Journal of Fish Health
Volume 5, Issue 2, May 2025
https://doi.org/10.29303/jfh.v5i2.6800

Fish Diversity in Lubuk Larangan Indigenous Conservation Area in Nagari Pelangai Kaciak, South Pesisir Regency

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Received:
April 3rd, 2025
Accepted:
May 3rd, 2025

Keywords:
Diversity, Conservation Area, Lubuk Larangan, Uniformity, Dominance

ABSTRACT

Lubuk Larangan is a form of customary conservation area as a form of fish conservation and breeding ground for fish. Diversity in the Lubuk Larangan area can be used as a form of river ecosystem conservation and help identify endangered species and the sustainability of the conservation area. This study aims to determine the level of diversity, uniformity, abundance and dominance of fish in the traditional conservation area of Lubuk Larangan in Nagari Pelangai Kaciak, South Pesisir Regency. This research was conducted in October 2024 using the survey method. The results showed that the fish obtained were 7 species with the highest composition of crisp fish (*Tor tambroides*) 47%. Diversity index (H') with a value of 1.37 medium category. The uniformity index (E) with a value of 0.7 is included in the high category. The dominance index (C) with a value of 0.32 is included in the low category. From the results obtained, it can be concluded that the indigenous conservation area of Lubuk Larangan in Nagari Pelangai Kaciak has fish diversity in the medium category, which means that the waters are in a stable and supportive condition to be used as a conservation area.

INTRODUCTION

Conservation area is an effort used in improving the effective and sustainable management of fisheries resources. One of the purposes of conservation areas is as a breeding ground for economically important fish and fish that are almost extinct. This is in accordance with the opinion of Supriharyono (2007) that conservation areas have a positive impact on environmental sustainability, society and sustainable resources. South Pesisir Regency has many streams that are utilized by the community as customary conservation areas, namely Lubuk Larangan.

Lubuk Larangan is a conservation area with a predetermined area on a river and has boundaries that have been determined by the surrounding community. The formation of Lubuk Larangan is a community effort in river conservation, especially in maintaining fish

populations (Supriatna, 2013). The purpose of the formation of the Lubuk Larangan area in Nagari Pelangai Kaciak is due to the existence of almost extinct fish that are seen breeding in the river so that a joint decision was formed by local youth and administrators to make a river area with predetermined boundaries as a Lubuk Larangan area. In addition, this Lubuk Larangan has an economic purpose where it is also used as a tourist attraction, outside communities are given permission to feed the fish in Lubuk Larangan. In addition to being a tourist attraction, the economic purpose of this prohibition hole is that during the process of opening the area, catches that meet the criteria will be sold and the proceeds of the sale will be used as the village treasury for the needs of the village and the prohibition hole.

Lubuk Larangan conservation area applies restrictions on the fishing process as an effort to sustain the fish population so that it continues to multiply through the process of natural reproduction and growth. After reaching the time agreed upon by the community and the management, the community will conduct fishing or the surrounding community calls it a demolition activity that is carried out under supervision. The fishing gear usually used by the community is in the form of nets and nets. After demolition activities are carried out, the area is again guarded from prohibited fishing so that the remaining fish return to breed and spawn.

The purpose of this research is to determine the level of diversity, uniformity, abundance and dominance at the research location in order to be used as information on the sustainability of how the condition of the waters is whether the traditional conservation area of Lubuk Larangan in Nagari Pelangai Kaciak, Ranah Pesisir District, South Pesisir Regency has abundant species and has good conditions so that it is used as a conservation area.

METHODS

The method used in this research is the survey method. According to Rangkuti (2016), the survey method is conducted through direct observation of a population. The fish sampling process using a cast net was carried out in areas or zones authorized by the area's management. The sampling was conducted with 8 repetitions, meaning the cast net was thrown 8 times by a single fisherman.

