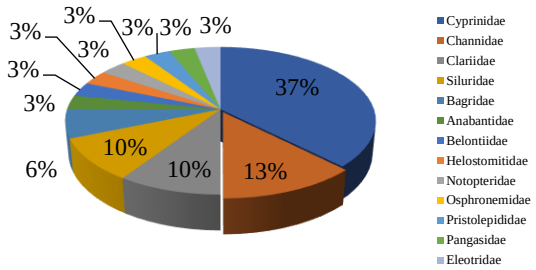

Figure 2. Percentage of number of species

The most common fish species found in Benderas Bay Lake are from the Cyprinidae family (Figure 2). Fish from the Cyprinidae family are most commonly found in freshwater, so fish populations from this family are widely found in Teluk Benderas Lake. The results of data from several studies that have been conducted in Riau Waters also show that several species of fish from the Cyprinidae family are found more than other fish families in the research of Jelita et al.[3] stated that among the 19 species of fish caught in Lake Daek, Teluk Kindae Village, Tambang Subdistrict, Kampar Regency, eight species of which belonged to the Cyprinidae family.

Furthermore, research by Efizon et al.[4] in Oxbow Pinang Dalam, Buluh Cina Village, Kampar Regency, showed that of the 28 species of fish caught, 12 species belonged to the Cyprinidae family. Then, the research of Syahputra et al.[5] in the Siak River, Tebing Okura Village, East Rumbai District, Pekanbaru City, Riau Province stated that of the 13 species of fish caught, six species were included in the Cyprinidae family. Research by 6 Fithra & Siregar[6] on the diversity of the Kampar River fish inventory from the Kampar Kanan River found 58 species of fish included in 9 orders, 23 families, and 40 genera; among the 23 families, 25 species represented the Cyprinidae family. According to Beamis et al.[7], the large number of fish species of the Cyprinidae family indicates that this type of

fish has a swift breeding process, so its presence is always found in fresh waters in almost all parts of the world. The catch during the study can be seen in Figure 3.

Figure 3 shows that motan fish (*T.vaillanti*) from the Cyprinidae family had the highest number of species (126 fish). The Cyprinidae family was found in this study because fish species from the Cyprinidae family have reasonable adjustment and ability to change the environment[2].

Environmental Conditions of the Benderas Bay Oxbow

The results of the water quality measurements of Teluk Benderas Lake during the study can be seen in Table 2.

Table 1. Fish species caught in Teluk Benderas Lake

No	Ordo	Family	Genus	Species	Local Name
1	Cypriniformes	Cyprinidae	Ambkyrhynhichthys	*A. truncatus*	Tabingalan
2			Barbichthys	*B. laevis*	Pitulu
3			Barbodes	*B. schwanefeldi*	Kapiek
4			Cyclocheilichthys	*C. apogon*	Puyau
5			Hampala	*H. macrolepidota*	Barau
6			Osteochillus	*O. hasselti*	Paweh
7			Oxygaster	*O. amomarula*	Sepimping
8			Puntius	*P. bulu*	Subahan
9			Rasbora	*R. argyrotaenia*	Pantau
10			Thynnichthys	*T. Polylepis*	Motan
11				*T. thynnoides*	Motan
12				*T. vaillanti*	Motan
13	Perciformes	Anabantidae	Anabas	*A. testudineus*	Betok
14		Belontiidae	Belontia	*B. hasselti*	Selinca
15		Channidae	Channa	*C. lucius*	Bujuk
16				*C. striata*	Gabus
17				*C. micropeltes*	Toman
18				*C. marulioides*	Jolai
19		Helostomitidae	Helostoma	*H. teminckii*	Tuakang
20		Notopteridae	Notopterus	*N. borneensis*	Belida
21		Osphronemidae	Osphronemus	*O. gouramy*	Gurami
22		Pristolepididae	Pristoplepis	*P. grooti*	Katung
23	Siluriformes	Bagridae	Mystus	*M. nemurus*	Baung
24				*M. nigriceps*	Ingir-ingir
25		Clariidae	Clarias	*C. batrachus*	Lele lokal
26			Parambassis	*P. macrolepis*	Sepongkah
27				*P. wolffii*	Sepongkah
28		Pangasidae	Pangasius	*P. polyuranodon*	Juaro
29		Siluridae	Kryptopterus	*K. apogon*	Selais
30			Ompok	*O. hypopthalmus*	Selais danau
31			Wallago	*W. leerii*	Tapah
32	Symbranchiformes	Eleotridae	Oxyeleotris	*O. marmorata*	Betutu