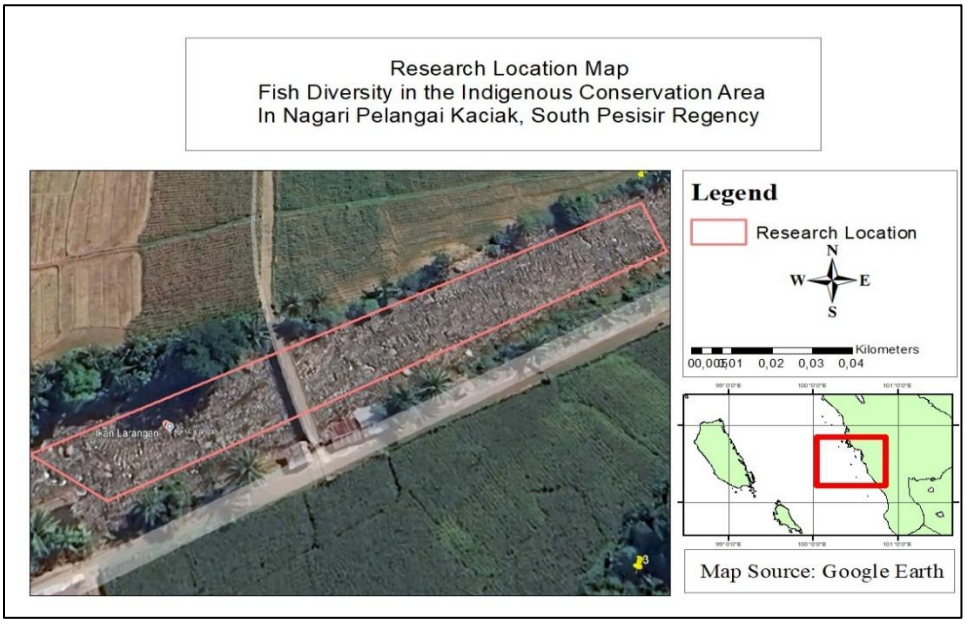

Figure 1. Research Location

Sampling Site

This research will be conducted in the Lubuk Larangan conservation area in Nagari Pelangai Kaciak, Ranah Pesisir District, South Pesisir Regency in October 2024. The indeginous conservation area of Lubuk Larangan in Nagari Pelangai Kaciak has a total area of 15,000 m^2, with a length of 300 meters and a width of 50 meters. The water conditions have a rocky substrate, fast flowing and clear. In the Lubuk Larangan area there are no holes in the river, but the fish that live in this area usually breed and take refuge in the deeper parts of the river and are on the banks of the river and there are trees.

Data Collection

Data collection was carried out from October to November 2025 using stocking nets. The fishing process in the traditional conservation area of Lubuk Larangan in Nagari Pelangai Kaciak, South Pesisir Regency is carried out in several stages, namely the preparation of fishing gear and fishing materials before the start of fishing. The fishing process is carried out in the permitted zone. The fishing process is carried out with 8 times stocking the net. The process of one time stocking the net takes 15 minutes including the process of pulling the net to the edge of the area and removing the catch. Removing the catch from the nets to a special place at the edge of the fishing area to keep the fish alive. Then the nets are stocked again. After the fishing process is complete, the types of fish caught are separated into containers or buckets. The next process is to count the number of fish of each type. Each fish that has been separated will be measured for body length. After the type of fish is measured, the weight of the catch per type of fish will be weighed. After all types of fish are weighed, then the catch is released back into the waters.

Data Analysis

To know the abundance, data were analyzed using the abundance data analysis method as follows (Odum & Barrett, 1971):

$$K=\frac{ni}{A}$$

Description:

K = abundance of the i-th species
Ni = Number of individuals of the i-th species
A = area

Meanwhile, to calculate the relative abundance using the formula in (Odum, 1993):

$$KR=\frac{ni}{N}\times 100\%$$

Description:

KR = Relative Abundance
ni = Number of individuals of the i-th species
N = Number of individuals of all species

The data analysis method used to calculate the fish diversity index is using the Shannon-Wiener index method (Brower et al., 1990) as follows:

$$H'= -\sum\left(\frac{ni}{N}\right) \ln \left(\frac{ni}{N}\right)$$

Description:

H' = Shanon-Wiener Diversity Index
ni = Number of individuals in a species
N = Total number of individuals of the species found

Where the range of diversity values (H') is classified as follows:

H' < I = Low, meaning low diversity with a non-uniform number of individuals and one species dominating.

I < H' < 3 = Moderate, meaning moderate diversity with a uniform number of individuals and no dominating species.
H' > 3 = High, meaning high species diversity, high number of individuals per species.

Data analysis used to determine the uniformity of fish species caught in this Lubuk Larangan conservation area is using the method (Odum, 1993a), namely:

$$E = \frac{H'}{lnS}$$

Description:
E = Uniformity Index
H' = Diversity Index
S = Number of species found
With the range of uniformity values categorized as follows (Krebs, 1972)
E < 0,4 = Low species diversity
0.4 ≤ E ≤ 0.6 = Medium species uniformity
E > 0,6 = High species uniformity

The data analysis used to determine the value of the fish dominance index in this Lubuk Larangan conservation area is using the formula (Tustiyani et al., 2020):

$$C = \Sigma \left(\frac{ni}{N}\right)^2$$

Description:
C = dominance index
ni = index of the number of the i-th species
N = index of total number of species
The criteria for the dominance index according to (Odum, 1971) are as follows:
0 < C ≤ 0.5 = low dominance
0.5 < C ≤ 0.7 = moderate dominance
0.7 < C ≤ 1 = high dominance

RESULTS

From the results of the research, the demolition process was carried out in the customary conservation area of lubuk larangan in Pelangai Kaciak village using a stocking net fishing gear with 8 times stocking nets obtained a catch of 7 species namely red mahseer (*Tor tambroides*), tilapia (*Oreochromis niloticus*), catfish (*Clarias* sp.), common carp (*Cyprinus carpio*), stimpson's goby (*Sicyopterus stimpsoni*), hampala barb (*Hampala macrolepidota*), loach goby (*Rhyacichthys aspro*). The types of catches of stocking nets in the lubuk larangan nagari pelangai kaciak area can be seen in Table 1.

Table 1. Catch Composition of Stocking Nets

No	Catch Results		Total	Composition (%)	Weight (kg)	Weight Composition (%)
	Common Name	Latin Name				
1	Red mahseer	*Tor tambroides*	52	47.27%	10	55%
2	Tilapia	*Oreochromis niloticus*	5	4.55%	2	11%
3	Catfish	*Clarias* sp.	3	2.73%	1.5	8%
4	Common carp	*Cyprinus carpio*	3	2.73%	2	11%

No	Catch Results		Total	Composition (%)	Weight (kg)	Weight Composition (%)
	Common Name	Latin Name				
5	Stimpson's goby	*Sicyopterus stimpsoni*	30	27.27%	1	6%
6	Hampala barb	*Hampala macrolepidota*	16	14.55%	1.5	8%
7	Loach goby	*Rhyacichthys aspro*	1	0.91%	0.1	1%
		Total	110	100%	18.1	100%

Table 2 Index of Diversity, Uniformity, Dominance

Index	Value	Category
Diversity	1.37	Medium
Uniformity	0.7	High
Dominance	0.32	Low

DISCUSSION

Table 1 shows the total catch of 110 fish. The highest catch is garing/semah fish (*Tor tambroides*) with 52 fish. This is because garing fish is one of the fish from West Sumatra which is found in river waters and in the prohibition hole (Endryeni & Amrullah, 2018). Garing fish (*Tor tambroides*) based on data from the IUCN Red List is classified into the Data Deficient (DD) category. Lack of data does not mean that the fish is not endangered. However, based on research by Syofriani *et al*. (2024) garing fish *(Tor tambroides*) is threatened with extinction due to overfishing activities that often occur in West Sumatra.

Meanwhile, the lowest type of fish caught was pinang fish (*Rhyacichthys aspro*) which was only caught by 1 fish. Based on data from the IUCN, *Rhyacichthys aspro* is included in the Data Deficient (DD) category and includes endangered fish. This fish usually lives in rocky waters, swift waters and usually lives attached to rocks (Jaafar, 2019). The fish caught such as crisp fish are a type of fish that likes fast flowing waters, has a rocky water substrate and clear waters.

The fish currently conserved in the Lubuk Larangan area are garing/semah *(Tor tambroides*) and sebarau (*Hampala macrolepidota*) because these fish have a higher economic value. Meanwhile, areca nut fish (*Rhyacichthys aspro*) is not included as a conserved fish because it is considered to have no economic value. However, this fish should be conserved in the Lubuk Larangan area because the fish is included in the endangered fish category. However, because the Lubuk larangan area emphasizes the economic function so that the fish that is the main focus for conservation is only garing/semah fish (*Tor tambroides*). Meanwhile, pinang fish (*Rhyacichthys aspro*) is not used as a fish that needs to be conserved.

Diversity

The diversity index is a value that can be used as a determinant to show how the conditions of diversity and life in an area or ecosystem. If there are many species in a community then it can be said that the diversity index in the community is high or large. Based on table 2. It can be seen that the diversity index in the Lubuk Larangan area in Pelangai Kaciak village is in the medium category with a diversity index value of 1.37. This is in accordance with the category set by Shannon-Winner where the diversity index 1 < H'<3 is classified into the medium category.