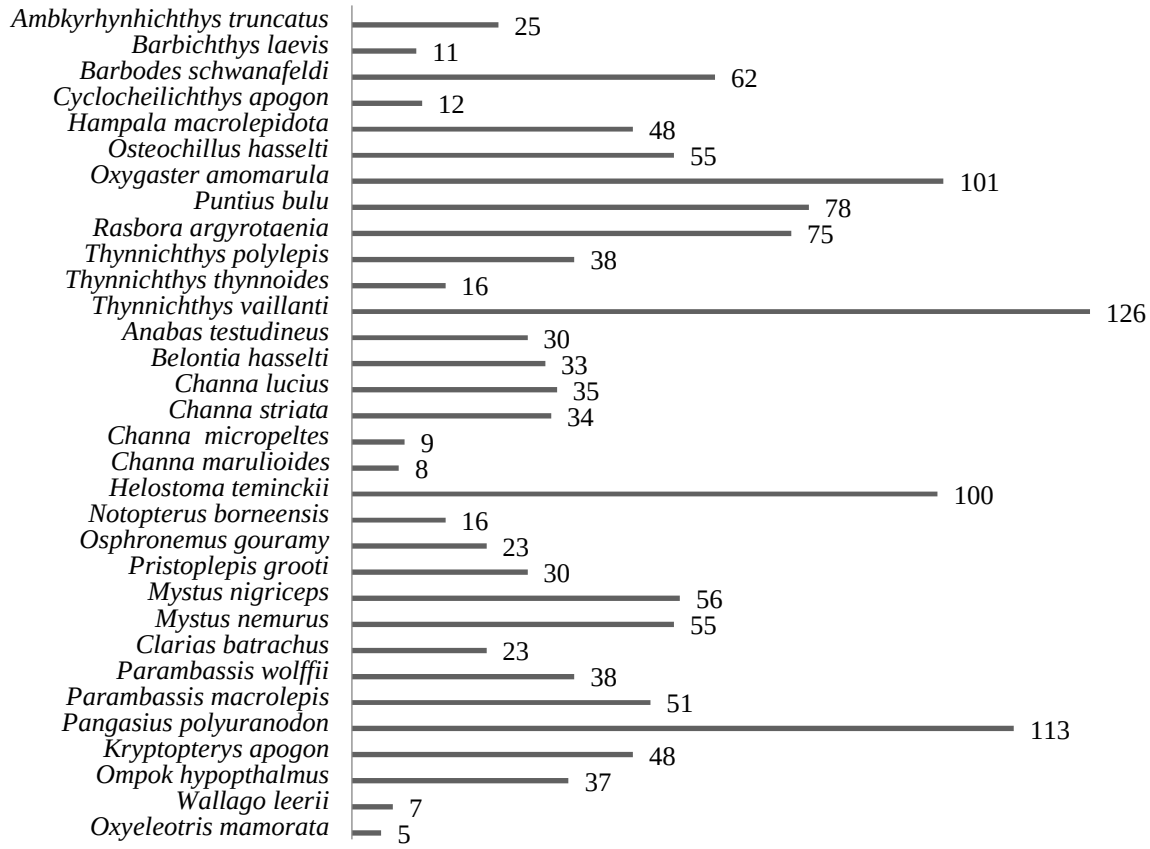

Figure 3. Number of Individuals per species caught in Teluk Benderas Lake

Table 2. Measurement results of physicochemical aspects in Benderas Bay Lake

No.	Parameters	Unit	March			April		
			SP 1	SP 2	SP 3	SP 1	SP 2	SP 3
I.	Physics							
	Temperature	^{0}C	30	32	32	30	33	31
	Brightness	cm	60,5	70,2	64,5	62,5	74	63
	Depth	m	2,5	3,2	1,93	2,7	4,3	1,9
II.	Chemistry							
	Degree of acidity (pH)	-	5	5	5	5	5	5
	Dissolved oxygen (DO)	mg/L	3,26	4,08	2,97	3,34	4,18	2,95
	Free carbon dioxide (CO_2)	mg/L	7,64	6,43	9,58	7,57	6,74	9,62

The results of water temperature measurements in Benderas Bay Lake are suitable for fish growth, so the fish in these waters are diverse. Effendi[8] states that the optimal temperature for developing fish and aquatic organisms in the tropics ranges from 25-32^{o}C.

Alaerts & Santika[9] stated that good brightness is not less than 60 cm. Brightness in the waters of Lake Teluk Benderas is more than 60 cm. If the brightness value in this study is compared with the above opinion, the waters of Teluk Benderas Lake are classified as good waters for the life of aquatic organisms.

Based on this depth, Lake Teluk Benderas Lake is a type of shallow water. This follows Purnomo's *in* Sitompul[10,] which states that lakes based on depth are divided into two types: shallow lakes with an average depth of less than 15 m and deep lakes with an average depth of more than 15 m.

Wardoyo *in* Salim[11] states that the pH that can support the life of an aquatic organism is reasonably 5-9. The acidity (pH) value of Benderas Bay Lake waters in this study is 5. Compared with the above opinion, the lake waters can still support the life of aquatic organisms.

During the study, the results of dissolved oxygen measurements in Benderas Bay Lake were 2,95-4,18 mg/L. Fujaya[12] states that 2 mg/L of dissolved oxygen is sufficient to support the life of aquatic organisms normally. It will be better if the value of dissolved oxygen is above 4 mg/L, so it can be concluded that the waters of Benderas Bay Lake are waters whose dissolved oxygen content is still good for the life of organisms in these waters.