The results obtained show that in the Lubuk Larangan area, the species found are quite varied. The moderate category indicates that fish species in the area are still found and there are endangered fish also caught but it is possible that under different conditions it can experience a decline. The moderate diversity index obtained means that the species is in a stable condition in its habitat (Wijayanti *et al*., 2018). Similar to research conducted by Erika *et al*. (2018) in the Linggang River Waters, Belitung Regency which obtained the results of diversity values ranging from 1.933-2.147 which are include in the medium category.

The diversity index with a medium category indicates that the condition of individuals between species is quite evenly distributed, seen from the number of individuals caught showing several species that dominate. However, this is not significant where the dominance index results have a value of 0.32 classified as a low category which means that the community structure in these waters is in a stable condition (Aprilia *et al*., 2023). It can be said that the water conditions in the area are still good as a breeding ground for fish species.

Uniformity

The uniformity index is a value to determine the balance of an area or population. Based on the results of the study can be seen in table 2. That the uniformity index in the area of the prohibition hole in Nagari Pelangai Kaciak is included in the high category where the uniformity index value is 0.7. The uniformity index value of 0.7 is included in the high category where fish in the area have the same density and the presence of fish is evenly distributed (Balqis *et al*., 2021). This means that the number of individuals per species is almost the same and there are no more individuals than other species. The high uniformity value obtained is the same as the research of Budiman *et al*. (2021) in the Batang Uleh River Waters, Bungo Regency, Jambi Province that the uniformity value in these waters is included in the high category with a value of E = 0.99, E = 0.92 and E = 0.94. The high uniformity value is due to the composition of individuals between fish caught evenly and the fish growth area is relatively harmonious (Arfiati *et al*., 2019). If the uniformity index value is higher, the uniformity between species is also high, which means that it is less likely for other species to dominate (Zamdia *et al*., 2020).

Dominance

The dominance index is a value that can be used to see and determine the mastery of species in a community. The dominance index is a value that shows whether a species is dominant or not in the community. Based on the results of the study can be seen in table 2. That the level of dominance index in the Lubuk Larangan area is 0.32 including the low category. A low dominance value can mean that in the area there is no dominant species. This means that in this Lubuk Larangan area has a balanced abundance. The results obtained show that the dominance index value is always inversely proportional to the diversity index value (Nasir *et al*., 2017). This means that the level of diversity in the area is quite high and each species has almost a balanced number (Alwi *et al*., 2020).

CONCLUSION

The results obtained show the level of diversity in the traditional conservation area of Lubuk Larangan in Nagari Pelangai Kaciak, namely with a value of 1.37 including the medium category and a uniformity index with a value of 0.7 which is included in the high category and a dominance index with a value of 0.32 low category. A moderate diversity index, high uniformity and low dominance, fish identified as almost extinct and there are varied species

can be said that the area is in a stable and supportive condition to be used as a conservation area.

ACKNOWLEDGEMENT

We are very grateful to the management of the Lubuk Larangan area in Nagari Pelangai Kaciak and the fishermen who have helped and provided information and opportunities for us to conduct research on the lubuk larangan area.

REFERENCES

Alwi, D., Muhammad, S. Hi., & Herat, H. (2020). keanekaragaman dan kelimpahan Makrozoobenthos Pada Ekosistem Mangrove Desa Daruba Pantai Kabupaten Pulau Morotai. *Jurnal Enggano*, *5*(1), 64–77. https://doi.org/10.31186/jenggano.5.1.64-77

Aprilia, K., AS, A. P., & Rosmaiti, R. (2023). Studi Keanekaragaman Jenis Ikan di Sungai Mati Alur Cucur Aceh Tamiang. *Jurnal Perikanan Unram*, *13*(1), 72–80. https://doi.org/10.29303/jp.v13i1.433

Arfiati, D., Yuli Herawati, E., Buwono, R., Firdaus, A., Winarno, S., & Puspitasari, A. W. (2019). Struktur Komunitas Makrozoobentos Pada Ekosistem Lamun di Paciran, Kabupaten Lamongan, Jawa Timur. *Journal of Fisheries and Marine Research*, *3*(1), 1–7. http://jfmr.ub.ac.id

Balqis, N., Afdhal El Rahimi, S., & Damora, A. (2021). Keanekaragaman dan kelimpahan fitoplankton di perairan ekosistem mangrove Desa Rantau Panjang, Kecamatan Rantau Selamat, Kabupaten Aceh Timur. *Jurnal Kelautan Dan Perikanan Indonesia*, *1*(1), 35–43.

Brower, J. E., Zar, J. H., & Ende, C. V. (1990). Field and Laboratory. *Methods 3rd Edition WB Sounder. Inggris*.

Budiman, Syafrialdi, & Hertati, R. (2021). Keanekaragaman Jenis Ikan di Perairan Sungai Batang Uleh Kabupaten Bungo Provinsi Jambi. *Journal Pengelolaan Sumberdaya Perairan*, *5*(1).

Endryeni, M., & Amrullah, M. Y. (2018). Identifikasi Keseragaman Ikan Gariang (Genus Tor) di Lubuk Larangan Batang Ulakan Kabupaten Padang Pariaman. *UNES Journal of Scientech Research*, *3*(2), 128–135.

Erika, R., Kurniawan, & Umroh. (2018). Keanekaragaman Ikan di Perairan Sungai Linggang, Kabupaten Belitung Timur the Diversity of Fish in Lenggang River, East Belitung Regency. *Akuatik Jurnal Sumberdaya Perairan*, *12*(2).

Jaafar, Z. (2019). *Rhyacichthys aspro*. IUCN Red List of Threatened Species.https://doi.org/10.2305/IUCN.UK.20192.RLTS.T196434A91603008.en

Nasir, M., Zuhal, M., & Ulfah, M. (2017). Struktur komunitas ikan karang di perairan Pulau Batee Kecamatan Peukan Bada Kabupaten Aceh Besar. *Bioleuser*, *1*(2), 76–85.

Odum, E. P. (1971). Fundamental of ecology WB Sounders. *Company Philadelphia and London*.

Odum, E. P. (1993). Dasar-Dasar Ekologi. Penerjemahan: Samingan, T dan B. Srigandono. *Gajahmada University Press, Yogyakarta. Pribadi, R., R. Hartati, Dan CA Suryono*, *20010*, 102–111.

Odum, E. P., & Barrett, G. W. (1971). *Fundamentals of Ecology Fifth Edition Australia· Canada-Mexico· Singapore· Spain· United Kingdom· United States* (Vol. 3).

Rangkuti, A. N. (2016). *Metode Penelitian Pendidikan* (M. S. Lubis, Ed.; revisi). Citapustaka Media.

Supriatna, J. (2013). Peran Kearifan Lokal dan Ilmu-ilmu Kepribumian dalam Pelestarian Alam. *Research Center of Climate Change, Universitas Indonesia. Jakarta*.

Supriharyono. (2007). *Konservasi ekosistem sumberdaya hayati di wilayah pesisir dan laur tropis*. Pustaka Pelajar.

Syofriani, S., Ulfauza, U., & Nazran, N. (2024). Pelatihan Domestik Ikan Garing (*Tor tambroides*) Pada Kolam Air Mengalir di Nagari Guguak Kuranji Hilir Kecamatan Sungai Limau Kabupaten Padang Pariaman. *Jurnal Pemberdayaan Sosial Dan Teknologi Masyarakat*, *4*(2), 170. https://doi.org/10.54314/jpstm.v4i2.2269

Tustiyani, I., Utami, V. F., & Tauhid, A. (2020). Identification of Diversity and Domination of Insects in Sunflower Plants (*Helianthus annuus* L.) with the Yellow Trap Technique. *Agritop*, *18*(1). http://jurnal.unmuhjember.ac.id/in

Wijayanti, F., Pandu Abrari, M., Fitriana, N., Sains dan Teknologi UIN Syarif Hidayatullah, F., Ir Juanda No, J. H., & Tangerang Selatan, C. (2018). Keanekaragaman Spesies dan Status Konservasi Ikan Pari di Tempat Pelelangan Ikan Muara Angke Jakarta Utara. *Jurnal Biodjati*, *3*(1), 23. https://doi.org/https://doi.org/10.15575/biodjati.v3i1.1613

Zamdial, Herliany, N. E., Nurmansyah, W., & Musqit, A. (2020). Struktur Komunitas Ikan Karang PadaTeknologi Atraktor Multifungsi di Perairan Kahyapu, Enggano, Bengkulu. *Jurnal Teknologi Perikanan Dan Kelautan*, *11*(2), 127–139.