The concentration of free carbon dioxide in this study is still suitable for the life of aquatic organisms. This is the opinion of Asmawi[13] that the content of free carbon dioxide in safe waters is not less than 2 mg/L and should not exceed 25 mg/L. This means that Benderas Bay Lake still has limited biological conditions that support aquatic organisms' lives, as seen from the concentration of carbon dioxide.

Management in Benderas Bay Lake

Sustainable fisheries business development is an effort that can be implemented wisely and responsibly, considering aspects of ecological, economic, and social sustainability and the preservation of fisheries resources. For this reason, it is necessary to socialize the regulation and use of sustainable fishing gear.

The fish utilization group in Teluk Benderas Lake uses a trawl (circle net) with a mesh size of 1-2.5 inches, which is pulled along the bottom of the water. This trawl can catch fish of various sizes and species. Due to the use of trawling, the hue of the water bottom changes. In one fishing session, the trawl is operated 4-5 times, from 15:00 to 23:00 WIB, especially when the lake conditions are not flooded.

In addition, this fishing activity takes place throughout the year. As a result of this activity, it is feared that it will significantly impact the decline of the fish population in Teluk Benderas Lake. Therefore, an in-depth study is needed to evaluate the impact of this customary activity (auction system) and maintain it without disturbing the sustainability of fish species in Benderas Bay Lake. During the development of fisheries, it is vital to consider and maintain ecological balance and various other aspects to achieve the goal of sustainable fishing. Management of oxbow lakes should be carried out with a comprehensive approach and collaborated with three main aspects: ecosystem management, fishing management, and utilizing local knowledge. This approach aims to address complex issues, both in ecological and social aspects.

4. CONCLUSION

The fish were caught using a trawl measuring 150 m long and 4,5 m wide with 1-inch mesh size. Water quality parameters measured were temperature, brightness, depth, pH, DO, and CO_2. The results showed that 1.398 fish were caught, consisting of 4 orders, 13 families, 25 genera, and 32 species. Based on the results of water quality measurements, it was concluded that Teluk Benderas Lake can still support fish life in the waters.

REFERENCES

1. Saanin, H. *Taxonomy and Key to Fish Identification*. Volume 1 and 2. Bina Cipta. Jakarta, 1984.
2. Kottelat, M.A., Whitten, A.J., Kartikasari, S.N., Wiroatmodjo, S. *Freshwater Fishes of Western Indonesia and Sulawesi*. Hong Kong. Periplus Edition, 1993.
3. Jelita, J., Efizon, D., Efawani, E. Fish Biodiversity in Daek Teluk Kenidae Village, Tambang District, Kampar Regency Riau Province. *International Journal of Research Publication and Reviews*, 2023; 4(1): 1065-1070.

4. Efizon, D., Putra, R.M., Kurnia, F., Yani, A.H., Fauzi, M. *Diversity of Fish Species in Oxbow Pinang Dalam Buluh Cina Village, Kampar Regency, Riau.* Proceedings of the International Seminar on Ecologists, Human Habitat and Environmental Change, 2015; 8(4): 23-24.
5. Syahputra, M.I., Fauzi, M., Sumarsih, E. Diversity of Fish on Siak River Tebing Tinggi Okura Village Rumbai Timur District Pekanbaru Riau Province. *Berkala Perikanan Terubuk*, 2022; 50(3): 1658-1664.
6. Fithra, R.Y., Siregar, Y.I. Kampar River Fish Diversity Inventory from Kampar Kanan River. *Journal of Environmental Science*, 2010; 4(2): 139-147.
7. Beamis, F.W.H., Saadrit, P., Tongnunui, S. Habitat Characteristics of the Cyprinidae in Small Rivers in Central Thailand. *Journal Environmental Biology of Fishes*, 2006; 76:2-4.
8. Effendi, H. *Water Quality Assessment for Management of Aquatic Resources and Environment*. Kanisius. Yogyakarta, 2003.
9. Alaerts, G.A., Santika, S.S. *Water Research Methods*. Usaha Nasional. Surabaya, 1984.
10. Sitompul, N. *Vertical Profile of Phosphate in Bandar Kayangan Lembah Sari Reservoir, Lembah Sari Village, Rumbai Pesisir Subdistrict, Pekanbaru City*. Faculty of Fisheries and Marine Science, Universitas Riau. Pekanbaru. 44 pp, 2013.
11. Salim, A. *The Quality of Kampar River Waters Around Fish Cages in Ranah Village Viewed from Plankton Saprobic Coefficient.* Faculty of Fisheries and Marine Science, Universitas Riau. Pekanbaru. 78 pp, 2011.
12. Fujaya, Y. 2004. *Fish Physiology: Basic Development of Fisheries Engineering*. Rineka Cipta. Jakarta.
13. Asmawi, S. *Fish Rearing in Cages*. Gramedia. Jakarta, 1983.